DEVELOPMENTS, DISCOVERIES AND INVENTIONS MADE BY SCIENCE TEACHERS AND OTHER SCIENTISTS IN PHYSICAL AND ENVIRONMENTAL SCIENCES: AN EMPIRICAL STUDY OF AKWA IBOM STATE SCIENCE TEACHERS PERCEPTION

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ABSTRACT

The study examined the developments, discoveries and inventions made by science teachers and other scientists in physical and environmental sciences, empirically studying the perception of Akwa Ibom State science teachers. Descriptive survey design was adopted to carry out this research in Akwa Ibom State. The targeted population for the study comprised all science teachers in Akwa Ibom State. Stratified sampling technique was used to select 40 science teachers each from the three senatorial districts of the state which gave a sample size of 120 science teachers used to carry out this research. The instrument used for data collection was a structured questionnaire titled "Science Teachers and other Scientists Discoveries Questionnaire (STSDQ)". 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 0.84, 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 descriptive statistics to answer research questions. The result of the analysis showed that discoveries related to teaching strategies in physics among many other discoveries was the most prominent invention made by science teachers in physical science. It also revealed that among many other type of discoveries made by science teachers in environmental science, the most notable was discovery-based learning. Based on this, the study concluded that scientific discovery drives human progress, particularly in physical and environmental sciences, which shape our understanding of the natural world. One of the recommendations made was that governments, private sectors, and international organisations should prioritise funding for research and development (R&D) in physical and environmental sciences.

Keywords: Discoveries, Inventions, Science Teachers, Scientists, Physical and Environmental Sciences

Introduction

Scientific discovery has long been the driving force behind the advancement of human civilization. In the fields of physical and environmental sciences, these discoveries have significantly impacted how societies understand and interact with the natural world. Physical sciences, which include disciplines such as physics, chemistry, and geology, focus on understanding the fundamental properties and phenomena of matter and energy. Environmental sciences, on the other hand, delve into the relationships between living organisms and their surroundings, emphasising sustainable practices for preserving ecosystems. Together, these fields have shaped humanity's approach to solving pressing global issues, such as climate change, energy crises, and resource management. As quoted by Yoldere & Adamu (2014), science helps humans gain increased understanding of how the world works, while technology helps scientists make these discoveries.

According to Gregory, Bridle, & Wilson (2024), scientific advances have a pervasive influence on human lives and livelihoods, and science continues to be a dominant philosophy in building knowledge, advancing technology, making predictions in time and space, and improving the quality of human life. One notable role of scientific discovery in physical sciences is its contribution to technological innovation. Discoveries in quantum mechanics, thermodynamics, and electromagnetism have led to the development of transformative technologies such as computers, renewable energy systems, and space exploration tools. These advancements have redefined industries and improved quality of life globally. Similarly, environmental sciences have unveiled critical insights into biodiversity, pollution control, and climate adaptation, enabling informed policymaking and practical interventions to protect the planet.

The prospects of scientific discoveries in these fields are immense. Breakthroughs in nanotechnology and renewable energy hold the potential to revolutionise energy efficiency and reduce dependence on fossil fuels. Additionally, advancements in environmental monitoring technologies, such as satellite imaging and artificial intelligence, provide unprecedented tools for addressing ecological challenges. Environmental degradation can negatively affect human health, livelihoods, and well-being, with a disproportionate effect on disadvantaged populations, exacerbating societal inequalities (Hoffman et al., 2020). However, the intersection of physical and environmental sciences promises a future where humanity can mitigate environmental degradation while ensuring sustainable growth. However, these advancements are not without challenges. The pursuit of scientific discovery often demands significant financial resources, advanced infrastructure, and collaboration among experts across disciplines. Developing nations frequently face limitations in accessing cutting-edge technologies, creating a gap between global scientific progress and local applicability. Furthermore, ethical concerns surrounding some scientific innovations, such as genetic modification and nuclear energy, pose societal dilemmas that require careful consideration.

