DIFFICULT TOPICS IN SCHOOL BIOLOGY AS PERCEIVED BY STUDENTS IN EGOR LOCAL GOVERNMENT AREA

BY

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CERTIFICATION

This is to clarify that the study was carried out by Chukwuagozie Nwachukwu with matriculation number **EDU2102030** in the department of curriculum and Instructional technology, faculty of Education, University of Benin in partial fulfillment of the award of Bachelor of Science Degree in Biology Education.

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DEDICATION

This project is dedicated to God Almighty who saw me through my undergraduate programme in University of Benin, by giving me the strength and grace to overcome the hard times.

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ABSTRACT

The purpose of the study was to examine the difficult topics in school biology as perceived by students in Egor local government area, Edo state. The study was motivated from the consistent decline of students performance in biology. The aim of the study is to identify the specific Biology topics students perceive as difficult, examine the factors responsible for their difficulties, and suggest possible solutions to enhance the teaching and learning of Biology.

The descriptive survey design was adopted for this study. The population comprise of about (18,207) Secondary School students across Egor local government area with SS2 students as focus. A simple random sampling technique was used to select a sample of 120 students from five secondary schools schools in Egor(three public and two private). A self structured questionnaire with four sections were used as research Instrument to collect data from the sample population. The validity of the instrument was confirmed by the supervisor and the reliability of the instrument was tested using the test-retest method. The questionnaire was administered physically to respondents and a period of one week was used for administration and collection of questionnaires. The data collected were analysed using descriptive statistics involving frequency counts and percentage.

The findings of the study revealed that a higher population of the SS2 students perceived majority of their topics as difficult. Topics such as Adaptation, Ecology and Microorganisms were perceived as difficult by majority of the students. The factors behind these difficulties as stated by the respondents were high technicality of terms, abstract nature of the topics and lack of practical demonstrations. Furthermore various guidelines were outlined such as use of more practical demonstrations and experiments in the teaching process, use of visual aids and

simplification of terms and curricula in order to enhance the understanding of these difficult topics and improve the general teaching and learning of biology.

The researcher concludes that indeed there is a high level of difficulty in the understanding of major biology and topics by secondary school students which inquires the intervention of both the teachers, school management, Education bodies(FME, NERDC, WAEC, etc) as well as the students themselves who are expected involve themselves in peer/group discussion and learning and also learn to apply intrinsic motivation towards their studies. Everyone has a role to play in order to mitigate this problem of difficulty in understanding biology topics. The roles the aforementioned are expected to play in order to actualise this are mentioned in the subsequent chapters.

CHAPTER ONE

INTRODUCTION

Background of Study

Biology, as one of the core science subjects taught at the secondary school level in Nigeria, plays a crucial role in laying the foundation for careers in medicine, agriculture, biotechnology, and environmental science (Udo and Eze, 2018). Despite its significance, many students often perceive biology as a challenging subject. This perception is especially evident in the way students approach certain topics within the subject, which affects their interest, performance, and overall understanding (Ogunleye, 2002).

The Nigerian education system, the Senior Secondary School Biology curriculum is broad and covers various areas such as genetics, ecology, cell biology, evolution, reproduction, and physiology (FME, 2013). While some topics are generally understood with relative ease, others are persistently reported as difficult by students. Factors contributing to this perception include abstract content, lack of practical exposure, inadequate instructional materials, poor teaching methods, and limited background knowledge (Nwagbo, 2001).

Egor Local Government Area, located in Edo State, Nigeria, has a mix of urban and semi-urban schools, with varying levels of educational resources and teacher competencies. Understanding which biology topics students in this area find difficult—and why—can provide insights into how educators and curriculum planners might improve teaching strategies and resource allocation (Oloruntegbe and Ikpe, 2011).

This study aims to investigate the difficult topics in biology as perceived by students in Egor Local Government Area. By identifying these topics and exploring the underlying reasons for the difficulties, the study seeks to provide valuable insights that can inform curriculum development, teaching practices, and student support strategies. Ultimately, the findings of this research can contribute to enhancing students' understanding and appreciation of biology, thereby fostering a stronger foundation in scientific knowledge and critical thinking skills (Okebukola, 2005).

The background of this study is rooted in the broader context of science education, where biology plays a pivotal role. The challenges students face in learning biology are not unique to any one region but are a concern globally. However, the specific topics that students find difficult can vary based on regional curriculum emphases, teaching methodologies, and student demographics (Nwagbo, 2001). Therefore, this study is significant in providing localized insights that can be used to address the specific needs of students in Egor Local Government Area.

By exploring students' perceptions of difficult topics in biology, this research can also shed light on the effectiveness of current teaching practices and curriculum design. It can help identify areas where educational resources and support might be lacking, thereby informing policy decisions and professional development programs for educators. The study's findings can also contribute to the broader discourse on science education, offering perspectives that can be adapted and applied in other educational contexts (Okebukola, 2005).

Overall, this study is poised to make a meaningful contribution to the field of biology education by providing a nuanced understanding of the challenges students face and the potential strategies for overcoming these challenges. Through its focus on the specific experiences and perceptions of students in Egor Local Government Area, the research aims to generate practical and

applicable insights that can enhance the teaching and learning of biology in this region and beyond.

Statement of Problems

Despite the importance of biology in shaping students' academic and career paths—especially in science-related fields—many secondary school students continue to perform poorly in the subject. This underperformance is often linked to students' perception of biology as a difficult and abstract subject. In particular, certain topics within the biology curriculum are repeatedly identified as being more difficult than others, leading to a lack of interest, reduced classroom participation, and low achievement in examinations.

In Egor Local Government Area of Edo State, anecdotal reports from teachers and performance trends in both internal and external examinations indicate that a significant number of students struggle with understanding key biology concepts. However, there is a lack of empirical data identifying exactly which topics students find most difficult, and the underlying reasons for these perceptions remain largely unexplored. Factors such as teaching methods, availability of laboratory facilities, language barriers, and students' cognitive abilities may all contribute to these challenges.

Without a clear understanding of the specific topics that students perceive as difficult and the reasons behind these perceptions, efforts to improve biology teaching and learning may not be well-targeted or effective. This study, therefore, seeks to identify the difficult topics in biology as perceived by students in Egor LGA and to investigate the factors contributing to these difficulties, with the aim of informing more effective teaching strategies and curriculum plannin

Research Questions

1. Which topics in the biology curriculum do students in Egor Local Government Area perceive as most difficult?
2. What are the major factors contributing to students' perception of difficulty in certain biology topics?
3. How do students' perceptions of difficult biology topics vary based on gender
4. How do students perception of difficult biology topics vary based on school type (public vs. private)
5. What teaching methods are currently used to teach the perceived difficult topics in biology?
6. How do students believe the teaching and learning of these difficult topics can be improved?

Purpose of the Study

The purpose of this study is to:

1. Identify difficult topics in biology: Determine the specific topics in biology that students in Egor Local Government Area find most challenging.
2. Understand student perceptions: Explore students' perspectives and experiences regarding these difficult topics.
3. Inform educational practices: Provide insights to inform teaching approaches, curriculum development, and student support strategies.

Other specific objectives are:

- To identify the most difficult topics in biology as perceived by students.
- To determine the factors contributing to these difficulties.
- To explore potential solutions to improve student understanding and academic performance.

Significance of the Study

1. For Students:

   It will help students gain a better understanding of the specific topics they find difficult and why, which may lead to improved study strategies, greater engagement, and better academic performance in biology.

2. For Teachers:

   The findings will provide valuable insights into the topics that students struggle with the most. This can guide teachers in adjusting their teaching methods, providing more focused support, and adopting more effective instructional strategies.

3. For School Administrators and Curriculum Planners:

   The study will offer useful information that can inform decisions on resource allocation, curriculum development, and teacher training programs, particularly in areas that need additional support.

4. For Educational Researchers:

The study will contribute to the existing body of knowledge on science education by identifying patterns in students' perceptions of difficult topics, particularly in the context of a local government area like Egor.

5. For Policy Makers:

   The results can inform education policies aimed at improving science education outcomes, especially by addressing curriculum gaps, improving laboratory facilities, and supporting more effective teaching practices.

6. For Examination Bodies:

   The study provides examination bodiesike WAEC, NECO and JAMB with necessary and useful information about the topics students are finding difficult in order for them to appropriately construct the national and international examination questions for the appraisal and assessment of the students.

Scope and Delimitation of the Study

Scope:

This study focuses on identifying the biology topics that are perceived as difficult by senior secondary school students (SS1–SS3) in Egor Local Government Area of Edo State, Nigeria. It investigates the specific topics considered challenging, the reasons behind these perceptions, and the factors influencing students' difficulties, such as teaching methods, availability of resources, and students' learning backgrounds. The study will also consider differences in perceptions based on variables such as gender, class level, and school type (public or private).

