

**INVESTIGATING THE INFLUENCE OF INSTRUCTIONAL MATERIAL  
AND INSTRUCTIONAL METHODS ON STUDENTS' PERFORMANCE IN  
MATHEMATICS IN EDO STATE**

**BY**

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BENIN CITY**

**OCTOBER, 2023**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF  
CURRICULUM AND INSTRUCTIONAL TECHNOLOGY, UNIVERSITY OF  
BENIN, BENIN CITY IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE AWARD OF THE BACHELOR OF EDUCATION  
(B.Ed.) DEGREE IN MATHEMATICS.**

**OCTOBER, 2023**

## CERTIFICATION

We, the undersigned, certify that this research work was carried out and completed by **Fanama Priscilla Ebimoboere** with matriculation number EDU1803183 of the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Edo State, Nigeria, in partial fulfilment of the award of B.Ed. Degree in Mathematics.

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## **APPROVAL**

I, the undersigned, certify that this research study is adequate in scope and quality for the partial fulfilment of the requirement for the award of a Bachelor of Education (B.Ed.) degree in Mathematics.

\_\_\_\_\_  
**Dr. (Mrs) Esther Ngozi Odafe**  
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\_\_\_\_\_  
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## **DEDICATION**

This research study is dedicated to God Almighty, my daily source of strength and resilience, whom I rely on for wisdom, strength and understanding. His unending favour has seen me through my academic pursuit. It is a testament to the completion of my journey at the University of Benin.

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### **Abstract**

This research work was carried out to identify The Influence of Instructional Material and Instructional Methods on Students' Performance in Mathematics. The research was done as survey research and aimed to determine the importance and need for various instructional materials and methods in teaching Mathematics and how these instructional materials and methods can be utilized to enhance students' performance in Mathematics. Four research questions were raised, of which two were hypothesized and analyzed to guide this study. The random sampling technique was utilised in the selection of hundred (100) mathematics students from five (5) senior secondary schools in Ovia North-East Local Government Area of Edo state. The data were collected with a 4-point Likert scale questionnaire and analyzed using the Statistical Package for the Social Sciences (SPSS). The frequencies, mean, standard deviation, and percentages were calculated using parametric statistics. The result showed that instructional materials enable students visualize and understand complex concepts in Geometry, thereby improving their academic performance.

Moreover, instructional methods like inquiry, flipped classrooms and problem-solving methods of teaching help to give students a better understanding of Mathematics. The schools sampled were poorly equipped with instructional materials and laboratories for the teaching and learning of Mathematics. Results recorded that factors determining the effectiveness of Instructional Methods or Materials in the Teaching and Learning of Geometry include proper use of instructional materials, funds, the willingness of the mathematics teacher and a conducive environment. Based on the outcome of the research, the following recommendations were made: mathematics teachers should be encouraged to utilize instructional materials in the teaching of mathematics as it helps in the learning of mathematical concepts and processes. Teachers should be retrained on the need for various methods of improvisation in mathematics teaching and learning. Consequently, various seminars and workshops should be organized for teachers on this vital subject matter to encourage interest in the subject and ensure an increase in the number of students taking mathematics. There is a need for a change in the present methodology of the teachers wherein emphasis is mainly on the lecture method, and teachers should be encouraged to attend seminars/workshops on modern teaching methods like cooperative learning strategy, values analysis, values clarification, and action learning strategy.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **Background To the Study**

Mathematics, a design of the human mind, concerned primarily with ideas, processes and reasoning, is seen as a subject that relates to all aspects of human life to various degrees (Maliki, Ngban, and Ibu, 2019). It is the bedrock of science and technology, and its practical significance in science and technology is so varying that no area of science, technology, or business enterprise is without its application. According to Adamu (2020), mathematics impacts an individual's personal growth and adds to a nation's prosperity. It has long been regarded as one of the most critical aspects of human intellect and is one of the earliest academic disciplines in the history of humans.

Humans benefit from mathematics in many ways, including cognitive improvement, increased rationality and reflective thoughts, and improved structural reasoning and dominance, as it contributes to a leading role in developing logical reasoning, critical thinking as well as problem-solving skills in students and all aspects of life. It has always been given special attention in school as all students are required to pass this subject, and it is also related to many other fields and disciplines.

According to (The National Mathematics Advisory Panel, 2008), it is employed in our daily lives. In Nigeria, every student striving to advance their education in any higher learning institution is expected to pass Mathematics, at least with credit level at the Secondary School Certification, as it is compulsory in all primary and secondary school levels.

The influence of instructional methods and materials in contributing to and improving students' academic performance as well as educational development is irrefutable. The teaching of Mathematics, especially in Nigerian secondary schools, needs to be aptly handled as the methods and materials used by teachers to convey and drive home their planned out subject points at the secondary school levels of our education system are inarguably an important factor in beneficial classroom interaction, the adequate transfer of knowledge from the teacher to the students which determines the students' performance.

Experience over time have unveiled that, teachers have been making use of words to communicate and convey ideas or concepts in the teaching-learning process of Mathematics. This process is known as the 'chalk-talk' method, where teachers come to class and write on the board, expecting students to grasp effectively what is been taught by using their mouths to explain and convey certain concepts. Today, technological advances have made it feasible to come up with materials and devices that helps to reduce the teachers' talking and at the same time make the concepts

more accurate, exciting and accessible for the learner to comprehend. These materials are called Instructional materials, and they are notable tools employed in the teaching-learning process to increase teachers' efficiency and improve students' performance. They are used to concretize various concepts as they help to provide variations in how messages are delivered during the teaching and learning process of Mathematics.

Instructional materials also make learning interesting, practical, realistic, and more engaging. Also, it enables teachers and students to contribute actively and effectively in lesson sessions. Some researchers have said that lack and non-use of instructional materials is one of the significant contributors to students' poor achievement in a subject like Mathematics (Awobodu, 2002; Eze and Nwafor, 2012). According to (Oladejo, Ojebisi, Olusunde and Isola, 2011), it is reported that there is a definite connection between academic achievement and the use of instructional materials in teaching science subjects. This means that they guide the teaching and learning processes through the logical and successive preparation and presentation of lessons. Instructional materials are all the instructional aids used to support, facilitate, influence, or encourage acquiring knowledge, competency, and skill (Abiodun-Oyebanji and Adu 2007).

Instructional materials are said to be divided into three categories based on their sensory appeal: audio, visual and audio-visual. Audio instructional materials

are instructional materials such as radio and audio tapes which appeal to the hearing sense. Visual instructional materials appeal to the faculty of sight, and they are in the form of charts, pictures, and CDs, to list a few. Audio-visuals appeal to the learner's sense of hearing and visual senses to stimulate interest in learning. Such materials include films, television, audio-visual tapes, CDs, VCDs, DVDs and other high-definition electronic devices. It is said that students understand mathematics better when innovative teaching resources are in use. Innovative learning materials are instructional materials that are more flexible per the needs of students. To develop innovative learning materials, the teachers must understand students' interests and talents to present Mathematics in practical and creative ways, i.e., using cameras, data projectors or video films as tools to explain the lesson thoroughly by audio and visual means at the same time.

According to Professor Babatunde Fafunwa, Teaching is facilitating learning or acquiring knowledge, skills, values, morals, beliefs, and habits. Teaching is a process that brings about the needed changes in learners to attain specific outcomes. To ensure this process is effective, the method used for teaching needs to be efficient; teachers need to be familiar with various teaching strategies that acknowledges the vastness and complexity of the concepts to be taught. These teaching strategies are also known as instructional methods. Instructional methods refer to the techniques and strategies teachers use to deliver instruction to students (Baloğlu & Karakus,

2019; Akram & Mahmood, 2015). Teaching methods are avenues to help students study effectively. They are strategies teachers take up in meeting teaching goals, including instructional organization and techniques, subject matter presentation, and teaching materials. Ameh and Dantani (2012) opined that technique is essential in any teaching-learning environment, and the method used by the teacher may encourage or inhibit learning. It may enhance mental activities, which are essential for social prowess, or discourage eagerness and curiosity, thus making self-sustenance and survival difficult.

It is the teacher's duty to single out the most suitable method to suit his learners' current situation and level to attain or further improve the desired learning outcome. Teachers' instructional methods can be grouped into student-centred instruction and teacher-centred. Student-centred instruction is where students are inspired to direct their learning by doing and working with other students (McCombs & Miller, 2007; Pedersen & Liu, 2003) while Teacher-centred instruction is an instruction process where teachers deliver content to students through conventional lectures or demonstrations (Adams & Engelmann, 1996; Rosenshine & Stevens, 1986). Some types of teacher-centred instruction is the lecture, demonstrations, discussion methods, etc.

Instructional materials and methods are vital to effective teaching and learning in mathematics. They are used in the presentation and explanation of mathematical

concepts, which help students expand their understanding of the subject. Considering Mathematics is a subject filled with activities, the way it is taught is essential in assisting students to acquire basic foundational Mathematical knowledge, skills, and attitudes to providing solution to varying problems in life. Therefore, Mathematics, a unique subject, necessitates the teacher to use effective teaching methods that will allow the students to be diligently involved.

Numerous studies have examined how teaching strategies and materials affect students' attitudes toward mathematics. For instance, Oghuvbu (2015) looked into how instructional materials affected secondary school pupils' academic performance in mathematics. The study revealed that pupils' academic performance in mathematics was improved upon when proper instructional materials were used. In another study, Igbokwe et al. (2016) on the effect of teaching strategies on mathematics achievement in secondary schools. The study revealed that effective teaching strategies, including cooperative learning, Problem-Based learning, and peer tutoring, favourably impacted students' mathematical proficiency.

Quite notably, constant low academic performance by the majority of students is elementally linked to the use of unproductive teaching methods by teachers to impart knowledge to learners (Adunola, 2011). Hence, this study seeks to investigate and examine the influence of effective instructional methods and

materials in terms of availability, accessibility, ability to use and the extent of usage on teaching Mathematics and its influence on students' academic performance.