Another pressing challenge lies in the communication of scientific findings to policymakers and the public. As stated by Halpern, Boettiger, Dietze, Gephart, Gonzalez, Grimm, & Youngflesh, synthesis science in ecology and environmental science is particularly well suited to informing decision makers. Misinformation and resistance to change can hinder the adoption of beneficial innovations, particularly in environmental sciences. Effective science communication is essential to bridge the gap between scientific knowledge and practical implementation. This challenge underscores the importance of fostering public trust and understanding through education and outreach. Despite these obstacles, scientists continue to play a vital role in addressing the world's most complex problems. Improved communication, coproduction,

transparency, and data reuse practices can support evidence-informed decisions (Donnelly et al., 2018).Their discoveries form the foundation for evidence-based solutions, guiding efforts to combat climate change, improve energy security, and enhance public health. The integration of interdisciplinary approaches and international collaboration further strengthens the prospects for overcoming global challenges.

Statement of Problem

The role of science teachers in fostering scientific discoveries and inventions in physical and environmental sciences remains underexplored, particularly in Akwa Ibom State. Despite advancements in science education, there is limited empirical evidence on the contributions of science teachers to innovations in these fields. Many teachers lack adequate support, resources, and research opportunities to develop and implement scientific discoveries in their classrooms. Additionally, their perception of their role in driving scientific progress remains unclear. The gap between theoretical knowledge and practical application of scientific principles further hinders local innovations. There is also insufficient collaboration between science teachers and research institutions, limiting the translation of ideas into real-world solutions. Furthermore, environmental challenges such as pollution, climate change, and resource depletion require innovative scientific approaches, yet the extent to which teachers contribute remains uncertain. Understanding their perception of scientific discoveries and inventions is crucial for policy development and capacity-building initiatives.

Objectives of the study

1. To find out the types of discoveries and inventions made by science teachers in physical science
2. To examine the types of discovery made by science teachers in environmental science

Research Questions

1. What are the types of discoveries and inventions made by science teachers in physical science?
2. What are the types of discovery made by science teachers in environmental science?

LITERATURE REVIEW

Concept of Science

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. Science is a systematic discipline that builds and organises knowledge in the form of testable hypotheses and predictions about the universe. According to Mickens (2016), science is the systematic observation, creation, analysis, and modelling of patterns that exist in the physical universe.

Science can also be seen as the observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. Science is the pursuit of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. Heintz (2024) mentioned that science covers various subjects such as physics, chemistry, mathematics, basic science, agriculture, and biology.

Science refers to the knowledge and comprehension that individuals possess about the principles and processes of scientific inquiry, as well as the competencies and understandings they acquire through formal and informal education to make informed decisions and cope with real-life situations involving science. Science is the study of the nature and behaviour of natural things and the knowledge that we obtain about them. Prachagool and Nuangchalerm (2019) explained science as an attempt to explore and explain the natural phenomena surrounding students. Science is the study of the physical and natural world through observation and experimentation. It is everywhere around us, from the air. Science is an accumulated and systematised learning in general usage restricted to natural phenomena. Science refers to the system or process of acquiring knowledge about the natural world.

Concept of Physical Science

Physical science, the systematic study of the inorganic world, is distinct from the study of the organic world, which is the province of biological science. Physical science is ordinarily thought of as consisting of four broad areas: astronomy, physics, chemistry, and the Earth sciences. Physical science deals with inquiry into nature. Physical science is a branch of natural science that studies non-living systems, in contrast to life science. It in turn has many branches, each referred to as a physical science, and together is called the physical sciences. Physical science is a broad term encompassing the various branches of natural science that study non-living systems.

According to Srivastava (2024), physical science is a branch of natural science that deals with the study of non-living processes and systems in contrast to life science. It is used to explain concepts in the form of explanations and predictions about the universe. Furthermore, Anjov (2023) mentioned that physical sciences are precise to the study of the physical or natural world. The earth sciences are sometimes considered to be either made up of four or five branches, such as geology, meteorology, oceanography, and astronomy or climatology, and environmental science. With this list, it is not out of place to say that physical sciences deal with inanimate matter.

Concept of Environmental Science

Environmental science is a field that studies circumstances, objects, or conditions by which an organism or community is surrounded and the complex ways in which they interact. According to Young & William (2024), environmental science is a multidisciplinary inquiry that deals primarily with the variety of environmental problems caused by humans as they live their lives: satisfying needs and wants, processing materials, and releasing unwanted products back into the environment. It is a relatively recent field of study that emerged from recognition of the multiple, interrelated impacts caused by the complex interactions between humans and the Earth environments in which they live.

