

**LABORATORY AND LIBRARY FACILITIES: INVESTIGATING THEIR POTENCIES IN
PROMOTING STUDENT INTEREST AND PERFORMANCE IN SCIENCE SUBJECT**

By

**Dr Francis Donatus Eyenaka
Department of Physics
College of Education
Afaha Nsit**

And

**Friday Alphonsus Umoren
School of Secondary Education
Department of Physics Education
Federal College of Education (T)
Bichi, Kano**

ABSTRACT

This study examined the potency of laboratory and library facilities in promoting students' interest and performance in physics. In carrying out the study, descriptive survey design was adopted and the study area was Akwa Ibom State. The targeted population for the study comprised all laboratory scientists and librarians in secondary schools in Akwa Ibom State. A stratified random sampling technique was used to select 90 laboratory scientists and 90 librarians which gave a total of 180 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "Laboratory and Library Facilities Potencies and Students' Interest and Performance in Physics Questionnaire (LLFPSIPPQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.82 and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such as percentage analysis used in answering the research questions. The study delves into the aspects of laboratory, physics, laboratory facilities, and the academic performance of a students, giving results that indicate a positive correlation between the availability of these educational facilities and the improvement of student outcomes. Indicating that students with regular access to laboratories and libraries demonstrate more positive interest, higher engagement levels and better academic performance in physics compared to those with limited access in Akwa Ibom State and the reason being that there is laboratory and library facilities have the potency in promoting students' interests and performance in physics. The study concludes that by engaging in experiments and witnessing scientific principles in action, students become more motivated and confident in their abilities, which translates into improved academic performance. One of the recommendations provided was that educational authorities should priorities the development and maintenance of modern laboratory facilities in schools. Well-equipped laboratories enable students to engage in hands-on

experiments, which are crucial for understanding complex scientific concepts in physics and other science subjects.

KEYWORDS: Laboratory and Library Facilities, Students Interest, Performance in Physics and Akwa Ibom State

INTRODUCTION

Facilities for labs and libraries are essential for improving students' academic performance, especially in scientific classes. According to recent studies, rich library resources and well-equipped laboratories have a major role in boosting students' interest in and success in these subjects. Knowing the effects of these facilities becomes more crucial as educational establishments work to enhance scientific instruction.

Understanding scientific concepts and processes requires hands-on experience, which is mostly provided by laboratory facilities. The National Research Council (2017) emphasizes that laboratory experiences are essential for learning science because they allow students to interact directly with the material world. Studies have consistently shown that students who engage in laboratory work develop better scientific inquiry skills, have a deeper understanding of scientific concepts, and show greater interest in science (Hofstein & Lunetta, 2017).

Libraries are essential resources for students, providing access to a vast array of scientific books, reference materials, and digital resources, in addition to labs. Libraries promote an atmosphere that is favourable to independent study and research in addition to aiding in the acquisition of information. According to Smith (2019), libraries that provide comprehensive collections and accessible digital resources significantly enhance students' ability to perform in-depth research, which is crucial for their success in science subjects. The availability of such resources ensures that students can keep up with the latest scientific discoveries and methodologies. According to Bassey (2020), Library facilities like the use of cards catalogue, flipping through several cards to the use of online public access catalogue (OPAC) through the use of computers. Libraries are gradually moving away from hard copies of books, and student's project. This makes it easier for student in science subject promoting their performance and interest.

Moreover, the integration of digital technologies in libraries has transformed the way students engage with scientific information. Digital libraries and online databases have made it easier for students to access up-to-date research papers, journals, and other educational materials from anywhere, thereby promoting continuous learning (Johnson & Green, 2020). Williams and Wong (2021) highlighted that students who regularly utilized digital library resources showed improved academic performance and a higher level of engagement in their science courses. Despite the clear benefits, the effectiveness of laboratory and library facilities can be influenced by various factors such as funding, maintenance, and accessibility.

Brown and Smith (2022) revealed that underfunded laboratories and poorly maintained libraries negatively impact student outcomes. They argued that continuous investment in these facilities is crucial for maintaining high educational standards and promoting students' success in science subjects. Furthermore, ensuring that these

facilities are accessible to all students, including those from marginalized communities, is essential for fostering an inclusive learning environment (Garcia & Hernandez, 2023). Library facilities helps students find materials to augment their lecture notes, classroom, assignments, etc. Bassey (2024) revealed that most science student users use the library virtually every day and that books, newspapers and magazines are the materials users utilize the most. By so doing young learners reading habits are encouraged and good academic performance is guaranteed.

