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Assessing the Perceived Benefits of Implementing Artificial Intelligence Technologies on Students' Academic Performance in Secondary Schools in Port Harcourt Metropolis

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Abstract

The study investigated the perceived benefits of implementing artificial intelligence technologies on students' academic performance in secondary schools in Port Harcourt Metropolis. Three research objectives, three research questions and three hypotheses guided the study. The study adopted a descriptive survey design with a population of 27,082 teachers and students comprising 25,077 students and 2,005 teachers in the 35 public senior secondary schools in Port Harcourt and Obio/Akpor Local Government Areas of Rivers State. The sample size of the study was 727 respondents comprising 394 students and 333 teachers. The sample size was determined using Taro Yamene's formula. The multi-stage sampling technique was adopted in selecting the sample size. The instrument for the study was a self-designed questionnaire titled; "Assessing the Perceived Benefits of Implementing Artificial Intelligence Technologies on Students' Academic Performance Questionnaire (APBIAITSAPQ)'. The instrument was validated by experts in educational research. The reliability of the instrument gave a Cronbach Alpha index of 0.84 which was considered reliable. Mean and standard deviation were used to answer the research questions while z-test statistics was used to test the formulated null hypotheses at 0.05 level of significance. The findings of the study revealed that, improved access to resources, data-driven insights and efficient administrative task through A.I technology implementation influence students' academic performance in public secondary schools in Port Harcourt Metropolis. The study recommended that, Federal and State government, Ministry of education, Curriculum planners and principals should implement A.I technology in public schools to improve students' academic performance.

Keywords: Academic Performance, Artificial Intelligences, Assessing, Implementation, Secondary Schools, Technologies.

Introduction

The introduction of Artificial Intelligence (AI) technologies into educational settings has heralded a new frontier in pedagogy, fundamentally reshaping teaching and learning processes. In public senior secondary schools, particularly in metropolitan areas like Port Harcourt, AI tools have begun to play a pivotal role in enhancing students' academic experiences and outcomes (Williamson, Eynon, & Potter, 2022). AI technologies, ranging from intelligent tutoring systems to predictive analytics, offer personalized learning experiences that are tailored to meet the individual needs of students, thus promoting more effective learning (Luckin, Holmes, Griffiths, & Forcier, 2022). By analyzing vast datasets,

AI can provide insights into students' learning behaviors, potentially identifying areas where students struggle and suggesting targeted interventions. This capability not only helps educators personalize instruction but also empowers students to take charge of their learning, fostering a self-directed and engaged approach to their studies. The integration of AI in the classroom is anticipated to bridge gaps in educational attainment by providing equitable access to resources and knowledge, assisting in reducing instructional disparities that are often found in public educational institutions (West, 2023).

The perceived benefits of AI in education extend beyond immediate academic performance. These benefits encapsulate broader educational outcomes, such as improved critical thinking, increased student satisfaction, and the development of a technologically savvy workforce ready to meet the challenges of a digital economy (Ministry of Education, Port Harcourt, 2024). As educators and policymakers in Port Harcourt Metropolis explore the full potential of AI, understanding students' perceptions of its benefits is crucial. This understanding can inform strategies to maximize its effectiveness in enhancing educational outcomes and in overcoming existing barriers to its adoption (UNESCO, 2023).

The importance of implementing AI in educational institutions is underscored by its potential to bridge educational gaps. In regions like Port Harcourt, where resources seem to be limited, AI technologies can provide scalable solutions that deliver quality education across diverse settings (Rivers State Ministry of Education, 2024). By leveraging AI, educational stakeholders can ensure that learning is accessible, inclusive, and equitable, addressing disparities often present in public educational systems. Moreover, the integration of AI into educational frameworks aligns with the global shift towards digital literacy and competencies necessary for the 21st-century workforce. As Luckin, Holmes, Griffiths, & Forcier (2022) note, preparing students for future careers requires equipping them with experience and proficiency in using advanced technologies, including AI. Therefore, the implementation of AI not only benefits current academic performance but also prepares students for future challenges and opportunities.

