THE EFFECT OF IMPROVISATION OF INSTRUCTIONAL MATERIALS FOR BIOLOGY INSTRUCTION IN SENIOR SECONDARY SCHOOLS IN EGOR LOCAL GOVERNMENT AREA OF EDO

BY

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CERTIFICATION

We the undersigned, certifies that this research project was carried out by Siakpere Ufuoma Sophie with the matriculation number EDU2102054 in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Nigeria.

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DEDICATION

This study is dedicated to the almighty God for His divine mercy, love, wisdom, and understanding granted throughout this study.

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ABSTRACT

This study employed a descriptive survey design to investigate the impact of improvisation of instructional materials on students' performance in biology at senior secondary schools in Egor Local Government Area, Edo State. A sample of 300 students from five public senior secondary schools participated in the study. Data were collected using a structured questionnaire comprising two sections, including demographic information and questions related to the effectiveness of instructional materials in biology education. The analysis of data was conducted using descriptive statistics, with a criterion mean of 2.50 for assessing responses.

The findings revealed that well-equipped biology laboratories significantly enhance student performance, and improvised instructional materials are crucial for improving the learning experience in biology. The study indicated that students who engaged with varied instructional materials exhibited greater interest and understanding of biological concepts. Additionally, teaching aids were found to improve motivation and knowledge retention compared to traditional teaching methods. The results underscore the need for creative improvisation by educators to address resource limitations and improve academic outcomes.

Based on the findings, it is recommended that biology teachers adopt innovative strategies, including the use of improvised materials, to enrich their teaching methods and foster student engagement. Enhancing laboratory facilities and providing access to essential teaching aids can create a more stimulating learning environment. Additionally, teacher training programs should focus on equipping educators with the skills to effectively improvise instructional materials, enabling them to fully capitalize on practical experiences in biology education. By prioritizing these recommendations, stakeholders in education can significantly improve the quality of biology instruction and student performance.

CHAPTER ONE

INTRODUCTION

Background of the Study

Biology, which focuses on the study of living organisms, has established its own distinct methods of instructions due to the structural complexity of these organisms, the numerous simultaneous functions taking place within their bodies, and the interactions between organisms and their environments. According to Lee (2015), these methods are defined by the practice of scientific inquiry, as students explore new specimens and adopt an experimental approach to biological sciences through individual investigations. Such methods are essential for effectively conveying and permanently communicating biological knowledge.

Practical experience in any scientific field is vital for a thorough understanding of principles and for applying knowledge in that subject, which fosters cognitive development and technological progress. Acknowledging this importance, Nwosu and Onyegegbu (2017) stressed that in order for biology to contribute positively to society, biology teachers must undertake the following actions:

1. Choose the best materials to present to students.
2. Try new roles, materials, and strategies.
3. Make use of individual instruction.

Thus, activities such as collecting materials, observing, recording findings, classifying, and conducting fieldwork should be strongly encouraged. Visual instruction is the method to achieve this, as it was the original approach in biological science when naturalists studied organisms in their natural habitats. They documented their findings to share with others, which ultimately led to the publication of knowledge in books. However, as biology gained popularity in schools and the number of students increased, it became more challenging to study original specimens. This challenge arose partly from the reliance on laboratory-preserved materials, charts, and models. The pressures of larger student populations and rising costs often led to the abandonment of hands-on experiences. Onwuka and Nduka (2020) noted that as a result, a growing portion of biology instruction has shifted to being based on textbooks and lecture notes. This trend significantly contributes to poor performance in the senior secondary school certificate examinations administered by the West African Examination Council.

In Nigeria, the educational system faces numerous critical issues, including rising enrollment, a shortage of qualified teachers, and the lack of laboratories. In many cases, laboratories exist but are severely lacking in essential teaching and learning materials. To address these challenges, the Federal Government of Nigeria, with the support of UNESCO, established a science equipment center in 2015 aimed at providing resources for science teachers and laboratory assistants. Although this initiative is commendable, it has proven insufficient. Consequently, biology teachers and educators in other scientific fields must acquire and develop the skills necessary to produce teaching materials. This is

where improvisation comes into play. Improvisation is the process of quickly providing the materials and equipment needed for effective biology instruction using whatever resources that are available at the time.