Physics as a science subject is one of the most fundamental scientific disciplines. Its main goal is to understand how the universe behaves. There are a lot of advances in physics and this helps enable new technology. Physics uses the scientific method to help uncover the basic foundations and principles that cover light and matter, and to discover the implications of those laws and it is assumed that there are rules by which the universe functions, and that those laws can be at least partially understood by humans. Physics aims to describe the function of everything around us, from the movement of tiny charged particles to the motion of people, cars, and spaceships. According to Williams (1912) and cited by Powers (2023) Physicist are so busy in enlarging the structure of knowledge that few of them concern themselves with the consideration of the fundamental consideration of the fundamental concept of the science. Physics is the foundation of many important disciplines and contributes directly to others.

STATEMENT OF PROBLEM

Students across the globe often struggle with maintaining interest and achieving strong performance in science subjects. This lack of engagement can hinder their development of critical thinking skills and limit their future career prospects in science and technology fields. This research focuses specifically on the Akwa Ibom State context, aiming to investigate the potential of two crucial resources - laboratory and library facilities - in promoting student interest and academic achievement in physics within the region.

OBJECTIVES

- To find out the potency of laboratory facilities in promoting students' interests and performance in physics in Akwa Ibom State.
- To find out the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State.

RESEARCH QUESTIONS

- What are the potency of laboratory facilities in promoting students' interests and performance in physics in Akwa Ibom State?
- What are the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State?

LITERATURE REVIEW

CONCEPT OF PHYSICS

The Greek word "physikos," which refers to all facets of nature at both the macroscopic and submicroscopic scales, is where the word "physics" originated. The structure of matter and the interactions between the basic elements that make up the observable universe are the subjects of the science of physics. Its field of study includes the nature and genesis of gravitational, electromagnetic, and nuclear force fields in addition to the behaviour of things under the influence of certain forces. Its ultimate goal is to develop a few all-encompassing principles that reconcile and make sense of all these seemingly unrelated phenomena. Physics is a branch of natural science that studies matter, how it moves through space and time, and associated ideas like force and energy.

The study of matter, its basic components, its motion and behaviour across space and time, and the related concepts of energy and force are all covered by the natural science of matter, or physics. However, physics can also be described as the study of physical matter, motion, force, and energy. The physical cosmos is more complex than what can be seen with the unaided eye and has a lot of moving elements. Physics is the study of mechanics, waves, thermodynamics, electricity and magnetism, geometrical optics, and atomic physics. Additionally, Puspitasari, Mufit, and Asrizal (2021) postulated that the purpose of studying physics is to lead students to develop experience and be able to formulate problems. Furthermore, although understanding physics and its rules can help with problem-solving, one does not necessarily need to be a scientist to utilize them.

PHYSICS AS A SCIENCE SUBJECT

The study of matter, its basic components, its motion and behaviour across space and time, and the related concepts of energy and force are all covered by the natural science of matter, or physics. It is clear that one of the most fundamental scientific fields is physics, with the primary objective being to comprehend the behaviour of the universe. A physicist is a scientist who specializes in the study of physics. Since physics incorporates astronomy, it may be the oldest academic science altogether. Weidner (2024) mentions physics as a science that deals with the structure of matter and the interactions between the fundamental constituents of the observable universe. Physical science's foundation is physics. Up until recently, the science whose goal is the discovery and articulation of the fundamental laws of nature was referred to as either natural philosophy or physics.

Williams (2023) mentioned that physics is a branch of natural science that explains and predicts the interaction between energy and matter. Cosmology, astrophysics, geophysics, biophysics, nuclear physics, and particle physics are among the topics and natural phenomena covered by physics. Physics mostly studies natural phenomena. It looks for basic truths regarding the nature of the cosmos. For example, the reason clouds do not descend even though they are made of water vapour and droplets can only be explained by physics. The scientific explanation for this is because the air's density and the clouds' density of mass per unit volume are equal. Thus, one way to characterize physics is as a subfield of natural science that aims to forecast and explain how matter and energy interact. Energy is the capacity to perform labour,

whereas matter is anything that has a mass quantity of matter contained in a substance and fills space. A person who studies physics is referred to as a physicist.