Delimitation:

1. Self-Reported Data:

The study relies on students' responses through questionnaires, which may be influenced by personal bias, misunderstanding of questions, or lack of honesty. As a result, the data may not fully reflect the actual difficulties experienced.

2. Geographical Coverage:

The research is confined to Egor Local Government Area alone. Therefore, the findings may not be applicable to other local government areas or regions with different educational environments.

3. Sample Size and School Access:

Due to time and logistical constraints, only a limited number of schools and students will be selected. This may not provide a complete representation of all students in the area.

4. Exclusion of Teachers' Perspectives:

The study focuses mainly on students' perceptions and does not extensively consider biology teachers' views or teaching experiences, which could provide a more balanced understanding of the issues.

5. Lack of Practical Assessment:

The study does not include an analysis of students' actual performance data (e.g., test scores or exam results) to support their perceived difficulties, which may limit the objectivity of the findings.

Definition of Terms

1. Difficult Topics:

Topics or areas within the biology curriculum that students find hard to understand, learn, or retain due to various factors such as complexity, abstractness, or poor teaching methods.

2. Perception:

The way students interpret or understand certain topics based on their experience, comprehension, and feelings toward those topics.

3. Curriculum:

The structured content and topics officially outlined for teaching biology at the senior secondary school level in Nigeria.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviewed related literature as it relates to the "Difficult topics in school biology as perceived by students in Egor local government area".

The review will be organised under the following sub-heading:

- Introduction.
- Concept of Biology Education.
- Theoretical framework.
- Students perception of difficult topics in biology.
- Identification of difficult biology topics in secondary school.
- Factors contributing to the perceived difficulty of biology topics.
- Strategies for addressing difficult topics in biology.
- Summary of the literature review .

Introduction

Biology as a subject plays a central role in scientific literacy, equipping students with the knowledge and skills necessary to understand life processes, solve problems, and make informed decisions about health, environment, and biotechnology. As a core science subject in secondary school curricula across the world, including Nigeria, biology serves as a foundational requirement for numerous science-related fields such as medicine, nursing, pharmacy, agriculture, and environmental science (Okebukola, 2020; Aina, 2022).

Despite its importance, numerous studies have revealed that secondary school students often find several biology topics difficult to understand and master (Ezeudu, Okeke and Nwosu 2021; Salami & Lawal, 2023). These difficulties hinder students' interest, reduce performance, and ultimately influence their choice of biology-related careers. In many cases, the challenge arises not from a lack of content, but from the way the subject is delivered, the abstract nature of certain biological concepts, and insufficient teaching aids (Adeyemo & Olagunju, 2020).

In Nigeria, particularly in regions such as Egor Local Government Area of Edo State, challenges surrounding difficult biology topics persist, affecting both teaching and learning outcomes. Biology topics such as genetics, evolution, respiration, ecology, and cell biology are often reported by students as conceptually difficult due to their abstractness, complexity, or lack of practical exposure (Nwosu & Odetola, 2021). These perceptions are shaped by multiple factors, including teaching strategies, teacher competence, student motivation, and availability of learning resources (Adebayo, 2022).

Understanding students' perceptions of difficult topics is vital because it provides educators and policymakers with valuable insights that can help in curriculum adjustment, teacher training, and the design of targeted instructional strategies. A well-informed approach to addressing these difficulties will not only improve students' academic performance but also increase their engagement and confidence in biology (Yusuf & Bello, 2023).

This chapter therefore reviews relevant literature concerning the concept of biology education, students' perception of difficult topics, the factors influencing topic difficulty, its effect on academic achievement, and strategies for addressing these difficulties. By exploring previous empirical studies and theoretical frameworks, this review aims to provide a comprehensive

background for understanding the challenges students face in learning school biology, particularly within the context of Egor Local Government Area.

Concept of Biology Education

Biology education is a cornerstone of scientific learning that deals with the systematic study of living organisms, including their structure, function, development, origin, evolution, and distribution. It is one of the core subjects taught at the secondary school level and serves as a prerequisite for further education in various science and health-related fields, such as medicine, nursing, pharmacy, biotechnology, agriculture, and environmental science (Okebukola, 2020; Aina, 2022). The aim of biology education is not only to impart factual knowledge but also to instill scientific literacy, develop problem-solving skills, and foster inquiry-based thinking in learners.

Biology occupies a central role in the school science curriculum because of its relevance to everyday life. It provides learners with insights into human biology, plant and animal life, ecosystems, and current global issues such as climate change, biodiversity loss, pandemics, genetic engineering, and reproductive health (Eze & Okafor, 2021). The Nigerian Educational Research and Development Council (NERDC, 2019) outlines that biology education at the senior secondary level is designed to enable students to:

- Develop interest in science and biology in particular;
- Acquire relevant knowledge and skills for solving everyday problems;
- Apply scientific knowledge for personal and societal development;
- Prepare for further studies and careers in science-related fields;
- Develop attitudes such as curiosity, critical thinking, creativity, and objectivity.

The curriculum of biology education is broad and multifaceted. It covers diverse topics such as cell biology, genetics, ecology, physiology, evolution, reproduction, classification, and biotechnology. While some of these topics are practical and easily demonstrable, others are abstract and conceptual, making them difficult for students to understand without appropriate instructional strategies (Ezeudu et al., 2021). Biology education thus requires not only a mastery of content but also pedagogical skills that help in simplifying abstract concepts using real-life examples, models, and practical demonstrations.

In modern educational discourse, biology education is viewed through the lens of constructivist learning theory, which emphasizes active participation of students in the learning process. According to Bruner's and Piaget's theories of learning, students construct knowledge through interaction with their environment and through guided discovery (Adeyemo & Olagunju, 2020). This has led to a shift from traditional teacher-centered approaches, such as rote memorization and lecture methods, toward more student-centered strategies that involve inquiry-based learning, problem-solving, group work, peer instruction, and use of multimedia tools (Yusuf & Bello, 2023).

Despite its recognized importance, biology education in Nigeria faces numerous challenges that affect both teaching and learning outcomes. These challenges include overcrowded classrooms, inadequate laboratory facilities, lack of qualified teachers, poor funding, limited access to instructional materials, and curriculum overload (Salami & Lawal, 2023). These factors contribute to students' negative perceptions of certain biology topics, which they find difficult or boring, leading to low performance and reduced interest in science-related careers.

Research also shows that some biological concepts are inherently complex and require higher-order thinking skills for proper understanding. For instance, topics like genetics, evolution, and molecular biology involve abstract reasoning, symbolic representation, and understanding of microscopic processes that cannot be directly observed. Without proper scaffolding and instructional support, students may struggle to make sense of these topics (Adebayo, 2022). The problem is further compounded by the use of scientific language and terminology that may be unfamiliar to students or poorly explained by teachers.

Another important component of biology education is its practical orientation. Practical work in biology, such as dissecting specimens, observing cell structures under a microscope, and conducting ecological surveys, is intended to help students bridge the gap between theory and application. However, in many Nigerian schools, practical biology is limited or theoretical due to lack of equipment and resources. This limitation reduces students' experiential learning and makes biology appear abstract and difficult (Nwosu & Odetola, 2021).

Furthermore, biology education plays a significant role in promoting sustainable development and responsible citizenship. By studying biology, students become more aware of issues like environmental degradation, food security, pollution, and human health. This awareness fosters a sense of responsibility and equips them with knowledge to contribute meaningfully to national development and global sustainability efforts (UNESCO, 2020).

Theoretical Framework

A theoretical framework provides a structured foundation for understanding the principles and ideas that guide a research study. It offers a lens through which concepts, variables, and their

relationships are interpreted, allowing researchers to contextualize findings within established knowledge. For a study on difficult topics in school biology as perceived by students, the theoretical foundation is crucial to explaining how students learn, what makes certain topics more difficult, and how learning can be improved.

This study is underpinned by two interrelated learning theories:

Cognitive Load Theory.

Constructivist Learning Theory.

Together, these theories explain the nature of learning difficulties, especially in complex subjects like biology, and suggest strategies to address them.

Cognitive load theory (CLT)

Cognitive Load Theory (CLT) was developed by John Sweller in the 1980s. It is based on the premise that human working memory has limited capacity, and that instructional design should avoid overwhelming this capacity in order to facilitate effective learning (Sweller, 1988; Paas & van Merriënboer, 2020).

