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Artificial Intelligence Tools and Educational Management for Sustainable Development in Public Rivers State Owned Universities

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Abstract

The study examined the relationship between artificial intelligence tools and Educational Management for Sustainable Development in Rivers State Owned Universities. The study adopted a correlational research design. To direct the investigation, two research questions and two hypotheses were formulated to guide the study. The population of the study comprised all 384 level 400 students of Department of Educational Management, Rivers state university and Ignatius Ajuru University of Education. The sample size of 370 students were selected for the study through random sampling techniques. The Researchers developed instruments titled " Artificial Intelligence Questionnaires and Sustainable Development Questionnaires were used to gather data for the study. The reliability coefficient of the study was calculated using crombach's alpha reliability coefficient statistics and the overall reliability coefficient of 0.83 and 0.75 were obtained respectively. Data collected were analysed using pearsons' Product Moment Correlation (PPMC) Statistics. The result obtained showed that artificial intelligence relates with educational Management for sustainable development in Rivers state owned universities. The Researchers recommended that artificial intelligence should be considered as a tool for effective management for sustainable development.

Keywords: Artificial intelligence, Tools, Educational Management, Sustainable and development.

Introduction

In recent years, the meteoric rise of artificial intelligence (AI) has shockwaves through society on economic, political, social environmental, and cultural levels. Seemingly poised to become as ubiquitous as email, this rapidly evolving technology is transforming. many sectors and aspects of daily life including management of educational system. Bernard (2017), Educational management is a field which is concerned with the operation of educational institutions. According to Brown, Johnson, and white (2019) educational management is the process of planning, organizing, directing, and coordinating activities in a school system by Effectively utilizing human and material resources in order to achieve the school objectives.

Educational Management is the process of planning, organizing and directing activities in a school and effective utilizing human and material resources in order to accomplish the school's objectives and it is one of the most gratifying career choices that can enable managers to work with a team to create curriculum, resources, technologies which will affect students at all levels of education and across the globe.

Williams (2018). Educational Management helps managers of education to develop education policy, conduct research and evaluate the development of education system so as to enrich and enhance education at all levels, therefore education plays a major role in the successful running of educational institutions and it According to is a crucial factor in determining the success of educational institutions, as it will help Managers be committed to addressing systematic inequalities and ensuring that all students have access to high quality education. They must also be eager to engage in critical self-reflection and work to develop inclusive and culturally sensitive learning environments. The educational Managers possesses certain traits, personalities, behaviors, patterns, values and styles of leadership in the school system. Such as instructional leadership, participatory leadership, transformational leadership, servant leadership, ethical leadership, distributive leadership, and digital leadership.

Okoroma (2019) stated that educational Management encompasses several key elements, including decision making, planning, coordination, motivation, creating a shared vision, building relationships, as technologies continues to evolve, there is a growing interest in the use of artificial intelligence in education setting, which is, if further inculcated into educational leadership, has the potentiality to improve leadership, learning outcomes, and sustainable development. Artificial intelligence is a rapidly developing technological machine that can completely transform global sustainability initiative as a result of its capability to perform tasks that typically require human intelligence. It plays a crucial role in educational Management by streamlining administrative duties such as scheduling, record keeping, predictive analytics, grading, and also in teaching and learning by means of identifying areas for development and offering individualized support to instructors and students, which by extension will lead to sustainable development (Obadimeji and Oredein, 2020).

The first attempt to create machines that could think and learn like human beings were made in 1950s which is when artificial intelligence was first studied in line with rule- based systems, neural networks, machine learning and deep learning are few of the stages that artificial intelligence research has gone through. Russell and Norvig (2021) stated that recent advances in artificial intelligence have been fueled by the availability of large datasets, improved

computing, power, and sophisticated algorithms. Artificial intelligence can be classified into two main types. Narrow or weak artificial intelligence and general or strong artificial intelligence. Narrow or weak artificial intelligence is designed to perform specific tasks such as playing chess or detecting fraud and it operates within a limited domain. General or strong artificial intelligence on the other hand, is designed to perform any intellectual task that a human being can do, and it is not limited to a specific domain.