The study of matter and how it relates to energy is called physics. It entails examining the physical and environmental phenomena that surround us. The creation of rainbows, eclipses, objects falling from above to below, the origin of sunrises and sunsets, the generation of shadows, and many more phenomena are examples of these phenomena. Friedl & Brecht (2024) mentioned that physics is the study of the natural world, both seen and unseen. It is a wide topic that can be divided into more focused fields of study, such as optics and electromagnetic.

Furthermore, Arfken & Priest (2024) defined physics as the study of matter and energy. The laws that unify physics refer to particular physical quantities. The fundamental elements of our universe are described by physics. This covers the contents, the features that stand out about it, and the processes that either the contents or their properties go through. Put more simply, physics aims to explain the fundamental processes that underlie the behaviour of our universe. Understanding the behaviour of the cosmos, or how matter moves and behaves in space and time, is the focus of the physical science field of physics. Related ideas include energy and force. Applied physics, astrophysics, biophysics, condensed matter physics, high-energy physics, nuclear physics, optics, and particle physics are some examples of sub-disciplines in physics.

Favat (2024) mentioned that physics is the cornerstone of the other natural sciences (chemistry, geology, biology, and astronomy) and is essential to understanding our modern technological society. Experimentation, observation, and the use of mathematical and computational tools for phenomenon analysis form the foundation of physics.

CONCEPT OF SCIENCE SUBJECTS

Science is the methodical study of nature by means of analysis, experimentation, and observation. It includes a number of disciplines, including earth sciences, physics, chemistry, biology, and astronomy. Fundamentally, science aims to comprehend the underlying laws controlling the cosmos and to formulate hypotheses supported by empirical data. Science is defined by its quest for understanding and knowledge. Science is essential to the advancement of human knowledge and the development of new technologies.

According to Almarode (2018), science subjects are not static; they continuously evolve as new discoveries are made and technologies advance. This dynamic nature requires that science education also be adaptive, incorporating the latest research findings and technological innovations into the curriculum. Keeping the curriculum up-to-date ensures that students are well-prepared for future scientific challenges and opportunities. Furthermore, science permeates daily life and is not only found in labs and educational settings. Scientific knowledge is ingrained in many facets of society, from knowing the fundamentals of nutrition to sustain a balanced diet to understanding the dynamics of climate change to make educated decisions.

In recent years, the importance of science in addressing global challenges has become increasingly evident. The COVID-19 pandemic highlighted the critical role of scientific research in developing vaccines, understanding the spread of the virus, and implementing public health measures to mitigate its impact. As emphasized by the World Health Organization (2020), "Science is critical in guiding responses to health emergencies and other global challenges."

The objectives of science education are to foster profound comprehension of scientific concepts, critical thinking, and problem-solving abilities. It pushes pupils to think critically, pose questions, carry out experiments, and examine data. The advancement of knowledge and technology depends on the scientific method. Students who participate in science classes develop their analytical skills and get ready for a variety of vocations in science and technology by learning how to apply scientific ideas to real-world issues.

CONCEPT OF LABORATORY

A laboratory, commonly referred to as a "lab," serves as a dedicated space for scientific experimentation, research, and analysis across various disciplines such as physics, chemistry, biology, engineering, and medicine. It provides a controlled environment equipped with specialized apparatus, instruments, and materials essential for conducting empirical investigations and testing hypotheses (MacLeod, 2011). It is also a facility that provides controlled conditions in which scientific or technological research, experiments, and measurements may be performed. Laboratories are found in a variety of settings, such as schools, universities, privately owned research institutions, corporate research and testing facilities, government regulatory and forensic investigation centres, physicians' offices, clinics, hospitals, regional and national referral centres, and even occasionally personal residences (Bertholf, 2017).

