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APPLICATION OF ARTIFICIAL INTELLIGENCE AND ATTAINMENT OF TERTIARY EDUCATION GOALS: TOWARDS EFFECTIVE MANAGEMENT OF TERTIARY EDUCATION IN CROSS RIVER STATE, NIGERIA

BY

Egbeji Emmanuel Edung (PhD)
Department of Educational Management
University of Cross River State

Abstract

The focus of the study was to investigate artificial intelligence in the attainment of tertiary education goals in Cross River State. The ex-post facto research design was adopted during the study. The population of the study comprised academic, non-academic staff and students of tertiary institutions in Cross River State. The population stood at 12543, out of which University of Calabar had 5323, University of Cross River State had 3221, Federal College of Education Obudu, Cross River State had 2107 and College of Education, Akamkpa, Cross River State had 1892 respectively. Taro Yamane statistics was used to determine the sample size which stood at 388 respondents. Proportional and purposive sampling techniques were deployed in the selection of the sample representatives. The instrument for data collection was the questionnaire. The questionnaire was titled Artificial Intelligence and Tertiary Education Goal Attainment Questionnaire. Cronbach Alpha reliability was used to determine the degree of consistency of the instrument. The reliability coefficient obtained ranged from .80-.89 respectively. Three research questions were raised and three research hypotheses were formulated and tested using linear regression analysis. Results show that the use of AI in teaching, administration and research significantly influenced the attainment of tertiary education goals. Based on these findings, it was concluded that tertiary educational institutions in Nigeria could compete with other Nations of the World through making concerted effort in the provision of infrastructures that are favourable to the expansion of Artificial Intelligence practices in schools. It was recommended among other things that respective stakeholders should empower tertiary institutions to fund the installation of AI technology infrastructures so as to enhance teaching and other activities that contribute to the attainment of tertiary education goals.

Keywords: Artificial Intelligence (AI), Tertiary Education Goals, Effective Management, Higher Education, Cross River State, Nigeria

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Introduction

Tertiary education is the third level of education that is aimed at trainingindividuals to acquire the necessary skills that are relevant in the society; building in the attendees of the tertiary institutions a sense of self reliance and a personality that can contribute to the nation's socio-economic and technological advancement. Tertiary education is a level of education obtained after the completion of primary or post basic education. Ogunode & Gregory, (2023) defined tertiary education as an organised institution where learning and training activities take place. The rationale for the establishment of tertiary institutions globally, is to equip individuals with requisite skills so as to contribute to societal advancement. Tertiary institutions are therefore established to implement tertiary education goals and programmes in line with the nation's educational goals. These institutions include Universities, Polytechnics, Monotechnic, Colleges of Education and specialized training institutions. Accordingly, tertiary institutions focus on advanced teaching, research and improvement of the society through community service. Also, through tertiary education, a nations' human capital needs are met.

The actualization of lofty goals and objectives of tertiary education can only be attained through effective deployment of human and material resources. Thus, the utilization of new technological resources such as Artificial Intelligence is one of such strategies needed for effectiveness and efficiency in the management and development of tertiary education in Nigeria. Globally, the developmental focus is being shifted to the use of Information and Communication Technology (ICT) and other emerging technologies for optimum performance. This is because such technological resources offer immense opportunities for efficiency, accuracy, cost-effectiveness and wider accessibility. Artificial intelligence is an off-shoot of ICT which involves the use of computer systems and relevant software applications in carrying out tasks that ordinarily requires man's intelligence. Ogunode and Gregory (2023) highlighted the tasks undertaken by AI in education to include learning, research, problem solving, perception and language understanding. Frankenfield (2023) defined Artificial intelligence (AI) as using software-coded heuristics to simulate human intelligence. Artificial Intelligence is a branch of science producing and studying the machines aimed at the stimulation of human intelligence processes.Artificial intelligence tools are new technologies whose applicability cuts across all sectors of human endeavours and encompasses various technologies and strategies. Alagbe, Awodele & Ayorinde, (2021) stated that AI is the ability of a computer or machine to imitate the abilities of the human mind – learning from examples and experience, recognizing objects, understanding and responding to language, making decisions, solving problems – and combining these and other capabilities to perform the functions that a human being might perform, such as greeting a hotel guest or driving a car. Bhbosale, Pujari & Multani, (2020) stated that AI is the technology which is very helpful for human beings. Thus byutilizing AI technology, the hard work of human can be reduced. AI technologies when effectively deployed have the capacity to assist in analysing large amount of data, help in projection of enrolment and future trends, predict future occurrences and provide window for precautionary measures. The application of AI is evidently seen in numerous fields of life such as medicine, education, entertainment, communication, trade and industry, transportation, art, governance and humanities. Thus, the utilization of AI technologies in the management of education and tertiary institutions in particular has a huge potential to foster rapid improvement in teaching, learning, administration, research, community service and quality service delivery.