Ugwu and Ogunremi (2019) stated that sustainable development is a progressive growth in all aspects of nations building. It is a positive growth of people economically, politically, culturally technologically, educationally, socially interwoven and intermingled to form a whole. On this note, sustainable development relates to the principles of meeting human development goals while at the same time sustaining the ability of natural systems to provide benefits without sacrificing environmental, social, and cultural values and norms. Sustainable development can be seen as the experience of growth and change in both tangible and intangible aspects of social and cultural life including industrialization, material advancement, modernization, and increased opportunity for social members and better standard of living. Nwonkwo (2023) stated that Sustainable development connotes national development and it is an ongoing dynamic process by which individuals identifies themselves as a community and are collectively empowered to bringing about positive change in the three Sustainable development components, which are environment, society, and economy. He further added that it is the realization of human rights especially economic, cultural, and social which is aimed at ending poverty, inequality, suffering, and injustice. On the whole therefore, Sustainable national development can be viewed as a dynamic and progressive process that brings about positive change and advancement in all aspects of social, cultural, political, and economic life which enhances productivity. Ijah (2018), identify various tools of artificial intelligence that can assist educational management for Sustainable development like machine learning, predictive analytics, knowledge representation, and record keeping. Record keeping is a vital responsibility of the education managers because it is a core duty of education managers to update records and information in their day to day activities of the school system through artificial intelligence tools. Koko (2018) stated that School managers rely on record keeping to make effective decision about immediate issues and more comprehensive School policies that without school records there can be no accountability, effective job performance, attainment of educational goals and objectives, the quality of teachers' job performance, tasks accomplishment, measurable outcomes depend heavily on the school records. The education

manager who dwell on the traditional way of recording, makes job performance inefficient. Therefore, the acquisition of knowledge of artificial intelligence assists education managers to carrying out their functions in terms of filling, recording, and storing information for effective and efficient documentation of school records.

Machine learning as one of the indices of artificial intelligence that makes predictions about future outcomes using historical data combined with statistical modeling, and data mining techniques. According to Zulkifli (2023) machine learning is a subset of artificial intelligence that uses statistical techniques and data to extract algorithms and models for learning. He further stated that machine learning can access future outcomes based on historical data and ongoing trends that focuses on data science and how units within organization can collaborate to drive profitability. In this regard, the educational Managers can collaborate with experts in other disciplines such as computer engineering, sciences, and environmental science to foster sustainable development. machine learning predicts the outcome of behaviour of students in order to take better decisions for students' future academic achievement. Machine learning helps to calculate each student score for effective recording and documentation. Machine learning according to Milligans, (2023), is the use of mathematical and statistical techniques, including artificial intelligence to predict the value of teachers, students and others for effective assessment and appraisal. and helps to improve teachers and students' behaviours, retentions, lifetime values, and satisfaction based on their class interactions, preference, and feedback. Therefore, machine learning correlates with artificial intelligence because both are computer programme machine that have the capacity to use statistical analysis to identify patterns, behaviours and forecast future events for the attainment of educational sustainable development.

Machine learning is an application of artificial intelligence that enables systems to learn and improve from experience without being explicitly programmed that can access data and use it to learn for themselves. According to Sarvendra and Vijay (2023), machine learning is a tool that can change the experience educational managers, teachers, and students. It optimizes and personalizes the learning experience for students and helps educational administrators and teachers to grade students' continuous assessments and examinations accurately. Lee and Kin (2023) stated that artificial intelligence transforms education management by enabling individualized learning, intelligent, tutoring, data- driven, decision making, automation, stimulation, and ethical issues. In order hand, machine learning in education helps in the

analysis of students' performance, and determine the student's strength and weakness. Nwile and Edo, (2023) Stated that artificial intelligence and machine learning offers schools a bright future in school management software. On this note, artificial intelligence systems will become more accessible and sophisticated with each technological advance leading to personalized learning, predictive insight, and efficient and effective Administrative processes. Rashmi (2023), machine learning is used to automate grading, assignment, tests, and students' assessments. This will reduce education managers and teacher's workload and can personalized attention to larger student population, thereby improving learning outcomes and students expressing understanding through data visualization, and dynamic storytelling.