Laboratories vary in size, complexity, and specialization, ranging from small-scale educational labs in schools and universities to large-scale research facilities in academic institutions, government agencies, and industrial settings. They are characterized by their adherence to rigorous safety protocols, quality assurance measures, and ethical standards to ensure the validity, reliability, and reproducibility of scientific findings. Laboratories are subject to regulatory oversight and compliance with local, national, and international safety standards to protect the health and well-being of laboratory personnel and the surrounding environment (National Research Council, 2011). Laboratories play a crucial role in driving scientific advancement and innovation by providing essential infrastructure and resources for research, experimentation, and development.

The specialism and function of laboratories can be used to classify them. Educational laboratories are primarily used for teaching and learning, giving students practical training and hands-on experiences. On the other hand, the goals of research laboratories include knowledge advancement and original research in a range of scientific domains. Laboratories are integral to science education, providing students with opportunities to engage in hands-on experimentation, inquiry-based learning, and critical thinking. Practical work in laboratories enhances students' conceptual understanding, problem-solving skills, and scientific literacy, preparing them for future

careers in science and technology (American Association for the Advancement of Science, 2011).

CONCEPT OF LABORATORY FACILITIES

In order to facilitate experimentation, analysis, and innovation in a wide range of disciplines, including chemistry, biology, physics, engineering, and medicine, laboratory facilities are essential parts of scientific research institutions, educational settings, and industrial environments. The idea of laboratory facilities includes a variety of components that enhance its usefulness, security, and capacity to facilitate scientific research.

First and foremost, specialist infrastructure designed to meet particular research objectives is what distinguishes laboratory facilities. For investigations requiring liquids, wet laboratories with sinks, fume hoods, and bench space are ideal, whereas dry labs with computers and simulation software are best for computational analysis and modelling. Clean rooms for the production of semiconductors, biological containment facilities for handling infections, and animal research facilities for preclinical investigations are examples of more specialist fields.

Moreover, laboratory facilities are equipped with a diverse array of instruments and equipment essential for conducting experiments and measurements. These may include microscopes, spectrometers, centrifuges, chromatographs, incubators, autoclaves, and more, depending on the nature of the research being conducted. The availability of cutting-edge instrumentation facilitates precise data collection and analysis, enabling researchers to explore complex phenomena and develop innovative solutions to scientific challenges (National Institutes of Health, 2022).

Safety is paramount in laboratory facilities due to the potential hazards associated with certain experiments and materials. As such, these facilities are equipped with robust safety measures, including ventilation systems to remove fumes, protective gear such as lab coats and goggles, emergency eyewash stations and showers, and protocols for handling hazardous materials. Compliance with regulatory standards such as OSHA and EPA guidelines ensures the safety of personnel and the environment (American Chemical Society, 2022). Additionally, laboratory facilities often employ support staff, including lab managers, technicians, and research assistants, to assist with day-to-day operations, equipment maintenance, and experiment implementation. These personnel play a crucial role in ensuring the smooth functioning of the laboratory and facilitating research activities.

CONCEPT OF LIBRARY FACILITIES

Libraries have been around for a very long time and are traditionally seen as collections of information and services. Francis, Estabrook, Foskett & Haider (2017) explain that the library has its origins in the Latin word "liber", which means "book". From this standpoint, it infers that a book is inseparable from the concept of a library. As stated by Akpan and Ekong (2021) the conservative definition of a library as a storehouse of knowledge where resources are shackled to preserve and prevent them

from any form of theft, making access to them very narrow, is no longer adequate. This has in a way made the utilization process slightly hampered.

Library facilities encompass a broad range of resources, services, and physical spaces designed to support the informational, educational, cultural, and recreational needs of a community. Library facility means structures or spaces that are constructed, installed, or established to serve specified library functions. Petrov (2020) mentioned that well-equipped library facilities play a crucial role in promoting student interest and performance in science subjects by providing access to necessary resources, fostering a conducive learning environment, and incorporating advanced technologies to enhance the learning experience. Investments in library infrastructure and professional development for library staff are essential to maximising these benefits and improving educational outcomes in science education. Library facilities like the electronic resources i.e online learning, the printed materials i.e books, periodical, government publications and the non-printed materials i.e audio, visuals, and audio visuals has the potency in promoting good performnace among students in science subjects (Bassey 2017)