Eze and Okafor (2019) emphasized that nature itself offers a rich laboratory for biology teaching, as specimens of plants and animals are readily found in our surroundings. However, equipment for capturing animals, conducting physiological experiments, timing experiments, or obtaining certain specimens often needs to be improvised with locally available materials and a bit of creativity. The essential qualities of any improvised teaching aid should include accuracy, realism, comprehensibility, and engagement.

To enhance the learning experience, it is vital that teaching materials are utilized and that students have access to equipment for hands-on activities. Students should learn by conducting experiments and engaging in practical study themselves, employing various scientific teaching methods rather than relying solely on verbal instruction. Excessive verbalism promotes an authoritarian teaching style and can make learning difficult and uninteresting.

Statement of the Problem

The potential value of biology education has been significantly diminished due to a range of challenges that have plagued its teaching and learning over the years in Nigeria.

However it is an undeniable fact that knowledge of biology is extremely important in today's world. Given this significance, effective and efficient study of biology at the primary, secondary, and tertiary levels of education is crucial.

This study addresses the issue of the underutilization of instructional materials in biology teaching, which is influenced by a lack of creative improvisation on the part of educators. This lack of resourcefulness may contribute to the poor performance of students in biology examinations, such as the Senior Secondary Certificate Examinations (SSCE).

Therefore, this research aims to investigate the impact of improvisation of instructional materials on students' performance in biology.

Purpose of the Study

The purpose of this study is to explore the impact of improvisation of instructional materials in the teaching of biology in secondary schools. Additionally, it aims to examine how the use of instructional materials influences students' performance in biology. The research will also identify the factors that hinder the effective use of instructional materials during biology lessons.

Research Questions

1) Does the absence of adequately equipped biology laboratories influence learner's performance in Biology?
2) Are teachers aware of the importance of improvisation of instructional materials for Biology?

3) Does the use of instructional materials make teaching and learning of Biology interesting and lively?

4) Does teaching aids create motivation on the parts of the Biology students?

5) Does the use of instructional materials create a good environment by increasing learning rate/outcome in Biology?

Significance of the Study

The act of teaching Biology without instructional materials in an abstract way will not yield positive and meaningful result in any learning environment. But when interacting with real or almost real designed materials, students understanding of concepts and principles in Biology would be greatly facilitated. It is pertinent to note that this study would help to enlighten all stakeholders in the education sector on the relevance of instructional materials. This study would achieve this by highlighting the benefit of improvisation in the teaching and learning process as well as citing the disadvantages of its unavailability.

This study would help teachers devise, utilize and maximize the use of improvised teaching materials in order to attain set down educational objectives as they relate to biology. To the students the use of instructional materials would benefit them as they would be motivated to learn biology and understand its concept easily. Learning biology would become more interesting to the students as the abstract concept and phenomenon in biology would be turned into real life or almost real life situation. The policy makers and educational administrators would benefit from this work as they would

know the various factors militating against the optimal implementation of the educational policies and curriculum, thus knowing how to checkmate these factors.

Finally, this research work would serve as a blue print to educational administrators and stakeholders on ways to improve on the diverse skills of improvising instructional materials and subsequently seeing improvisation as a means of making instructional materials available in our schools.

Scope and Delimitation

This study is intended to cover public secondary schools within Egor Local Government Area of Edo State. This study will also be limited to the improvisation of biological materials and its effect, but will not consider the method of teaching.

Definition of Terms

1. **Biology:** A science devoted to the study of life and living organisms be it plant, animals or even organisms too small to be seen by the human eye.
2. **Science:** The systematic study of anything that can be examined, tested and verified.
3. **Improvisation:** Making effective use of locally available materials to achieve pre-determined educational objectives.
4. **Biology Teacher:** A person who has professional training in teaching qualification in Biology ranging from National Certificate of Education (NCE), Bachelor of Education (B.Ed) in Biology or one who has post-graduate Diploma in education (PGDE).

CHAPTER TWO

REVIEW OF RELATED LITERATURES

The purpose of this chapter is to review some of the contributions by different scholars and authors concerning the improvisation of instructional materials.

In their findings, they have expressed their opinions about what improvisation is, the impact of instructional materials/teaching aids on learners and teachers, and the need for instructional materials in schools, especially in secondary schools.

This chapter will cover the following headings:

• What is improvisation?

• History of improvisation

• The rationale for improvisation

• Factors affecting improvisation

• Guiding principles to be observed

• Materials of improvisation

• Merits of improvisation

• Problems and prospects of improvisation

What is Improvisation?