Knowledge representation is a field in artificial intelligence that allows Artificial intelligence programmes to answer questions intelligently. It refers to presenting educational information in a systematic way that computer system can understand and use it to generate and solve education problems. Alexander (2024) stated that knowledge representation is concerned with how knowledge can be presented symbolically and manipulated in an automated way by reasoning programmes. On this note knowledge representation provides a framework for representing, organizing, and manipulating knowledge that can be used to solve complex problems, make decisions, and learn from data and a fundamental concept in artificial intelligence that involves creating models and structures that will facilitate and promote management and learning activities. Loannis and Jim (2018) stated that knowledge representation is one of the most transformative components of artificial intelligence that help demonstrate human-like intelligence in machine learning. In the same vein, Rajeswari (2022) asserted that knowledge representation is a process used in education that generate deep learning, metacognition, and also help educational management to reason about how to capture and encode knowledge in a format that can be easily processed and utilized by students.

Statement of the Problem

Educational management is an issue for sustainable development especially in Rivers state owned universities as it plays a major role in the successful running of educational institutions. Educational management encompasses procedures used in managing educational institutions such as Tertiary, secondary, and primary institutions towards achieving stipulated goals and objectives. Despite the importance of educational Management, the aims of sustainable development have not been fully realized. The Researchers wonder what could be the reasons behind this lack of actualization of the objectives of sustainable development. Could it be lack of knowledge about sustainable development? Could lack of professional development

contribute to this poor education management? Again the Researchers have noted that not much efforts seems to have been made towards finding out whether the application of machine learning and knowledge representation could be responsible for the shortfall and if these indices are properly investigated can improve and enhance sustainable development in educational management.

Purpose of the Study

The purpose of the study was to examine the tools of artificial intelligence and educational management for sustainable development in Rivers state owned universities. The specific objectives are to:

1. examine the relationship between machine learning and educational management for sustainable development in Rivers State Owned Universities.
2. examine the relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities.

Research Questions

The following research questions guided the study.

1. What is the relationship between machine learning and educational management for sustainable development in Rivers State owned universities?
2. What is the relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities?

Hypotheses

The following null hypotheses were formulated to guide the study at 0.05 level of significance

1. There is no significant relationship between machine learning and educational management for sustainable development in Rivers state owned universities.
2. There is no significant relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities.

Methodology

The study examined the relationship between artificial intelligence tools and educational management in Rivers state owned universities.

The study adopted correlational research design. To direct the investigation two research questions and two hypotheses were formulated to guide the study. The population of the study comprised all 184 students in department of educational Management, Rivers State University

and 200 students in department of educational Management, Ignatius Ajuru University of education, totalling 384 level 400 Students 2022/2023 academic session. The sample size of 370 which comprised 180 students in department of educational Management, Rivers state university and 190 students in department of educational Management, Ignatius Ajuru University of education. The proportionate sampling method and simple random sampling method were deployed. The Researchers employed questionnaires to elicit response from the students titled " Artificial Intelligence Tools Questionnaires (AITQ) and Sustainable development Questionnaire (SDQ) were used to gather data for the study. The reliability coefficient of the study was calculated using crombach's alpha reliability coefficient statistics of 0.83 and 0.75 were obtained respectively with the overall reliability index of 0.79. Data collected were analyzed using pearsons' product moment correlation (PPMC) statistics.

Results and Discussions

The following results were obtained from the study.

Research Question 1

What is the relationship between machine learning and educational management for sustainable development in Rivers state owned universities?

Table 1: Relationship between machine learning and educational management for sustainable development in Rivers state owned universities.