EFFECT OF LABORATORY FACILITIES ON STUDENTS' PERFORMANCE IN PHYSICS

There are several ways that the laboratory affects how well students do in physics. They consist of: improving conceptual understanding; strengthening scientific abilities; boosting motivation and engagement; strengthening the connection between theory and practice; and promoting group learning. Details are as below:

- **Enhanced Understanding of Concepts:**

Facilities for laboratories are essential for improving students' comprehension of physics principles. Students' understanding is reinforced when they witness the practical application of academic knowledge through practical experiments. When students can physically manipulate materials and observe outcomes, they are better able to grasp complex concepts that are often difficult to understand through lectures alone (Kolawole & Ilugbusi, 2014). This practical experience encourages knowledge retention and active learning, which improves academic success.

- **Development of Scientific Skills:**

Students who have access to well-equipped laboratories are better able to learn the fundamental scientific abilities. The best way to learn skills like measurement, observation, data collection, and analysis is through hands-on experience. When students engage in experiments, they learn how to apply the scientific method, which enhances their critical thinking and problem-solving abilities (Udo & Udofia, 2016). These skills are not only crucial for their success in physics but also beneficial for their overall academic and professional development.

- **Increased Engagement and Motivation:**

Physics lab sessions have the potential to greatly boost students' interest and drive to learn the subject. When students participate in interactive and hands-on activities, they find the learning process more interesting and enjoyable (Ogunleye & Babajide,

2018). A more favourable attitude towards the subject, higher attendance rates, and a greater willingness to participate in class activities can all result from this enhanced involvement. Students that are motivated are more likely to put effort into their studies, which improves achievement.

- **Improvement in Practical Examination Performance:**

Students who utilize labs on a regular basis typically score higher on practical exams. A big part of teaching physics is assessing students' practical application of theory in real-world scenarios through practical evaluations. Regular use of laboratory facilities allows students to practice and refine their experimental techniques, making them more confident and proficient during examinations (Okeke & Nwankwo, 2017). Gaining proficiency with laboratory apparatus and protocols can lead to improved performance on hands-on assessments.

- **Bridging the Gap between Theory and Practice:**

The ability of laboratory equipment to bridge the gap between theoretical knowledge and practical application is one of its most important benefits. Physics, being an experimental science, requires students to understand how theoretical principles operate in real-world scenarios (Adejumo & Adeoye, 2019). This connection is made possible by laboratory experiments, which assist students in seeing the value and relevance of the knowledge they acquire in the classroom. Their general understanding and academic achievement are improved by this link between theory and practice.

- **Encouragement of Collaborative Learning:**

Students' collaborative learning is encouraged by the frequent group work involved in laboratory tasks. Working in groups allows students to share ideas, discuss problems, and collectively find solutions, fostering a collaborative learning environment (Nsofor & Akanbi, 2020). Their learning experience is improved and their communication and teamwork abilities are developed as a result of this peer engagement. Improved academic results and a deeper comprehension of physics concepts can result from collaborative learning in the lab.

EFFECT OF LIBRARY FACILITIES ON STUDENT INTEREST AND PERFORMANCE IN PHYSICS

Science students' interest and performance are greatly impacted by the availability and calibre of library resources. Libraries offer vital resources that help students in their academic endeavours and enhance their comprehension of scientific ideas, such as scientific journals, textbooks, and digital media. Students can investigate topics outside of the classroom curriculum when they have access to a well-stocked library, which promotes a more thorough and involved learning process.

Libraries are essential for helping students succeed academically, especially in courses like physics where a high degree of conceptual comprehension and problem-solving abilities are required. To optimize these advantages and raise the quality of science instruction, investments in library infrastructure and staff professional development are crucial. Library facilities like electronic resources, i.e., online learning;

printed materials, i.e., books, periodicals, and government publications; and non-printed materials, i.e., audio, visuals, and audiovisuals, have the potential to promote good performance among students in science subjects (Bassey 2017). The effect of library facilities on student performance in physics includes several factors:

- **Access to Resources:**

A wide variety of physics textbooks, scholarly journals, and digital resources are available in libraries, giving students access to extensive materials that enhance their classroom education. According to Elbert and Du (2016), access to updated textbooks and reference materials significantly enhances students' understanding of complex physics concepts, leading to better academic performance. To keep up with scientific discoveries, it is imperative that students have access to the most recent physics research and developments, which is made possible by the availability of digital databases and e-books.