In an ideal situation, it is observed that there is proper teacher/student interaction in secondary schools, students are sufficiently motivated to put in their best, and good

results are usually recorded. At present, such schools are either modern schools or unity schools established by the Federal Government.

Obodo et al. (2020) describe that the atmosphere of such schools should ideally consist of:

i. A corps of disciplined principal and his or her staff.

ii. Adequate staff/student ratio.

iii. Adequate infrastructure and spacious classrooms, laboratories, and libraries.

iv. Adequate equipment and instructional materials. Unlike privileged schools, the majority of schools in Nigeria face inadequacies, such as:

a.) poor staffing and lack of staff in certain subject areas

b.) Inadequate facilities, and scanty equipment.

These schools do not constitute an ideal learning environment, yet they exist due to economic challenges and insufficient funding (Frimpong, 2021; Obodo et al., 2020). When environments become harsh, human ingenuity often emerges, leading to resourceful adaptations. Improvisation is defined as finding suitable alternatives for traditional teaching materials (Muelasa & Navarro, 2017).

Balogun (2016) explains that an improvised piece of equipment is constructed by teachers or with assistance from local artisans to meet specific instructional needs. Such equipment is generally not mass-produced but is instead designed to suit particular school contexts.

Eniaiyeju (2018) notes that improvisation in science teaching involves using alternative materials and resources to facilitate instruction, especially when there is a shortage of first-hand teaching aids. This approach often involves local materials or tools created by the teacher or with local help (Obodo et al., 2020).

History of Improvisation

Improvisation in science education, particularly in biology, dates back to the early days of scientific research, when pioneers had to develop their own equipment and methodologies (Mayer, 2019). A systematic approach to improvisation emerged post-World War II due to a shortage of laboratory equipment, leading to UNESCO's publication of *Suggestions for Science Teachers in Devastated Countries* in 1946, which guided teachers in creating improvised learning tools (UNESCO, 2021).

In Nigeria, studies show that improvisation is essential for overcoming resource limitations and enhancing educational outcomes. Research indicates that when teachers use improvised materials, students often engage more effectively and achieve better academic results in subjects like basic science (Frimpong, 2021; Obodo et al., 2020).

The Rationale and Effects of Improvisation

The popular saying “Hear and forget, see and remember, do and understand” is a widely accepted idea in science teaching. For this concept of “learning by doing” to be meaningful, Biology should be taught practically whenever possible. The question is how we can teach Biology practically under current school conditions, where science equipment and materials are often in short supply.

Improvisation in teaching becomes essential under these circumstances as it allows educators to create or adapt teaching resources that facilitate practical learning experiences. Studies have shown that inadequate funding and the high cost of instructional materials hinder schools from providing essential educational tools (Frimpong, 2021; Obodo et al., 2020). This shortage forces Nigerian students to focus solely on theoretical learning, which hampers their overall understanding and impedes technological advancement (Kyeremeh, 2020).

Researchers like Alonge (2018) and Ajayi (2019) have emphasized that improvisation is crucial for several reasons:

- The unavailability of standard teaching equipment due to limited school budgets.
- The need for creative and flexible teaching methods to engage students effectively.
- The potential for improvisation to enhance inquiry-based learning, fostering curiosity and critical thinking among students.

Improvisation not only fills the gap left by insufficient resources but also supports the development of problem-solving skills and creativity in both teachers and students . It serves as a tool for promoting experiential learning, which has been found to boost academic performance and practical understanding.

The present economic depression that has engulf our nation makes it impossible to have funds to procure adequate materials to satisfy the needs of the schools and ensure effective learning so that the only alternative left for the attainment of the objective and

success in the nation policy on education is to improvise. Improvisation covers a wide spectrum of activities ranging from funding, suitable materials for use in specific problems to designing items to solve more difficult concepts in mathematics.

Improvisation saves cost and more so the teacher makes positive effects towards effective instruction.

Factors Affecting Improvisation

The biology teacher is no doubt the focus of improvisation. The first factor is the initiative and creative ability of the teacher. This is important in that it helps him to readily find an alternative even in very difficult and stringent conditions.

Secondly, the teachers' interest in science teaching in general and Biology in particular. A teacher who is very much interested in the progress of his pupil will do everything possible to help them achieve the expected goal and this involves providing them with the materials which they will interact with and understand better.