### **Statement Of Problem**

One of the problems with the teaching and learning of Mathematics is that most teachers keep trust in the old system of education that has barely anything exciting or interesting to give to the learners. Studies have shown that over 90% of the teachers who were present at the National Mathematical Centre workshops from 2012 to 2021 still use the traditional teaching method. Unfortunately, students' performance in this very important subject has been consistently poor. As reported by the West African Senior School Certificate Examination Chief Examiner on the May/June 2018, 2019, 2020, 2021, and 2022 on mathematics, poor performance was seen in some areas such as mensuration, cyclic quadrilaterals and geometry, including reading and answering questions from graphs and construction.

This report included students in Edo State to be specific. Furthermore, the Chief Examiner's report shows that candidates showed evident weakness in plotting, reading, and interpreting graphs, applying the rule of BODMAS to solve problems, trigonometric relations/values of angles, longitude and latitude, scale drawings, and geometry. WAEC Chief Examiners' Reports of 2018-2022 show that in 2018, 2019,

2020, 2021, and 2022 May/June WAEC results, 31.28%, 36.68%, 52.97%, 50.22%, and 49.98% of the students in the respective years had credits in mathematics in almost all the years. The reports show that students are not strong in Mathematics, which includes geometry and also displayed weak knowledge of circle theorems and geometrical construction. This poor performance will constitute severe problems and challenges to achieving scientific and technological advancement in Nigeria, as this could have been corrected with appropriate instructional materials and methods. What could have been the issues surrounding this recurring decline in academic performance? Could it be the unavailability of instructional materials? Are mathematics teachers not employing effective methods of teaching? Hence, this study seeks to investigate the influence of instructional materials and methods on Students' performance in mathematics.

### **Research Questions**

The following research questions guided the study:

1. What is the Influence of instructional methods on students' performance in Geometry?
2. What is the Influence of instructional materials on students' performance in Geometry?

3. Are instructional materials available for teaching and learning Geometry in Senior Secondary Schools in Ovia North East Local Government Area of Edo state?
4. What factors determine the effectiveness of instructional methods or materials in teaching and learning Mathematics in Senior Secondary Schools in Ovia North East Local Government Area of Edo state?

### **Hypotheses**

The following hypotheses were raised to guide this study:

1. Using instructional materials has no significant impact on students' academic performance.
2. There is no significant difference between the mean performance scores of male and female students taught Geometry with appropriate instructional methods in geometry.

### **Purpose of the study**

The study aims to investigate the influence of instructional material and instructional methods on students' performance in mathematics. Specifically, the objectives of the study are to examine:

1. The influence of instructional methods on students' performance in mathematics with a focus on Geometry.

2. The influence of instructional materials on students' performance in mathematics with a focus on Geometry.
3. Availability of instructional materials for teaching and learning mathematics in Senior Secondary Schools in Ovia North East Local Government Area of Edo state.
4. Factors that determine the effectiveness of instructional methods or materials in the teaching and learning of mathematics in Senior Secondary Schools in Ovia North East Local Government Area of Edo state

### **Significance of the Study**

This research will contribute to improving the knowledge about the influence of instructional methods and materials on the performance of mathematics students in Senior Secondary Schools in Ovia North East Local Government Area. The findings will provide suggestions on what instructional methods and materials will positively influence students' attitudes towards mathematics. This study's results will benefit Secondary School teachers, the Ministry of Education, parents and the schooling community at large.

Undergraduate students can use this study's findings to understand better the influence of instructional materials and methods on students' performance in

mathematics. It can help them in their studies and research projects related to mathematics education. It can also provide undergraduate students with appropriate instructional materials and methods that they can use to teach mathematics effectively.

Mathematics teachers can use this study to identify efficient teaching strategies and resources that can be applied to enhance teaching and learning. Teachers can use these tools to help students learn, make abstract ideas more understandable, establish a baseline of understanding among pupils, and pique their interest.

Secondary school students in Nigeria can gain from this study as it will provide insights into how the appropriate use of instructional materials and methods can improve students' performance in mathematics, making the subject more exciting and understandable to them.

Finally, the findings of this study will clarify the most effective instructional methods and materials to boost performance in mathematics as this could see to an increase in their motivation to learn mathematics and, ultimately, better academic performance.

### **Scope/Delimitation of the Study**

This research focuses on the influence of instructional material and methods on students' performance in mathematics. This study will consider the impact of instructional materials and methods on students' performance in Geometry, an essential aspect of mathematics. The study is therefore delimited to mathematics students focusing on Geometry in some senior secondary schools one (1) in Ovia North East Local Government Area.

### **Operational Definition of Terms**

**Mathematics** is a compulsory subject taught from pre-primary to senior secondary school. It gives students knowledge of quick reasoning and calculation.

**Instructional Materials:** Resources which are used to support teaching and learning. These resources can be physical or digital, including textbooks, workbooks, diagrams, graphs, charts, models, and videos.

**Instructional Methods:** The techniques teachers use to deliver instructional materials to students.

**Performance:** The extent to which students grasp and retain knowledge gained which is assessed by marks over a specific period

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

This chapter focuses on the review of related literature. It will be discussed under the following sub-headings:

- Conceptual Framework
- The influence of instructional methods and materials on students' academic performance
- The influence of instructional materials on students' academic performance
- The availability of instructional materials for the teaching and learning of mathematics in Junior Secondary Schools
- Factors that determine the effectiveness of instructional methods or materials in the teaching and learning of mathematics in Senior Secondary Schools
- Empirical Review
- Summary of Reviewed Literature

## **Conceptual Framework**

This literature review focuses on the Cognitive Load Theory, which serves as the theoretical framework for this study. The Cognitive Load Theory, developed by John Sweller and further reviewed by other researchers, propounded that learning involves cognitive processes and these processes have certain limitations. It differentiates between three types of cognitive load: (1) Intrinsic Cognitive Load: it is the innate complication of the subject matter being learned. Some mathematical concepts, such as solving complex equations or understanding geometric proofs, naturally have a high fundamental difficulty. (2) Extraneous Cognitive Load: This arises from how information is designed and passed out. Poorly planned instructional materials or methods can increase extraneous cognitive load thus hindering learning. (3) Germane Cognitive Load: This is the efforts which is necessary to process new information which leads to long-term learning. Effective instructional materials and methods can support the development of germane cognitive load.

In the context of mathematics teaching and learning, the Cognitive Load Theory offers valuable insights into how instructional materials and methods can either facilitate or hinder learning. For example: (1) Intricate Problem Solving: Complex problem-solving tasks in mathematics inherently have a high intrinsic cognitive load. Effective instructional materials should aim to reduce extraneous cognitive load by providing clear, structured, and well-organized problem-solving processes. (2) Visual Representations: Visual representations, such as diagrams and graphs, can reduce cognitive load, which aids in understanding abstract mathematical concepts. Well-designed visual instructional materials enhance germane cognitive load. (3) Interactive Simulations: Digital tools and simulations can manipulate cognitive load. When used appropriately, they can facilitate learning

by allowing students to explore mathematical concepts interactively, managing their cognitive load effectively.

### **Instructional Materials**

Instructional materials are carefully planned to aid effective teaching and learning processes. They are used to relay information, ideas, and notes to learners (Ijaduala 2017) and they involve deliberate human efforts, apt utilization, and design of materials. Usman and Adewumi (2016) state that instructional materials can be seen as the broad variety of instruments and materials used for teaching to incite self-activity on the part of the pupils. They are employed in learning situations to complement the written or spoken words during the learning process. They help learners understand, retain and apply the experience gained during the process to attain educational goals.

Various authors have defined instructional materials. For example, (Obanya, 2019) says they are materials that are supposed to make learning and teaching possible. They assist the teacher to convey the planned out concept, message, or idea effectively so that they make meaning to the learner. According to (Abdullahi, 2012), they are materials or tools that are designed locally or imported and could cause huge improvement of lessons and impact if intelligently used. (Ikerionwu, 2016) made reference to them as objects or devices, which assists the teacher to make a lesson much more explicit to the learner.