Moreover, Ha & Schleiger (2024) mentioned that environmental science is the dynamic, interdisciplinary study of the interaction of the living and non-living parts of the environment, with special focus on the impact of humans on the environment. Furthermore, Victor (2023) stated that environmental science is an interdisciplinary field that involves the study of the natural world and the impact of human activity on it. It encompasses a wide range of topics, including ecology, geology, atmospheric science, oceanography, and conservation biology. Environmental scientists use scientific methods and data to understand and address environmental problems and create solutions that benefit both humans and the natural world. One of the key issues that environmental science addresses is climate change.

Environmental science emphasises the need for scientific evidence to guide policy decisions that promote environmental stewardship and resilience. It is an interdisciplinary field

dedicated to understanding the complex relationships between humans and the natural world. It combines principles from various scientific disciplines, including ecology, geology, chemistry, and physics, to study the effects of human actions on the environment. This field aims to provide scientific insights into environmental problems such as pollution, deforestation, and climate change while also proposing strategies for sustainable management and conservation of natural resources (Martinez & Wong 2022).

DISCOVERIES AND INVENTIONS MADE BY SCIENCE TEACHERS IN PHYSICAL SCIENCE

Awesome Discoveries and Inventions in Physical Science

Science teachers play a crucial role in advancing physical science education by developing innovative teaching strategies, uncovering misconceptions, and contributing to the improvement of scientific inquiry. Over the past few years, their discoveries have led to better pedagogical methods, novel experimental approaches, and refined conceptual understandings of key physical science concepts. These are five major types of discoveries made by science teachers in physical science:

- **Discoveries Related to Teaching Strategies in Physics**

Science teachers have developed and refined innovative teaching strategies to improve students' conceptual understanding of physical science topics.

Active Learning in Physics: Research shows that integrating active learning strategies, such as peer instruction and inquiry-based learning, enhances student engagement and comprehension (Berge & Anderhag, 2025).

Use of Humor in Science Learning: A study by Berge and Anderhag (2025) found that science teachers discovered humor to be an effective tool in making physics lessons more engaging, leading to deeper learning and improved retention of concepts.

Flipped Classroom in Physics Education: The flipped classroom model, where students engage with lecture materials at home and focus on problem-solving in class, has been found to improve students' understanding of abstract physical science topics (Li, 2025).

- **Discoveries in Conceptual Understanding and Misconceptions**

Teachers have identified and corrected various misconceptions held by students in physical science, leading to improved instructional approaches.

Gravity Misconceptions: A study by Mwambazi (2025) found that many students mistakenly believe that gravity only acts downward, rather than acting as an attractive force between two masses. Teachers discovered effective ways to clarify this misconception through interactive models and real-world applications.

Wave-Particle Duality: Research by Ferrufino et al. (2025) highlights that students often struggle with the dual nature of light. Science teachers have found that using visual aids and hands-on experiments significantly enhances understanding.

Forces and Motion Misconceptions: Many students incorrectly believe that an object in motion must have a continuous force applied to keep moving. Science teachers have developed new analogies and simulations to address this common misunderstanding (Buteler et al., 2025).

- **Discoveries in Experimental and Laboratory Methods**

Science teachers have pioneered new experimental techniques and hands-on learning experiences to enhance student engagement in physical science.

Low-Cost Physics Experiments: Research by Mir and Ahmad (2025) indicates that teachers have developed low-cost, easy-to-implement physics experiments using everyday materials to make learning more accessible.

Virtual Laboratory Integration: The integration of AI-powered virtual labs has allowed teachers to simulate complex experiments that may not be feasible in traditional classrooms (Jere, 2025).

Innovative Use of AI for Chemistry Experiments: Teachers in South Africa have found that AI-powered language models can assist students in predicting chemical reactions and understanding molecular structures more effectively (Jere, 2025).

- **Discoveries Related to Digital and AI Tools in Physical Science**

Teachers have explored and evaluated various AI and digital tools to improve student learning in physics and chemistry.