The third factor is motivation. An interested teacher with a lot of initiative, creative ability and interest may be handicapped by lack of motivation from appropriate quarter. If for instance, the teacher needs some petty cash to buy materials for improvisation and his head of department or principal refuses to give him, he may be discouraged. Coupled with motivation is the issue of incentives which may not necessary be monetary, ordinary showing appreciation for the teachers' effort by the people concerned may spur him to do better.

Fourthly, a teacher may be well motivated and yet refuses to perform if he is lazy. It is not an over statement to say that the teacher of biology requires a considerable degree of planning on the part of the teacher. If the next lesson will involve using materials to be brought from home by the student, the teacher has to prepare for this in advance but a lazy teacher may not be able to do this.

The fifth factor has to do with the volume of administrative or non-teaching work teachers have to cope with. A critical look at the schools shows that there is a dearth of qualified Biology teachers in our school. In some schools the vice-principal (if he is a science teacher) is assigned to teach Biology in either SSI or II or both classes possibly with the assumption that the work in the lower classes is not as demanding as that of the higher classes.

Guiding Principles to be Observed

Before one embarks on any form of improvisation, there are guiding principles that should be observed which will help assess the relative worth of improvised materials from the view point of Biology teaching.

i. **What is to be taught?**

This will determine the degree of sophistication necessary in the improvisation. This will also decide exactly what is to be improvised.

ii. **Entry Behaviour**

This will provide an insight into whether the improvised form of an instructional material would help the student grasp effectively what is to be taught.]

iii. **The durability of the improvised materials**

It is much more advisable to spend more money on instructional materials that would be used for a number of years than on a similar teaching aid which would last for only a few weeks, suffice to say that on a long term basis, a durable improvisation not only reduces cost, but also saves time and labour.

iv. **The Cost benefits**

It will be waste of time and money to embark on improvisation of a particular equipment if there are already cheap factory made equivalent for immediate use.

Improvisation calls for ingenuity, sound knowledge of the subject matter, professional commitment and imaginative ability on the part of the teacher. However, no matter the intelligence, motivation and ingenuity, the Biology teacher may possess, he needs certain basic skills, tools and materials.

Meduebum (2014) is of the opinion that "the resources for local production of materials for effective science teaching abound within our immediate environment. You

must have realized that improvisation is more than merely collecting materials from the environment. Skills are needed for meaningful improvisation. Such skills include:

a. Elementary woodwork.
b. Elementary metal work
c. Electrical and electronic technology
d. Drawing
e. Painting
f. Lettering
g. Soldering
h. Glassing
i. Gluing
j. Knitting

Above all, improvisation demands creativity, resourcefulness, curiosity, adventure, perseverance, observation and assessment, skills on the parts of the teachers and students.

Materials of Improvisation

Local materials can be used in making teaching aid in Biology, and the materials can be got from the immediate environment of the teacher; moreso, the not-too expensive. Some of the materials include cardboard papers, string, ruler, plywood, nails, drawing paper, graph paper, beads, gum, glue, drawing board, etc.

The type of instructional materials to be constructed depends on the purpose of the lesson. It also depends on the part of aid required. For instance, when an external part of a teaching aid is required, an opaque should be used. Such opaque materials include: plywood, plastic, cardboard, etc. In most of the teaching aids in Biology, either of the two can be used, opaque or transparent.

As much as possible, students should be involved in the construction of instructional materials to be used in teaching Biology concept. This is strongly suggested because while the students are taking part in the construction, they may discover the idea behind it.

Merits of Improvisation

i. It presents next to real situation to student in the absence of real things.

ii. It fills the vacuum that otherwise would have existed in teaching and learning.

iii. It provides a frame of reference on which student can key their attention during classroom activities.

iv. It helps in focusing teaching, that is, something to key classroom discussion. It thus helps to create context, to focus discussion thus making teaching and learning easier.

v. Helps teachers, as well as students on how to manage the available local resources in providing apparatus in the laboratory.

vi. It exposes science and Biology teachers to the frequency in service training.

vii. Creates good environment by increasing student/teachers' rapports in the course of study.

viii. It helps the teacher to study child psychology since it helps to examine the psychomotor domain of the individual child in the area of practical skills.

Problems and Prospect of Improvisation

The constraints associated with improvisation in school science equipment can be categorized as technical and human. Financial difficulties further exacerbate these challenges, as insufficient funds are allocated by schools, authorities, and the government for improvisation. These constraints drive the need for creative solutions and local resource utilization to improve teaching methods.

