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AI LEARNING AND EDUCATIONALLY DISADVANTAGED STUDENTS IN RURAL SECONDARY SCHOOLS IN OWERRI EDUCATION ZONE 11, IMO STATE, NIGERIA

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Abstract
This study investigated Artificial Intelligence and Educationally Disadvantaged students in Rural Secondary Schools in Owerri Education Zone II. The researchers posed three research questions and formulated three hypotheses. The study was anchored on Expectancy-Contingency theory. The design of the study was correlational survey. The population of the study was 1125 secondary school students whereas the sample was 385 SS2 students were selected through multistage random sampling technique. Two instruments were used in data collected namely: Students vulnerability questionnaire (SVQ) and educationally at risk questionnaire (ERQ). They were adopted with reliability coefficient determined to be 0.72, 0.76 and 0.79. Data collected were analyzed using Pearson Product Moment Correlational Statistics. The findings of the study indicated that there is significant relationship between AI learning and motivation of students, there is significant relationship between AI learning and adjustment of students, and there is no significant relationship between AI learning and tasks engagement of students. The researchers recommended that secondary schools should be equipped with Artificial Intelligence facilities for familiarity and frequent use.

Keywords: Artificial Intelligence (AI), Vulnerability, Students, Educationally Disadvantaged, and Rural Secondary Schools.

Introduction

Across the globe, large numbers of young children are affected by one or more risk factors that have been linked to academic failure and poor health. According to Chuka-Okonkwo (2019) at risk students are those students who have been labeled failures, either officially or unofficially as being in danger of academic failure. Adolescents that came from low socio-economic-status are more likely to be labeled "at risk". Growing up in deprivation and poverty is associated with feeling of defeat, denial, low selfesteem, want and general dissatisfaction in life rating scale (Atsua, 2017). Otolehi, Okware-Kalu and Agulanna (2023) enumerated characteristics of at-risk students as: emotional and behavioural problems, truancy, low academic performance, demotivation to learning, disconnection from school activities, and isolate tendencies in classroom discourse. Vulnerability according to National Commission on excellence in education (2019) is used interchangeably with at risk". Children and in this social bracket are tagged endangered because of numerous deprivations associated in their up-brining.

Children who are economically and socially deprived may have insufficient and close friend to learning. They are prone to erratic advances in group discussion, quick to solicit recreational options and restive behaviours. Observations from Obiweluozo (2017) show that in spite of Government's lofty idea for mass lliteracy and free education for all as explained in the National

Policy on Education (NPE), children from indigent parents are not widely benefiting as required.

Many children from these homes drop-out-of school or constitute nuisance against conducive learning environment. RagueLevison and Zibani in Ohauakwanwa and Otolehi (2024) asserted that these indigent children are described as educationally at risk'. According to Esown (2024), formal education provisions cannot compensate for an impoverished home environment nor offset the effects of inadequate family care and support. Many children from deprived homes live in unfavourable physical and harsh economic condition. Many parents cannot afford or provide the basic needs – physiological needs (food, clothe, shelter) for their children. In line with Maslow's theory of hierarchy of needs, when basic physiological needs are not met, invariably other higher order needs cannot be talked about. (iheka 2023).

In the face of deprivations, families in the bid to make ends meet, work towards augmenting family Meager income by sending their children to hawk, trade, serve as domestic servants, cleaners, early marriage and hotel attendants resulting in childabuse. According to Obikeze in Chuka-Okonkwo (2019) as many as 298,000 children were engaged in agricultural labour. Many families engage in child trafficking within the country or internationally. Children who engage in child labour are most likely to drop-out-of-school. Child labour is any work carried out by children and which endangers their health or safety. Activities which keep children from playing and engaging in any other activities necessary for a child's schooling are considered to be harmful to their health. Child labour is not restricted to paid jobs, it also involves children working in their own homes, at school, or in family business without remuneration (Adeyeye, 2022).. These activities are common in many homes in the South Eastern states of Nigeria.