Chatbots for Science Learning: Teachers have discovered that AI-driven chatbots improve student engagement and conceptual understanding by providing instant feedback and personalized explanations (Li, 2025).

Augmented Reality (AR) for Physics Visualization: A study by Zhang et al. (2025) found that AR applications help students visualize abstract physics concepts, such as electric fields and wave interference, more effectively.

AI in Assessment and Feedback: AI-assisted grading systems have been found to provide more consistent and objective evaluations of student performance, helping teachers identify learning gaps more effectively (Metaxas et al., 2025).

- **Discoveries in Student Motivation and Learning Behaviors**

Teachers have made significant discoveries regarding how student motivation and learning behaviors impact physics education.

Comic-Polya Method for Physics Learning: Teachers in the Philippines found that integrating comic storytelling with Polya's problem-solving method significantly improves students' motivation and conceptual understanding in physics (Gardose et al., 2025).

Blended Learning and Student Engagement: A study by Chi et al. (2025) found that students in blended-learning environments, which combine online and face-to-face instruction, show higher motivation and retention in physics classes.

Effects of School Climate on Science Learning: Andriani (2025) discovered that supportive school environments, including access to outdoor learning spaces, positively influence students' interest and performance in physical science.

TYPES OF DISCOVERY MADE BY SCIENCE TEACHERS IN ENVIRONMENTAL SCIENCE

Science teachers play a crucial role in advancing physical science education through discoveries in pedagogy, curriculum development, student cognition, and even novel approaches to scientific experimentation. Recent researches highlights multiple types of discoveries made by science teachers, ranging from the effectiveness of discovery-based learning methods to the use of virtual tools in physics instruction. Below is a detailed discussion of these discoveries:

1. Discovery-Based Learning in Environmental Science

Science teachers have found that discovery-based learning allows students to better grasp environmental science concepts by actively engaging in inquiry-driven exploration. Dash & Kaur (2024) highlighted that students develop critical thinking skills when they are encouraged to explore environmental challenges such as deforestation, pollution, and biodiversity loss through hands-on learning. Their study emphasized that project-based learning helps students internalize environmental responsibility and promotes eco-friendly behaviors beyond the classroom.

2. Using Outdoor Learning Environments for Environmental Science

Science teachers have discovered that outdoor learning environments enhance students' environmental literacy. Ndoi (2024) conducted a study on outdoor play environments and found that students who learn through direct engagement with nature—such as exploring ecosystems, collecting soil samples, and analyzing water quality—retain environmental concepts better than those in traditional classroom settings. Teachers have adopted field-based science activities to foster a deeper connection between students and nature.

3. Virtual Reality (VR) for Environmental Science Education

A major discovery in environmental science teaching is the use of virtual reality (VR) simulations to help students visualize environmental processes. Failla et al. (2024) found that VR improves comprehension of ecological systems, climate change models, and conservation strategies by allowing students to experience environments they would not typically have access to, such as coral reefs, glaciers, and rainforests. Teachers using immersive VR learning have reported higher student engagement and deeper understanding of environmental challenges.

4. AI-Powered Personalized Learning for Environmental Science

Artificial intelligence (AI) is transforming environmental science education by providing personalized learning experiences. Perrella & Bernardi (2024) discovered that AI-powered learning platforms help students identify their strengths and weaknesses in understanding environmental topics such as climate change, waste management, and renewable energy. AI-driven tools provide instant feedback and allow teachers to customize lesson plans based on student progress, making learning more efficient and engaging.

5. Gamification of Environmental Science Learning

Gamification—integrating game elements into education—has been discovered as an effective way to engage students in environmental science. Sahmal et al. (2025) found that students learning through environmental science board games, digital quizzes, and interactive storytelling retained more information about conservation and sustainability. This discovery has led to more widespread adoption of game-based learning techniques in environmental education, improving student motivation and participation.