The perceived benefits of AI in enhancing student performance signify a transformative shift in educational paradigms. This shift, when effectively harnessed, could profoundly impact not just individual learners but also the educational landscape as a whole (West, 2023). Therefore, it is essential to assess these perceptions thoroughly to support informed decision-making in the implementation of AI technologies in the educational sector. Artificial Intelligence (AI) refers

to the simulation of human intelligence in machines, designed to think and act like humans. This burgeoning field encompasses various technologies that enable machines to learn from experience, adapt to new inputs, and perform tasks that typically require human intellect, such as reasoning, problem-solving, and understanding natural language. The rapid advancements in AI are reshaping various sectors, including healthcare, finance, entertainment, and education. As AI continues to evolve, its impact on society becomes increasingly profound, leading to discussions about its potential benefits and challenges (Woolf, 2021).

Improved access to resources through Artificial Intelligence (AI) refers to the ability to efficiently and effectively find, utilize, and manage a wide range of educational materials and tools thanks to AI technologies (Provost, & Fawcett, 2013). Data-driven insights through Artificial Intelligence (AI) refer to the valuable information and conclusions derived from analyzing large volumes of data using AI algorithms and techniques. These insights help organizations and individuals make informed decisions based on patterns, trends, and anomalies identified within the data (Luckin, et al., 2016). Efficient administrative tasks through Artificial Intelligence (AI) refer to the automation and optimization of routine and repetitive operational processes within organizations using AI technologies. This efficiency can significantly enhance productivity, reduce errors, and free up valuable time for staff to focus on more strategic initiatives (Huang, & Rust, 2021). The perceived benefits of AI in enhancing student performance signify a transformative shift in educational paradigms. This shift, when effectively harnessed, could profoundly impact not just individual learners but also the educational landscape as a whole. Therefore, it is essential to assess these perceptions thoroughly to support informed decision-making in the implementation of AI technologies in the educational sector.

Statement of the Problem

The integration of artificial intelligence (AI) technologies in education promises a transformative impact, particularly with respect to enhancing student academic performance. However, while AI's potential benefits are widely discussed in global educational forums, there is a pressing need to contextualize these discussions within specific regional environments to understand their nuanced implications. Port Harcourt Metropolis, a rapidly growing urban area in Nigeria, presents a unique context where secondary schools face challenges such as varying levels of resource availability, technological infrastructure, and educational readiness among both educators and students.

Despite the global advocacy for AI integration in classrooms, there is a marked gap in empirical research assessing the perceived benefits of these technologies specifically within the secondary schools of Port Harcourt Metropolis. This gap underscores the need for localized studies that provide insights into how students, educators, and administrators perceive the value and impact of AI on academic performance. Such perceptions are crucial, as they not only shape the successful implementation of AI technologies but also influence the educational strategies and investments made by stakeholders. It's for these reasons the researcher carried out the study, to examine what are the perceived benefits of implementing Artificial intelligence technologies on students' academic performance in secondary schools in Port Harcourt Metropolis? And to proffer solutions were necessary.

Purpose of the Study

The purpose of this study was to examine, the perceived benefits of implementing Artificial intelligence technologies on students' academic performance in secondary schools in Port Harcourt Metropolis. Specifically, the objectives of the study are to:

1. Determine the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.
2. Find out the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.
3. Ascertain the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Research Questions

The following research questions guided the study:

1. To what extent does improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis?
2. To what extent does data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis?

3. To what extent does efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis?

Hypotheses

The following null hypotheses were used for the study and tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of teachers and students on the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.
2. There is no significant difference in the mean ratings of teachers and students on the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.
3. There is no significant difference in the mean ratings of teachers and students' teachers on the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Literature Review

Concept of Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines, designed to think and act like humans. This burgeoning field encompasses various technologies that enable machines to learn from experience, adapt to new inputs, and perform tasks that typically require human intellect, such as reasoning, problem-solving, and understanding natural language. The rapid advancements in AI are reshaping various sectors, including healthcare, finance, entertainment, and education. As AI continues to evolve, its impact on society becomes increasingly profound, leading to discussions about its potential benefits and challenges (Woolf, 2010).