Engaging some children in 21st century education is therefore demanding because of vast use of internet facilities with negating influences explained in moral challenges. According to Raj Ghosh, Verma, and Singh (2021) extensive exploitative advances, nauseating moderations and exclusive subjectivity of users results in adverse condition of children. Vulnerable children who by their nature are easily wooed into abuses, may not have a favourable manipulation of social sites such as WhasApp, Instagram, Facebook, Utube and other internet application without abuse. Adverse motivation to use internet applications may be influenced by bizarre alterations inherent in their nature. Watching pornographic sites, violent films, in modest website, has a way of creating negative attractions that arecounter productive to quality Educational outcome.

Insufficient number of secondary school teachers, poor supply of electricity, non provision of science laboratories, dilapidated school structures, insecure school environment, poor funding of educational facilities in rural secondary schools may also limit extensively the use of internet services in teaching and learning in secondary schools in rural areas. More frustrating according to Iwundu and Uzoagba (2020) are the influences of rural deprivations such as, bad roads, poor infrastructure, insecurity from banditry, terrorism, trafficking and child abduction. Added to these are rural influences such as stealing school facilities, destruction of classroom structures, encroachment into school properties, cultism, drug intake and use of school building for criminal activities. In the views of Radibe in Nwosu, Omeanu, Iwundu, Elijah, and Animba (2023), complete absence of law enforcement agents have worsened the atmosphere of tranquility expected in school environments. Internet facilities need broad applications, while securing the tools. Internet facilities need regular electricity supply which is not available. Where solar panels are made accessible their security are not guaranteed.

For Canagarajah, Sudharshen and Nelson in Chuka-Okonkwo (2019), most professional teachers such as computer experts detest living in rural areas because of pronounced deprivation from lack of healthcare services, poor electricity supply, lack of pipe born water, insecurity, banks, bad road networks, unaccessibility to vital institutions and services that will make living worthwhile. Most rural areas lack trained technicians that could repair with ease computer tools. According to Mukhtar and Buhari (2020) many counselling experts dread rural postings because of the extent of deprivation inherent in those environments. The availability of smartphones have made AI applications universally accessible, durable and affordable. Students according to Garba and Abba (2023) can have access to websites that may further learning after classrooms activities. Some teachers give assignments and take home tasks through that require internet for students to perform such tasks, but unavailability of electricity to regularly charge phones hinder active participation of most of the students. The use of social media are hindered more in rural areas because of network issues. Many

students resort to charging their phones using commercial agents, computer centres and through friends and relatives. Many schools according to Otolehi Okwara-Kalu and Nwoga (2023) are without electricity fittings, students do not have access to electricity while in-school. Laboratory facilities powered by electricity are not used. Agricultural demonstration farms are demobilized because of poor infrastructure.

According to Iheka (2023) the absence of infrastructures to back AI learning, the poor mediation of internet instructions for vulnerable students and pronounced rural deprivation are bound to affect the effective implementation of AI learning in many rural communities in Owerri Education Zone II. The researchers visited thirteen junior and senior secondary schools in Ngor-Okpala and AbohMbaise local Governments in Imo state. None among these schools has electricity connection to service lines, school structures are in bad shape, windows and doors were broken, school fence where available were pulled down, allowing villagers access for unlawful activities. Many of the school do not have science laboratory. In addition, inside the classrooms, there were no bulbs or fittings where students can charge their phones. How can AI learning take place in such unconducive learning environments? The present study therefore seeks to determine AI learning and Educationally disadvantaged students in rural secondary schools in Owerri Education Zone II.

The advancement of AI learning in all aspects of human endevours, especially in education, engineered this study. The fast spread and utilization of artificial intelligence is bridging all barriers in academic advancement is commendable. Neglecting the spread to our rural areas needs the attention of counselling psychologists to call the authorities to order through verifiable findings which can only come through empirical research study. This research is a template for policy direction in a word where there is growing need for technological breakthrough. No such study has been carried out in AbohMbaise and Ngor-Okpala Local Government Areas of Imo state. The present study has immense benefit to students who would benefit as such facilities need to be made available through the awareness created by this study and its findings. The spread of artificial intelligence learning to rural areas will help extend innovation in rural communities, thus expanding development