## TYPES OF INSTRUCTIONAL MATERIALS

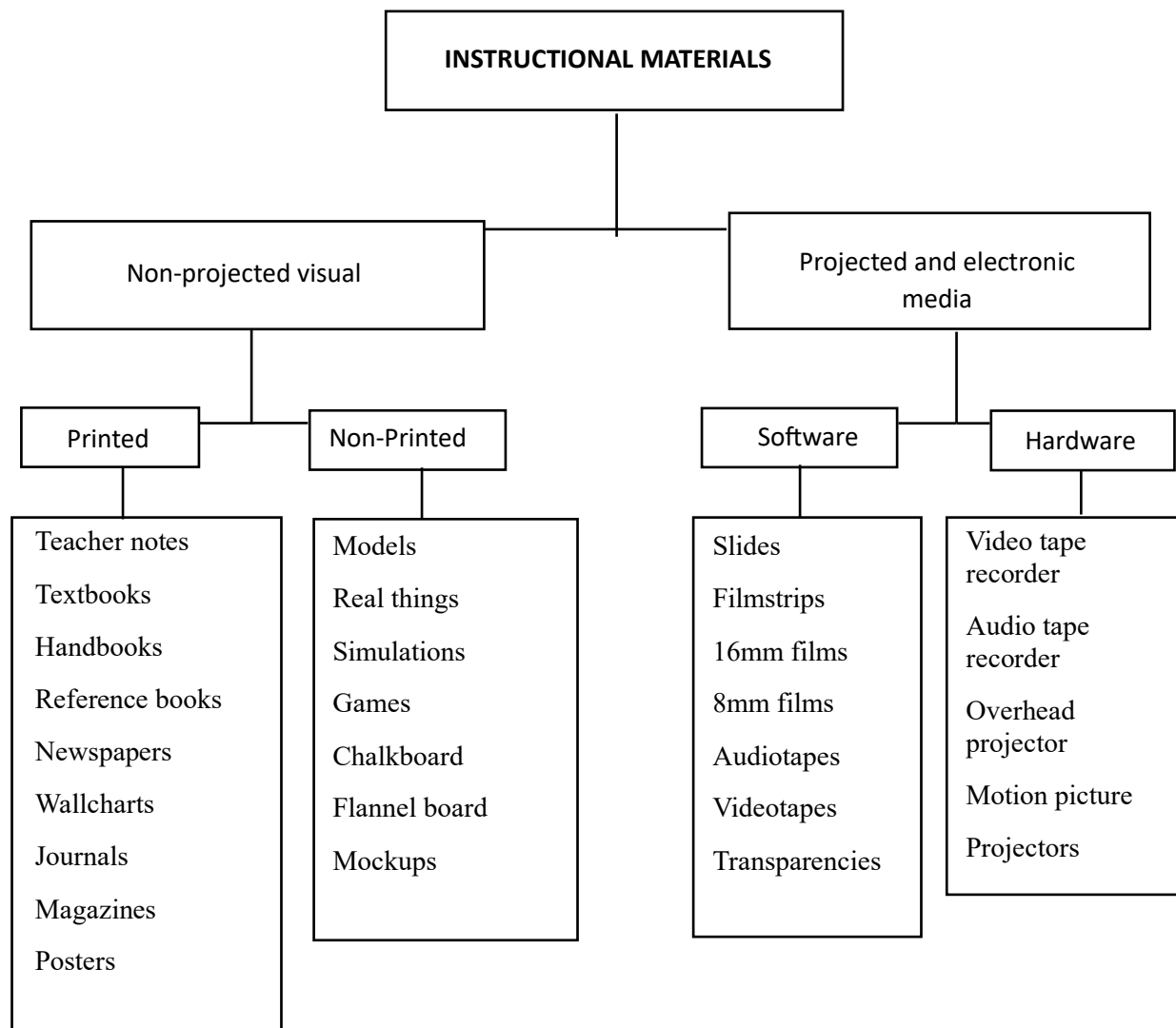
Various instructional materials are available for use in teaching and learning different subjects at all levels of education. However, other authors have differing categories of instructional materials. Teacher Education in Sub-Saharan Africa (Tessa, 2009) cited the work of Egunjobi (2007), who classified instructional materials as visual, audio, audiovisual, projected media, non-projected media, printed, non-printed, display board, graphic materials, software, hardware, 2-dimensional objects, 3-dimensional objects.

**Odili (2006) classified instructional materials into projected and non-projected materials.**

<b>Projected materials</b>	<b>Non-Projected materials</b>
Slides, filmstrips, motion pictures, related projection equipment, records and record players, tape and tape recorder, radio, television and video tape recording, reading machine and programmed instruction, learning kits or packages.	Objects, pictures, charts/graphs, specimens, models, maps and globes, display boards, chalkboards, bulletin boards, field trips, diagrammatic expression, games simulation, role-playing, exhibition and experiment

*SOURCE: Internet*

**Ughamadu (1992) classified instructional materials as follows**



*SOURCE: Internet*

Instructional materials have been categorized into three categories: audio, visual and audio-visual. Audio materials speaks to the sense of hearing alone; examples are radio and audio tape. Visual materials speaks to the sense of sight only, and examples include flashcards, posters, charts, textbooks, real objects, models, chalkboards, etc. Audio-visual materials incites both the visual (sight) and audio (hearing) senses; examples are computers, tape recorders, radios, videos, and televisions.

Their impact in the teaching/ learning process is not to be under stated. Brown (2020) summed up the function of instructional materials as follows: it contributes to meaningful transmission of information, hence leading to effective learning; it makes certain retention of knowledge, thus aiding learning to be more permanent; it helps to prevail over the constraints in the classroom by making the inaccessible accessible; this is mainly true of films, filmstrips etc. as they provide a common experienthrough which other learning can be expanded on, and they hrlp to incite participation especially if students are allowed to work on materials used.

### **Instructional Methods**

According to Robert M. Gagne (2016), instructional methods are "the ways information is organized and systematically presented to learners." They are also

known as teaching methods/strategies. They can also be a group of specific teaching principles and activities used to relay ideas, concepts or information to learners. Instructional methods employ specific instructional practices, actions, and interactions to create an effective learning environment that will promote student understanding and engagement. Instructional methods spans from teacher-centred, expository approaches to discovery methods, mainly learner-centred. There are different instructional methods, and the choice and use of a method depends on the kind of the objectives, the concept to be taught, and the type of students to be trained as a teaching strategy should be employed while considering the student's background. We will be looking at various teaching methods.

### **Deductive and Inductive method**

As defined by John M. Swales and Christine B. Feak (2004), an inductive method is "a teaching approach that starts with specific examples or instances and then derives general principles or rules from them". The teacher acts as a guide where the learners are at the very centre of the teaching-learning process. In this method, the concept to be taught is first approached by giving the learners examples and then generalizing from the given examples. The deductive method, which is the opposite of inductive methods, is a teaching method where the generalization/rules of a concept are first

stated, followed by corresponding examples. In the words of James D. Brown (2001), the deductive method is "a teaching approach that starts with presenting a general concept or rule and then applies it to specific examples or problems". In this method, the learners get the terminology first, then move on to understanding the terminology using the given examples. That means the learners have little to do as the teacher facilitates this process. We know, therefore, that the methods used in teaching a concept depend on the nature of the content and the students, amongst others.

### **The Lecture Method**

The lecture method is one of the oldest and traditional methods of teaching, where an instructor presents information to a group of students in a one-way communication format. Gossman, P., and Bohensky, M. (2019) describe it as "a pedagogical approach where an instructor presents information to students in a structured, oral form, typically in a face-to-face setting." The lecture method is commonly used in secondary schools and universities. Before the teacher comes to teach, the teacher prepares and organizes the content to be trained in lecture notes, presentation slides or visual aids, as the case may be. The teacher then stands before the class and presents the concept to be learnt.

The lecture method is characterized by one-way communication, where the teacher imparts knowledge, and the students listen and take notes. Since students mainly listen and observe, the lecture method is considered a passive form of learning as the student's role is to absorb and comprehend the information presented by the teacher. To enhance the effectiveness of the lecture method, teachers are advised to adopt strategies such as incorporating multimedia elements, encouraging student questions and discussions, using real-life examples, and infusing interactive activities to keep students engaged and promote a more profound understanding of the material. Combining the lecture method with other teaching techniques, such as group work, hands-on exercises, and flipped classroom approaches, can create a more comprehensive and interactive learning experience.

### **The Discussion Method**

The sound of discussion method might leave one thinking about whether this method can be efficiently used in mathematics. This method has been found quite suitable for classroom teaching in English, Economics and CRE. There are various topics in art subjects that are usually discussed. However, In science subjects, they are somewhat few and in mathematics, they are even fewer. Afolabi Tofade, Jamil Elsner, and Stuart T. Haines (2013) define discussion as "a teaching method that encourages active participation, critical thinking, and exploration of ideas through

open and structured dialogue among students." One benefit of the discussion method is that the teacher is no longer the central figure in classroom communication, and his position is taken over by small groups involved in exchange of ideas. Learners are encouraged to participate when this method is used, and as they develop a feeling of belonging, unlike the usual teacher-student conversations that could have learners feeling lost in certain situations. The learners, no matter how "dull", can take place in the discussion, making this method somewhat efficient. However, it can be longer than expected which may cause its intended purpose to be completely sidetracked. Moreover, it can be used to facilitate changes in the classroom, permitting students to focus on something other than the teacher as well as have insightful conversations.

### **Innovative Teaching Methods**

Innovative teaching methods refer to creative and non-traditional teachers use to enhance the learning experience for students. These methods aim to go beyond traditional instructional methods by promoting active learning, critical thinking, problem-solving, engagement and analytical skills among learners. Innovative teaching methods leverage strategies, technologies, and instructional designs to create dynamic and meaningful learning experiences. Innovative teaching methods

in mathematics aim to transform the learning experience by employing creative and non-conventional approaches. Some examples of innovative teaching methods are;

1. Problem-based learning: Wei-Song Hung (2009) states that it is "a student-centred learning method that engages learners in solving open-ended, real-world problems, promoting active exploration, critical thinking, and self-directed learning". It is a teaching method in which complicated real-world problems are employed by teachers to facilitate student learning of concepts and ideas instead of the traditional direct presentation. In this method, learning is started by a posed problem, query, or puzzle the learner needs to find a solution to. Then, students work independently or in small learning teams to develop ideas and solutions to solve the problem. It helps to encourage the development of critical thinking skills, problem-solving abilities and communication skills.
2. Flipped classroom: Lakmal H. C. Abeysekera and Phillip Dawson (2015) define the flipped classroom as "a method that requires students to get ready for class by going through pre-recorded or pre-read material so that in-class, time can be devoted to active, problem-solving, and application activities". In this teaching method, the teacher grants the students access to instructional materials such as prerecorded videos/audio or textbooks. The students go through these materials and learn at their own pace before class. When the

students come to class, the teacher helps answer any questions and gives the students exercise to practice what they have learnt from the materials. It aids a more profound understanding of the concept as students get involved in discussions, participate in activities and solve more problems.

3. **Gamification:** This teaching method uses game elements, such as rewards, points, challenges, and interactive activities, to make the learning process more engaging and enjoyable for students. Isaac Caponetto, Jeffrey Earp, and Michela Ott (2014) describe gamification as "a pedagogical approach that employs game design elements to create a motivating and engaging learning environment". Just like playing games makes students feel happy and motivated, gamification is aimed at helping students feel the same way about learning, and instead of just reading books or listening to the teacher talk, students get to play fun games and puzzles. This method helps students understand topics like coordinate geometry, constructions and areas and perimeters of different shapes. It also helps students understand and visualize angles and lines.