Benefits of Implementing Artificial Intelligence in Secondary Schools

Integrating AI into secondary schools offers numerous advantages that can enhance the learning experience for students and support educators in their teaching efforts (Zhang, & Zheng, 2022). Some key benefits include:

i. **Personalized Learning:** AI can analyze individual student performance and learning styles, providing tailored educational experiences that cater to each student's needs. This personalization can help students master subjects at their own pace.

ii. **Efficient Administrative Tasks:** AI systems can automate routine administrative tasks, such as grading tests and managing schedules, allowing teachers to focus more on instruction and student engagement.

iii. **Enhanced Engagement:** Interactive AI-driven tools and platforms can create dynamic learning environments that engage students more effectively than traditional teaching methods, making the learning process more enjoyable.

iv. **Immediate Feedback:** AI can provide instant feedback on assignments and assessments, helping students identify their strengths and weaknesses promptly, thus facilitating timely interventions.

v. **Access to Resources:** AI can curate a wealth of educational resources and materials, providing students and teachers with quick access to relevant information and learning tools that enhance the educational experience.

vi. Preparation for Future Careers: Introducing students to AI technologies equips them with the skills and knowledge required in a workforce increasingly reliant on these advancements, preparing them for future careers in a tech-driven world.

The implementation of AI in secondary education can create a more adaptive, engaging, and efficient learning environment, ultimately helping to foster a generation of learners who are better prepared for the challenges of tomorrow.

Concept of Students' Academic Performance

Students' academic performance refers to the level of achievement and success that students attain in their educational pursuits, typically measured through grades, test scores, and assessments. It encompasses various aspects of learning, including understanding of the subject matter, the ability to apply knowledge, and skills demonstrated in academic work (Tuck, 2018). Key components of academic performance include:

i. **Grades and Scores:** Academic performance is often quantified through grades in coursework, standardized test scores, and assessments. These numerical indicators reflect the students' mastery of material and their ability to meet educational standards.

ii. **Engagement and Participation:** Active participation in class discussions, group projects, and extracurricular activities can also indicate strong academic performance, as engaged students are more likely to comprehend and retain information.

iii. **Skill Development:** Academic performance is not just about grades; it also includes the development of critical thinking, problem-solving, and communication skills, which are essential for overall educational success.

iv. **Retention and Progression:** Academic performance can also be evaluated by students' ability to progress to higher levels of education, complete courses, and graduate within anticipated timeframes.

v. **External Factors:** Various social, economic, and environmental factors can influence students' academic performance. Support systems, such as family, peers, and educational resources, play significant roles.

Understanding and improving students' academic performance is crucial for educational institutions, as it affects not only individual students' futures but also the effectiveness of educational programs.

Concept of Improved Access to Resources through Artificial Intelligence (AI)

Improved access to resources through Artificial Intelligence (AI) refers to the ability to efficiently and effectively find, utilize, and manage a wide range of educational materials and tools thanks to AI technologies. Here are some key aspects of how AI enhances resource accessibility:

i. **Personalized Recommendations:** AI algorithms can analyze a student's learning patterns and preferences to recommend tailored resources such as articles, videos, and interactive simulations that match their specific needs, making it easier for them to access appropriate materials.

ii. **Curated Content:** AI can sift through vast amounts of information on the internet and curate high-quality educational resources, categorizing them based on relevance and difficulty. This saves time for both students and teachers, ensuring they find relevant and trustworthy resources more quickly.

iii. **Language Translation:** AI-powered tools can translate educational materials into different languages, enabling non-native speakers to access content in their preferred language. This inclusivity enhances learning opportunities for diverse student populations.

iv. **24/7 Availability:** AI-driven platforms can provide access to learning resources at any time, allowing students to study and explore topics at their own convenience, which is particularly beneficial for those with varied schedules.

v. **Interactive Learning Tools:** AI can facilitate the creation of interactive and immersive learning experiences, such as virtual simulations or gamified content, making it easier for students to engage with complex subjects and concepts.

vi. **Research Assistance:** AI can assist students and educators in conducting research by quickly identifying relevant papers, publications, and data sets, enabling them to gather information more efficiently for projects and assignments.

By leveraging these capabilities, AI significantly enhances access to educational resources, enabling students and educators to have a richer, more supportive learning experience. This improved access can lead to better educational outcomes and a more equitable learning environment for all students.