Variables.	ΣX ΣY	ΣX^2 ΣY^2	Σxy	r – cal	r – crit	remarks
Machine learning	3817	62733	233167	0.77	0.139	strongly positive relation
Educational Mgt. for Sustainable development	14664	880440				

The result presented in table 1 shows that the correlation coefficient (r) is 0.77. this indicates that strong positive relationship exists between machine learning and educational management for sustainable development in Rivers state owned universities.

Research Questions 2

What is the relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities?

Table 2 Relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities.

Variables.	ΣX ΣY	ΣX^2 ΣY^2	Σxy	r – cal	r – crit	remarks
Knowledge Rep. Educational Mgt. for Sustainable development	4391 14664	79196 880440	261946	0.52	0.139	strongly positive relation

The result presented in table 2, shows that the correlation coefficient (r) is 0.52. this indicates that strong positive relationship exists between knowledge representation and educational management for sustainable development in Rivers state owned universities.

Table 3: correlation analysis of the relationship between machine learning and educational management for sustainable development in Rivers state owned universities

Variables.	ΣX ΣY	ΣX^2 ΣY^2	Σxy	r – cal	r – crit	remarks
Machine learning Educational Mgt. for Sustainable development	3817 14664	62733 880440	233167	0.77	0.139	strongly positive relation

N=370* significant p<.0.5; df368; critical r- value=0.139.

The result presented in 3, shows that calculated r-value of o.77 is greater than the critical r-value of 0.139 at 368 degree of freedom and 0.05 alpha levels. Therefore, the null hypothesis which stated that there is no significant relationship between machine learning and educational management for sustainable development in Rivers state owned universities was rejected. Hence, there is a significant relationship between machine learning and educational management for sustainable development in Rivers state owned universities.

Table 4: Correlation of the relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities

Variables.	ΣX ΣY	ΣX^2 ΣY^2	Σxy	r – cal	r – crit	remarks
Knowledge Rep. Educational Mgt. for Sustainable development	3817 14664	62733 880440	233164	0.52	0.139	strongly positive relation

N=370* significant p<.0.5; df 368; critical r- value=0.139

The result presented in table 4, shows that calculated r-value of 0.52 is greater than the critical r-value of 0.139 at 368 degree of freedom and 0.05 alpha levels. Therefore, the null hypothesis which stated that there is no significant relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities was rejected. Hence, there is a significant relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities.

Discussion of Findings

The result presented in table 1, shows that a strong positive relationship exists between machine learning and educational management for sustainable development in Rivers state owned universities. The corresponding hypothesis in table 3 also shows that there is a significant relationship between machine learning and educational management for sustainable development in Rivers state owned universities. This is in agreement with the earlier study of Zulkifli (2023) who stated that the purpose of machine learning in educational Management is to predict the outcome of student's behaviour in order to take positive decisions for students future academic achievements and to calculate each student scores for effective recording, storing, and documentation.

In the same vein, Rashmi (2023) found out that machine learning helps to automate grading, texts, and students assignments and this makes it possible to bring experts from various disciplines such as computer science, engineering, business studies, and environmental studies to collaborate on artificial intelligence driven sustainable development programmes that will help to equip educators and students with the needed skills and knowledge to work with data including how to calculate, analyze, and visualize data in order to drive information for sustainable development helps educational Management to reason about how to capture and encode knowledge in a format that can be easily passed on students and utilized for students' academic achievements.

The result presented in table 2, shows that a strong positive relationship exists between knowledge representation and educational management for sustainable development in Rivers state owned universities. The corresponding hypothesis in table 4 also shows that there is a significant relationship between knowledge representation and educational management for sustainable development in Rivers state owned universities. This is in agreement with the study of Alexander (2023) who found out that knowledge representation helps educational Managers to symbolically manipulate artificial intelligence in order to personalize learning experience for students' academic achievement. In the same vein, Rajaswari (2022) found out that knowledge

representation helps educational Managers to reason about how to capture and encode knowledge in a format that will be easily processed and utilized for students' academic success.