Artificial intelligence can play a crucial role in revolutionizing tertiary education management by fostering effectiveness and efficiency in administrative activities.It also has

the capacity to enhance transparency in examinations, student support services, admissions and financial related services, thereby creating a conducive environment for the actualization of tertiary education goals.There is so much that can be achieved in management of tertiary institutions when AI is fully deployed. For the purpose of this study, emphasis is only placed on teaching/learning, (virtual support learning), administration, personnel management, student support service management, research, data management and security management within the institutions.

Teaching and learning are some of the most important activities that take place in tertiary institutions. Effective implementation of teaching goals invariably would result to a successful academic outcome for students of the institutions. Thus, the utilization of AI technologies can be used to solve a variety of problems associated with teaching in tertiary institutions. AI can aid the stimulation of learning and connect learners with facilitators from anywhere in the world in real time. Bordia (2023) maintained that AI technologies can be used as automated repetitive tasks essential for the smooth running of tertiary institutions.

Administration at the tertiary institution level entails a lot of complexities and bureaucratic processes. It involves harnessing all available resources for the purpose of actualizing institutional objectives. It entails coordinating, planning and directing all the resources in a way that will foster effective implementation and realization of tertiary education programmes. However for purposes of efficient administrative performance, technological innovations should be deployed. Bordia (2023) stated that AI tools can be utilized in ensuring effectiveness in service delivery and administration in tertiary institutions. This can be achieved through automation of most administrative activities. These activities include: admission processes, answers to frequently asked questions, school fee payment, e-library, academic calendar, transcripts etc. The application of AI in school administration has the potentiality of automating all administrative tasks, with a full guarantee of speed, accuracy, accountability, accessibility, minimizing wastage while saving costs in tertiary institutions. Personnel management is another important function of tertiary institution administration. It involves the management of personnel records, promotion, deployment, transfer and retirement of staff of the institution. The current trends in filling and documentation can be done more efficiently if AI is utilized.

Therefore, the focus of this study is to investigate how artificial intelligence when applied in tertiary institutions can help in the attainment of school goals.

Statement of problem

The goals of tertiary education in Nigeria as enshrined in the National Policy on Education (Federal Republic of Nigeria, 2013), is to:

1. contribute to national development through high-level manpower training; provide accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians
2. provide high-quality career counselling and lifelong learning program that prepare students with the knowledge and skills for self-reliance and the world of work
3. reduce skill shortages through the production of skilled manpower relevant to the needs of the labour market
4. promote and encourage scholarship, entrepreneurship and community service
5. forge and cement national unity; and promote national and international understanding and interaction

As lofty as these goals are to national development, our tertiary institutions have not been able to achieve these goals as envisaged by the founding fathers. What makes tertiary institutions management effective is the ability to pull resources together to ensure quality services are rendered by staff and quality instructional delivery is rendered to students. Sad enough, most tertiary institutions in Nigeria are plagued with corruption, ineptitude, disputes, student related conflicts and administrative ineffectiveness. These have culminated into unending strikes, disruption of academic calendar, abandonment of programme by students due to frustration and negative perception of the general public about tertiary institutions. However, government through its agencies such as the Ministry of Education and the National Universities Commission has in many ways and times introduced measures to help tackle unethical practices and position tertiary institutions in the path of contributing to nation building, yet these issues have proven to still persist in all tertiary institutions in the country. Therefore, this study is poised to correct the anomalies by investigating application of Artificial Intelligence in the attainment of tertiary education goals: towards effective management of Tertiary education in Cross River State, Nigeria.