4. **Mathematical modelling:** This method involves studying a problem and then using mathematics to create a model, i.e. a blueprint or a map that represents the situation, and then this model is used to find solutions to various problems and make predictions. Werner Blum and Rossella Borromeo Ferri describe

mathematical modelling as "a teaching approach in which students formulate, analyze, and solve real-world problems using mathematical techniques". This method helps students think critically and logically about problems and allows them to apply mathematics to real-life situations.

These innovative teaching methods help the students to develop a sense of belonging, accomplishment and maturity in students as they become responsible for every decision they make when going through their projects and assignments. As they are more student-centred, they also allow students to see the practical applications of the topics they have been taught while they practice what they were taught.

### **The Influence of Instructional Methods on Students' Academic Performance in Geometry**

In Nigeria, there have been efforts made to improve on the effectiveness of mathematics education and this include making Mathematics a compulsory subject during the early years of one's education (Miheso 2016). Mathematics holds a special position in the curriculum of each school by being one of the essential subjects, and more lessons in mathematics are taught in schools than most subjects. Also, mathematics was and still is one of the core and compulsory subjects in primary and secondary schools in Nigeria.

Although mathematics is quite important in our daily lives and plays a crucial role in the school curriculum, students' performance remains dissatisfactory, which could be ascribed to the teaching strategies that teachers adopt. This poor performance caused an uproar from teachers, educators, parents, students and one of the main causes of the outcry was the students' poor performance in the subject and in the 1990s, the mathematics community had stated showing concern regarding the teaching strategies, competency, and mathematics proficiency of secondary school students.

As mentioned earlier, Mathematics is one body of knowledge that is significant and necessary for any country seeking to improve and upgrade scientifically and technologically. According to Ale and Lawal (2017), the point of distinction between developed and underdeveloped countries is determined by their level of mathematical knowledge and innovativeness. They see mathematics as a glaring and obvious agent of a country's development and wealth creation.

Affirming to this statement, (Nosa & Ohenhen, 2018) submit that there are sufficient evidence to show that nations that embrace mathematics, science, and technology are less dependent on other countries and have a better standard of living. The world is hurriedly becoming a global village, making it even more urgent that all individuals should have an adequate understanding of mathematical procedures and processes so as to be carried along and adequately equipped with the necessary

skills to solve various practical task and issues that they might come across. (Adedayo, 2017) expressed that proper understanding of mathematics and its processes promotes and enables logical, structured, and organized ordering of facts in every learner. It also encourages the hone of self-reliance and helps learners to think and unravel their issues themselves.

One issue with Mathematics is that most teachers remain confident in the old teaching system that has barely anything interesting to pique the interest of learners. (Eniayeju & Azuka, 2017) Noted that over 90% of the teachers who attended the National Mathematical Centre workshops from 2002 to 2010 still use the traditional teaching method. Happenings in certain Nigerian classrooms still display a situation where topics are simply introduced by mouth, and few exercises are selected from the textbook and solved for the students who are taught to learn by memorizing formulas and facts and sometimes, students are not encouraged to ask questions.

This requires consideration of the qualities that anyone called a teacher must demonstrate to ensure the accomplishment of the expected tasks. As (Sober, 2018) puts it:

- Teachers must know and have an in-depth understanding of their duties
- Teachers must assess and study the pupils whom they are teaching
- And above all, they must be aware of the best methods to convey various concepts to the students for easy understanding.

Suppose knowledge of the subject alone is rather not enough as the mathematics teacher should be effective and efficient in the usage of various teaching methodologies. (Cockcroft Report, 2017) recommends, that for effective and efficient mathematic teaching at all levels:

- Proper elucidation of each topic by the teacher
- There should be room for discussion between teacher and pupils and among pupils themselves
- Practical works should be done where applicable
- Students should be made to practice fundamental skills and routines to strengthen their understanding
- Problem-solving and the application of mathematics to everyday situation should be emphasized

Lassa (2018) suggested that children in secondary schools should be taught in such a way that they develop interest and pleasure in learning mathematics. He noted that, mathematics used to be a dreadful business and little or no attempt was made to change our ideas about the mathematics largely depends on how mathematics is taught and studied in schools and colleges. Majority of students are made to learn mathematics only by rote learning where teachers taught by working out problems on the blackboard in cases where various methods like modelling and simulations could be used. He furthermore noted that with the high demand for mathematics in all

professions and spheres of life, there is a need to drive and ignite the interest in mathematics by changing the way it is been taught in our secondary schools

According to Timku (2017, broadly speaking, there are just two utmost methods of teaching mathematics: the intuitive approach and the formal/axiomatic approach. He further noted that there have been a lot of recommendations and all recommendations tilts towards the fact that emphasis should be on practical and untaught application of strategies which comes from a place of deep understanding rather than relying on the traditional strategies, which laid emphasis on cramming mathematical theorems.

Also, Ampadu (2015) did a research that sought to examine student's viewpoint of the various methods used by their teachers and how these teaching methods affected their learning process. This study had a sample of 258 students between the ages of 12-14 years from 12 senior high schools who were selected at random to complete a semi-structured questionnaire. The study showed that students' perception of the teaching methods used by their teachers varied as the results showed that both teacher-centred and student-centred teaching method were made use of by mathematics teachers and thereafter a teacher's actions and inaction could either have a negative or positive effect on students' learning experiences, as most of the students reported that their learning experiences are largely controlled by the teachers.

Learning Mathematics could pose various challenges to students as Mathematics is often seen as a complex subject (Sedig, 2018). And Educational video games that are interactive and immersive have the capacity to address some of these challenges. These games have the ability to preoccupy the children's attention for hours, by exposing them to practical instructions thereby making their learning experience fun. Games have been extensively used to promote student's achievement across various domains in mathematics including problem-solving and strategic and reasoning abilities (Abramovich, 2010), algebra skills (Bottino, Ferlino, Ott & Tavella, 2017), critical geometry skills (Yang & Chen, 2015), and arithmetic procedures (Moreno & Duran, 2014). But, the National Mathematics Advisory Panel (NMAP, 2018) does not directly recommend game as a tool that can be used to teach specific subject-matter content to certain populations because there are not enough studies that exposes us to the effects of using games to develop mathematical skills.

### **The Influence of Instructional Materials on Students' Academic Performance**

Instructional materials also known as IMs hold some fundamental advantage that makes them an integral part of the teaching process. For one thing, they enable the teacher provide information in a way that is interesting and would motivate the students to enjoy learning. Also, they provide wide range of opportunities that

encourages personal study and reference, thereby increasingly stimulating student's interest and curiosity. Further, they also help the teacher overcome certain physical difficulties that could prevent effective topic presentation. Instructional materials largely make teaching and learning stressless and easier. They are equally said to be a needed catalysts for the required intellectual and social development of the learners.

Mathematics is a versatile subject that holds a crucial place every educational system, both in Nigeria and globally. Hence, it is considered as compulsory for all students in the secondary and pre-secondary education level. However, it is heartbreaking to know that over the years the academic performance of Nigerian students in mathematics has been largely rated as very poor by key stakeholders in mathematics education except for some few students whose performance is outstanding. The ultimate question now is: what is impeding the performance of students in Mathematics? Several factors have been attributed to the poor performance of students in mathematics in Nigeria over the years. And one of the factors that stand out is the inadequate use of instructional materials. Instructional materials are necessary tools and instruments that aids the teaching and learning of any school subject thereby promoting the teachers competence and improving students' performance.

As per Fletcher (2016), the initial exposure of secondary school students to geometry involves motion geometry. This encompasses the movement of shapes or objects from one point to another, where the process is delineated and facilitated by the teacher. She identified these movements as transformations, comprising specific procedures such as rotation, translation (sliding), and reflection (mirroring). Fletcher emphasized that employing this instructional method in teaching geometry fosters the students' capacity to cultivate geometric cognition, enabling them to explore and uncover geometric concepts commensurate with their skills and maturity. Ultimately, this approach supports their problem-solving skills and ignites a keen interest in the subject of geometry.

Furthermore, (Ajayi & Ayodele, 2019) previously emphasized the significance of having sufficient instructional resources to ensure effective educational delivery and oversight within the school system. It was also highlighted by (Enaigbe, 2019) that fundamental materials such as textbooks, chalkboards, as well as essential equipment like computers, projectors, and televisions, are frequently unavailable in numerous schools.

The study conducted by (Olumorin, Yusuf, Ajidagba, & Jekayinla, 2018) discovered that instructional materials aid teachers in delivering lessons more conveniently and enable learners to comprehend more effectively. They emphasized that these materials, if utilized, would engage all the senses directly. Additionally,

(Kochhar, 2017) supported the significance of instructional materials as essential tools for both learning and teaching. Kochhar recommended that teachers procure necessary instructional materials to supplement textbooks, thereby expanding concepts and stimulating students' interest in the subject. According to (Abolade, 2019), the benefits of instructional materials include their cost-effectiveness in production, their ability to facilitate teaching multiple students simultaneously, their capacity to encourage learners to focus better, and their capability to enhance student interest in the subject matter.

However, (Akinleye, 2017) affirmed that effective teaching and learning necessitates the use of instructional materials by teachers, coupled with practical activities to render learning more vivid, logical, realistic, and pragmatic. In agreement, (Esu, Enufoha, & Umoren, 2016) acknowledged that instructional materials are indispensable tools for enhancing teaching and learning activities. Additionally, (Ekpo, 2016) also supported the idea that teaching aids play a crucial role in supporting the sensory organs.

Despite their significance in facilitating practical teaching and simplifying knowledge acquisition, instructional materials are not readily accessible in Nigerian secondary schools. This lack leads to decreased performance levels by students in external examinations (Abdu-Raheem, 2014). Abiodun-Oyebanji & Adu (2017) defined instructional materials as comprising all the components employed in the

teaching and learning process to bolster, ease, shape, and promote the acquisition of knowledge, expertise, and abilities. (Abdu-Raheem, 2015) strongly recommended that educators maintain a consistent practice of furnishing teaching aids in their lessons, as these aids serve to augment student engagement, promote inquiry-based learning, encourage problem-solving, foster discussions, and facilitate the clarification of concepts and ideas among both students and instructors.