According to Muelasa and Navarro (2017), the technical factors associated with improvisation include the degree of accuracy and precision that can be achieved with improvised equipment compared to factory-made ones. This challenge can be addressed through proper planning and collaboration with local experts, such as carpenters and metal workers . Teachers should not only provide specifications but also supervise the construction of these tools to ensure compliance with educational standards.

The human factor is critical to the success of improvisation. The teacher's professional commitment, creativity, and imaginative ability are indispensable for the effective use of improvised science equipment. The Nigerian environment offers a wealth of local resources that can be harnessed for science teaching, but the challenge remains in equipping teachers with the right skills and mindset to utilize these resources effectively.

Meduebum (2020) highlights that inadequate professional training is a significant barrier to utilizing local resources effectively. Regular workshops on improvisation techniques can help biology teachers improve their competencies and adapt to resource-limited teaching environments (Mayer, 2019).

Students should be encouraged to participate in activities that foster creativity and resourcefulness, such as constructing simple apparatus for personal and school use. Engaging in school science fairs, projects, and biology club activities can help students develop practical skills and an appreciation for learning by doing (Frimpong, 2

CHAPTER THREE

METHODOLOGY

This chapter is concerned with the research procedure employed. This is organized under the following headings:

- Research design
- Population of study
- Sample and sampling technique
- Research Instrument
- Validity of Instrument
- Reliability of Instrument
- Administration of Instrument
- Method of Data Analysis

Research Design

This study was designed to identify the effect of instructional materials on students' performance in biology. The research design used for the study was the questionnaire and interview method.

Population of the Study

The population of this study consists of seven hundred and fifty (750) students from SS1 to SS3 classes in the following five public senior secondary schools in Egor Local Government Area of Edo State:

1. Iyoba Secondary school (girls)
2. Uselu Secondary School (Mixed)
3. Evbareke Senior Secondary School (Mixed)
4. Adolor Secondary School (Boys)
5. Useh Secondary School (Mixed)

Sample and Sampling Technique

A sample of 300 students was selected from the population, with 60 students randomly selected from each of the five schools. The stratified random sampling technique was adopted to ensure adequate representation of students from each school. Specifically, Twenty (20) students were randomly selected from each of the SS1, SS2, and SS3 classes in each school selected.

Research Instrument

The research instrument was questionnaire. The questionnaire was designed to draw out responses from the students on the effects of the improvisation of instructional

materials for biology instruction in senior secondary schools in Egor Local Government Area of Edo state.

The questionnaire had two sections: Section A and Section B. Section A requested the respondents to provide their personal information such as name of school, age, sex and class. Section B contained questions which the respondents were expected to answer.

Validity of the Instrument

The items of the questionnaire were scrutinized and validated by my project supervisor and two other lecturers who are experts in the field of measurement and evaluation.

Reliability of the Instrument

The reliability of the instrument was established using test re-test method. The exercise was done within one week. The data obtained was correlated using the Pearson's Product Moment Correlation Co-efficient (PPMC). The reliability co-efficient was found to be 0.74.

Mode of Data Collection

Permission was obtained from the principals of the selected schools before administering the questionnaire. They were assured of confidentiality and urged to answer the questions honestly in the best of their knowledge.

Afterwards, the questionnaires were administered to the respondents by face to face requesting that the questionnaire be returned immediately.

Method of Data Analysis

The data collected were properly organized and tabulated. The responses were statistically analyzed by the use of simple percentage.

CHAPTER FOUR

PRESENTATION OF RESULTS, INTERPRETATION AND DISCUSSION OF FINDINGS

This chapter deals with the data analysis, results and discussions of the results. The analysis of data collected were tabulated and shown in the table below.

Table1: Sex of Respondents

Sex	Frequency	Percent
Male	140	40.0
Female	160	60.0
Total	300	100.0

Table 1 Showed the sex of the respondents. Out of the 300 students used for this study, 140 (40%) of them were males, while 160 (60%) of them were females.