DISCOVERIES AND INVENTIONS BY OTHER SCIENTISTS

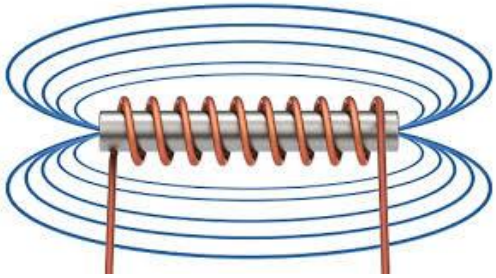
Awesome Discoveries and Inventions in Physical Science

Throughout history, physical science has unveiled groundbreaking discoveries that have revolutionised our understanding of the natural world. As mentioned by Amuzat and Eno (2024) the awesome discoveries in physical science has formed the critical factors to the success of many other innovative discoveries. From gravity to quantum mechanics, these milestones have shaped modern technology, medicine, and industry. The following are such discoveries:

Law of Universal Gravitation: formulated by Sir Isaac Newton in 1687, revolutionised our understanding of the forces that govern the universe. Newton proposed that all objects exert a gravitational pull on one another, with the force being proportional to their masses and inversely proportional to the square of the distance between them. This groundbreaking law provided a framework for understanding planetary motion, the behaviour of tides, and the motion of objects on Earth. Its principles have been instrumental in engineering feats and space exploration, influencing everything from the design of bridges to the trajectories of spacecraft. Newton's work laid the foundation for classical mechanics and remains a cornerstone in physics education.

The discovery of electromagnetism: Discovered by Hans Christian Ørsted in 1820, it bridged the gap between electricity and magnetism, showing they are interconnected phenomena. During an experiment, Ørsted noticed that a compass needle moved when placed near a current-carrying wire, revealing the magnetic effects of electric currents. This discovery paved the way for numerous technological advancements, including the development of electric motors, transformers, and generators. It also formed the basis for telecommunications and modern electronics, which have transformed communication and everyday life. Ørsted's findings remain crucial in fields ranging from engineering to theoretical physics.

Fig 1: Electromagnetism



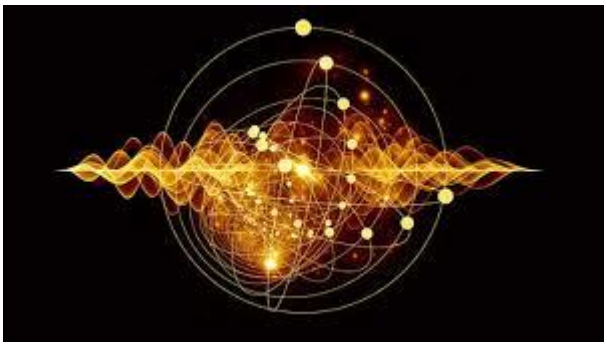
https://advancedmagnetsource.com/industry-news-blog/advanced-magnet-source-explores-the-fascinating-world-of-electromagnetism/

Albert Einstein's Theory of Relativity: developed between 1905 and 1915, it introduced a new understanding of space, time, and gravity. His special theory of relativity revealed that the laws of physics are consistent across all inertial frames of reference, while the general theory described gravity as the curvature of spacetime caused by mass. These ideas revolutionised physics, replacing Newtonian mechanics for extreme conditions like high speeds and massive gravitational fields. Relativity's implications are profound, influencing GPS technology, nuclear energy, and our understanding of the cosmos, including black holes and the expanding universe. Einstein's work remains a cornerstone of modern theoretical physics.

Discovery of X-rays: by Wilhelm Röntgen in 1895 provided an invaluable tool for non-invasive imaging. Röntgen observed that invisible rays emitted by a cathode-ray tube could penetrate various materials and leave shadows on photographic plates. This breakthrough transformed medical diagnostics, enabling doctors to see inside the human body without surgery. X-rays have since been applied in numerous fields, including security screening and material testing in industries. Röntgen's discovery earned him the first Nobel Prize in Physics in 1901, cementing its importance in science and society.

Quantum Mechanics: which emerged in the early 20th century with contributions from scientists like Werner Heisenberg, Max Planck, and Erwin Schrödinger, revolutionised our understanding of particles at atomic and subatomic scales. This theory explains phenomena that classical physics cannot, such as electron orbits and the behaviour of photons. Quantum mechanics is the foundation for modern technologies, including semiconductors, lasers, and quantum computing. It has also enhanced our understanding of chemical reactions and nuclear processes, making it essential in both theoretical and applied sciences.