Concept of Data-Driven Insights through Artificial Intelligence (AI)

Data-driven insights through Artificial Intelligence (AI) refer to the valuable information and conclusions derived from analyzing large volumes of data using AI algorithms and techniques. These insights help organizations and individuals make informed decisions based on patterns, trends, and anomalies identified within the data (Luckin, et al., 2016). Here's a closer look at what this means:

i. **Analysis of Large Datasets:** AI can process and analyze vast amounts of structured and unstructured data swiftly, something that would be impractical for humans to do manually. This capability enables organizations to harness the power of big data.

ii. **Pattern Recognition:** AI algorithms, particularly machine learning models, excel at identifying patterns and correlations within datasets. This allows for the discovery of relationships that may not be readily apparent, helping users understand underlying trends and behaviors.

iii. **Predictive Analytics:** AI can use historical data to make predictions about future outcomes. For example, in education, AI can analyze previous student performance data to predict which students may need additional support, enabling proactive interventions.

iv. **Enhanced Decision-Making:** By providing actionable insights derived from data, AI equips educators, administrators, and other stakeholders with the information needed to make informed decisions. This can lead to improved policies, targeted interventions, and more effective resource allocation.

v. **Continuous Improvement:** As AI systems learn from new data over time, they can refine their insights and recommendations. This continuous learning process helps organizations adapt and improve their strategies based on the most current and relevant information.

Data-driven insights generated through AI empower users by transforming raw data into meaningful information, leading to better decision-making and enhanced outcomes across various sectors, including education.

Concept of Efficient Administrative Tasks through Artificial Intelligence (AI)

Efficient administrative tasks through Artificial Intelligence (AI) refer to the automation and optimization of routine and repetitive operational processes within organizations using AI technologies. This efficiency can significantly enhance productivity, reduce errors, and free up valuable time for staff to focus on more strategic initiatives (Huang, & Rust, 2021). Here are some key elements of this concept:

i. **Automation of Routine Tasks:** AI can automate processes such as scheduling meetings, processing invoices, managing email communications, and data entry. This minimizes the need for manual intervention, thereby saving time and reducing the likelihood of errors.

ii. **Data Management and Analysis:** AI systems can efficiently organize, analyze, and retrieve data, making it much easier for administrators to manage large volumes of information. For instance, AI can track performance metrics or audit compliance with policies, streamlining decision-making processes.

iii. **Enhanced Communication:** AI-powered chatbots and virtual assistants can handle routine inquiries from staff or customers, providing immediate responses and support. This reduces the administrative burden on human resources while maintaining a high level of service.

iv. **Resource Allocation:** AI can analyze administrative workflows and pinpoint areas for improvement, enabling better allocation of resources. This ensures that tasks are assigned based on availability and expertise, enhancing overall efficiency.

v. **Predictive Capabilities:** With access to historical data, AI can forecast trends (like peak times for inquiries) that help administrators plan better. This foresight allows for proactive scheduling and resource management.

By employing AI in administrative tasks, organizations can achieve greater efficiency, leading to a more productive work environment.

Impact of AI on Academic Performance in Secondary Schools

Recent studies have investigated the role of Artificial Intelligence (AI) technologies in enhancing academic performance, especially in secondary schools. AI applications such as personalized learning platforms and automated tutoring systems have been found to contribute positively to students' learning outcomes. According to a study by Zhang et al. (2023), AI-powered learning tools tailored to students' learning styles and needs improve their academic performance by providing personalized, real-time feedback. This ensures that students grasp

concepts at their own pace, which is particularly beneficial for learners in diverse secondary school settings. In Port Harcourt Metropolis, AI technologies can help bridge the educational gap created by overcrowded classrooms and limited access to qualified teachers. AI's role in offering differentiated instruction, along with its ability to adapt to the learning needs of individual students, aligns with findings from Omojuwa et al. (2022) that indicate a direct correlation between AI-enhanced teaching strategies and improved academic performance in both public and private secondary schools.