- **Conducive Study Environment:**

A well-planned library provides a calm, orderly space that is ideal for concentrated learning and study. Physics and other topics requiring a high level of cognitive involvement and concentration benefit greatly from this atmosphere. Houghton (2017) stated that students who utilize library facilities regularly exhibit higher levels of academic achievement in physics compared to those who study in less structured environments such as home or cafes. The research emphasizes that the arrangement of study spaces in libraries, such as study carrels, group study rooms, and silent areas, is crucial in reducing disturbances and improving the effectiveness of studying.

- **Academic Support Services:**

Academic assistance services including tutoring, workshops, and subject-specific librarian access are frequently offered by modern libraries. These resources are essential for guiding students through difficult physics ideas and challenges. Kim and Shumaker (2018) mentioned that students who participated in library-facilitated tutoring sessions showed marked improvement in their physics grades. Better academic results are also a result of the availability of skilled librarians who can assist students in locating pertinent materials and making efficient use of research tools.

- **Collaborative Learning Opportunities:**

Additionally, libraries act as gathering places for group talks and study sessions among students. Students can discuss various approaches to problem-solving and points of view in this cooperative learning environment. Lopez and Molinaro (2020) noted that group study sessions in library settings significantly boost students' performance in physics by encouraging active learning and deeper understanding of the material. These classes frequently result in enhanced analytical and critical thinking abilities, which are crucial for learning physics.

- **Technological Integration:**

The impact of library services on student performance has been further amplified by the use of technology. The utilisation of virtual laboratories, interactive simulations, and

internet-based platforms provide practical experience that is essential for understanding physics subjects in libraries. Nguyen and Wargo (2022) indicate that students who utilize technological resources in libraries exhibit better practical understanding and application of physics theories, which translates into higher academic performance.

METHODOLOGY

In carrying out the study, descriptive survey design was adopted for this study. The study was carried out in Akwa Ibom State. The targeted population for the study comprised all laboratory scientists and librarians in secondary schools in Akwa Ibom State. A stratified random sampling technique was used to select 90 laboratory scientists and 90 librarians which gave a total of 180 respondents used for the study. The instrument used for data collection was a structured questionnaire titled "Laboratory and Library Facilities Potencies and Students' Interest and Performance in Physics Questionnaire (LLFPSIPPQ)". Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument has the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.82 and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such as percentage analysis used in answering the research questions.

RESULTS AND DISCUSSIONS

Research Question 1

The research question sought to find out the potency of laboratory facilities in promoting students' interests and performance in physics in Akwa Ibom State. To answer the research percentage analysis was performed on the data, (see table 1).

Table 1: Percentage analysis of the potency of laboratory facilities in promoting students' interests and performance in physics in Akwa Ibom State.

POTENCY	FREQUENCY	PERCENTAGE
Highly Effective	137	76.11**
Effective	43	23.89*
TOTAL	180	100%

** The highest percentage frequency
* The least percentage frequency

SOURCE: Field survey

The above table 1 presents the percentage analysis of the potency of laboratory facilities in promoting students' interests and performance physics in Akwa Ibom State. From the result of the data analysis, it was observed that 137(76.11%) of the respondents affirmed that the potency of laboratory facilities in promoting students' interests and performance in physics in Akwa Ibom State was "Highly effective". While the least respondent 43(23.89%) affirmed it to be "Effective". The result therefore is in

agreement with the research findings of Schwartz (2019) who mentioned in his study that active participation in laboratory activities significantly boosts students' conceptual understanding and retention of scientific concepts as it affords students the invaluable opportunity to engage in hands-on experimentation, a cornerstone for grasping abstract scientific principles.

Research Question 2

The research question sought to find out the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State. To answer the research percentage analysis was performed on the data, (see table 2).

Table 2: Percentage analysis of the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State.