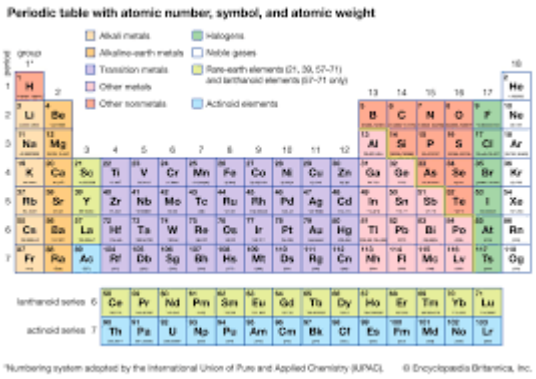
Fig 2: Quantum Mechanics



https://online.stanford.edu/courses/soe-yeeqmse01-quantum-mechanics-scientists-and-engineers

The Periodic Table: developed by Dmitri Mendeleev in 1869, provided a systematic arrangement of elements based on their atomic weights and properties. Mendeleev's table not only classified known elements but also predicted the existence and properties of elements yet to be discovered. This discovery is fundamental to chemistry, enabling scientists to understand chemical behaviour and reactions. It has guided research in material science, pharmaceuticals, and environmental studies, solidifying its role as a critical tool in scientific education and research.

Fig 3: Periodic Table



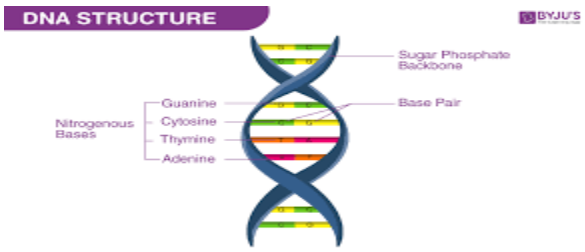
The phenomenon of Radioactivity: discovered by Henri Becquerel in 1896 and expanded by Marie and Pierre Curie, unveiled the emission of radiation from unstable atomic nuclei. This discovery has had far-reaching implications, from the development of nuclear energy to medical applications like cancer radiotherapy. Radioactivity also plays a significant role in archaeology through radiocarbon dating and in understanding atomic structures. The work of Becquerel and the Curies earned Nobel Prizes, highlighting the profound impact of their findings on science and humanity.

The Laws of Thermodynamics: formalized in the 1850s by scientists like Rudolf Clausius, William Thomson (Lord Kelvin), and James Joule, explain the principles of energy transfer. These laws describe how heat, work, and energy interact, laying the foundation for technologies like engines, refrigeration, and power plants. Beyond engineering, thermodynamics has applications in biology, chemistry, and astrophysics, offering insights into everything from metabolic processes

to the behaviour of stars. These laws remain fundamental to both practical applications and theoretical understanding.

The discovery of the DNA Structure: by James Watson, Francis Crick, Rosalind Franklin, and Maurice Wilkins in 1953 revealed the double-helix configuration of DNA molecules. This finding transformed biology, providing a molecular basis for understanding heredity, genetic disorders, and evolution. It has led to advancements in genetic engineering, biotechnology, and forensic science. DNA research continues to drive innovations in medicine, agriculture, and environmental science, demonstrating the far-reaching impact of this landmark discovery.

Fig 4:



https://byjus.com/biology/dna-structure/

The discovery of the Higgs Boson: in 2012 at CERN confirmed the existence of a particle that gives mass to other particles, as predicted by Peter Higgs and his colleagues in the 1960s. This finding validated the Standard Model of particle physics, deepening our understanding of the fundamental forces that govern the universe. The Higgs Boson has implications for cosmology and particle physics, advancing theories about the universe's origin and its underlying structure. This discovery represents a milestone in modern physics and continues to inspire new research.

Fig 5: Higgs Boson

These remarkable discoveries exemplify humanity's pursuit of knowledge, each contributing to our understanding of the natural world and driving technological progress.