The theory of Victor Vroom 1964 tagged Expectancy-contingency theory anchored this study. The theory is about choice. It explains the processes that an individual undergoes to make choices. The choice is based on two-stage sequence of Expectations, thus, effort leads to performance and performance leads to a scientific outcome/reward. For the theory, Motivation is affected by an individual's expectation that certain level of effort will produce the intended performance and equally motivation is influenced by the employee's perceived chances of getting various outcomes as a result of accomplishing his or her performance goal. The theory posits that there is a positive correlation between efforts and performances. A favourable performance will lead to desirable reward. The reward will satisfy an important need and that the desire to satisfy will be strong enough to make the effort worthwhile. The implication of this theory to this study is that effort toward better academic achievement can only prevail if the needed resources are made available to rural communities. Without regular supply of electricity it may be practically impossible to operate and manipulate AI tools at any level.

Since this study is on Artificial intelligence (AI) learning, there is need to conceptualizse the meaning of Artificial intelligence. Artificial intelligence refers to activities that emerge from connecting students, individuals, business, devices, data and operations through digital technology. It encompasses the online connections and transactions that take place across multiple sectors and technologies, such as the internet, mobile technology, big data and information and communications technology (Yasar, & Pratt, 2020). Components of digital learning are, E-learning and infrastructural. Also, a key component of the digital learning is hyper connectivity, which is the increasing interconnection of people, students, organizations and machines that results in internet connectivity. Internet, mobile technology all in (ICT) refers to the conduct of learning activities using the internet and other electronic means. The use of facebook, whatsApp, UTube, twitter, E-learning infrastructure are all connected to a robust artificial intelligence mechanism. Hardwares, software, telecommunication networks, support services and human capital used in E-learning infrastructures are: computers, routers, and other hardware, satellite, wire and optical communications and network channels, system and applications software. E-learning encompasses the overall network of system and processes to manage E-learning resources.

Digital Learning offers potential for institution of learning (secondary, tertiary) to connect more quickly, more efficiency and more meaningfully to the products, services and experience needed for knowledge acquisition development and expansion. Artificial intelligence has given rise to many new trends and start up ideas (Onweh, Obiand Obunadudike, 2024). Goggle, Apple, Microsoft, Amazon and more have their services and structure's fully utilized in learning. Goggle classroom are widely used in distant learning. A number of challenges have been highlighted by scholars that constitute a hindrance to integrating information communication technology (ICT) in teaching and learning of subjects. These challenges include time, curriculum, accessing internet facilities, paucity of teachers, lack of skills any positive attitude, poor role of leadership, lack of software, lack of hardware, low level of ICT skills; poor network, lack of experts among others (Onweh, Obi and Obunadika, 2024). This implies that Nigeria education sector does not have enough hardware peripherals (input devices), network technologies ad simultaneous internet access to technology use that will have an impact on the quality of instructions that facilitate teaching and learning.

To carry out an effective teaching and learning through artificial intelligence, regular and stable electricity supply are needed. Lack of these basic infrastructure as power to run ICT equipment hampers the role (ICT) plays in transforming modern teaching and learning. Many schools lack the necessary capacity of generating plant to tackle the challenge of lack of public power supply. Amaly (2014) observed that most educational chalk and duster approach skills dominates the Nigerian education. Vulnerable educationally at-risk students may not be favoured by lack of resources to promote artificial intelligence through E-learning may lead to dropping out of school or remaining unadjusted because of frustrations associated with its operations. The present study in view of the prevailing circumstances seeks to determine AI learning and vulnerability of educationally disadvantaged students in rural secondary schools in Aboh-Mbaise and Ngor-Okpala Local Government areas of Imo state.

Purpose of the Study

The purpose of the study was to determine the relationship between AI learning and vulnerability of Educationally disadvantaged students. The study specifically sought to:

i. Determine the relationship between AI learning and motivation of students
ii. Ascertain the relationship between AI learning and adjustment of students
iii. Determine the relationship between AI learning and task engagement students.

Research Questions

i. What is the relationship between AI learning and motivation of students?
ii. What is the relationship between AI learning and adjustment of students?
iii. What is the relationship between AI learning and tasks engagement of students?