Conclusion

Based on the findings of this study, the researchers concluded that there is a significant relationship between artificial intelligence and educational management. This is so, because it was revealed that artificial intelligence will assist educational managers through machine learning and knowledge representation for sustainable development in Rivers state owned universities.

Recommendations

Based on the findings of this study, the following recommendations were made by the researchers

1. Educational Management should use artificial intelligence tools to enhance Sustainable development in Rivers state owned universities
2. Government should provide enough artificial intelligence tools for state owned universities so as to enable educational Management to improve on their duties or functions in terms of analyzing and visualizing of data in order to drive Sustainable development.
3. Government should organize workshops and seminars for educational management on how to use machine learning and knowledge representation to capture and encode knowledge for Sustainable development.

References

Alexander. G. B (2024). Modern challenges in machine learning and artificial intelligence. *Science Journal of computing. 17(2),*107-116

Bernard A. (2017). Factors affecting administrative competence in some selected public secondary schools in Ekiti state. *International Journal of Educational Management 6(2),* 11-22.

Brown A., Johnson B. and White L. (2019) Impact of digital detox on well- being: A systematic literature review. Journal of Technology and Society. 12(2), 45-61.

Ijah J.F (2018). Educational administration and research: A Platform for National Transportation issues, challenges, and prospects: A paper presented at the educational Administrative class conference. Almadu Bello University, Zaria, Nigeria 13th, June

Koko N.M (2018) Role of education in promoting gender equality and women empowerment: implications for social justice and development in Nigeria. *Journal of Education and Practice. 9(33)* 48-60.

Lee C. and Kin J. (2023) Artificial intelligence education for young Children: A case Study of technology- enhanced embroided learning. *Journal of Computer Assisted Learning. 40(2)* 465-477.

Loannis H, andJim p. (2018). Knowledge representation in intelligence educational system. *International Journal of Artificial Intelligence tools: 9(12),* 113-125

Milligan, S. (2023). Learning analytics and assessment emerging research trends, prospects and future opportunities. *British journal of Educational Technology 54(1).* 10-18 https.//doi.org./10.1111/bjet.133.1

Nwile C. B. and Edo B. L. (2023). Artificial Intelligence and robotic tools for effective educational management and administration in state owned universities in Rivers state, Nigeria. *Natural and Applied science Journal of mathematics and science education. 2(4).* 28-36

Nwonkwo S. O. (2023). Educational administration: A panacea for sustainable national youth development. *The Nigeria Academic Forum. 30,(1),* 110-116.

Obadimeji C. C. and Oredein A. O. (2022) Digital leadership and communication styles on Public Primary School Teachers' Job Performance in Nigeria. *Science Journal of Education. 10(1)* 72-83

Okoroma S. N. (2019), Educational management, planning, and policy: A broad perspectives. University of port Harcourt, press

Rajaswari. P (2022) Investigation on the impact of internet of things (IOT) and machine learning. *International Journal of e-collaboration. 18(1),* 1-15.

Rashmi, A. (2023). Advancement in machine learning for computer science and decision support system. *Global journal of environmental science and management, 9(3)53*1-543.

Russell.S and Norvig P (2021). Artificial Intelligence: *A modern Approach*, 3rd Edition. Doi:10.1016.artint.2 on.01.005

Sarvendra k. p and Vijay D. (2023), machine learning based, A real - time analysis and prediction of mental health Disorders. *International Journal of Environmental and Climate change. 13(10),* 72-83.

Ugwu E.O and Ogunremi P.O(2022). Nigeria and sustainable development Goals: *While the Indigenous language Count.* European scientific journal. 15(5),52-66. Doi:10.19044/esj.

Williams K. (2019). Impact of artificial Intelligence on Learner-instructors interactions in online learning. *International Journal of Education, Technology and Higher Education, 18(4)*19-32

Zulkifli N.N(2023) Impact of online reciprocal peer tutoring on students academic performance. *Journal of Engineering science and Technology. 13(10),* 10-17