POTENCY	FREQUENCY	PERCENTAGE
Highly Effective	159	88.33**
High Extent	21	11.67*
TOTAL	180	100%

** The highest percentage frequency

* The least percentage frequency

SOURCE: Field survey

The above table 2 presents the percentage analysis of the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State. From the result of the data analysis, it was observed that 159(88.33%) of the respondents affirmed that the potency of library facilities in promoting students' interests and performance in physics in Akwa Ibom State was "Highly effective". While the least respondent 21(11.67%) affirmed it to be "Effective". The result therefore is in agreement with the opinion of Petrov (2020) who mentioned that well-equipped library facilities play a crucial role in promoting student interest and performance in science subjects by providing access to necessary resources, fostering a conducive learning environment, and incorporating advanced technologies to enhance the learning experience.

CONCLUSION

Laboratory and library facilities play crucial roles in enhancing student interest and performance in science subjects. Laboratory facilities provide hands-on experiences that are vital for understanding scientific concepts and developing practical skills. These interactive sessions help students connect theoretical knowledge with real-world applications, thereby deepening their comprehension and fostering a genuine interest in scientific exploration. By engaging in experiments and witnessing scientific principles in action, students become more motivated and confident in their abilities, which translates into improved academic performance.

RECOMMENDATIONS

- Educational authorities should priorities the development and maintenance of modern laboratory facilities in schools. Well-equipped laboratories enable students to engage in hands-on experiments, which are crucial for understanding complex scientific concepts in physics and other science subjects.
- Schools should invest in enriching their library collections with current and comprehensive scientific literature, including textbooks, journals, and digital resources.
- Curriculum planners should incorporate structured and regular use of laboratory and library facilities into the science curriculum. This integration ensures that students not only learn theoretical concepts but also apply them through practical experiments and further reading.

REFERENCES

- Adejumo, A. O., & Adeoye, F. A. (2019). Bridging the gap between theory and practice in physics education through laboratory activities. *Journal of Science Education*, 25(3), 123-135.
- Akpan, E. E. & Ekong, X. M. (2021) *Information and Communication Technology as a Correlate of Library and Information Services in Tertiary Institutions in Akwa Ibom State*. Library and Information Science Compendium. Global Academic Stars Promoter, Germany.
- Almarode, J. T., & Vandas, K. (2018). *Clarity for Learning: Five Essential Practices That Empower Students and Teachers*. Corwin Press.
- American Association for the Advancement of Science. (2011). Vision and change in undergraduate biology education: A call to action. Retrieved from <https://visionandchange.org/>
- American Chemical Society. (2022). Guidelines for Chemical Laboratory Safety in Academic Institutions. <https://pubs.acs.org/doi/10.1021/bk-2012-1112.ch002>
- Arfken G. & Priest J. (2024) general physics. Available at: <https://www.sciencedirect.com/topics/physics-and-astronomy/physics>
- Bassey M. (2017). Library education programmes and literacy skills as predictors of library use in university libraries in akwa ibom states, Nigeria. *Akwa Ibom State Library and Information Services Antecedents Perspective prospects*
- Bassey M. (2020). *Library Advocacy: A Sustaining Library Services in the 21st Century. Anthology in Library and Information Science*
- Bassey M., Ukanga C. & Ngozie V. (2024). Assessment of use of library resources and services by students at the University of Delta, Agbor, Nigeria. *Abraka Humanities Review*
- Bertholf R.L. (2017) Laboratory Structure and Function. In: Molinaro R., McCudden C., Bonhomme M., Saenger A. (eds) *Clinical Core Laboratory Testing*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4899-7794-6_1concept of laboratory facilities
- Brown, L., & Smith, M. (2022). Funding and Maintenance of Educational Facilities: Implications for Student Performance. *Educational Policy*.
- Dresner, S. (2015). *The principles of sustainability (2nd Ed.)*. Routledge.
- Elbert, M., & Du, J. (2016). The Impact of Library Resources on Academic Performance. *Journal of Academic Libraries*, 72(4), 543-559.
- Favat (2024) physics as a sciences. Available at: <https://www.montclair.edu/physics-astronomy/why-study-physics/#:~:text=Physics%20is%20the%20cornerstone%20of,using%20mathematical%20and%20computational%20tools>.