Hypotheses

The researcher formulated three hypotheses

1. There is no significant relationship between AI learning and motivation of students
2. There is no significant relationship between AI learning and adjustment of students
3. There is no significant relationship between AI learning and tasks engagement of students.

Methodology

The researcher employed a correlational survey design, relying on coefficient index ranging from 0.8 – 1.00 as very high or near perfect correlation 0.60 – 0.80 as high relationship.
0.40 – 0.60 as medium relationship while 0.20 – 0.40 as low relationship. However, 0.00 – 0.20 was regarded as very low or no relationship. The population is 5,840. The sample of the study was 385 selected by adopting
Taro Yameneformular(n = $\frac{N}{1 + (0.025)^2}$ for sample selection from stated population. The instruments used in data collection are; Artificial Intelligence Questionnaire (AI Q), students vulnerability Questionnaire (SVQ) and students Educationally at-risk Questionnaire (SEARQ). These instruments were adopted from Asian *et al*. (2019) AIQ; Otolehi*et al.* (2023) SVQ and Otolehi*et al.*

2017 SEARQ. The reliability coefficients of the instruments were determined to be 0.72; 0.76 and 0.79 respectively. Data was collected by distributing the questionnaires to SS2 students from ten selected secondary schools in Aboh-Mbaise and Ngor-Okpala. Two research assistants aided in the distribution of instruments to respondents. Forty-five minutes was given for the respondents to answer to the questionnaires. Their responses were collected and packaged for analysis. Data collected were analyzed using Pearson Product Moment Correlational Statistics. Decision on the strength of the relationship was based on the coefficient index.

Results/Data Analysis

Table 1: Pearson Correlational Coefficient on AI learning and Motivation of students

Variables		AI	Motivation
Artificial Intelligence	Pearson Correlation	1	0.68
	Sign (2 – tailed)		.000
		385	
Motivation	Pearson correlation	0.68	1
	Sign (2 – tailed)	.000	385

Listwise 385

In table 1, the correlational relationship between artificial intelligence and motivation of SS2 students was 0.68 signifying a strong association. This connotes a linear association and direct impact. The relationship based on the fact that the probability value is .000 against the alpha value of 0.05 is significant. These deductions shows that the poor nature of artificial intelligence facilities in rural areas align students to vulnerability such as lack of interest to engage in internet activities. Insufficient awareness of internet services around creates knowledge vacuum among students on artificial intelligence.

Table 2; Pearson Correlational Coefficient on AI learning and adjustment of students

Variables		AI	Motivation
Artificial Intelligence	Pearson Correlation	1	0.57
	Sign (2 – tailed)		.000
		385	
Adjustment of students	Pearson Correlation	0.57	1
	Sign (2 – tailed)	.000	385

Listwise 385

In table 2, the coefficient of the relationship is 0.57 signifying moderate association between artificial intelligence and adjustment of students. 0.57 coefficient shows that there is a linear and direct association signifying moderate influence of artificial intelligence on students' attitude, behavior and academic achievement on secondary schools. On establishing the significance of the association, a probability value of .000 against alpha level of 0.05 was observed. When the probability value is less than alpha level, the hypotheses is rejected revealing a significant relationship between artificial intelligence and adjustment of SS2 students in secondary schools in Aboh-Mbaise and Ngor-Okpala Local government area of Imo state.

Table 3: Pearson Correlational Coefficient analysis between AI and engagement of students

Variables		AI	Motivation
Artificial Intelligence	Pearson Correlation	1	0.62
	Sign (2 – tailed)		.000
		385	
Engagement in tasks	Pearson correlation	0.62	1
	Sign (2 – tailed)	.000	385

Listwise 385

In table 3, the engagement of students in learning activities which involved the effective incorporation of artificial intelligent tools had a strong relationship. The more robust artificial intelligence services are made available engagement of students in school tasks will increase. Assignments will be accepted and attended to and submitted in good time. Collaboration among students will increase using whatsApp, twitter, facebook, goggle services will become frequent and meaningful. Relatively there was a significant association between artificial intelligence and engagement of students on tasks (academic tasks). The alpha level of 0.05 against the probability value of .000 signify a pronounced influence of artificial intelligence on school engagement.