AI and the Enhancement of Cognitive Skills in Secondary Education

The implementation of AI technologies has been shown to enhance various cognitive skills that are essential for academic achievement in secondary education. AI-driven learning platforms provide interactive simulations, problem-solving exercises, and real-time quizzes that stimulate critical thinking and improve students' cognitive engagement. A study by Olayemi et al. (2023) suggests that AI applications have been particularly effective in enhancing problem-solving abilities and cognitive flexibility, leading to improved performance in subjects like mathematics and science. In secondary schools in Port Harcourt, where students often face challenges such as lack of resources and insufficient individual attention, AI tools offer an innovative solution. For example, AI systems can track a student's progress and adjust content to suit their cognitive level, allowing for improved retention and deeper understanding. Such benefits have been shown to result in higher academic performance, particularly in STEM (Science, Technology, Engineering, and Mathematics) subjects (Nguyen & Li, 2022).

The Role of AI in Teacher Support and Students Academic Performance

The perceived benefits of AI technologies extend beyond direct student interaction to supporting teachers in their instructional practices, ultimately influencing students' academic performance. AI systems can assist teachers in grading, providing insights into student performance trends, and identifying areas of difficulty for students. According to a study by Adebayo and Owolabi (2023), AI tools can reduce the administrative burden on teachers, allowing them to focus on more individualized instruction. In secondary schools in Port Harcourt Metropolis, AI can help teachers optimize lesson planning by analyzing student data and recommending personalized learning interventions. This leads to improved instructional quality, which in turn boosts student performance. Additionally, the use of AI-powered systems for formative assessments ensures that students receive continuous feedback, helping them correct mistakes and strengthen areas of weakness (Ajayi et al., 2022). This collaborative

relationship between AI technologies and teachers has been shown to improve learning outcomes across various subjects.

AI's Role in Promoting Student Engagement and Motivation

One significant benefit of AI technologies in education is their ability to enhance student engagement and motivation, which are crucial factors in academic success. AI tools are designed to be interactive and adaptive, providing students with personalized learning experiences that keep them engaged. A study by Adams et al. (2024) found that AI-powered learning apps, such as gamified learning platforms, increased student motivation and participation in lessons, leading to improved academic performance. Students who used AI-driven platforms reported feeling more in control of their learning, as these tools offered immediate feedback and allowed for self-paced progress. In Port Harcourt Metropolis, where schools face challenges such as large class sizes and a lack of adequate learning resources, AI technologies can significantly boost students' intrinsic motivation. By making learning more enjoyable and relevant to each student's abilities, AI encourages active participation, which ultimately results in better academic performance (Bello & Moyo, 2023).

AI in Assessment and Feedback: Implications for Academic Performance

The integration of AI in student assessment processes is another perceived benefit that positively impacts academic performance. AI tools offer timely and accurate assessments that provide insights into students' strengths and weaknesses. According to a study by Chika et al. (2023), AI-based formative assessments, such as adaptive quizzes and instant feedback systems, allow teachers to identify struggling students early and intervene accordingly. In secondary schools in Port Harcourt Metropolis, AI-powered assessment systems have been implemented to streamline the evaluation process and provide personalized feedback. These tools allow teachers to focus on targeted interventions, thereby improving student performance in areas that are typically more challenging. Furthermore, students benefit from constant feedback that helps them refine their understanding of complex concepts, which has been shown to enhance both immediate and long-term academic performance (Nwachukwu & Eze, 2023).

AI and Equity in Education: Addressing Disparities in Students Academic Performance

AI technologies have the potential to address educational disparities, particularly in underfunded or resource-limited schools, such as those in Port Harcourt Metropolis. According to research by Ijeoma and Okafor (2022), AI applications can mitigate issues like the lack of qualified teachers and unequal access to educational resources. AI-driven tools enable students

to access quality education regardless of geographical location or socio-economic status. This technology makes learning resources available online, offering remote access to educational content and interactive learning activities. In areas like Port Harcourt, where some schools may struggle with outdated curricula and limited learning materials, AI can level the playing field by providing students with equal opportunities to succeed academically. The study found that AI adoption in secondary schools led to improved performance, particularly among students who previously lacked access to advanced learning materials (Afolabi & Adeoye, 2023).