Afolabi & Adeleke (2018) pointed out the challenges in schools regarding the lack, insufficiency, and underutilization of learning materials. They attributed these issues to teachers' inadequate skills, resulting in a predominant use of lecture-based teaching methods in mathematics education. Their suggestion was for a collaborative effort involving students, teachers, parents, parent-teacher associations, government entities, and philanthropists to prioritize the provision of instructional materials for the effective teaching and learning of mathematics in schools. Much earlier, Ogbondah (2018) encouraged teachers to demonstrate resourcefulness by actively seeking and incorporating necessary instructional materials to complement their teaching of mathematics. The observations above highlights the significant role that instructional materials play in the teaching and learning of mathematics in schools, which some educators may have inadvertently overlooked.

Research has demonstrated that certain teachers instruct topics such as Graphical solution quadratic equations and construction, crucial for NECO and WASSCE mathematics examinations, in an abstract manner without utilizing instructional materials like "mathematical sets" and "graph boards" (Oluwagbohunmi, 2015). This approach leads many students to perceive mathematics, particularly these specific topics, as overly complex or comprehensible only to a select group of gifted students. It's crucial to acknowledge that while the government is often criticized for the lack of adequate instructional materials, teachers also bear responsibility for their failure to exhibit creativity and improvisation in teaching mathematical concepts in schools.

### **The Availability of Instructional Materials for the Teaching and Learning of Geometry in Senior Secondary Schools**

Education stands as an indispensable element in the progress of any nation. Consequently, numerous countries consider education to be a valuable investment for national advancement. This is due to its role in meeting the needs and aspirations of individuals. Therefore, education can only effectively serve both individual and societal needs when taught using appropriate materials.

The use of materials and tools to augment instructional efficacy dates back to ancient times. A knowledgeable educator will consistently employ instructional aids and tools to assist learners in comprehending and mastering Mathematics. The

absence of adequate instructional materials for effective teaching in Public Senior Secondary Schools, along with limited utilization of available resources, has been recognized as having a detrimental impact on students' performance at the secondary level (Anyanwu, 2019).

Lately, discussions and debates have centered on the declining quality of education. Often, blame is placed on teachers, parents, and students for this issue. However, besides the roles of teachers, parents, and students in the deterioration of education standards in Nigeria, research has revealed that the lack of access to and utilization of instructional materials also significantly contributes to this problem.

Abdu–Raheem (2016) emphasizes that instructional materials are vital tools for enhancing Mathematics education, aiming to improve teachers' effectiveness and boost students' performance. However, the inherent value of these materials is not inherently realized; their effectiveness relies on how the teacher employs them. This also suggests that skillful management and deployment of these materials in the classroom are crucial. To effectively utilize instructional materials, teachers must comprehend their usage and command over these resources. It is imperative for classroom instructors utilizing these tools to guide students in applying instructional materials during lesson delivery.

Throughout the years, the inadequate performance of students in public examinations has often been attributed to the incorrect selection, lack of use, and

availability of instructional materials by teachers. However, teaching and learning activities are influenced by various factors, including the use of instructional materials, teachers' qualifications, school environment, and student-related variables. The significance of instructional materials in any teaching and learning procedure is undeniable this is because these materials serve to enrich, facilitate, and streamline the teaching and learning process, making it more engaging, accessible, and substantial.

Instructional materials play a crucial role in improving teaching and learning as they expand students' learning encounters, introduce them to a diverse array of learning activities, and enhance teacher efficiency by providing tutorials and guidance for individual students and small groups. Furthermore, these materials foster heightened interest in learning, maintain learners' attention, offer opportunities to engage with the social and physical environment (e.g., during excursions/field trips), and encourage the acquisition of knowledge. The incorporation of instructional materials in Public Senior Secondary Schools is imperative. There's an evident challenge where students in these schools often struggle to readily grasp the concepts taught due to the lack of available instructional materials for conveying the subject matter. This deficiency may have influenced the academic performance of students in Public Senior Secondary Schools (Emmana, 2016). Many students have faced difficulty achieving academic success in both internal and external

examinations due to the perceived insufficiency or unavailability of instructional materials in these schools.

Ensuring the availability of instructional materials in Public Senior Secondary Schools is not adequate without their proper utilization. Utilizing the accessible materials for instruction is indispensable. Audio-visual resources play a distinctive role in teaching and learning settings and should be readily available, particularly in resource centers like libraries. According to Chambers English dictionary, 'available' in this context pertains to the state of being physically present and easily accessible to users. It encompasses information resources that are within the reach of users. 'Accessibility' refers to the effectiveness and independent reach and utilization of resources. The key difference between these terms, availability and accessibility, lies in the former indicating the provision of resources and the latter highlighting the capability to access them. Instructional resources for classrooms can be obtained from various sources.

In accordance with the guidelines outlined in the National Policy on Education, both federal and State governments have established various educational audiovisual centers. These centers are entrusted with the responsibility of procuring, producing, and distributing educational media to schools (Adewoyin, 2017). For instance, the curriculum development center in Enugu creates maps and graphs for schools through its graphic arts section, and it manufactures learning aids and games

from wood via its woodwork division. Additionally, the center possesses a substantial collection of overhead and sound projectors, along with a supply of sound films typically provided to schools on loan (Idowu and Mabawonku, 2019).

The National Education Technology Centre in Kaduna is a specialized institution dedicated to improving the teaching and learning processes for the benefit of both educators and students on a national scale. The center is equipped with comprehensive training facilities in educational broadcasting, which have significantly contributed to the training and development of a proficient workforce for educational broadcasting in Nigeria. Fawole (2014) highlighted that numerous states and local governments across the country have derived substantial benefits from the training programs offered by the National Educational Technology Centre.

### **Factors that Determine the Effectiveness of Instructional Methods or Materials in the Teaching and Learning of Geometry in Senior Secondary Schools**

The fundamental objective of education is to empower learners to become responsible, productive, and beneficial contributors to society. Hence, the Nigerian government regards education as an instrument crucial for both individual and national development. Therefore, establishing a robust foundation for education through effective teaching and learning is imperative. This process ensures the development of knowledge, skills, attitudes, and appreciation through the interactive

patterns between teachers and learners in the classroom. However, Megbo and Saka (2015) underscored that achieving effective teaching is incomplete without the use of instructional materials.

Geometry, a fundamental branch of mathematics, holds a significant place in mathematical studies. Biber, Tuna, and Korkmaz (2018) define geometry as a focused-on points, straight lines, plane figures, spatial figures, space, and their interrelations. The National Council of Teachers of Mathematics (NCTM, 2010) emphasizes the importance of geometry, linking it as a distinct yet interconnected aspect of mathematical thinking, diverging from the realm of numbers. Researchers highlight that geometry serves as a tool enabling the interpretation and reflection of the physical environment, allowing for the description, analysis, and comprehension of the world we inhabit. Ozerem (2012) underlines the significance of studying geometry as a pivotal element in comprehending the environment and providing tools applicable to various mathematical areas. This understanding of our surroundings and proficiency in other mathematical domains hinge on a firm grasp of geometry. NCTM (2010) further stresses the benefits of geometry for both educators and students across the mathematics curriculum and related disciplines, especially in its close relationship with measurement.

Although it is stressed that Mathematics teachers should incorporate and utilize instructional materials in their teaching, research findings indicate that many Mathematics teachers instruct without using these materials. The prevalent reason cited is the unavailability of pre-existing instructional materials in schools (Otor, Ogbeba & Ityo, 2015). This standpoint is reinforced by the National Teachers Institute (2018), affirming that the majority of instructional materials used in schools for teaching and learning are costly and not easily accessible. This situation has exacerbated in recent times due to economic recessions and the high exchange rates between the dollar and the naira, rendering it challenging for many schools to afford an adequate supply of instructional materials. Consequently, Mathematics teachers and students are urged to employ improvisation to create the necessary instructional materials.

Several challenges are linked with the use of instructional materials for teaching and learning Mathematics. These problems encompass:

1. **Poor Funding:** A significant issue is the lack of funds in procuring the instructional materials required for Mathematics education in schools. This financial constraint hampers many schools from acquiring essential instructional materials.

2. **Lack of Power Supply:** Another substantial obstacle is the absence of consistent power supply, especially in rural areas. Many instructional materials necessitate electricity to operate effectively. The scarcity of electricity impedes the use of technological materials, not only in rural but also in urban schools, affecting the efficiency of teaching and learning.
3. **Lack of Skills:** Many secondary school teachers lack the proficiency to install, operate, or effectively utilize various instructional materials. For instance, a considerable number of educators may not be well-versed in using computers, which inhibits their capacity to employ such technology in teaching mathematical concepts.
4. **Lack of Network:** Inconsistent network availability, especially for internet-dependent instructional materials, causes frustration for both teachers and students, resulting in wasted time waiting for network connectivity.
5. **High Cost:** Some essential instructional materials for teaching Mathematics, such as projectors, computers, and public address systems, come with a substantial price tag, making them unaffordable for many educational institutions.
6. **Inadequacy of Materials:** Schools often lack an adequate supply of instructional materials, making it challenging to provide each student with

necessary resources like computers in the classroom, thus hindering effective teaching and learning.

These challenges pose significant hurdles to the effective use of instructional materials in teaching and learning Mathematics, impacting both educators and students.

In pursuit of this objective, teachers integrate instructional materials such as models, video presentations, PowerPoint slides, and other aids into classroom sessions. However, while these tools offer advantages, it is crucial to consider the disadvantages of using instructional materials. Effective and timely use of these materials can mitigate certain challenges associated with their use in classrooms.