Biology, as a discipline, includes numerous abstract and detailed concepts—such as cellular respiration, genetic inheritance, and the nitrogen cycle—which often require students to process large amounts of information simultaneously. According to CLT, when the cognitive demand of a biology topic exceeds a student's working memory capacity, learning becomes ineffective, and the topic is perceived as difficult (Clark, Nguyen & Sweller, 2019).

CLT identifies three types of cognitive load:

Intrinsic Load: The inherent complexity of the subject matter. For example, understanding DNA replication requires the integration of many interdependent concepts.

Extraneous Load: The way information is presented. Poor teaching methods, disorganized textbooks, or unclear diagrams can increase extraneous load.

Germane Load: The cognitive effort required to create schemas or mental models. Effective teaching strategies should aim to increase germane load by encouraging meaningful learning.

In the context of Nigerian secondary schools, where students often lack access to instructional aids, interactive models, and adequately trained teachers, the extraneous load becomes overwhelming. Consequently, students may label certain topics as "difficult" not because of the topic's nature, but because of how it is taught or presented (Adebayo, 2022).

The implication of CLT for biology education is clear: teachers must design learning experiences that manage cognitive load by simplifying complex information, using visual aids, scaffolding learning, and encouraging step-by-step problem-solving (Yusuf & Bello, 2023).

Constructivist learning theory

Constructivist Learning Theory provides another important foundation for this study. Constructivism is rooted in the works of Jean Piaget, Lev Vygotsky, Jerome Bruner, and others, who argue that learners actively construct their own understanding of the world through experience and reflection (Piaget, 1970; Vygotsky, 1978; Bruner, 1966).

According to constructivism, knowledge is not passively received but actively built by the learner. In biology education, this means students learn best when they are involved in hands-on, minds-on activities such as experiments, group discussions, and problem-solving. Difficulties arise when students are not given opportunities to connect new information to their prior knowledge or when instruction is heavily lecture-based and abstract (Adeyemo & Olagunju, 2020).

A major principle of constructivism is the Zone of Proximal Development (ZPD) proposed by Vygotsky, which refers to the gap between what a learner can do independently and what they can achieve with guidance. Effective biology teaching should operate within the ZPD, providing the right level of support through scaffolding, peer interaction, and teacher feedback.

In the Nigerian classroom context, where large class sizes and resource shortages limit personalized teaching, many students may struggle to engage with difficult biology topics due to lack of individualized support. Constructivist theory emphasizes the need for learner-centered approaches, including the use of project-based learning, inquiry-based instruction, and the integration of students' real-life experiences in lessons (Ezeudu et al., 2021).

Furthermore, constructivism aligns with experiential learning—where students learn biology by doing, such as observing plant growth, dissecting specimens, or participating in field trips. When such activities are missing, topics become more abstract, leading to confusion and disengagement.

Synthesis of theories:

By integrating Cognitive Load Theory and Constructivist Learning Theory, this study acknowledges both the mental demands of learning biology and the importance of interactive,

supportive learning environments. While CLT focuses on managing the mental effort required to process biological concepts, constructivism emphasizes the social and experiential processes involved in learning.

Together, these theories explain:

Why students perceive some biology topics as more difficult than others;

How teaching methods, instructional design, and learner engagement influence comprehension;

What strategies can be employed to reduce difficulty and enhance meaningful understanding.

This theoretical framework guides the analysis of students' perceptions by:

Identifying cognitive and pedagogical factors contributing to topic difficulty;

Informing the design of research instruments to probe students' learning experiences;

Suggesting evidence-based interventions that teachers and curriculum planners can adopt to reduce perceived difficulty in biology learning.

Students Perception of Difficult Topics in Biology

Students' perception of a subject or topic is a powerful determinant of their academic engagement, motivation, and performance. In the context of biology education, how students perceive specific topics—whether easy, manageable, or difficult—significantly influences how well they learn and perform in assessments. Perception refers to the way individuals interpret and make sense of information based on their experiences, background, and cognitive capacities.

Students' perception of biology topics as "difficult" often arises from a complex interplay of cognitive, instructional, emotional, and environmental factors (Okebukola, 2020; Yusuf & Oyetunde, 2022).

Meaning and importance of perception in learning

Perception in educational psychology involves the mental interpretation of sensory input and experiences during the learning process. It is subjective and often varies from student to student. In science education, especially biology, students' perceptions are shaped by prior knowledge, instructional delivery, classroom experience, teacher competence, and the nature of the content (Adebayo, 2022).

Positive perception fosters curiosity, motivation, and persistence, while negative or anxious perceptions of a topic can lead to disengagement, poor performance, and even aversion to science in general (Ezeudu et al., 2021). Students who perceive biology as difficult may develop a defeatist attitude toward the subject, believing that success is unattainable. This perception can be self-fulfilling and lead to poor outcomes regardless of the student's actual potential.

Evidence from empirical studies

Recent studies have consistently shown that a substantial number of secondary school students consider biology a difficult subject, particularly due to the nature of specific topics. Lawal, Ibrahim, and Salami (2023), in a study across three states in North-Central Nigeria, found that over 65% of students rated topics like genetics, evolution, and physiology as "very difficult" or

"confusing." Students cited reasons such as lack of practical experience, complex scientific language, and poor teaching approaches.

Similarly, Nwankwo and Ezeani (2021) revealed that students in public secondary schools identified cell structure, osmosis, mitosis and meiosis, ecological cycles, and hormonal coordination as difficult due to abstractness and lack of visual or experimental demonstrations. This perception persisted even in schools with relatively better infrastructure, suggesting that the problem may also be pedagogical rather than purely resource-based.

Another study by Afolabi and Okonkwo (2022) involving SS2 students in Lagos State.

Afolabi and Okonkwo (2022) conducted a descriptive survey involving SS2 students in Lagos State to identify biology topics perceived as difficult. A sample of students was likely selected from different schools using random or stratified sampling to ensure fair representation of various school types. Data were collected using a structured questionnaire and analyzed using descriptive statistics to determine the major factors contributing to students' perception of difficulty.

They found out that students associated difficulty with topics that:

i. Contain too many scientific terms;

ii. Lack immediate real-world relevance;

iii. Require memorization of complex diagrams or cycles (e.g., nitrogen cycle, food chains);

iv. Are taught in a rigid, lecture-heavy format with limited student interaction.

Commonly perceived difficult biology topics

Multiple studies across Nigeria and beyond have listed biology topics most frequently perceived as difficult:

Genetics and Heredity –

abstract nature and use of symbolic representation (Usman & Adebisi, 2021);

Evolution –

controversial content and conceptual depth (Ibrahim & Musa, 2023);

Cell Biology and Mitosis/Meiosis –

microscopic processes difficult to visualize (Chikwendu & Nwankwo, 2022);

Photosynthesis and Respiration –

chemical equations and complex biological processes (Lawal et al., 2023);

Ecological Cycles and Adaptation –

systemic thinking and interrelatedness (Okebukola, 2020);

Reproduction and Endocrine System –

due to its abstract and sensitive content (Ogunniyi & Bello, 2020).

This consistent pattern of perceived difficulty underscores the need for targeted instructional interventions and curriculum rethinking.

Factors Influencing Perception of Difficulty

Several factors have been found to influence why students perceive certain biology topics as difficult:

Cognitive Load and Abstractness: Topics that require understanding of abstract processes or multiple interrelated ideas often exceed the working memory capacity of students (Sweller, 2019).

Language and Terminology: Scientific jargon and Latin-based terms can intimidate students, especially if not well explained (Chikwendu & Nwankwo, 2022).

Instructional Methods: The use of teacher-centered approaches (e.g., lectures and dictation) reduces student engagement and leads to shallow understanding (Adebayo, 2022).

Lack of Teaching Aids and Practical Exposure: Many Nigerian schools lack functional laboratories, making practical topics seem theoretical and confusing (Yusuf & Bello, 2023).

Teacher Competence and Attitude: Unenthusiastic or underprepared teachers may fail to inspire interest or simplify difficult topics (Ogunleye & Ajayi, 2021).

Student Attitudes and Motivation: Students' prior failures, fear of science, or external discouragement can bias them toward perceiving topics as difficult (Usman & Adebisi, 2021).

Gender and perception of difficulty

Some researchers have investigated the role of gender in perception of difficulty in biology. Eze and Okafor (2021) reported no significant gender difference in perception; both male and female

students rated the same biology topics as challenging. However, Adediran & Salawu (2022) found that female students tended to express greater anxiety over physiological topics, while male students reported higher difficulty in memorization-heavy topics like plant classification. These findings suggest that perception may also be influenced by sociocultural and psychological variables beyond content difficulty.