Awesome Discoveries and Inventions in Environmental Science

Environmental science has unveiled groundbreaking discoveries that have shaped our understanding of the planet and its ecosystems. From identifying the causes of global phenomena to uncovering hidden ecosystems, these findings highlight the intricate connections between

human activities and nature. The following are some awesome discoveries in environmental sciences:

The Ozone Hole and Its Causes (1985): British scientists Joe Farman, Brian Gardiner, and Jonathan Shanklin discovered a large ozone hole over Antarctica in 1985. They linked it to chlorofluorocarbons (CFCs), widely used in refrigeration and aerosols. The ozone layer protects Earth from harmful ultraviolet radiation, so its depletion raised global concern. Their findings led to the 1987 Montreal Protocol, an international agreement to phase out CFCs. This was pivotal in reducing UV-related health risks like skin cancer and cataracts. It also helped protect ecosystems and agriculture from UV damage. The ozone hole discovery underscored human impact on atmospheric chemistry. It became a key example of successful environmental science-policy interaction. Today, the ozone layer shows signs of recovery. This achievement demonstrates global cooperation for environmental restoration.

Acid Rain (1974): Dr. Gene Likens and Dr. F. Herbert Bormann discovered acid rain in 1974, caused by sulfur dioxide (SO_2) and nitrogen oxides (NO_x). These pollutants originate from industrial activities, fossil fuel combustion, and vehicles. When combined with water vapor, they form acidic precipitation. Acid rain harms forests, aquatic ecosystems, soil, and infrastructure. Their research drew attention to this environmental issue, spurring regulations like the U.S. Clean Air Act amendments. These laws reduced emissions, protecting ecosystems and improving air quality. Acid rain discovery highlighted the interconnectedness of human activity and natural processes. It also emphasized the need for global cooperation in pollution control. Acid rain studies laid the groundwork for addressing transboundary environmental challenges.

Climate Change and the Keeling Curve (1958): Charles David Keeling began precise CO_2 measurements in 1958 at the Mauna Loa Observatory in Hawaii. He observed a steady annual increase in atmospheric CO_2 levels, visualized in the "Keeling Curve." His work proved human activities, especially fossil fuel combustion, drive climate change. The Keeling Curve became a critical tool for understanding global warming. It informed climate science and policy, like the Kyoto Protocol and Paris Agreement. Keeling's findings underscored the urgent need for emission reductions. His research shifted climate change from theory to measurable reality. The discovery raised awareness of the long-term impacts of industrialization. It remains central to modern environmental monitoring and decision-making.

Biodiversity Hotspots (1988): Norman Myers identified "biodiversity hotspots" in 1988, regions with high species endemism and significant habitat loss. These areas, such as the Amazon and Indo-Burma, house a vast array of life forms. Myers' concept revolutionized conservation science, focusing efforts on areas needing urgent attention. Protecting these regions helps preserve global biodiversity and ecosystem services. The idea influenced organizations like Conservation International and global funding strategies. Biodiversity hotspots aid in combating climate change through carbon storage. Their preservation ensures food security, medicinal resources, and cultural heritage. Myers' discovery provided a framework for sustainable development. It remains a cornerstone of conservation planning worldwide.

Deep-Sea Hydrothermal Vents (1977): In 1977, Robert Ballard and Jack Corliss discovered deep-sea hydrothermal vents near the Galápagos Rift. These vents emit mineral-rich, superheated water and host unique ecosystems. They revealed life forms thriving without sunlight, relying on chemosynthesis instead of photosynthesis. This discovery revolutionized understanding of life's

adaptability and origins. It inspired studies in biotechnology, medicine, and sustainable resources. Hydrothermal vents provided new insights into Earth's geological processes. They also informed astrobiology, suggesting potential for life on other planets. The discovery expanded ecological knowledge and environmental exploration. It remains a landmark finding in marine and planetary science.

Methodology

Descriptive survey design was adopted to carry out this research in Akwa Ibom State. The targeted population for the study comprised all science teachers in Akwa Ibom State. Stratified sampling technique was used to select 40 science teachers each from the three senatorial districts of the state which gave a sample size of 120 science teachers used to carry out this research. The instrument used for data collection was a structured questionnaire titled "Science Teachers and other Scientists Discoveries Questionnaire (STSDQ)". 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 0.84, 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 descriptive statistics to answer research questions.

Research Question 1

The research question sought to find out the types of discoveries and inventions made by science teachers in physical science. To answer the research percentage analysis was performed on the data, (see table 1).