Some drawbacks of employing instructional materials include technical issues that may unexpectedly arise. For instance, during the operation of specific audio-visual aids like an overhead projector, sudden technical malfunctions, such as the burning out of the projector bulb, can occur. In multimedia presentations, there might be difficulties in achieving the desired sound and color, or compatibility issues between a Digital Video Disc (DVD) or Compact Disc (CD) and the player being used. Hence, there is a higher likelihood of encountering technical problems (Prasad, 2015).

Critics argue that instructional materials possess an inherent level of allure that may distract children from the intended learning path, leading them to become

absorbed in recreation and fantasy (Mangal S, 2018). Due to budget constraints in many schools, the expensive nature of instructional materials poses a challenge in ensuring their widespread availability in every classroom. Brown, Lewis, and Harclerod (2015) assert that engaging in activities supplemented by instructional materials becomes a futile use of time and resources when the selection of suitable materials is inadequate. For instance, teaching about a specific culture using a map might be ineffective; instead, employing charts with images of traditional clothing, cuisine, lifestyle, and other visual aids could prove more beneficial. The preparation of instructional materials demands a significant amount of time. Creating personal transparencies, slides, films, posters, charts, or other teaching aids is a time-consuming process.

While arranging instructional materials, there's a tendency for teachers to overlook the importance of developing a clear and well-organized lesson plan (Sampath, Pannneerselvam, and Santhan, 2018). Simultaneously displaying an excessive amount of instructional material in a single class can be bewildering for both students and teachers. This overload may result in concepts overlapping, leading to misunderstandings and poor retention (Sampath, Pannneerselvam, and Santhan, 2018). Mangal S (2018) highlights that the appropriate selection of instructional materials tailored to the age group of students is rare. Often, educators may lack awareness of the specific audiovisual aids best suited for different age

groups, such as young children, adolescents, and older students. For example, while flashcards and pictorials are ideal for young kids, they would be unsuitable if used for 9th-grade students.

### **Possible remedies to encourage using instructional materials for teaching and learning Geometry in senior secondary schools.**

The utilization of instructional materials has emerged as the most favored learning approach, despite the challenges associated with their integration and acceptance. Incorporating these materials into the Nigerian educational system is anticipated to boost the efficacy of knowledge acquisition. It will provide both students and teachers/lecturers with convenient access to a vast amount of information within the global village.

Instructional materials serve to mitigate issues of classroom shortages for teachers, enabling students to access lectures conveniently online without disruptions. They provide an avenue for students and lecturers to engage in classes from their comfort zones, equipped with the necessary amenities. This stands in contrast to traditional teaching methods, where these basic amenities might sometimes be lacking for an optimal learning environment. These insights are echoed in the research findings of Pingle (2019), indicating that undergraduates in India exhibit a higher comfort level and acceptance of using computers and other instructional materials compared to traditional face-to-face classroom settings.

Instructional materials offer a platform for students to engage in interactive discussions, breaking down barriers to participation. They facilitate effective communication, nurturing relationships between students and their instructors. These materials enable students to learn at their own pace and convenience by providing readily available lecture materials and accessible content delivery from the lecturer, contributing to increased satisfaction and reduced stress. Understanding instructional materials exposes both teachers and students to the broader world beyond the classroom, leveraging the global nature of the internet. This exposure aids in students' seamless integration into organizations utilizing such platforms for operation.

Here are some strategies for enhancing instructional materials in secondary schools:

- The government should proactively address challenges associated with the use of instructional materials and leverage the opportunities they offer in educational institutions.
- Stable and reliable internet access is vital for the effectiveness of instructional materials; therefore, measures should be taken to ensure a consistent and fast internet connection to support seamless learning and teaching.
- Students and teachers should receive training on how to effectively operate instructional materials, particularly computers and related tools.

- Curriculum planners should focus on integrating practical strategies and effective assessment methods for evaluating the proficiency of learners in using instructional materials to ensure optimal functional education.
- Given that electricity is crucial for powering instructional materials and computer tools, the government should invest in and expand access to a stable electric grid, especially in rural areas.
- The responsibility for computer literacy programs should extend to all stakeholders, not solely limited to the Ministry of Education, to ensure comprehensive engagement and support for students and staff.

### **Empirical Review.**

Several studies have cautioned that inappropriate or irrelevant instructional materials could impede the achievement of instructional objectives if wrongly chosen for teaching and learning specific topics. However, many schools have conducted research highlighting the essential nature of instructional materials.

In a study titled "The Effectiveness of Instructional Materials in Learning Economics in Onitsha Educational Zone" by Okpala (2004), data analysis conducted through chi-square revealed a noteworthy distinction between students who were taught using instructional materials and those taught without such resources. This finding indicated the effectiveness of instructional media in facilitating learning in the field

of Economics. Additionally, it was suggested that visits to economic institutions such as banks, insurance companies, and stock exchange markets could stimulate and cultivate students' interest in pursuing careers in economics.

As per Ezeugo (2010), whose research focused on "Teachers' Use of Information and Communication Technology (ICT) in Primary Mathematics Instruction," the analysis of data using mean and Z-test methods revealed a general low utilization of ICT tools in teaching mathematics within both private and public schools. Notably, teachers in private schools demonstrated significantly higher usage compared to those in public schools. The limited application of ICT in teaching and learning mathematics was suggested to have implications: it hinders the potential transformation of teaching-learning processes from being predominantly teacher-centered to becoming more student-centered, thereby restricting opportunities for learners to develop creativity, problem-solving abilities, information reasoning skills, and other higher-order cognitive skills.

Also, Mbionwu, Ononiwu, and Udekaigbo (2007) conducted a study on "The Use of Instructional Materials in Teaching Economics in Secondary Schools." The data analysis involved the use of percentages, a modified Likert scale, and Spearman rank correlation coefficient. Their findings indicated a substantial correlation between teachers' professional qualifications and their proficiency in utilizing

instructional materials. The interpretation suggested that certified teachers outperformed non-certified counterparts in the teaching profession.

According to Udeorah (2010), in the study investigating the roles, constraints, and strategies in improvisation of instructional materials for teaching and learning Agricultural Science in Nigeria, mean scores were used for data analysis. The findings suggested that several factors influence the extent to which teachers engage in improvisation, including: lack of funding, diminished interest, insufficient skills stemming from a lack of exposure to seminars and courses focusing on the selection, production, and utilization of materials, absence of appropriate storage facilities (such as stores and laboratories) for improvised materials, teachers' dependence on pre-made or imported materials, and students' poor attitude toward executing projects in Agricultural Science. These factors signify that, for a teacher to effectively engage in improvisation, these considerations must be earnestly addressed and followed.

### **Summary of Reviewed Literature**

The research provides a comprehensive examination of the impact of instructional materials and methods on students' performance in mathematics. It delves into the necessary support, training, and conducive environments essential for effectively integrating instructional materials into the teaching and learning of Mathematics.

Through the literature review, it becomes evident that teachers and students are advancing in their approach to teaching and learning, leveraging instructional materials. Mathematics, being a foundational subject, serves as a cornerstone for various academic and professional pursuits. Hence, exploring and implementing effective teaching strategies and materials becomes crucial to ensure students' success and proficiency in this discipline. The literature review further demonstrates that instructional materials have contributed to enhancing the quality of Mathematics education, emphasizing that employing suitable teaching aids and innovative methodologies can enhance conceptual understanding, problem-solving abilities, and overall academic performance. However, the successful implementation of these methods necessitates addressing challenges and considering contextual factors specific to the Nigerian educational system. Additionally, the literature explores the availability of physical facilities for teaching and learning Mathematics in secondary schools and discusses constraints related to using instructional materials, proposing potential solutions to mitigate these constraints.

The analysis of crucial literature sources related to instructional materials and methods' impact on students' performance in mathematics revealed a noticeable research gap. While existing studies have examined the influence of instructional materials and methods separately on students' mathematics performance, there is a distinct absence of comprehensive research investigating the combined effects of

instructional materials and methods on mathematics students' performance in Edo state, Nigeria. Prior research has largely focused on instructional methods, materials, and factors affecting student achievement but has not extensively explored how the interplay between instructional materials and methods influences mathematics performance. Therefore, this study aims to address this gap by offering a comprehensive understanding of the intricate relationship between instructional materials, methods, and their combined effects on students' academic performance in mathematics in Nigeria. The study's findings are expected to contribute not only to the theoretical framework of effective mathematics education but also to provide practical insights for educators, curriculum developers, and policymakers seeking to enhance mathematics instruction and improve student achievement in Nigeria.

## **CHAPTER THREE**

### **METHODOLOGY**

In this chapter, the researcher describes the research methodology that was used in the study under the following sub-headings:

1. Design of the study
2. Population of the Study
3. Sample and Sampling techniques
4. Instrumentation
5. Validity of the Instrument
6. Reliability of the Instrument
7. Method of data collection
8. Method of Data Analysis

#### **Design of the study**

The survey research method was selected to investigate the influence of instructional materials and methods on students' performance in mathematics. This method was considered appropriate as it involves collecting data by gathering responses and studying a subset of individuals from a larger group to make generalizations.

## **Population of the Study**

The target population for this study comprises mathematics students enrolled in five (5) private and public Senior Secondary Schools within the Ovia North East Local Government Area of Edo state, Nigeria.

S/N	NAME OF SCHOOLS	TYPE OF SCHOOLS	POPULATION
1.	Ekosodin Secondary School	Public School	172
2.	Evbareke Secondary School	Public School	350
3.	Russell School	Private School	228
4.	Boiling Point Academy	Private School	335
5.	Caret Academy	Private School	163

## **Sample and Sampling procedure technique**

A multi-stage simple random sampling technique will be employed to select participants for this study. In the first stage, five (5) senior secondary schools were randomly chosen from the Ovia North East Local Government Area. In the second stage, SSS1 classes were chosen from each school. Finally, one hundred (100) participants were selected from the chosen classes.