Implications for Teaching and Learning

Understanding students' perception of difficult biology topics is crucial for improving teaching strategies and curriculum design. If students consistently perceive certain topics as difficult, it is a signal for teachers, curriculum planners, and policymakers to:

Revisit the sequencing and instructional approach for these topics;

Integrate more visual aids, models, and simulations;

Adopt interactive teaching methods such as project-based and inquiry-based learning;

Strengthen teacher professional development in pedagogical content knowledge;

Encourage peer support systems and formative assessments to identify learning gaps early.

Identification of Difficult Biology Topics in Secondary School

The identification of difficult topics in biology is essential for curriculum developers, educators, and policymakers to improve students' academic performance and overall engagement with the subject. Despite the foundational role of biology in understanding life sciences and pursuing careers in health, agriculture, and environmental sciences, a recurring concern in science

education is students' struggle with certain biology concepts. These perceived difficulties hinder the achievement of the objectives of biology education, especially at the secondary school level where students are expected to develop scientific literacy, practical skills, and critical thinking (Okebukola, 2020; Yusuf & Afolabi, 2022).

Methods for identifying difficult topics

The identification of difficult topics in biology has typically been achieved through a variety of empirical and classroom-based methods. These include:

Student Surveys and Questionnaires:

Many studies have used structured questionnaires to gather data directly from students about which topics they find challenging and why (Ezeudu et al., 2021).

Teacher Reports and Classroom Observations:

Teachers' perspectives are valuable, as they often identify topics where students consistently perform poorly or express confusion (Lawal & Ibrahim, 2023).

Analysis of Examination Results:

WAEC and NECO reports often highlight biology questions that most students fail or avoid, helping identify persistently difficult areas (WAEC Chief Examiners' Report, 2022).

Focus Group Discussions (FGDs):

These allow for in-depth discussions with students and teachers to understand the root causes of difficulty in specific topics (Ogunleye & Ajayi, 2021).

Diagnostic Testing:

Some researchers employ pre- and post-tests to evaluate learning gains and pinpoint topics that show little improvement, indicating difficulty (Usman & Adebisi, 2021).

Each of these methods provides critical insight into the learning challenges students face, allowing for targeted interventions.

Commonly identified difficult biology topics

Based on research conducted across various regions of Nigeria and similar educational contexts, several topics have consistently emerged as difficult for secondary school students. These include:

1. Genetics and Heredity

Students often struggle with understanding Mendelian genetics, chromosomal behavior, genotypic and phenotypic ratios, and inheritance patterns. The use of abstract symbols and terminology contributes to the difficulty (Adediran & Salawu, 2022).

2. Evolution

As a theory-based and historically complex topic, evolution requires a grasp of gradual changes over time, natural selection, and fossil interpretation. Students find it abstract and sometimes controversial (Ibrahim & Musa, 2023).

3. Cell Structure and Functions

Despite being fundamental, students find microscopic cellular structures difficult to visualize and understand. Concepts like cell organelles, their functions, and differences between plant and animal cells can be overwhelming (Afolabi & Okonkwo, 2022).

4. Photosynthesis and Respiration

These biochemical processes involve chemical equations and energy transformations. Many students lack the background in chemistry necessary to fully grasp these concepts (Chikwendu & Nwankwo, 2022).

5. Reproduction in Plants and Animals

The sensitive nature of human reproduction makes it difficult for teachers to address comprehensively, especially in conservative communities. Students also find hormonal interactions and reproductive cycles confusing (Ogunniyi & Bello, 2020).

6. Ecology and Ecological Relationships

Topics such as food chains, food webs, biogeochemical cycles, and ecosystem dynamics are conceptually challenging and demand systems thinking, which many students find abstract (Lawal et al., 2023).

7. Classification of Organisms

The hierarchical structure of taxonomy and use of Latin terminology confuse many learners. The difference between kingdoms, phyla, and classes can be difficult to retain (Eze & Okafor, 2021).

8. Excretion and Homeostasis

These physiological processes involve multiple organ systems and biochemical mechanisms. The interplay between kidneys, hormones, and body fluid regulation adds to the complexity (Adebayo, 2022).

Why these topics are perceived as difficult

The consistent perception of difficulty in the above topics can be attributed to several overlapping factors:

Abstractness and Lack of Visualization: Many of the difficult topics involve microscopic or non-observable phenomena that cannot be easily demonstrated in class.

Inadequate Practical Experience: A lack of functional laboratories and practical demonstrations makes theoretical knowledge hard to relate to real life (Yusuf & Bello, 2023).

Poor Foundation in Related Subjects: Topics that overlap with chemistry and mathematics—like respiration and genetics—are more difficult for students with weak backgrounds in those areas.

Complex Terminology: The frequent use of scientific and Latin-based terms without proper explanation contributes to student confusion.

Pedagogical Limitations: Teacher-centered teaching methods, lack of engaging instructional materials, and limited use of visual aids contribute significantly to the perception of difficulty (Okebukola, 2020).

Regional and Gender Variations

While the topics identified are generally consistent, minor variations exist across regions due to differences in school facilities, teacher quality, and local curriculum interpretation. Some studies, such as that by Nwankwo and Ezeani (2021), report that female students tend to struggle more with diagrams and structural processes, while male students report greater difficulty in memorization-intensive topics like classification.

Implications for stakeholders

The identification of difficult biology topics is not merely diagnostic; it carries significant implications for all stakeholders in education:

For Teachers: It calls for differentiated instruction, increased use of teaching aids, and adoption of inquiry-based approaches.

For Curriculum Developers: There is a need to scaffold difficult topics better and integrate simpler, more relatable content.

For School Administrators: Ensuring the availability of well-equipped laboratories and teacher training programs can mitigate topic difficulty.

For Students: Awareness of challenging topics helps them allocate more study time, seek help proactively, and engage with peers for group learning.

Factors Contributing to the Perceived Difficulty in Biology Topics

The following are key factors identified in literature as contributing to the perceived difficulty of biology topics in secondary schools:

Abstractness of Biological Concepts:

Many biology topics deal with abstract concepts that cannot be directly observed, making them difficult for students to visualize and understand. Topics such as genetics, photosynthesis, and cellular respiration involve processes that occur at the molecular or cellular level and are not easily demonstrable in the typical classroom setting (Okebukola, 2020). The inability of students

to relate these concepts to real-life experiences increases their cognitive load and contributes to misconceptions (Ibrahim & Musa, 2023).

Inadequate Teaching Methods:

The use of teacher-centered and lecture-based teaching methods in biology classrooms often leads to passive learning. Many teachers fail to adopt interactive, practical, and student-focused approaches such as inquiry-based learning, cooperative group work, and the use of models or simulations. This limits students' engagement with the content and makes it difficult to grasp complex topics (Ogunleye & Ajayi, 2021). According to Afolabi and Okonkwo (2022), students taught using participatory methods reported significantly lower difficulty levels in topics like ecology and evolution.

Poor Understanding of Scientific Terminology:

The heavy use of Latin, Greek, and technical terminologies in biology—such as “homeostasis,” “heterozygous,” “endoplasmic reticulum,” and “photosystem II”—makes it challenging for students to understand and retain concepts. Many students, especially those with low reading proficiency, struggle with interpreting complex terms, which affects comprehension (Eze & Okafor, 2021). Without simplified explanations and contextual learning, these terms become barriers rather than building blocks for learning.

Curriculum Overload and Content Breadth:

The biology curriculum in many Nigerian secondary schools is often criticized for being too broad and dense. The sheer volume of topics to be covered within limited instructional time means that teachers may rush through content, giving students little time to understand or reflect.

As observed by Nwankwo and Ezeani (2021), topics like classification and human reproduction are often taught superficially, leading to confusion and poor retention.

Lack of Practical Exposure and Teaching Aids:

Biology is inherently a practical science. However, many schools in Nigeria lack adequate laboratory facilities, specimens, models, and charts. This absence of hands-on experience makes it difficult for students to bridge the gap between theoretical knowledge and real-world application (Usman & Adebisi, 2021). Studies show that students who engage in practical sessions have a better grasp of difficult concepts like mitosis, meiosis, and cell structures (Lawal & Ibrahim, 2023).

Students' Background Knowledge and Cognitive Ability:

A student's foundational knowledge in science, especially in chemistry and mathematics, greatly influences their understanding of biology topics. For instance, understanding genetics or respiration may require prior knowledge of chemical reactions and mathematical probability, which many students lack (Chikwendu & Nwankwo, 2022). Furthermore, individual differences in cognitive ability affect how well students process and retain complex information.

Teacher Qualification and Content Mastery:

The competence and experience of the biology teacher are critical determinants of student understanding. Teachers who are not well-grounded in the subject may skip difficult topics or provide inadequate explanations. According to Ogunniyi and Bello (2020), many teachers avoid topics like evolution or biotechnology either due to a lack of understanding or personal biases, which limits students' exposure.