Table 1:
Percentage analysis of the types of discoveries and inventions made by science teachers in physical science

DISCOVERIES	FREQUENCY	PERCENTAGE
Discoveries Related to Teaching Strategies in Physics	72	34.62**
Discoveries in Conceptual Understanding and Misconceptions	56	26.92
Discoveries in Experimental and Laboratory Methods	45	21.63
Discoveries Related to Digital and AI Tools in Physical Science	23	11.06
Discoveries in Student Motivation and Learning Behaviors	12	5.77*
TOTAL	**208**	**100%**

****** **The highest percentage frequency**
***** **The least percentage frequency**
SOURCE: Field survey

NB: The sample size was 120 respondents but the multiple responses increased the frequency to 208.

The above table presents the percentage analysis of the discoveries and inventions made by science teachers in physical science. From the result of the data analysis, it was observed that the discovery tagged "Discoveries Related to Teaching Strategies in Physics" 72(43.62%) was rated the highest discoveries and inventions made by science teachers in physical science, while "Discoveries in Student Motivation and Learning Behaviors" 12(5.77%) was rated the least. The result therefore is in agreement with the opinion of Berge & Anderhag (2025) who mentioned that science teachers have developed and refined innovative teaching strategies to improve students' conceptual understanding of physical science topics. Numerous researches have also showed that integrating active learning strategies, such as peer instruction and inquiry-based learning, enhances student engagement and comprehension.

Research Question 2

The research question sought to find out the discoveries and inventions made by science teachers in physical science. To answer the research percentage analysis was performed on the data, (see table 2).

Table 2:

Percentage analysis of the types of discovery made by science teachers in environmental science

DISCOVERIES	FREQUENCY	PERCENTAGE
Discovery-Based Learning in Environmental Science	72	42.11**
Using Outdoor Learning Environments for Environmental Science	41	23.98
Virtual Reality (VR) for Environmental Science Education	37	21.64
AI-Powered Personalized Learning for Environmental Science	17	9.94
Gamification of Environmental Science Learning	4	2.34*
TOTAL	**171**	**100%**

****** **The highest percentage frequency**

***** **The least percentage frequency**

SOURCE: Field survey

NB: The sample size was 120 respondents but the multiple responses increased the frequency to 171.

The above table presents the percentage analysis of the types of discovery made by science teachers in environmental science. From the result of the data analysis, it was observed that the discovery tagged "Discovery-Based Learning in Environmental Science" 72(42.11%) was rated the highest types of discovery made by science teachers in environmental science, while "Gamification of Environmental Science Learning" 4(2.34%) was rated the least. The result therefore is in agreement with the opinion of Dash & Kaur (2024) who stated that science teachers have found that discovery-based learning allows students to better grasp environmental science concepts by actively engaging in inquiry-driven exploration.

Conclusion

Scientific discovery drives human progress, particularly in physical and environmental sciences, which shape our understanding of the natural world. The analysed data revealed that discoveries related to teaching strategies in physics among many other discoveries is the most prominent invention made by science teachers in physical science. It also revealed that among many other type of discoveries made by science teachers in environmental science, the most notable is discovery-based learning.Physical sciences advance technology through breakthroughs in quantum mechanics, thermodynamics, and electromagnetism, transforming industries and enhancing lives. Environmental sciences emphasize sustainability, biodiversity, and climate adaptation, fostering policies to protect ecosystems. Future prospects include renewable energy innovations, nanotechnology, and advanced environmental monitoring, offering solutions to global challenges like climate change and resource management. Despite challenges such as funding, ethical dilemmas, and communication barriers, scientific advancements continue to provide evidence-based strategies for sustainable growth, energy security, and improved public health.

Recommendations

1. Governments, private sectors, and international organizations should prioritize funding for research and development (R&D) in physical and environmental sciences. Allocating adequate resources will ensure that scientists have access to cutting-edge tools, facilities, and training opportunities necessary for groundbreaking discoveries.
2. Governments and industries should implement policies and regulations that encourage the development and adoption of eco-friendly technologies and practices.
3. Scientists and institutions should adopt effective science communication strategies to engage policymakers, communities, and media, ensuring that scientific knowledge is accessible and comprehensible to non-experts.

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