Methodology

The study adopted a descriptive survey design with a population of 27,082 teachers and students comprising 25,077 students and 2,005 teachers in the 35 public senior secondary schools in Port Harcourt and Obio/Akpor Local Government Areas of Rivers State. The sample size of the study was 727 respondents comprising 394 students and 333 teachers. The sample size was determined using Taro Yamene's formula. The multi-stage sampling technique was adopted in selecting the sample size. The instrument for the study was a self-designed questionnaire titled; "Assessing the Perceived Benefits of Implementing Artificial Intelligence Technologies on Students' Academic Performance Questionnaire (APBIAITSAPQ)' Responses to the questionnaire items were structured on a four- point summated rating scale of: Very High Extent (VHE) – 4points, High Extent (HE) – 3points, Low Extent (LE) – 2points and Very Low Extent (VLE). The instrument was validated by experts in educational research. Reliability coefficients of 0.84, 0.83 and 0.85 were obtained for the various clusters of the instrument. The reliability of the instrument gave a Cronbach Alpha total index of 0.84 which was considered reliable. Mean and standard deviation were used to answer the research questions while z-test statistics was used to test the formulated null hypotheses at 0.05 level of significance. The null hypothesis was rejected and the alternate hypotheses accepted when the computed value was greater than the critical value at the significance level of 0.05. On the contrary, the null hypothesis was also accepted and the alternate hypotheses rejected when +the computed value is less than the critical table value.

Results Presentation

Research Question 1: To what extent does improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis?

Table 1: Mean Ratings on the Extent to which Improved Access to Resources through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

S/N	Questionnaire Items for	Students (394)	Teachers (333)

	Improved Access to Resources	$\bar{X}$	SD	Decision	$\bar{X}$	SD	Decision
1.	AI-driven platforms can provide students with round-the-clock access to learning materials and resources.	3.26	1.15	HE	3.18	1.09	HE
2.	AI cannot adapt educational content to match the student's proficiency levels and learning styles.	2.13	1.10	LE	2.28	1.17	LE
3.	AI systems can curate a diverse range of learning materials, making education more engaging.	3.20	1.18	HE	3.11	1.06	HE
4.	AI tools can help students quickly find and access the information they need for assignments or projects.	3.47	1.13	HE	3.43	1.09	HE
5.	AI can provide translation and language assistance, making educational resources accessible.	3.18	1.16	HE	3.28	1.04	HE
6.	AI can facilitate access to free or low-cost educational resources and courses, making education more affordable and accessible to a wider audience.	3.33	1.11	HE	3.26	1.19	HE
7.	AI-powered collaboration platforms can connect students with peers and instructors, fostering a collaborative learning environment.	3.21	1.15	HE	3.08	1.10	HE
	Grand Mean	**3.11**	**1.14**	**HE**	**3.09**	**1.11**	**HE**

Source: Field Survey, 2024.

Table 1 above revealed the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis. Majority of the respondents agreed with all the items in the table except item 2. The grand mean scores of 3.11, 3.09 and standard deviation scores of 1.14 and 1.11 for students and teachers respectively indicate that improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. The answer to research question 1 therefore is that: student and teachers indicate that improved access to resources through AI implementation influence students' academic performance to a high extent.

Research Question 2: To what extent does data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Table2: Mean Ratings on the Extent to Which Data-Driven Insights through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

S/N	Questionnaire Items for Data-Driven Insights	Students (394)			Teachers (333)		

		$\bar{X}$	SD	Decision	$\bar{X}$	SD	Decision
8.	AI can analyze individual student data to tailor the curriculum and learning activities to fit their unique needs.	3.30	1.08	HE	3.10	1.07	HE
9.	AI can identify signs of academic struggle early on, allowing educators to intervene and provide support before issues worsen.	3.01	1.12	HE	3.05	1.13	HE
10.	Data insights do not enhance students' engagement.	2.02	1.17	LE	2.10	1.15	LE
11.	AI analyze patterns in student data to inform curriculum development.	3.10	1.10	HE	3.20	1.14	HE
12.	AI-driven insights can guide schools inefficient resource allocation.	3.48	1.13	HE	3.41	1.17	HE
13.	AI can provide detailed and timely feedback to students, helping them understand their progress and areas for improvement.	3.31	1.07	HE	3.19	1.20	HE
14.	AI do not provide detailed and timely feedback to students.	2.15	1.11	LE	2.04	1.16	LE
	Grand Scores	**2.91**	**1.11**	**HE**	**3.01**	**1.15**	**HE**

Source: Field Survey, 2024.