Language Barrier and Instructional Delivery:

English is the official medium of instruction in Nigerian schools, but many students—especially in rural areas—are not proficient in English. This language barrier impairs their ability to comprehend classroom instruction and textbook material, particularly in science subjects with complex explanations (Adebayo, 2022). When teachers fail to break down information using local examples or mother tongue supplements, students find it difficult to grasp core concepts.

Lack of Motivation and Interest:

Student motivation plays a significant role in academic achievement. Many students perceive biology as difficult because they lack intrinsic or extrinsic motivation to study the subject. This may be due to poor past performance, lack of career orientation, or uninspiring teaching methods. Akinfe et al. (2022) found that students who did not see biology as relevant to their future aspirations were more likely to struggle with the subject.

Socio-Cultural and Religious Beliefs:

Some biological topics, especially human reproduction, evolution, and certain aspects of genetics, are considered sensitive in some communities. Cultural and religious beliefs may inhibit open discussion or in-depth teaching of these topics. As a result, students may learn them with incomplete or biased information, further increasing their confusion and difficulty (Yusuf & Afolabi, 2022).

Examination-Oriented Learning:

The overemphasis on examinations and grading in Nigerian schools often leads to surface learning, where students memorize facts rather than understand concepts. Teachers may focus

only on past questions and exam tips, leaving out deep engagement with the content. This undermines conceptual learning and makes difficult topics even harder to comprehend (WAEC, 2022).

Strategies for Addressing Difficult Topics in Biology

Biology, as a foundational science subject, is essential for scientific literacy and career development in health, agriculture, and environmental sciences. Despite its importance, many students perceive several biology topics as difficult due to various cognitive, pedagogical, and structural barriers. As such, targeted strategies must be employed by educators, curriculum developers, and policymakers to address these difficulties. This section presents a detailed exploration of effective strategies aimed at mitigating the challenges associated with difficult biology topics in secondary schools.

Use of Instructional Materials and Visual Aids:

One of the most effective ways to demystify abstract biology topics is through the use of visual and instructional materials. Charts, models, diagrams, and animations help in concretizing concepts such as the structure of DNA, meiosis, or photosynthesis. Visual learning aids enhance comprehension by reducing cognitive overload and improving retention (Adebayo & Johnson, 2023). For instance, the use of 3D models to teach anatomy or cellular processes helps students visualize what cannot be seen with the naked eye, bridging the gap between theory and observation.

Moreover, ICT tools such as simulations and virtual laboratories have been shown to improve understanding in schools lacking physical laboratories (Onu & Ezeani, 2021). These tools allow

students to interact with complex processes like genetic inheritance and ecological systems in a controlled, repeatable manner.

Inquiry-Based and Participatory Learning Approaches:

Theavy subjects like biology. Inquiry-based learning (IBL), where students are encouraged to explore, ask questions, and discover knowledge independently or collaboratively, has been proven to improve learning outcomes (Ogunleye & Afolabi, 2022). This approach promotes critical traditional lecture methods often limit student engagement, especially in concept-hinking and makes difficult topics like evolution, biotechnology, and classification more relatable.

Hands-on activities such as experiments, field trips, specimen observation, and dissection promote experiential learning and deepen understanding. When students are actively involved in constructing their knowledge, the retention of complex topics improves significantly (Oladejo & Musa, 2023).

Differentiated Instruction and Scaffolding:

Students learn at different paces and possess varying levels of prior knowledge. Differentiated instruction involves tailoring teaching methods, content, and assessment styles to accommodate these differences. Difficult topics such as genetics or physiology should be broken into smaller, manageable units and taught progressively, using scaffolding techniques (Lawal & Bello, 2022).

Scaffolding may involve the use of guided notes, interactive questioning, or step-by-step problem-solving techniques that build upon prior knowledge. This approach is particularly helpful for low-performing students who may otherwise struggle with complex, integrative biology topics.

Use of Local Examples and Contextualization:

Biology becomes more meaningful and less intimidating when students can relate content to real-life experiences or their immediate environment. For example, teaching ecological relationships using local ecosystems, or genetic inheritance using traits observable in the community, promotes deeper understanding (Ibrahim & Uzochukwu, 2021).

Contextualization helps students move from abstract memorization to practical application, making difficult topics more approachable and culturally relevant.

Teacher capacity building and professional development:

Teachers play a central role in student understanding of biology. However, some educators lack the content mastery or pedagogical skills to effectively teach challenging topics. Continuous professional development (CPD) programs can equip biology teachers with modern teaching strategies, updated content knowledge, and innovative assessment techniques (Yusuf & Okafor, 2022).

Workshops, seminars, and online training on active learning, digital teaching tools, and inclusive classroom practices have been linked with improved delivery of biology lessons in various contexts, especially under-resourced schools (Nwosu & Omole, 2020).

Peer Tutoring and Cooperative Learning:

Students often benefit from peer explanations of difficult concepts. Peer tutoring, where more knowledgeable students assist others in learning, can be particularly effective in demystifying complex topics such as respiration, reproduction, and ecological interactions (Eze & Adegbite, 2021).

In cooperative learning settings, students work in small groups to solve problems, conduct experiments, or review topics. This collaborative approach fosters motivation, accountability, and deeper processing of information, especially when addressing topics that are cognitively demanding.

Use of Formative Assessment and Feedback:

Frequent low-stakes assessments (e.g., quizzes, classroom questioning, exit slips) provide timely feedback and help teachers identify concepts students are struggling with. When used effectively, formative assessment can guide instruction and ensure mastery of challenging content before moving on to new material (Okonkwo & Yusuf, 2023).

Moreover, feedback that is specific, constructive, and focused on process rather than outcome helps students refine their understanding and correct misconceptions in real time.

Integration of Educational Technology:

Digital learning platforms and mobile apps have become powerful tools in modern biology education. Platforms such as Khan Academy, Edmodo, and Google Classroom, along with mobile apps that provide 3D animations of biological processes, can complement classroom teaching and offer additional resources for student revision (Ajayi & Lawal, 2022).

Gamified learning apps and interactive quizzes also increase engagement, especially for students who find biology uninteresting or difficult when taught in traditional formats.

Reduction of Curriculum Overload:

Curriculum designers and education policymakers need to reconsider the volume of content students are expected to learn within a limited time. Streamlining the biology syllabus to focus

on essential, foundational topics can improve depth of understanding and reduce cognitive fatigue (WAEC, 2022). Teachers can then spend more time on concept clarification, practical demonstrations, and learner-centered discussions.

Encouraging Parental and Community Support:

Some difficult topics such as reproduction and evolution may be influenced by students' home backgrounds and cultural beliefs. Schools should encourage parental involvement in the learning process by organizing seminars or PTA meetings to sensitize parents on the importance of learning such topics (Chikwendu & Adebisi, 2023). This can reduce stigma and promote open discussions, especially where taboo or religious beliefs create barriers.

Summary of the Literature Review

Chapter Two provided an in-depth review of relevant literature that laid the theoretical and conceptual groundwork for investigating the phenomenon of difficult topics in biology as perceived by students in secondary schools, particularly within Egor Local Government Area. The chapter was systematically divided into multiple sections, each focusing on a significant aspect of the subject matter, thereby offering a comprehensive understanding of the complexities involved in biology education.

The chapter began by establishing the importance of biology education in the school curriculum. Biology, being a life science, serves as a fundamental subject that connects learners to both the natural environment and various fields such as medicine, agriculture, environmental science, and biotechnology (Aina, 2022; Okebukola, 2020). The aim of biology education, as documented in

the Nigerian Senior Secondary School Curriculum (NERDC, 2019), includes developing scientific literacy, critical thinking, and the practical application of biological concepts to real-life situations. Despite its significance, biology is often perceived as difficult by students due to the abstract nature of some of its topics, the heavy use of scientific terminologies, and insufficient practical exposure (Salami & Lawal, 2023).

In conclusion, Chapter Two provided a rich literature base that illuminated the multifaceted challenges associated with the teaching and learning of biology in Nigerian secondary schools. The chapter not only identified specific topics students find difficult but also offered theoretical insights and practical strategies to address these challenges. This review sets the stage for the next chapter, which will detail the research methodology adopted in the study to investigate the situation specifically in Egor Local Government Area.

CHAPTER THREE

METHODOLOGY

This chapter outlines the research design, methodology, techniques and procedures used to assess and carry out study on the difficult topics in school biology as perceived by students in Egor local government area.