Discussions

The result of the study was that motivation had a relationship with artificial intelligence. This result means that a linear and direct association exist between motivation and artificial intelligence. Adolescents have a unique feature of curiosity and imitation. Artificial intelligence (Internet services) with its device applications appealing to desires of students are welcomed with strong attachment. Students are motivated to learn with applications such as twitter, facebook, whatsApp, histogram readily providing collaborations with activities around the world-goggle scholar provide services affording students the opportunity to study away from school environment most times at the comfort of their homes. Distance learning are also made easy and functional through internet services students can combine learning with their jobs without much challenges, as class discussions may be carried out through teleconferencing. The findings of the present study aligns to the result of Omou, Ononaiwu, Jombo-Mba and Akaneme (2020) whose findings revealed that artificial intelligence negatively influenced the academic engagement of undergraduates.

This would have been as a result students not having access to internet tools to work with when class activities were centred on using internet facilities. The finding of the study was not supported by the result of Ezeonwumelu and Okoro (2020) whose fiding revealed that social media engagement promoted deviant behaviours among students in Uyo education zone. The difference between Onwe*et al.,* (2020) and Ezeonwumelu and Okoro (2020) were based on the moderation of both studies. Onwe*et al.* (2020) was correlated among students in private schools outside classroom environment where teachers are at hand to moderate and regulate activities of students using internet services: Without adequate supervision, there is the tendency that student may use the internet adversely against the intention of the study. Previous studies have revealed that students must be monitored and supervised for a useful adventure with the social media.

The result of the study was that artificial intelligence (supported the adjustment) had a moderate relationship with adjustment of students. The study's findings suggest that effective use of artificial intelligence correlates adjustment intentions and prospects of students. The reason for this result could be that the availability of artificial intelligence services (Internet exploration) will get students effectively engaged, allow collaboration with peers around world and introduce novel dimensions of instructions delivered by teachers. Where such adventures and opportunities are found wanting, students hardly give attention optimally to learning and related activities. In the present study increase in crime rate in senior secondary schools in AbohMbaise and Ngor-Okpala could be because of poor internet applications in secondary schools in the area . The findings of the present study is in agreement with the result of Nnadozie and Otolehi (2020) whose study revealed that through computer games merged in schools, vocabulary and grammar proficiency of English language students improved. Further the study by Nnadozie and Otolehi (2020) suggests that exposing students to extensive tasks will improve their academic achievement. Therefore engaging students in artificial intelligence supported activities has a tremendous positive effect in tandem with adjustment processes in secondary schools. However in a contrasting finding Odofin (2020) opined that artificial intelligence facilitated internet activities could be a source of destruction to learning. This may be true when students were not supervised or monitored. Where students are supervised and directed towards a desired outcome, internet services has been a source of inspiration, promoting learning optimally.

Summary/Conclusion

From the findings of the study, the following conclusions were drawn; the result of this study has proved that effective use of artificial intelligence significantly correlates motivation, adjustment and engagement of students. Conversely vulnerable and disadvantaged students in rural impoverished communities are not disposed to the effective use of artificial intelligence services through the internet. These experiences were orchestrated by deprivations explained in poor infrastructures, unavailability of professional hands, expensive cost of communication services and corruption among the ruling class. This study however did not determine whether the vulnerability of students in these disadvantaged areas may become a hindrance to effective use of internet provisions if supplied. The study has therefore provided a framework for other studies on artificial intelligence in Imo state. Implication of this finding is that parents may after reading the literature of this study determine alternative way of effectively engaging students (wards) thereby improving their attention towards efficient use of their time.

Recommendations

The researcher based on the findings of this study recommended that:

i. Vulnerable disadvantaged students in rural area may be effectively engaged in school activities by providing adequate electricity in rural areas. This will help make artificial intelligence tools functional.
ii. By providing infrastructures in rural areas, professional ICT experts may be attracted to rural areas thereby expounding computer literacy.
iii. Students will be motivated to learn by engaging them in internet exploration. This can be made possible by engaging them, using educational web sites available for learning.

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