Table 2 above revealed the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis. Majority of the respondents agreed with all the items in the table except item 10 and 14. The grand mean scores of 2.91, 3.01 and standard deviation scores of 1.11 and 1.15 for students and teachers respectively indicate that data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. The answer to research question 2 therefore is that: students and teachers indicates that data-driven insights through AI implementation influence students' academic performance in public senior secondary schools to a high extent.

Research Question 3: To what extent does efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis?

Table 3: Mean Ratings on the Extent Efficient Administrative Task through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

S/N	Questionnaire Items for Efficient Administrative Task	Students (394)			Teachers (333)		
		$\bar{X}$	SD	Decision	$\bar{X}$	SD	Decision

15.	AI helps students in Personalized Learning.	3.46	1.19	HE	3.43	1.14	HE
16.	Faster Feedback. Automated grading and feedback systems ensure that students receive timely responses on assignments and tests.	3.28	1.15	HE	3.37	1.17	HE
17.	AI helps ensure that students have access to the right materials, instructors, and learning environments at the right times.	3.41	1.08	HE	3.49	1.02	HE
18.	AI helps in improved Communication between students, teachers and parents.	3.40	1.14	HE	3.46	1.11	HE
19.	It helps to reduced administrative burden on teachers.	3.45	1.06	HE	3.48	1.19	HE
20.	AI analytics provide insights into student performance and learning patterns.	3.33	1.13	HE	3.29	1.03	HE
21.	AI-driven tutoring systems can provide individualized assistance outside the classroom, offering students additional practice and support tailored to their needs.	3.49	1.12	HE	3.47	1.08	HE
	Grand Scores	**3.40**	**1.12**	**HE**	**3.43**	**1.21**	**HE**

Source: Field Survey, 2024.

Table 3 above revealed the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis. Majority of the respondents agreed with all the items in the table. The grand mean scores of 3.40, 3.43 and standard deviation scores of 1.12 and 1.21 for students and teachers respectively indicate that efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. The answer to research question 3 therefore is that: students and teachers indicate that efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools to a high extent.

Test of Hypotheses

H_{o1}: There is no significant difference in the mean ratings of teachers and students on the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Table4: z-testAnalysisofDifferenceintheMeanRatingsofStudentsandTeachersonthe Extent to which Improved Access to Resources through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

Category of Respondents	N	$\bar{X}$	SD	A	Df	z-cal	z-crit	Decision
Students	394	3.11	1.14					Ho
				0.05	725	0.24	±1.96	
Teachers	333	3.09	1.11					Accepted

Source: Field Survey, 2024.

From Table 4 above, the calculated z-value of 0.24 is less than the z-critical value of 1.96 at 725 degree of freedom and 0.05 alpha level. Given the above, the null hypothesis which states that there is no significant difference in the mean ratings of students and teachers on the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis is hereby accepted. The implication of this is that students and teachers consented that improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. **H_{o2}:** There is no significant difference in the mean ratings of teachers and students on the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Table 5: z-test Analysis of Difference in the Mean Ratings ofStudentsand Teachers on the Extent Data-Driven Insights through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

Category of Respondents	N	$\bar{X}$	SD	A	Df	z-cal	z-crit	Decision
Students	394	2.91	1.11					Ho
				0.05	725	-1.17	±1.96	
Teachers	333	3.01	1.15					Accepted

Source: Field Survey, 2024.

From Table 5 above, the calculated z-value of -1.17 is less than the z-critical value of 1.96 at 725 degree of freedom and 0.05 alpha level. Given the above, the null hypothesis which states that there is no significant difference in the mean ratings of students and teachers on the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis is hereby accepted.

The implication of this is that students and teachers agreed that data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent.

H_{o3}: There is no significant difference in the mean ratings of students and teachers on the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis.

Table6: z-testAnalysisofDifferenceintheMeanRatingsofStudentsandTeachersonthe Extent Efficient Administrative task through AI Implementation Influence Students' Academic Performance in Public Senior Secondary Schools in Port Harcourt Metropolis.

Category of Respondents	N	$\bar{X}$	SD	A	Df	z-cal	z-crit	Decision
Students	394	3.40	1.12					Ho
				0.05	725	-0.34	±1.96	
Teachers	333	3.43	1.21					Accepted

Source: Field Survey, 2024.