## **Instrumentation**

The research tool is a Likert Scale questionnaire titled "The influence of instructional material and instructional methods on students' performance in mathematics," designed specifically for this study. It consists of two sections: Section A and Section B. Section A encompasses the respondents' demographic data such as class, age, and gender, while Section B comprises twenty items related to the study. These items use a 4-point Likert Scale, including Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The questionnaire contains a total of twenty-five items, each addressing the research questions posited in the first chapter. To ensure accurate responses to the research inquiries, the items are categorized into four parts: eight questions in part one, eight in part two, five in part three, and four in the final part.

## **Validity of the Instrument**

To ensure the validity of the questionnaire, the designed questionnaire underwent a detailed review by the research supervisor. The supervisor's feedback was incorporated in the final copy to enhance the instrument's content and construct validity.

## **Reliability of the Instrument**

The reliability of the instrument was assessed using the split-half reliability method. The collected data's reliability was evaluated through Cronbach's alpha technique, resulting in a calculated reliability value of 0.860 for the instrument.

### **Method of Data Collection**

The researcher personally administered the questionnaire to the respondents within the five selected schools. Efforts were made to identify and approach the senior secondary school class in each school. The questionnaire was distributed among the class members, and the respondents were guaranteed confidentiality. They were encouraged to respond candidly and to the best of their understanding. Clear instructions were provided on how to complete the questionnaire, and the collected questionnaires were gathered on the same day to prevent any potential loss.

### **Method of Data Analysis**

The collected data underwent meticulous organization and tabulation. For demographic data, simple percentages were used, while mean calculations were employed to analyze the research questions. A benchmark mean value of 2.50 was set to categorize responses, with scores of 2.50 and above labeled as "agree" and scores below 2.50 categorized as "disagree." To establish this benchmark, the mean was calculated based on the assigned points for the Likert scale options: Strongly Agree (SA) = 4 points, Agree (A) = 3 points, Disagree (D) = 2 points, Strongly

Disagree (SD) = 1 point. The mean was computed as: Average =  $(4 + 3 + 2 + 1) / 4 = 10 / 4 = 2.50$ . Statistical analysis using the Statistical Package for the Social Sciences (SPSS) was conducted for hypothesis testing at a significance level of 0.05.

## **CHAPTER FOUR**

### **DATA ANALYSIS AND PRESENTATION OF RESULTS**

This section focuses on data analysis and result presentation derived from the research. The analysis involved the use of basic statistics such as mean and frequency for the research questions and t-test analysis for the hypothesis. The data has been structured and is displayed in tables, aligned with the research questions presented in Chapter One.

#### **Presentation of Results**

### **SECTION A**

#### **Table 1: Demography of Respondents by School**

S/N	NAME OF SCHOOL	RESPONDENTS	%
1.	Ekosodin Secondary School	20	20%
2.	Evbareke Secondary School	20	20%
3.	Russell School	20	20%
4.	Boiling Point Academy	20	20%
5.	Caret Academy	20	20%
	<b>TOTAL</b>	<b>100</b>	<b>100%</b>

*Researcher Fieldwork 2023*

**Table 2: Demography of Respondents by Type of School**

Type of school	FREQUENCY	PERCENTAGE (%)
Government	40	40
Private	60	60
<b>TOTAL</b>	<b>100</b>	<b>100</b>

*Researcher Fieldwork 2023*

**Table 3: Demography of Respondents by Gender**

SEX	FREQUENCY	PERCENTAGE (%)
MALE	56	56
FEMALE	44	44
<b>TOTAL</b>	<b>100</b>	<b>100</b>

*Researcher Fieldwork 2023*

**Table 4: Demography of Respondents by Age**

Age	FREQUENCY	PERCENTAGE (%)
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14-15	43	43
15-16	36	36
16-17	21	21
<b>TOTAL</b>	<b>100</b>	<b>100</b>

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*Researcher Fieldwork 2023*

### Section B

**Research Question 1:** What is the Influence of Instructional Materials on Students' Performance in Geometry?

**Table 5:** Influence of Instructional Materials on Students' Performance in Geometry

Items	Mean	Decision
1 & 2	1.7	(2) Disagree
3, 4, 5, 6, 7, & 8	3	(6) Agree

*Source: Researcher's fieldwork, 2023*

The table above outlines the responses to research question one, focusing on the Influence of Instructional Materials on Students' Performance in Geometry. Analysis of the data

depicts that among the eight items examining the types of instructional materials used and their impact on students' performance in Geometry, respondents concurred that instructional materials such as charts, pictures, and textbooks were employed in their teaching. Conversely, software applications like GeoGebra were less utilized. Respondents also expressed the view that the use of appropriate materials aided them in comprehending and visualizing abstract concepts in Geometry. Therefore, the conclusion drawn from the findings presented in Table 5 asserts that instructional materials play a crucial role in assisting students in comprehending and visualizing intricate geometric concepts. Although most respondents disagreed with using software applications like GeoGebra, potentially due to lack of exposure, there was a clear consensus that instructional materials such as charts and pictures notably improve students' understanding and academic performance. However, it's apparent that teachers predominantly rely on textbooks as the primary instructional material in Geometry.

**Research Question 2:** What is the Influence of Instructional Methods on Students' Performance in Geometry?

**Table 6:** Influence of Instructional Methods on Students' Performance in Geometry.

Items	Mean	Decision
9 & 13	1.9	Agree
10, 11, 12, 14, 15 & 16	3.1	Disagree

*Source: Researcher's fieldwork, 2023*

Research question two was designed to investigate the instructional methods utilized by class teachers and their influence on students' performance in Geometry. The data analysis presented in Table 6 indicates that teachers are not employing suitable methods in teaching geometric concepts. Students expressed a preference for methods such as Inquiry-Based learning, flipped classrooms, and problem-solving approaches, which were associated with enhanced comprehension and understanding of Geometry. These findings suggest that employing instructional methods like inductive, flipped classroom inquiry, and problem-solving approaches contributes to students' improved understanding of Geometry. On the contrary, the conventional lecture method does not significantly aid students in Geometry. Consequently, a shift from traditional teaching methods to more interactive strategies may potentially result in improved performance in Geometry.

**Research Question 3:** Are there Available Instructional Materials for the Teaching and Learning of Geometry?

**Table 7:** Availability of Instructional Materials for the Teaching and Learning of Geometry.

Item	Mean	Decision
17, 18, 20 & 21	2.2	Disagree
19	2.9	Agree

*Source: Researcher's fieldwork, 2023*

Research question three aimed to investigate the Availability of Instructional Materials for teaching and learning Geometry. The data presented in Table 7 portrays a diverse scenario.

While the responses highlighted the lack of well-equipped laboratories and instructional resources such as projectors, it was acknowledged that schools possessed computers. However, it was inferred from the data that students might not perceive computers as instructional materials due to their underutilization by teachers. The overall finding indicates that the schools under study lack proper equipment and laboratories necessary to facilitate the learning and understanding of Geometry.

**Research Question 4:** what factors determine the effectiveness of instructional methods or materials in teaching and learning Geometry?

**Table 8:** Factors determining the effectiveness of instructional methods or materials in the teaching and learning of Geometry.

Items	Mean	Decision
22 & 25	2	Disagree
23 & 24	3.3	Agree

*Source: Researcher's fieldwork, 2023*

Research question four aimed to explore the Factors determining the Effectiveness of Instructional Methods or Materials in the Teaching and Learning of Geometry. The data presented in Table 8 depicted that student are taught using instructional materials and identified crucial factors influencing the effectiveness of instructional methods and materials in Geometry education. Factors such as the appropriate use of instructional materials, adequate funding, the willingness of mathematics teachers to adopt innovative

approaches, and the presence of a conducive learning environment were recognized as critical determinants. These findings underscore the significance of teacher training, sufficient funding for educational resources, and the availability of essential instructional materials to enhance the effectiveness of Geometry instructions.

**H1:** There is no significant impact of the use of instructional materials on students' academic performance

**Table 9:** Questions on the performance of students

Item	Mean	Decision
1	2.0	Disagree
2	3.5	Agree

*Source: Researcher's fieldwork, 2023*

*SPSS output for hypothesis testing*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.211	.124		-1.698	.093
The mean score for instructional	1.188	.046	.933	25.628	.000

a. Dependent Variable: Mean performance of students

The table above demonstrates a t-test analyzing the influence of instructional materials on students' academic performance, utilizing students' mean scores as the dependent variable. Conducted at a significance level of 0.05, the significance level is lower than 0.05, leading to the rejection of the null hypothesis. Thus, it indicates a noteworthy impact of the use of instructional materials on students' academic performance.

**H2:** There is no significant difference between the mean performance scores of male and female students taught Geometry with instructional materials in Geometry.

**Table 10: Independent t-test statistic showing the difference between the mean performance score of male and female students taught Geometry with instructional materials**

<b>Group Statistics</b>						
Sex	N	Mean	Std. Deviation	df	t-test	Sig(2-tailed)
Male	56	3.1321	.47981	98	14.336	.000
Female	44	1.8364	.40295			

The table presents the outcomes of an independent sample t-test conducted on the mean performance scores of students taught Geometry with instructional materials categorized by sex. Observing the t-test value of 14.336 and 98 degrees of freedom, the significance level is registered at 0.000. Both p-values indicated by the test are extraordinarily small, close to zero, suggesting that they are lower than the specified alpha level of 0.05. Consequently, the null hypothesis, positing no significant

difference in the mean performance scores of male and female students taught Geometry with instructional materials based on sex, is rejected. This outcome indicates a substantial difference in the academic performance of male and female students taught Geometry with instructional materials.

## **Discussions and Findings**

The study aims to explore how instructional material and methods affect mathematics performance based on the analysis of gathered data from the respondents.

Research question one's analysis highlights the positive impact of instructional materials in aiding students to grasp and comprehend complex Geometry concepts, thereby enhancing their academic performance. A key observation is that the schools' teachers involved in the study did not use software, such as GeoGebra, for Geometry instruction. Mathematics education often poses challenges for students due to its intricate and demanding nature (Sedig, 2018). Various studies have shown that games serve as effective tools for enhancing different mathematical skills in students, ranging from problem-solving and algebraic skills (Abramovich, 2010) to critical Geometry skills (Yang & Chen, 2015). Educational video games have demonstrated the potential to address these challenges by offering interactive and immersive learning experiences. These findings stress the importance of diversifying instructional materials, including digital tools, to enrich the teaching and learning experiences in Geometry.