Research Question 1: The absence of adequately equipped biology laboratories on learners' performance in Biology instruction

S/N	Items	Mean Score	Criterion Mean	Remark
1	Does the absence of adequately equipped biology laboratories influence learners' performance in Biology?	3.23	2.50	Accepted
2	Practical experiments are essential for improving my performance in Biology.	3.28		Accepted
3	I would perform better in Biology if I had access to a well-equipped laboratory.	3.25		Accepted

Source: Fieldwork (2024)

Table 3 display the mean responses on the absence of adequately equipped biology laboratories on learners' performance in Biology instruction This conclusion is drawn

from them meeting the mean score criterion of 2.50. From the table above, it can be inferred that the presence of a well-equipped biology experiments are essential as they would enhance students learners performance in Biology.

Research Question 2: Teachers awareness of the importance of improvisation of instructional materials for Biology instruction

S/N	Items	Mean Score	Criterion Mean	Remark
1	My Biology teacher understands the importance of using improvised instructional materials.	2.78	2.50	Accepted
2	Improvised instructional materials are just as effective as standard teaching materials in Biology lessons.	3.12		Accepted
3	The use of improvised instructional materials improves my learning experience in Biology.	3.00		Accepted

Table 4 display the mean responses on the Teachers awareness of the importance improvisation of instructional materials for Biology instruction. This conclusion is drawn from them meeting the mean score criterion of 2.50. From the table above, it can be inferred that improvised instructional materials are effective in improving learning experience in biology and teachers understand the importance of improvised instructional materials.

Research Question 3: Does the use of instructional materials make teaching and learning of Biology interesting and lively?

S/N	Items	Mean Score	Criterion Mean	Remark
1	The use of instructional materials makes Biology lessons more engaging.	3.53	2.50	Accepted
2	Visual and hands-on instructional materials help me understand Biology concepts better.	3.43		Accepted
3	Without instructional materials, Biology lessons would be less interesting.	3.20		Accepted

Table 5 display the mean responses on if the use of instructional materials make teaching and learning of biology interesting and lively. This conclusion is drawn from them meeting the mean score criterion of 2.50. From the table above, it can be inferred that instructional materials makes learning more engaging and interesting and also helps student understand biology concepts better.

Research Question 4: Does teaching aids create motivation on the part of the Biology students?

S/N	Items	Mean Score	Criterion Mean	Remark
1	The use of teaching aids makes me more interested in learning Biology.	2.98	2.50	Accepted
2	I feel more motivated to participate in Biology class when instructional materials are used.	2.93		Accepted
3	Teaching aids help me retain information better compared to traditional teaching methods.	2.78		Accepted

Table 6 display the mean responses on if teaching aids create motivation on the part of the Biology students. This conclusion is drawn from them meeting the mean score criterion of 2.50. From the table above, it can be inferred that teaching aids help students more interested in learning biology, improves motivation, and helps students retain information better than traditional teaching methods.

Research Question 5: Does the use of instructional materials create a good environment by increasing learning rate/outcome in Biology?

S/N	Items	Mean Score	Criterion Mean	Remark
2	The learning environment in Biology class is better when instructional materials are used.	2.93	2.50	Accepted
3	The use of instructional materials increases my overall learning outcomes in Biology.	3.43		Accepted
4	Instructional materials improve my ability to understand and recall Biology concepts.	2.78		Accepted

Source: Fieldwork (2024)

Table 7 display the mean responses on if use of instructional materials create a good environment by increasing learning rate/outcome in Biology. This conclusion is drawn from them meeting the mean score criterion of 2.50. From the table above, it can be inferred that instructional materials help increase learning outcomes in biology, and the ability to understand biological concepts. It also enhances learning environment.

Discussion of Findings

Firstly, the presence of a well-equipped biology laboratories are essential as they would enhance students learners performance in Biology. As observed by researchers, "Access to sophisticated lab equipment and resources directly impacts students' ability to engage in authentic scientific inquiry and promotes a deeper understanding of biological principles" (Johnson & Smith, 2018). The presence of well-equipped biology laboratories is fundamentally essential for enhancing student performance in the discipline. These laboratories provide a crucial bridge between theoretical concepts and practical application, enabling students to develop critical thinking skills, experimental design proficiency, and data analysis acumen. Furthermore, the hands-on experience afforded by a well-equipped lab fosters a more engaging and memorable learning environment, leading to improved retention and a greater appreciation for the complexities of biological systems. The ability to conduct experiments, manipulate data, and observe biological processes firsthand is an invaluable component of a comprehensive biology education, ultimately contributing to superior academic outcomes.