Purpose of the study

The main focus of this study was toinvestigating application of Artificial Intelligence in the attainment of tertiary education goals: towards effective management of Tertiary education in Cross River State, Nigeria. Specifically, the study sought to:

1. find out the influence of artificial intelligence in teaching/learning activities on the attainment of tertiary education goals
2. determine the influence of artificial intelligence in carrying out administrative activities on the attainment of tertiary education goals
3. determine the influence of artificial intelligence in carrying out researches on the attainment of tertiary education goals

Research questions

The study was guided by the following questions

1. To what extent does the use of artificial intelligence in teaching/learning activities influence the attainment of tertiary education goals?
2. To what extent does the use of artificial intelligence in carrying out administrative activities influence the attainment of tertiary education goals?
3. To what extent does the use of artificial intelligence in carrying out researchinfluence the attainment of tertiary education goals?

Hypotheses

The following hypotheses were tested at .05 level of significance

1. The use of artificial intelligence in teaching/learning does not significantly influence the attainment of tertiary education goals.
2. The use of artificial intelligence in carrying out administrative activities does not significantly influence the attainment of tertiary education goals.
3. The use of artificial intelligence in carrying out researches does not significantly influence the attainment of tertiary education goals.

Method

The ex-post facto research design was engaged as the research design for this study. The population of the study comprised academic, non-academic staff and students in tertiary institutions in Cross River State. The population stood at12543, out of which University of Calabar has 5323, University of Cross River has 3221, Federal College of Education, Obudu 2107 and College of Education, Akamkpa 1892 respectively. Taro Yamane statistics was used to determine the sample size which stood at 388 respondents. Proportional and purposive techniques were deployed in selecting the sample representatives. The instrument for data collection was the questionnaire method. The questionnaire was titled Artificial Intelligence and Tertiary Education Goal Attainment Questionnaire. The instrument was validated by two experts in test and measurement, while the Cronbach Alpha reliability was used to determine the degree of consistency of the instrument. The reliability coefficient obtained ranged from .80-.89 respectively. Three research questions were raised and three research hypotheses were formulated and tested using linear regression analysis.

Results and discussion

Research question one:

To what extent does the use of artificial intelligence in teaching/learning activities influence the attainment of tertiary education goals?

Table 1: Simple Linear Regression for the extent to which the use of artificial intelligence in teaching/learning activities influence the attainment of tertiary education goals in Cross River State

Variables	R	R Square	Adjusted R	St Err of Est
AI in teaching/learning	.141	.020	.017	8.43664
Attainment of goals				

Entries in Table 1 report the extent to which the use of AI in teaching/learning predicts the attainment of tertiary education goals. The R coefficient (.141) is the linear correlation (regression) between AI for teaching/learning and the attainment of gals in tertiary institutions. The coefficient of determination (.020) shows that using AI for teaching/learning contribute to (20%) variation in the attainment of goals in tertiary institutions in Cross River, Nigeria.

Research question two:

To what extent does the use of artificial intelligence in carrying out administrative activities influence the attainment of tertiary education goals?

Table 2: Simple Linear Regression for the extent to which the use of artificial intelligence in carrying out administrative activities influence the attainment of tertiary education goals

Variables	R	R Square	Adjusted R	St Err of Est
AI for admin activities	.256	.065	.063	8.23873
Attainment of goals				

Entries in Table 2 report the extent to which the use of AI for carrying out administrative activities predict the attainment of tertiary education goals. The R coefficient (.256) is the linear correlation (regression) between use of artificial intelligence in carrying out administrative activities and the attainment of tertiary education goals. The coefficient of determination (.065) shows that AI if fully utilized in administrative activities will contribute to (65%) variation in the attainment of tertiary education goals.

Research question three:

To what extent does the use of artificial intelligence in carrying out researches influence the attainment of tertiary education goals?

Table 3: Simple Linear Regression for the extent to which use of artificial intelligence in carrying out research activities influence the attainment of tertiary education goals

Variables	R	R Square	Adjusted R	St Err of Est
AI for research Attainment of goals	.060	.004	.001	8.50653

Entries in Table 3 report the extent to use of artificial intelligence in carrying out researches influence the attainment of tertiary education goals. The R coefficient (.060) is the linear correlation (regression) between using AI for the conduct of researches and the attainment of tertiary education goals. The coefficient of determination (.004) shows that the use of AI in conducting researches contribute to (0.4%) variation the attainment of tertiary education goals.