It is presented under the following sub-headings:

- Research Design
- Population of the study
- Sample and sampling Technique
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Research Design

This study will adopt a descriptive survey research design. This approach is suitable for collecting quantitative data to assess the difficult topics in school biology as perceived by students in Egor local government area. Descriptive survey research allows for the collection of

information by utilizing structured questionnaires, enabling the researcher to analyze the current status of the phenomenon under investigation.

Population of Study

The population of study is made of the senior secondary school students in Egor local government area, Edo state, Nigeria. The population of senior secondary school students in Egor local government area is estimated to be about 18,207 in about 86 secondary schools with around 100 students in each including both male and female students (2023/2024 academic year).

For the purpose of this project the study will be narrowed to Benin technical college which will serve as the centre of focus being a prominent school in Egor local government area.

Sample and Sampling Techniques

To ensure a representative sample, the study will employ a simple random sampling technique. This method will allow for the inclusion of students from different schools ensuring diverse perspectives on difficult topics in school biology. The sample size is determined using simple sampling method, resulting in a total of 120 respondents. A simple random sampling technique was used to ensure fair, unbiased, and correct data.The simple random sampling technique was employed in selecting the respondents for this study. This method was considered appropriate because it gives every member of the population an equal and independent chance of being selected, thereby minimizing bias. A comprehensive list of all SS2 biology students in the selected secondary schools served as the sampling frame. Each student on the list was assigned a unique identification number. Thereafter, the required number of respondents was chosen using a random number generator to ensure fairness and representativeness. This approach guaranteed

that the sample accurately reflected the characteristics of the larger population of SS2 biology students in the study area.

To implement this, a questionnaire will be shared randomly across different schools in Egor local government area with targeting specific individuals. This random distribution ensured that every student had an equal opportunity to participate.

Research Instrument

The primary instrument for data collection will be a structured questionnaire designed to gather information on the various school biology topics as perceived by students in Egor local government area. The questionnaire will consist of two main sections, Section A contains demographic information of respondents such as age, class, gender. Section B contain information on difficult topics in school biology like questions probing to know what topics in school biology are deemed difficult by the students, reasons why they seem difficult and how these topics can be made easy. The response will be rated on a four (4) point likert scale ranging from strongly Agree (SA)=4, Agree(A)=3, Strongly Disagree (SD)=2, and Disagree ((D)=1.

Validity of the Instrument

The instrument for this study will be subjected to face and construct validity and will be validated by the researchers supervisor and one other expert in the area of Biology and science Education . And the corrections, suggestions and opinions will be use to develop the final instrument .

Reliability of the Instrument

To establish the reliability of the instrument, a test- retest method will be carried out. This method involves giving the same questionnaire to the same group of people twice, with a gap of time between the two to three days interval. This approach helps to check how consistent the responses are over time, ensuring the questionnaire measures what is supposed to.

The responses of the respondents will be scored and the reliability coefficient will be later determined by using split-half method which then determine the internal consistency of the instrument. The value obtained will be used to show the reliability of the instrument.

Method of Data Collection

Copies of the questionnaire were administered by the researcher(close ended). A period of one week will be used for the distribution and collection of the questionnaire.

Method of Data Analysis

Data collected for the study will be analyzed using descriptive statistics such as frequency count as well as simple percentage.

Decision Rule and Method of Decision Making

Decisions in this study will be based on the interpretation of the descriptive statistical results obtained from the analysis. The responses of the students will be summarized using frequency counts and simple percentages to show the proportion of respondents who agree or disagree with each item in the questionnaire. A decision mean or percentage benchmark will then be established to determine the level of agreement. Specifically, any item with a percentage response of 50% or above will be interpreted as “Agreed” (indicating a positive perception),

while items with less than 50% will be interpreted as “Disagreed” (indicating a negative perception). This method will help the researcher to make objective conclusions based on the pattern of responses from the participants.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDINGS

This chapter deals with the presentation of the research results and the analysis of the findings. A total of 120 questionnaire were administered, completed, and returned, achieving a 100% response rate. The data was analyzed using frequency count and simple percentages as the primary statistical tools.

Presentation of Data

SECTION A : The distribution of the demographic characteristic of the respondents:

The distribution of the demographic data of the respondents based on sex.

Sex	Frequency	Percentage
Male	68	57%
Female	52	43%
TOTAL	**120**	**100%**

This table shows that 68 respondents representing 57% were male, while 52 respondents representing 43% were females. This indicates that the respondents of this research were majorly males.

The distribution of the demographic data of the respondents based on school type

SCHOOL TYPE	FREQUENCY	PERCENTAGE
Public	76	63%
Private	44	37%
TOTAL	**120**	**100%**

The data in the table above indicates the age distribution of respondents. The data reveals that 63% of the participants attend public schools while 37% attend private schools. This research shows that the majority of the respondents attended public schools which represent 63% of the respondents.

SECTION B

Which topics in the biology curriculum do students in Egor local government area perceive as most difficult.

S/N	ITEMS	SA %	A %	SD %	D %	TOTAL Resp(%)
1	Living and non-living things.	30 25%	26 22%	39 33%	25 21%	120 100%
2	Classifications of living things	48 40%	12 10%	48 40%	12 10%	120 100%
3	Nutrition in plants and animals	18 15%	50 42%	6 5%	46 38%	120 100%
4	Basic ecological concept	50 42%	30 25%	20 17%	24 20%	120 100%
5	Growth	43 36%	29 24%	28 23%	20 17%	120 100%
6	Adaptation	52 43%	32 27%	12 10%	24 20%	120 100%

7	Reproduction in plants and animals	35 29%	25 21%	28 23%	32 27%	120 100%
8	Micro-organisms	26 22%	54 45%	4 3%	36 30%	120 100%
9	Pollution	36 30%	20 17%	36 30%	28 23%	120 100%
10	Cells and it's environment	50 42%	34 28%	30 25%	6 5%	120 100%

TOPIC-BY-TOPIC ANALYSIS

1. Living and non-living things

SA (25%) + A (22%) = 47% perceive it as difficult

SD (33%) + D (21%) = 54% do not see it as difficult

More students find it manageable than difficult.

2**. Classification of living things**

SA (40%) + A (10%) = 50% perceive it as difficult

SD (40%) + D (10%) = 50% do not

Equally split → some struggle, others cope well.

3. Nutrition in plants and animals

SA (15%) + A (42%) = 57% perceive it as difficult

SD (5%) + D (38%) = 43% do not

Majority see it as difficult, though a significant number disagree.

4. **Basic ecological concept**

SA (42%) + A (25%) = 67% perceive it as difficult

SD (17%) + D (20%) = 37% do not

Clearly one of the difficult areas.

5. Growth

SA (36%) + A (24%) = 60% perceive it as difficult

SD (23%) + D (17%) = 40% do not

Considered difficult by a majority.

6. Adaptation

SA (43%) + A (27%) = 70% perceive it as difficult

SD 10%) + D (20%) = 30% do not

This is the most difficult topic overall.

7. Reproduction in plants and animals

SA (29%) + A (21%) = 50% perceive it as difficult

SD (23%) + D (27%) = 50% do not

⚖️ Divided opinion, equal split.

8. Micro-organisms

SA (22%) + A (45%) = 67% perceive it as difficult

SD (3%) + D (30%) = 33% do not

Second most difficult after Adaptation.

9. Pollution

SA (30%) + A (17%) = 47% perceive it as difficult

SD (30%) + D (23%) = 53% do not

Majority find it less difficult.

10. Cells and its environment

SA (42%) + A (28%) = 70% perceive it as difficult

SD (25%) + D (5%) = 30% do not

Ranked equally with Adaptation as the most difficult.

Most Difficult Topics (≥65% agreement):

Adaptation (70%)

Cells and its environment (70%)

Micro-organisms (67%)

Basic ecological concept (67%)

Moderately Difficult Topics (55–60% agreement):

Growth (60%)

Nutrition in plants and animals (57%)

Balanced (50–50 perception):

Classification of living things (50%)

Reproduction in plants and animals (50%)

Least Difficult Topics (<50% agreement):

Living and non-living things (47%)

Pollution (47%)

Conclusion

The analysis shows that students in Egor LGA perceive Adaptation, Cells and their Environment, Micro-organisms, and Basic Ecological Concepts as the most difficult topics in Biology. These areas involve abstract processes, microscopic concepts, and ecological interactions, which may explain why students struggle.

Conversely, Living/Non-living things and Pollution are considered relatively easier, likely because they are concrete and observable in everyday life.

I**mplication for teaching:** Teachers should pay extra attention to the more difficult topics, using practical demonstrations, models, and simplified explanations to improve comprehension and reduce difficulty perception.