From Table 6 above, the calculated z-value of -0.34 is less than the z-critical value of 1.96 at 725 degree of freedom and 0.05 alpha level. Given the above, the null hypothesis which states that there is no significant difference in the mean ratings of students and teachers on the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis is hereby accepted. The implication of this is that efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a very high extent.

Discussion of Findings

Improved Access to Resources through AI and Students' Academic Performance

The result of the findings of the study for research question one revealed that improved access to resources through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. With grand mean scores of 3.11 and 3.09 which are greater than the criterion mean of 2.50. The corresponding hypothesis one also revealed that there is no significant difference in the mean ratings of students and teachers on the extent to which improved access to resources through AI implementation influence students' academic performance in public senior secondary schools

in Port Harcourt metropolis. This finding is in line with Huang, M.-H., and Rust, R. T. (2021), who viewed that AI can facilitate access to free or low-cost educational resources and courses, making education more affordable and accessible to a wider audience. The finding is also line with West (2023), who opined that, the integration of AI in the classroom is anticipated to bridge gaps in educational attainment by providing equitable access to resources and knowledge, assisting in reducing instructional disparities that are often found in public educational institutions.

Data-Driven Insights through AI and Students' Academic Performance

The findings of the study for research question two revealed that data-driven insights through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a very high extent. With grand mean scores of 2.91 and 3.01 which are greater than the criterion mean of 2.50. The corresponding hypothesis two also revealed that there is no significant difference in the mean ratings of students and teachers on the extent to which data-driven insights through AI implementation influence students' academic performance in public senior secondary schools. This finding is in line with the view of Williamson et al., (2022), who mentioned that data-driven Insights through AI can provide detailed and timely feedback to students, helping them understand their progress and areas for improvement.

Efficient Administrative Task through AI and Students' Academic Performance

The findings of the study for research question three revealed that efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis to a high extent. With grand mean scores of 3.40 and 3.43 which are greater than the criterion means of 2.50. The corresponding hypothesis three revealed that there is no significant difference in the mean ratings of students and teachers on the extent to which efficient administrative task through AI implementation influence students' academic performance in public senior secondary schools in Port Harcourt metropolis. This finding is in line with the view of Lee, (2021) who mentioned that AI helps ensure that students have access to the right materials, instructors, and learning environments at the right times.

Conclusion

Based on the findings of the study, it was concluded that the perceived benefits of implementing Artificial intelligence technologies on students' academic performance in secondary schools in Port Harcourt Metropolis include improved access to resources through AI, data-driven insights

through AI and efficient administrative task through AI. The study further concluded that. The exploration of the perceived benefits of Artificial Intelligence (AI) technologies in public senior secondary schools within the Port Harcourt Metropolis underscores a significant advancement in educational methodologies. AI's integration into the educational landscape offers a powerful tool for improving academic performance, addressing both the individualized needs of students and broader systemic challenges faced by educators.AI technologies facilitate personalized learning experiences by adapting content to suit individual learning velocities and styles, thereby promoting greater engagement and understanding among students. These technologies can identify patterns of strengths and weaknesses in student learning, allowing for timely and targeted interventions.

Recommendations

Based on the findings of the study, it was recommended that:

1. Federal and State government, Ministry of education, Curriculum planners and principals should implement A.I technology in public schools to improve students' academic performance.
2. It is crucial to engage all stakeholders, including educators, students, parents, and administrators, in the process of AI implementation. Comprehensive training programs should be developed to equip teachers with the necessary skills to effectively integrate AI tools into the curriculum. For students, workshops and informational sessions can help demystify AI technologies and illustrate their benefits, reducing apprehension and resistance.
3. Adequate technological infrastructure must be established to support the integration of AI in schools. This includes ensuring reliable internet access, providing necessary hardware such as computers and tablets, and maintaining software platforms. Investment in infrastructure is fundamental to enable seamless and consistent use of AI technologies in educational settings.
4. Establish clear guidelines and policies regarding data privacy and the ethical use of AI in schools. Educators and administrators should work with legal experts to develop protocols that protect student data while maximizing the benefits of AI technologies. Transparency in data usage will help build trust among students and parents.

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