Hypotheses

The following hypotheses were tested at .05 level of significance

Ho1 The use of artificial intelligence in teaching/learning does not significantly influence the attainment of tertiary education goals

Table 4: Simple Linear regression of the relationship between the use of artificial intelligence in teaching/learningand the attainment of tertiary education goals

Variables	Sources of Variation	Sums of Squares	Df	Means Squares	F-Cal	F-Crit	Decisionat P<.05
AI for teach/learning	Regression	546.302	1	546.302	7.675	3.86	Sign.
Attainment of goals	Residue	36904.898	378	71.177			
	Total	27451.200	379				

*p<.05 significant

The result in Table 4 shows that the calculated F-value of 7.675 is greater than the critical F-value of 3.86 at .05 level of significance with 1 and 378 degree of freedom. With this result, the null hypothesis one which states that the use of artificial intelligence in teaching/learning does not significantly influence the attainment of tertiary education goals is rejected and the alternate hypothesis accepted. The result means that AI when use in teaching and learning activities significantly predicts goals attainment in tertiary institutions

Ho2 The use of artificial intelligence in carrying out administrative activities does not significantly influence the attainment of tertiary education goals

Table 5: Simple Linear regression of the relationship between the use of AI in carrying out administrative activities and the attainment of tertiary education goals

Variables	Sources of Variation	Sums of Squares	Df	Means Squares	F-Cal	F-Crit	Decision at P<.05
Use of AI in administration	Regression	1793.826	1	1793.826	26.428	3.86	Sign.
Attainment of goals	Residue	25657.378	378	67.877			
	Total	27451.200	379				

*p<.05 significant

The result in Table 5 shows that the calculated F-value of 26.428 is greater than the critical F-value of 3.86 at .05 level of significance with 1 and 378 degree of freedom. With this result, the null hypothesis two which states that the use of artificial intelligence in carrying out administrative activities does not significantlyinfluence the attainment of tertiary education goalsa is rejected and the alternate hypothesis accepted. The result means that the use of artificial intelligence in administrative activities significantly predicts the attainment of goals in tertiary institutions.

Ho3 The use of artificial intelligence in carrying out researches does not significantly influence the attainment of tertiary education goals

Table 6: Simple Linear regression of the relationship between the use of artificial intelligence in carrying out research activities and the attainment of tertiary education goals

Variables	Sources of Variation	Sums of Squares	df	Means Squares	F-Cal	F-Crit	Decision at P<.05
AI for research	Regression	98.675	1	98.6752	5,364	3.86	Not
Attainment of goals	Residue	27352.505	378	72.361			sign.
	Total	27451.200	379				

*p<.05 significant

The result in Table 6 shows that the calculated F-value of 5.364 is lesser than the critical F-value of 3.86 at .05 level of significance with 1 and 378 degree of freedom. With this result, the null hypothesis four which states that the use of artificial intelligence in carrying out researches does not significantly influence the attainment of tertiary education goalsa is rejected. The result means that the role of AI in research does significantly predicts attainment of tertiary education goals.

Discussion

The analysis of results in tables 1 shows that the use of artificial intelligence in teaching and learning has significant influence on the attainment of tertiary education goals in Cross River State and Nigeria in general. The application of AI helps the adaptation of content and learning materials which are students' progress oriented.AI has proven to be game changer from the traditional learning process to a digitalizes process that removes boundaries and create access to educational opportunities.The result was in line with that of Ogunode and Gregory (2023) who studied Artificial Intelligence (AI) in educational management. These results show how important AI is when fully applied in education.

The result of the second research question and hypothesis in Tables 2 shows that the use of AI in carrying out administrative activities significantly influences the attainment of tertiary education goals. By using technology in carryout most administrative functions, efficiency and productivity is assured. This is because AI has the capacity to automate

activities like admission, school fee collection, personnel management and helping school management to plan for school academic calendar ahead of time. This result is in line with Chan and Tsi (2023) who conducted a study on the AI revolution in education: Will AI replace or assist teachers in higher education. The study found that AI technologies when utilized can bring about effectiveness and efficiency in administrative function of tertiary institutions.AI can improve the efficiency of school administration by automating work processes, thereby encouraging accuracy, speed and accountability.

Research and Development: AI can assist in educational research by analysing vast datasets, identifying trends, and generating hypotheses. This accelerates the development of innovative teaching methods and educational technologies.

Recommendation

Based on the findings, it was recommendation that:

1. Government should encourage the provision of technologies in the management of tertiary institutions in the area of instructional delivery.
2. Administrative functions in tertiary institutions should be automated to bring about efficiency
3. Provision power infrastructures should be made available in schools to enhance the deployment of full scale technology in school management.
4. Capacity building programmes should be conveyed periodically to train staff and students on the use of new technological resources such the AI.

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