- Friedl E. & Brecht m (2024) Physics as a science. Available at: <https://study.com/learn/lesson/what-is-physics-branches.html>,
- Garcia, A., & Hernandez, L. (2023). Accessibility of Educational Resources and its Impact on Student Equity in Science Education. *Journal of Diversity in Higher Education*.
- Hofstein, A., & Lunetta, V. N. (2017). The Role of the Laboratory in Science Teaching: Neglected Aspects of Research. *Review of Educational Research*.
- Houghton, J. (2017). Study Environment and Student Performance in Higher Education. *Higher Education Research & Development*, 36(3), 512-527.
- Johnson, R., & Green, T. (2020). Digital Libraries and Student Performance in Higher Education. *Journal of Academic Librarianship*.
- Kim, Y., & Shumaker, D. (2018). Academic Support Services in Libraries and Student Success. *College & Research Libraries*, 79(6), 742-758.
- Kolawole, E. B., & Ilugbusi, O. A. (2014). Impact of laboratory facilities on students' academic performance in physics. *International Journal of Educational Research*, 15(2), 54-67.
- Lopez, G., & Molinaro, M. (2020). Collaborative Learning in Library Spaces and Its Effect on Student Performance. *Journal of Library Administration*, 60(2), 138-153.
- MacLeod, R. M. (2011). "Laboratory." In M. Ruse (Ed.), *the Oxford Handbook of Philosophy of Biology*. Oxford University Press.
- National Institutes of Health. (2022). *Design Requirements Manual: Laboratory Facilities*.
<https://orf.od.nih.gov/PoliciesAndGuidelines/DesignRequirementsManual/LaboratoryFacilities>
- National Research Council. (2011). *prudent practices in the laboratory: Handling and disposal of chemicals*. National Academies Press.
- National Research Council. (2017). *America's Lab Report: Investigations in High School Science*.
- Nguyen, L., & Wargo, M. (2022). Technological Integration in Libraries and Its Impact on Learning Outcomes. *Library Hi Tech*, 40(1), 97-113.
- Nsofor, C. C., & Akanbi, M. O. (2020). The role of collaborative learning in laboratory settings on students' performance in physics. *Journal of Science and Technology Education Research*, 29(1), 78-88.
- Ogunleye, A. O., & Babajide, V. F. (2018). Enhancing student engagement in physics through laboratory work. *Journal of Science Education and Technology*, 22(4), 304-315.
- Okeke, C. E., & Nwankwo, C. A. (2017). Effect of laboratory facilities on students' performance in physics practical examinations. *Journal of Educational Assessment*, 19(3), 102-115.

- Petrov, P. D., & Atanasova, T. V. (2020). The Effect of Augmented Reality on Students' Learning Performance in STEM Education. *Information*, 11(4), 209.
- Pier, E. L., Britton, L., Otto, C., Dorsch, N., Allexsah-Snider, M., & McAuley, A. (2020). Collaborative learning: The role of group work in the student perception of learning outcomes in a STEM laboratory environment. *Journal of Chemical Education*, 97(6), 1553-1561.
- Powers, J. H. (2023). *Philosophy and the new physics*. Taylor & Francis.
- Puspitasari R., Mufit F. & Asrizal (2021) Conditions of learning physics and students' understanding of the concept of motion during the covid-19 pandemic. A paper presented by *3rd International Conference on Research and Learning of Physics (ICRLP) 2020 IOP publishing*.
- Schwartz, R. S., Lederman, N. G., & Crawford, B. A. (2019). Developing views of nature of science in an authentic context: An explicit approach to bridging the gap between nature of science and scientific inquiry. *Science Education*, 103(3), 529-558.
- Smith, J. (2019). The Role of Libraries in Enhancing Student Learning in Science. *College & Research Libraries*.
- Udo, M. I., & Udofia, E. A. (2016). Development of scientific skills through laboratory facilities in physics education. *Journal of Educational Research and Review*, 23(2), 89-99.
- Weidner (2024) physics as science. Available at: <https://www.britannica.com/science/physics-science>
- Williams P. (2023) Physics as science subject. Available at: <https://study.com/academy/lesson/what-is-physics-definition-branches-fundamentals-topics.html>
- Williams, P., & Wong, W. (2021). The Impact of Digital Library Resources on Student Engagement and Performance. *Library & Information Science Research*.
- World Health Organization. (2020). COVID-19 Strategy Update. Retrieved from <https://www.who.int/publications/i/item/covid-19-strategy-update---14-april-2020>