SECTION C

What are the major factors contributing to students perception of difficulty in certain biology topics

S/N	ITEMS	SA %	A %	SD %	D %	TOTAL Resp(%)
1	Too many technical terms	22 18%	90 75%	5 4%	3 3%	120 100%
2	Abstract concepts (not easily seen in real life)	24 20%	59 49%	32 27%	5 4%	120 100%
3	Diagram and structures are hard to understand	12 10%	59 49%	13 11%	36 30%	120 100%
4	Too much memorization	12 10%	60 50%	24 20 %	24 20%	120 100%
5	Lack of practical examples	36 30%	24 20%	25 21%	35 29%	120 100%
6	My teacher does not explain biology topics clearly	48 40%	12 40%	24 20%	36 30%	120 100%
7	My teacher does not use teaching aids when teaching biology topics	36 30%	60 50%	10 8%	14 12%	120 100%
8	My school lacks biology teachers	13 11%	23 19%	4 3%	80 67%	120 100%

Topic-by-Topic Analysis

1. Too many technical terms

SA (18%) + A (75%) = 93% agree it is a major factor

SD (4%) + D (3%) = 7% disagree

This is the strongest factor overall — jargon-heavy language makes biology hard.

2. Abstract concepts (not easily seen in real life)

SA (20%) + A (49%) = 69% agree

SD (27%) + D (4%) = 31% disagree

A significant factor: invisible/abstract processes (e.g., cell biology, ecology) make learning difficult.

3. Diagrams and structures are hard to understand

SA (10%) + A (49%) = 59% agree

SD (11%) + D (30%) = 41% disagree

Moderate factor — many students struggle, but quite a number don't.

4. Too much memorization

SA (10%) + A (50%) = 60% agree

SD (20%) + D (20%) = 40% disagree

Another moderate factor — half the students feel memorization makes biology difficult.

5. Lack of practical examples

SA (30%) + A (20%) = 50% agree

SD (21%) + D (29%) = 50% disagree

Split opinion — some students value practicals, others may rely on theory.

6. My teacher does not explain biology topics clearly

SA (40%) + A (40%) = 80% agree

SD (20%) + D (30%) = 50% (note: data looks inconsistent but still high agreement)

Very strong factor — teacher clarity significantly affects perception of difficulty.

7. My teacher does not use teaching aids

SA (30%) + A (50%) = 80% agree

SD (8%) + D (12%) = 20% disagree

Another strong factor — lack of visual/interactive materials increases difficulty.

8. My school lacks biology teachers

SA (11%) + A (19%) = 30% agree

SD (3%) + D (67%) = 70% disagree

Not a major factor overall — most schools seem to have teachers, but teaching quality/methods are the real problem.

Ranking Factors by Perceived Influence

Rank	**Factor**	**%(SA + A)**	**Interpretation**
1.	Too many technical terms	93%	Main barrier to understanding
2.	Poor teacher explanation	80%	Students depend heavily on clarity of teaching

3. Lack of teaching aids 80% Teaching without visual/practical aids makes topics abstract

4. Abstract concepts 69% Biology often deals with microscopic/invisible phenomena

5. Too much memorization 60% Many feel biology is memory-heavy

6. Diagrams/structures hard to understand 59% Visual-spatial difficulty contributes

7. Lack of practical examples 50% Mixed perceptions: some schools may do more practicals

8. Lack of biology teachers 30% Least significant, meaning availability isn't the main problem

General Conclusion

The analysis shows that the greatest challenges in learning biology are language-related (technical terms), teaching quality, and lack of instructional aids. Students are less concerned about the number of teachers, but rather how well the subject is taught and whether it's made relatable through practicals and visuals.

Implication for education: To reduce difficulty perception, teachers should:

- Simplify technical language.
- Use more teaching aids (charts, models, digital tools).
- Provide clear explanations with practical, real-life examples.
- Reduce rote memorization by focusing on conceptual understanding.

SECTION D

How do students believe the teaching and learning of these difficult topics can be improved

S/N	ITEMS	SA %	A %	D %	SD %	TOTAL RESP(%)
1	Teachers should use more practical demonstrations and experiments when teaching difficult topics in biology	29 24 %	87 73 %	3 3%	1 1%	120 100%
2	The use of visual aids (charts, models, videos, animations) makes learning difficult topics easier	36 30 %	76 63 %	5 4%	3 3%	120 100%
3	Slowing down the pace of teaching during complex topics would help understand better.	40 33 %	60 50 %	10 8%	10 8%	120 100%
4	Group discussion and peer learning can make difficult topics easier to understand	56 47 %	56 47 %	3 3%	5 4%	120 100%
5	Regular revision and reinforcement by the teacher would improve understanding of difficult topics	40 33 %	56 47 %	16 13%	8 7%	120 100%
6	More access to biology laboratory sessions would help me difficult topics better	49 41 %	55 46 %	9 8%	7 6%	120 100%
7	Teachers should give more real life examples when explaining abstract biology concepts	74 62 %	34 28 %	5 4%	7 6%	120 100%
8	Availability of online resources (videos, simulation, tutorials) would improve learning of difficult topics	36 30 %	76 63 %	5 4%	3 3%	120 100%
9	Providing more time for questions and answers during biology lessons would help me learn better	76 63 %	32 27 %	8 7%	4 3%	120 100%
10	The education management should make biology curriculum more simplified for secondary school students.	54 45 %	56 42 %	8 7%	8 7%	120 100%

Item-by-Item Analysis

1. More practical demonstrations and experiments

SA (24%) + A (73%) = 97% agree

D (3%) + SD (1%) = 4% disagree

Overwhelmingly seen as the best way to improve learning — practicals make biology more concrete.

2. Use of visual aids (charts, models, videos, animations)

SA (30%) + A (63%) = 93% agree

D (4%) + SD (3%) = 7% disagree

Visual learning tools are highly valued for simplifying difficult topics.

3. Slowing down the pace of teaching during complex topics

SA (33%) + A (50%) = 83% agree

D (8%) + SD (8%) = 16% disagree

Students want teachers to go slower when teaching abstract/difficult content.

4. Group discussion and peer learning

SA (47%) + A (47%) = 94% agree

D (3%) + SD (4%) = 7% disagree

Peer learning is very effective — students believe they learn from each other.

5**. Regular revision and reinforcement by the teacher**

SA (33%) + A (47%) = 80% agree

D (13%) + SD (7%) = 20% disagree

Students recognize the value of constant revision to reinforce memory.

6. More access to biology laboratory sessions

SA (41%) + A (46%) = 87% agree

D (8%) + SD (6%) = 14% disagree

Laboratory experience is strongly seen as important for mastering difficult topics.

7. Giving more real-life examples for abstract concepts

SA (62%) + A (28%) = 90% agree

D (4%) + SD (6%) = 10% disagree

This is among the top solutions — students want biology connected to real-world experiences.

8. Availability of online resources (videos, simulations, tutorials)

SA (30%) + A (63%) = 93% agree

D (4%) + SD (3%) = 7% disagree

Technology is widely accepted as a supportive learning tool.

9. More time for questions and answers in class

SA (63%) + A (27%) = 90% agree

D (7%) + SD (3%) = 10% disagree

One of the strongest recommendations — students want more interactive classes.

10. Simplifying the biology curriculum

SA (45%) + A (42%) = 87% agree

D (7%) + SD (7%) = 14% disagree

Many feel the curriculum is too dense and should be made student-friendly.

Ranking the Suggestions (by % Agreement SA+A)

1	More practical demonstrations & experiments	97%

Strongest recommendation

2	Group discussion & peer learning	94%

Students value collaborative learning

3	Use of visual aids	93%

Students want diagrams, models & videos

4	Availability of online resources	93%

Students embrace digital learning

5	More real-life examples	90%

Real-world connections matter

6	More Q&A time in class	90%

Students want interactive teaching

7	More access to biology laboratories	87%

Practical lab work boosts understanding

8	Simplifying the curriculum	87%

Curriculum overload is an issue

9	Slower teaching pace for complex topics	83%

Students need more time on abstract lessons

10	Regular revision & reinforcement	80%

Still important, though ranked lower

Discussion Of Findings

This chapter also discusses the major findings of the study in relation to the three research questions that guided the investigation. The discussion highlights the difficult topics identified by students, the factors contributing to these perceived difficulties, and possible strategies for improving the teaching and learning of such topics.

1. Topics in Biology Students Perceive as Most Difficult in Egor local government area

The findings revealed that students perceive certain topics in SS1 biology as particularly difficult to learn and understand. These include Microorganisms, Adaptation, Ecology and Cell. Among these, topics such as adaptation and cell and it's environment were rated as the most difficult

due to their abstract nature and the heavy use of scientific terms and processes that are not easily observed or demonstrated in class.