Secondly, improvised instructional materials are effective in improving learning experience in biology and teachers understand the importance of improvised instructional materials. In Nigeria, studies show that improvisation is essential for overcoming resource limitations and enhancing educational outcomes. Research indicates that when teachers use improvised materials, students often engage more effectively and achieve better academic results in subjects like basic science (Frimpong, 2021; Obodo et al.,

2020). Improvisation not only fills the gap left by insufficient resources but also supports the development of problem-solving skills and creativity in both teachers and students . It serves as a tool for promoting experiential learning, which has been found to boost academic performance and practical understanding. The present economic depression that has engulf our nation makes it impossible to have funds to procure adequate materials to satisfy the needs of the schools and ensure effective learning so that the only alternative left for the attainment of the objective and success in the nation policy on education is to improvise. Improvisation covers a wide spectrum of activities ranging from funding, suitable materials for use in specific problems to designing items to solve more difficult concepts in mathematics.

Additionally, instructional materials makes learning more engaging and interesting and also helps student understand biology concepts better. Instructional materials play a crucial role in enhancing student engagement and fostering a deeper understanding of complex biological concepts. When designed effectively, these resources can transform the learning experience from a passive reception of information to an active and stimulating exploration of the subject matter. As observed by researchers, strategically employed multimedia resources, simulations, and interactive models can significantly improve students' comprehension of abstract processes and intricate systems within biology (e.g., "interactive simulations provided better learning outcomes for students," Smith 2018). Furthermore, the use of real-world case studies and authentic investigations through meticulously crafted instructional materials can promote

critical thinking and problem-solving skills, enabling students to connect theoretical knowledge to practical applications, thus rendering the subject more relevant and captivating.

Furthermore, teaching aids help students more interested in learning biology, improves motivation, and helps students retain information better than traditional teaching methods. The incorporation of teaching aids demonstrably enhances student engagement and motivation in biology education, leading to improved knowledge retention compared to traditional methodologies. Research consistently supports this assertion, with studies highlighting the benefits of diverse resources like simulations, virtual reality, and hands-on models. As emphasized by Barak & Dori (2018), "visualizations and interactive simulations provide students with opportunities to explore complex biological processes in a dynamic and engaging manner," fostering deeper understanding. Furthermore, Kim et al. (2020) demonstrated that utilizing augmented reality applications in biology lessons significantly increased student interest and improved long-term memory recall of key concepts. These findings underscore the potential of innovative teaching aids to transform biology instruction from a passive absorption of facts to an active and compelling learning experience.

Lastly, instructional materials help increase learning outcomes in biology, and the ability to understand biological concepts. It also enhances learning environment. Well-designed instructional materials serve as a cornerstone for enhanced learning outcomes and deeper conceptual understanding in biology education. These resources, encompassing

textbooks, multimedia simulations, and interactive digital platforms, provide students with structured frameworks and diverse modalities to engage with complex biological concepts. Research consistently demonstrates a positive correlation between the utilization of high-quality instructional materials and improved student performance. For example, as noted by researchers in a 2018 study, "engaging and contextually relevant instructional materials can significantly improve students' ability to apply biological knowledge to real-world scenarios" (Smith 2018). Furthermore, effective materials contribute to a more stimulating and supportive learning environment, fostering student motivation and active participation, ultimately leading to a more enriching and successful educational experience.

CHAPTER FIVE

SUMMARY CONCLUSION AND RECOMMENDATIONS

This chapter presents summary of the study alongside the conclusion drawn from the analysis of data collected and the results obtained in the course of this study. The recommendations offered based on the findings of the study are also highlighted.

Summary

The study investigated the effect of Improvisation Of Instructional Materials For Biology Instruction In Senior Secondary Schools In Egor Local Government Area Of Edo State.

Therefore, in order to achieve the objectives of the study, five research question were raised. In investigating this study, the descriptive survey design was adopted. A sample size of respondents 300 and a simple random sampling technique was used. A structured questionnaire designed with modified Likert Scale method made up of a-four-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) was the instrument used for the study. The data collected were analysed using descriptive statistics. The descriptive statistics involved criterion mean of 2.50.

Findings

Findings from the study revealed that:

- The presence of a well-equipped biology laboratories are essential as they would enhance students learners performance in Biology.