The outcomes of research question two indicate that teaching methods such as inquiry-based learning, flipped classroom, and problem-solving approaches significantly

contribute to students' enhanced understanding of mathematics. Furthermore, scholarly works, such as the studies by Ajayi & Ayodele (2019) and Enaigbe (2019), highlight the essentiality of instructional materials for effective educational delivery and management within the school system. These sources emphasize that numerous schools lack necessary resources like textbooks, basic teaching materials, and modern equipment, including computers and projectors. Additionally, the findings from Olumorin, Yusuf, Ajidagba, & Jekayinla (2018) underscore the pivotal role of instructional materials in facilitating teachers' ease of instruction and learners' efficient comprehension without encountering challenges.

The findings of research question three indicate the inadequacy of instructional materials and laboratory resources in the schools studied, which hindered effective teaching and learning of mathematics. The use of instructional materials as tools for facilitating learning has been a longstanding practice in education. Skilled educators leverage aids and resources to improve learners' comprehension and understanding, particularly in the field of Mathematics. The absence of sufficient instructional materials in Public Senior Secondary Schools and the inadequate utilization of available resources have been associated with a perceived negative impact on students' performance at the secondary level, as noted by Anyanwu (2019).

The results from research question four highlight several factors that influence the effectiveness of instructional methods and materials in teaching and learning Geometry. These factors include the proper utilization of instructional materials, adequate funding, the willingness of mathematics teachers to embrace innovative approaches, and the

availability of necessary instructional materials. However, critics have expressed concerns about the potential distractions that highly attractive instructional materials may pose, leading students away from their intended learning path and into recreation and fantasy (Mangal S, 2018). Many schools contend with budget constraints, and it is well-established that instructional materials can be expensive, making it challenging to ensure their widespread availability in every classroom. As noted by Brown, Lewis, and Harclerod (2015), the effectiveness of instructional materials is contingent on making informed choices regarding the materials used in various educational contexts. For instance, using a map may not be the most effective approach when teaching about the culture of a specific area; instead, charts featuring pictures of traditional attire, food, lifestyle, and related visuals could be more beneficial. Additionally, it is important to recognize that preparing instructional materials is a time-consuming process, whether it involves creating transparencies, slides, films, posters, charts, or other teaching aids.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **Summary**

This study was designed to examine how instructional materials and methods impact the academic performance of students in mathematics, particularly in the field of geometry, within the Senior Secondary Schools located in Ovia North East Local Government Area of Edo State. The research focused on the analysis of how instructional methods and materials influenced academic performance, the availability of such materials in senior secondary schools, and the factors that determine the effectiveness of instructional methods or materials in teaching and learning mathematics within the senior secondary school setting. The detailed discussions on these topics were extensively covered in the literature review.

Data collection was conducted by administering questionnaires to one hundred (100) mathematics students across five (5) Senior Secondary Schools in Ovia North East Local Government Area of Edo State. The collected data underwent analysis, interpretation, and discussion through the utilization of percentages and frequency tables. The methodology encompassed several key aspects: the study's design,

population targeted by the research, sampling technique used, the instrument applied, instrument validity and reliability assessment, data collection method, and the approach to data analysis.

The study was guided by four primary research questions:

1. What is the Influence of Instructional Methods on Students' Performance in Geometry?
2. What is the Influence of Instructional Materials on Students' Performance in Geometry?
3. Are there available Instructional Materials for the Teaching and Learning of Geometry in Senior Secondary Schools in Ovia North East Local Government Area of Edo state?
4. What Factors Determine the Effectiveness of Instructional Methods or Materials in Teaching and Learning Mathematics in Senior Secondary Schools in Ovia North East Local Government Area of Edo State?

The findings of the study through analysis of the data collected revealed that:

1. Instructional materials enable students to visualize and understand complex Geometry concepts, which helps improve their academic performance.
2. Interactive and engaging instructional methods, including Inquiry-Based learning, flipped classrooms, and problem-solving approaches, were

supported by students for their ability to aid comprehension and better understanding of Geometry concepts.

3. The schools of the study were not well equipped with instructional materials and laboratories for teaching and learning mathematics.
4. The study identified key factors determining the effectiveness of instructional methods and materials in teaching Geometry, including the proper use of instructional materials, adequate funding, teacher willingness to adopt innovative approaches, and the unavailability of necessary instructional materials.

## **Conclusion**

The study's findings suggest a critical need for accessible instructional aids and the implementation of effective instructional methods for teaching and learning Mathematics in secondary schools within Ovia North East Local Government Area, Edo state. The absence of instructional materials in Mathematics instruction within the researched schools is a significant concern. Shortages and unavailability of instructional aids are identified as primary obstacles to effective Mathematics teaching and learning. Additionally, the study highlights a positive, albeit limited, connection between the utilization of instructional materials and methods and student performance in Geometry. This indicates that increased use of instructional

materials and suitable teaching methods could potentially enhance students' achievements in Mathematics. Effective Mathematics teaching requires educators to be well-versed in various teaching methods and understand their strengths, weaknesses, and their optimal contexts for application. The selection of a specific method should align with learning objectives, available technological resources, course design, and the teacher's training. Different teaching strategies should be considered and employed based on specific classroom conditions and learning objectives.

### **Recommendations**

Based on the conclusion of the study, the following recommendations are made;

1. Mathematics educators should be incentivized to employ instructional materials when teaching mathematics as it significantly enhances the explicit understanding of mathematical concepts and processes.
2. There is a necessity to re-educate teachers regarding the importance and techniques of improvisation in mathematics education. Hence, conducting seminars and workshops is imperative to educate teachers on this crucial aspect of teaching and learning mathematics.
3. To encourage interest in the subject and ensure an increase in the number of students offering the issues, there is a need for a change in the present

methodology of the teachers, where the emphasis is mainly on the lecture method.

4. Teachers should be encouraged to attend seminars/workshops on modern teaching methods like cooperative learning strategy, values analysis, values clarification, and action learning strategy. Etc.

### **Suggestion for further studies**

This study investigated The Influence of Instructional Material and Instructional Methods on Students' Performance in Mathematics in a specific local government.

Future research could expand on these findings by considering a broader scope, including multiple local government areas or states. Investigating the long-term impacts of incorporating digital tools and technology in Geometry education could yield valuable insights.

Furthermore, an in-depth exploration of teacher training programs and their effectiveness in promoting innovative instructional methods in Geometry teaching could guide educational policymakers and institutions.

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## Appendixes

**STUDENTS QUESTIONNAIRE**  
**DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL**  
**TECHNOLOGY (CIT)**  
**FACULTY OF EDUCATION,**  
**UNIVERSITY OF BENIN, BENIN CITY**

**THE INFLUENCE OF INSTRUCTIONAL MATERIAL AND INSTRUCTIONAL**  
**METHODS ON STUDENTS' PERFORMANCE IN MATHEMATICS.**

Dear Respondents,

This questionnaire is intended for academic purposes and has been formulated to investigate **The Influence of Instructional Material and Instructional Methods on Students' Performance in Mathematics.**

Please kindly respond candidly to the items by marking [] where appropriate. Your responses are essential for research purposes exclusively and will be handled with the utmost confidentiality. I appreciate your participation.

### **Section A**

#### **Demographic Data**

1. School Type: Government owned (  ) Private (  )
2. Name of School: \_\_\_\_\_
3. Gender: Male (  ) Female (  )
4. Age: 14 – 15 (  ) 15 – 16 (  ) 16 - 17 (  )
5. Class: SS1 (  )

**Section B**

	<b>ITEMS</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Strongly Disagree</b>	<b>disagree</b>
	<b>Influence of Instructional Materials on Students' Performance in Geometry?</b>				
1.	My teacher uses software like GeoGebra to teach us				
2.	The GeoGebra application helps me to visualize abstract concepts like circle theorem.				
3.	My teacher does not use any software or technology like GeoGebra to teach in the classroom				
4.	I cannot visualize abstract concepts in geometry because there is no material to aid my understanding				
5.	My teacher uses charts to explain Angles and Trigonometry in the classroom				
6.	These Charts helps me to understand when my teacher is teaching				
7.	The only instructional material available for teaching Geometry in my school is textbook				
8.	I understand geometry more when my teacher uses pictures to teach				
	<b>Influence of Instructional Methods on Students' Performance in Geometry</b>				
9.	My teacher explains topics like circle theorem with various examples first before writing notes on the board				
10.	This style of teaching helps me to understand the topic and when I am writing notes, I am able to understand what I am writing				
11.	My teacher writes on the board and does not explain with examples				
12.	I write notes on circle theorem without understanding what it is about				

13.	My teacher gives us prerecorded videos/audios or textbook for us to study and learn before teaching us				
14.	After learning myself, I ask a lot of questions to help me understand better when my teacher teaches				
15.	This helps me to solve more problems				
16.	My teacher does not give us prerecorded videos/audios or textbook for us to go study and learn before teaching us				
	<b>Availability of Instructional Materials for the Teaching and Learning of geometry</b>				
17.	My school has a standard laboratory				
18.	My mathematics teacher makes use of projectors to teach us Geometry				
19.	The only instructional material available for teaching Geometry in my school is the textbook				
20.	We do not have computers in my school				
21.	I cannot visualize geometry because my teacher only draws on the board				
	<b>Factors that Determine the Effectiveness of Instructional Methods or Materials in the Teaching and Learning of Geometry</b>				
22.	My teacher does not use any instructional materials and methods to help me understand geometry				
23.	I understand Geometry when my teacher uses instructional material to teach				
24.	My teacher does not use software applications or technology to teach us				
25.	My school does not have enough money to provide computers for each student				