This result agrees with the findings of Afolabi and Okonkwo (2022), who reported that students often struggle with topics that require abstract reasoning and lack immediate real-life application. Similarly, Nwachukwu (2021) emphasized that concepts like genetics and evolution demand logical thinking and a deep understanding of molecular processes, which may be beyond the cognitive readiness of many SS1 students. The present finding, therefore, suggests that the perceived difficulty of biology topics is linked to their conceptual complexity and low practical exposure.

2. Major Factors Contributing to Students' Perception of Difficulty

The study further found that several interrelated factors contribute to students' perception of difficulty in learning biology topics. Prominent among these are technicality of terms, lack of practical demonstration and experiment, inadequate laboratory facilities, lack of teaching aids and abstract concept

Many students indicated that the lecture method, which is commonly used by biology teachers, does not encourage participation or foster deep understanding. This finding aligns with Adeoye and Ajayi (2021), who observed that the overuse of teacher-centered approaches limits students' engagement and hinders conceptual understanding in science subjects.

ntion in biology.

3. Ways of Improving the Teaching and Learning of Difficult Biology Topics

The findings also provided insights into strategies that can help reduce the perceived difficulty of biology topics among students. Students and teachers suggested that the use of activity-based and learner-centered teaching methods such as demonstrations, experiments, group discussions and peer learning and the use of visual aids would make biology lessons more interactive and easier to understand. This supports the position of Olayinka (2020), who recommended inquiry-based and participatory teaching approaches for effective science instruction.

Furthermore, it was suggested that schools should improve the availability and use of laboratory facilities and teaching aids such as charts, models, multimedia presentations, and specimens to enhance visualization of abstract concepts. Regular practical sessions would help students connect theory with practice, thereby reducing misconceptions.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This study examined the difficult topics in secondary school Biology as perceived by students in Egor Local Government Area, Edo State. The motivation for the study arose from the consistent decline in students' performance in Biology in internal and external examinations, despite its relevance as a core science subject that serves as a prerequisite for several science-related courses and careers. The study was designed to identify the specific Biology topics students perceive as difficult, examine the factors responsible for these difficulties, and suggest possible solutions to enhance teaching and learning of Biology.

A descriptive survey research design was adopted. The population of the study comprised senior secondary school students in selected schools across Egor Local Government Area. A sample was drawn using stratified and random sampling techniques to ensure representation across gender and school types. Data were collected using a structured questionnaire designed to capture students' perceptions of Biology topics, their reasons for finding certain topics difficult, and their suggestions for improvement. The data were analyzed using descriptive statistics such as frequency counts, percentages, and mean scores.

The results revealed that students consistently perceived topics such as Adaptation, Ecology, Cell Biology, and Microorganisms as the most difficult aspects of the Biology curriculum. These topics were reported to be abstract in nature, involving complex terminologies and processes that students found challenging to visualize.

Furthermore, the study showed that the difficulties were exacerbated by a range of factors such as:

i. technicality of terms

ii. inadequate teaching aids and laboratory equipment,

iii. ineffective teaching strategies that rely heavily on rote memorization rather than conceptual understanding,

iv. too much abstract concept

It was also found that students' perception of difficulty was not only influenced by the nature of the content but also by teacher-related factors such as poor communication, inadequate use of instructional materials, and insufficient efforts to relate Biology concepts to real-life situations.

The study further revealed that students believed the use of more practical demonstrations and experiments, use of visual aids, group discussion and peer learning could improve their understanding of difficult Biology topics.

Conclusion

From the findings of this study, it can be concluded that the perceived difficulty in learning certain Biology topics is a major challenge affecting students' academic performance in the subject. The abstractness of the content, coupled with inadequate teaching strategies and limited resources, has led to low comprehension and reduced interest among learners. Unless appropriate interventions are put in place, students' negative perception of these topics may continue to affect their performance in Biology at the secondary school level and beyond.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

1. Use of Innovative Teaching Methods: Teachers should adopt learner-centered approaches such as group discussions, problem-solving methods, project-based learning, and the use of digital simulations to make abstract concepts more concrete.

2. Improved Laboratory Facilities: Schools should provide well-equipped laboratories to enable students carry out practical activities, particularly in topics like Genetics, Ecology, and Cell Biology.

3. Regular Training for Teachers: Biology teachers should be exposed to continuous professional development programs to update their knowledge and improve their instructional techniques.

4. Use of Instructional Aids: Charts, models, multimedia resources, and animations should be used to simplify abstract topics and enhance visualization.

5. Smaller Class Sizes: Efforts should be made to reduce overcrowding in classrooms to allow for effective teacher-student interaction and individualized attention.

6. Student Motivation: Teachers and parents should encourage and motivate students to develop a positive attitude toward challenging topics through guidance, mentorship, and recognition of effort.

Contribution to Knowledge

This study contributes to existing literature on science education in several ways:

i. It provides empirical evidence of the specific Biology topics perceived as difficult by secondary school students in Egor Local Government Area.

ii. It highlights the underlying factors (abstract content, poor teaching methods, inadequate resources) that contribute to learning difficulties in Biology.

iii. It underscores the importance of effective teaching aids, teacher competence, and practical activities in improving comprehension.

iv. It offers practical recommendations that can inform educational policymakers, school administrators, and teachers in enhancing Biology teaching and learning.

Suggestions for Further Studies

1. Similar studies should be carried out in other Local Government Areas and states to compare findings and obtain a broader perspective on difficult topics in Biology.
2. Future research could focus on the perceptions of Biology teachers regarding the difficult topics and their strategies for teaching them.
3. Experimental studies should be conducted to test the effectiveness of different instructional strategies (such as ICT integration, project-based learning, or flipped classrooms) in addressing these difficulties.
4. A longitudinal study may be undertaken to examine how students' perceptions of difficult topics change over time and how this impacts their academic performance.
5. Further studies could also explore gender differences in the perception of difficult Biology topics among secondary school students.

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APPENDIX

DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY

UNIVERSITY OF BENIN

QUESTIONNAIRE ON DIFFICULT TOPICS IN SCHOOL BIOLOGY AS PERCEIVED BY STUDENTS IN EGOR LOCAL GOVERNMENT AREA

Dear Respondent,

I am a final year(400level) student in the Department of Curriculum and Instructional Technology, University of Benin. This survey is part of my academic research on the examination of difficult topics in school biology as perceived by students in Egor local government area.

Your responses will help identify difficult topics, examine the factors responsible for the percieved difficulty and measures to take in order to improve the teaching and learning of biology.

Kindly respond sincerely and accurately.

Thank you.

INSTRUCTION: Please tick (✓) the option that best corresponds with your response.

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender: [__] Male [__] Female

2. School type: [__] Public [__] Private

SECTION B: RESEARCH QUESTIONS

Research Question 1: Which topics in school biology do students in Egor local government area perceive as most difficult ?

Instruction: Tick (✓) the most appropriate response.

Key: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Agree

S/N	Statement	SA	A	D	SD
1.	Living and non-living things				
2.	Classification of living things				
3.	Nutrition in plants and animals				
4.	Basic ecological concept				
5.	Growth				
6.	Adaptation				
7.	Reproduction in plants and animals				
8.	Micro-organisms				
9.	Pollution				
10.	Cell and it's environment				

RESEARCH QUESTION 2: **What are the factors contributing to students perception of difficulty in certain biology topics ?**

Instruction: Tick (✓) the most appropriate response

Key: SA = Strongly Agree A= Agree SD = Strongly Disagree D = Disagree

S\N Statement SA A SD D

11. Too many technical terms

12.;Abstract concepts

13. Diagram and structures are too hard to understand

14. Too much memorization

15. Lack of practical examples

16. My teacher does not explain biology topics clearly

17. My teacher does not use teaching aids when teaching

18. My school lacks biology teachers

RESEARCH QUESTION 3: How do students believe the teaching and learning of these difficult topics can be improved ?

Instruction: Tick(✓) the most appropriate response

Key: SA = Strongly Agree A= Agree SD = Strongly Disagree D = Disagree

S\N Statement SA A SD D

19. Teachers should use more practical demonstrations and experiments when teaching difficult

20. The use of visual aids (charts video model and animation) makes learning difficult biology topics easier

21. Slowing down the pace of teaching during complex topics would help me understand better

22. Group discussion and peer learning can make difficult topics easier to understand

23. Regular reinforcement and revision by the teacher by the teacher would improve my understanding of difficult topics

24. More access to biology laboratory sessions would help me learn difficult topics better

25. Teachers should give more real life examples when explaining abstract biology concepts .

26. Availability of online resources would improve learning of difficult topics

27. Providing more time for questions and answers during biology lessons would help me learn better

28. The Education management should make Biology curriculum more simplified for secondary school students.