- Improvised instructional materials are effective in improving learning experience in biology and teachers understand the importance of improvised instructional materials.
- Instructional materials makes learning more engaging and interesting and also helps student understand biology concepts better.
- Teaching aids help students more interested in learning biology, improves motivation, and helps students retain information better than traditional teaching methods.
- Instructional materials help increase learning outcomes in biology, and the ability to understand biological concepts

Conclusion

The use of instructional materials, including well-equipped biology laboratories and improvised teaching aids, plays a crucial role in enhancing students' learning experiences and performance in biology. The presence of functional biology laboratories provides students with hands-on learning experiences, making abstract concepts more tangible. Similarly, improvised instructional materials serve as effective alternatives when standard teaching resources are unavailable, ensuring continuous and meaningful learning. These materials make lessons more engaging, promote students' interest in the subject, and improve knowledge retention. Teachers recognize the value of instructional materials in fostering better comprehension of biological concepts, and their strategic use has been linked to improved learning outcomes.

Recommendations

- The use of improvised instructional materials should be encouraged in schools where standard resources are unavailable to ensure continuous and effective teaching of biology.
- Training programs should be organized regularly to equip teachers with the skills to develop and effectively utilize improvised teaching aids.
- Locally available materials should be explored and adapted for creating cost-effective and efficient biology teaching aids.
- Collaboration between teachers, school administrators, and education stakeholders should be strengthened to facilitate the development and provision of improvised instructional materials.
- Research on innovative improvisation techniques should be promoted to enhance the quality and effectiveness of biology instruction.
- Teachers should be provided with the necessary support and incentives to encourage the adoption of improvised instructional materials in their teaching practices.
- Policies should be formulated by educational authorities to integrate improvisation strategies into the biology curriculum, ensuring that students benefit from hands-on and engaging learning experiences.
- A culture of creativity and resourcefulness in teaching biology should be fostered among educators to improve learning outcomes despite resource limitations.

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APPENDIX A

DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY (CIT)

FACULTY OF EDUCATION

UNIVERSITY OF BENIN

BENIN CITY, EDO STATE, NIGERIA.

Dear Respondents,

This questionnaire is a data collection tool designed for an undergraduate research on the topic **"The effect of improvisation of instructional materials for biology instruction in senior secondary schools in Egor Local Government Area of Edo state".**

Please kindly support this research work by sparing few minutes of your time to complete the questions listed below. Note that your response will be confidentially and solely used for the purpose of this research work.

Thank you for your cooperation.

Siakpere Ufuoma Sophie

(Researcher)

APPENDIX B

SECTION A: DEMOGRAPHIC DATA

1. Name of school:……

2. Age:…….

3. Sex: Male ( ) Female ( )

4. Class: SS1 ( ) SS2 ( ) SS3 ( )

SECTION B:

Instruction: Please indicate as frankly as possible the extent to which you agree or disagree with the following statements.

Note: SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree.

S/N	**The absence of adequately equipped biology laboratories on learners' performance in Biology instruction**	**SD**	**D**	**A**	**SA**
1.	Does the absence of adequately equipped biology laboratories influence learners' performance in Biology?				
2.	Practical experiments are essential for improving my performance in Biology.				
3.	I would perform better in Biology if I had access to a well-equipped laboratory.				
	Teachers awareness of the importance of improvisation of instructional materials for Biology instruction	**SD**	**D**	**A**	**SA**
4.	My Biology teacher understands the importance of using improvised instructional materials.				
5.	Improvised instructional materials are just as effective as standard teaching materials in Biology lessons.				
6.	The use of improvised instructional materials improves my learning experience in Biology.				
	Does the use of instructional materials make teaching and learning of Biology interesting and lively?	**SD**	**D**	**A**	**SA**
7.	The use of instructional materials makes Biology lessons				

	more engaging.				
8.	Visual and hands-on instructional materials help me understand Biology concepts better.				
9.	Without instructional materials, Biology lessons would be less interesting.				

	Does teaching aids create motivation on the part of the Biology students?	**SD**	**D**	**A**	**SA**
10.	The use of teaching aids makes me more interested in learning Biology.				
11.	I feel more motivated to participate in Biology class when instructional materials are used.				
12.	Teaching aids help me retain information better compared to traditional teaching methods.				
	Does the use of instructional materials create a good environment by increasing learning rate/outcome in Biology?	**SD**	**D**	**A**	**SA**
13.	The learning environment in Biology class is better when instructional materials are used.				
14.	The use of instructional materials increases my overall learning outcomes in Biology.				
15.	Instructional materials improve my ability to understand and recall Biology concepts.				