

THE RELATIONSHIP BETWEEN LEARNING STYLES AND ACADEMIC PERFORMANCE IN ENGLISH LANGUAGE AMONG PUBLIC SENIOR SECONDARY SCHOOL STUDENTS IN RIVERS STATE, NIGERIA

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ABSTRACT: This study investigated the relationship between learning styles and academic performance in English language among public senior secondary school students in Rivers State, Nigeria. The correlational research design was adopted for the study. Four research questions and four null hypotheses guided the study. The population of the study consisted of 63,846 secondary school one (SS1) students from three hundred and eleven (311) public senior secondary schools in Rivers State. The sample size of the study was 480 senior secondary school one (SS1) students selected through the multistage sampling procedure. Self-structured questionnaires titled 'Learning Styles Questionnaire (LSQ)' and 'English Language Performance Test (ELPT)' was used for data gathering. The instruments for data collection (LSQ and ELPT) were validated by three experts in the Department of Educational Psychology, Guidance Counseling of Ignatius Ajuru University of Education, Nigeria. Cronbach alpha yielded reliability co-efficients for visual learning style sub-scale (.761), auditory learning style sub-scale (.890), kinesthetic learning style sub-scale (.801), reading/writing learning style sub-scale (.831). The English language Performance Test (ELPT) yielded a reliability co-efficient of .832. Simple regression analysis was used in answering the research questions and in testing the corresponding null hypotheses at .05 level of significance. The findings of the study revealed that reflective learning style to a high extent significantly predicted students' academic performance in English language in public senior secondary schools in Rivers State and it significantly predicted students' academic performance in English language in public senior secondary schools in Rivers State to a high extent. Based on the findings of the study, it was recommended among others that teachers should provide opportunities for reflective learners to engage in activities that allow for thoughtful analysis.

Keywords: Learning Styles, Auditory Learning, Kinesthetic Learning Style, Reading/Writing Learning Style, Academic Performance, English Language, Public Senior, Secondary School, Students, Rivers State, Nigeria.

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INTRODUCTION

Academic performance in English language remains a critical measure of educational outcomes in Nigerian senior secondary schools due to its importance for learners' overall academic success

and future opportunities (Steve, 2000 as cited in Alade & Ogbo, 2014). In secondary education, student performance in English Language influences progression into higher education and employability, making it imperative to examine factors that affect performance. One of such factor that has attracted considerable attention in educational research is learning styles, which is the preferred ways individuals perceive, process and retain information during learning activities (Brown, Zogni, Williams & Sim, 2009 as cited in Alade & Ogbo, 2014). Learning styles are believed to play a role in how students engage with instructional content, which, in turn, may influence their academic outcomes.

Learning styles are conceptualised as the various approaches that learners naturally use to absorb, process, and remember new information. Common models include the VARK framework: Visual, Auditory, Read/Write, and Kinesthetic, where each category represents a different mode of learning preference (Udu & Abughdyer, 2025). Advocates of learning styles posit that alignment between instructional strategies and students' preferred learning styles can enhance understanding and retention, potentially improving academic performance. For instance, visual learners are thought to benefit more from diagrams and written text, whereas auditory learners may perform better in lecture-based environments (Udu & Abughdyer, 2025). This notion suggests that acknowledging and accommodating students' learning styles could be a vital component of effective teaching and learning processes.

Empirical studies in diverse educational settings have explored the relationship between learning styles and academic performance, with mixed outcomes. Research conducted among undergraduate students in Nigeria found that multiple learning styles vis-à-vis visual, auditory, kinesthetic, and verbal jointly influenced academic performance in English language, though the degree of influence varied across styles (Udu & Abughdyer, 2025). In this study, verbal and auditory styles demonstrated relatively stronger predictive power than other styles, indicating that different learning preferences may contribute uniquely to performance outcomes. These findings underscore the complexity of learning styles as educational variables and their nuanced relationship with academic success.

Within the Nigerian secondary school context, studies have produced varied insights into how learning preferences relate to performance. For example, research in Lagos State reported prevalent learning styles among senior secondary students but found no significant differences in visual and auditory preferences between high and low achievers, though kinesthetic differences emerged (Akinawonu et al., 2025). Such findings highlight that the impact of learning styles on academic performance may be subject to contextual variables, such as instructional approaches, learner characteristics, and subject matter.

Statement of the Problem

Academic performance in English Language remains a persistent challenge in Nigerian public senior secondary schools, particularly in Rivers State, where students often demonstrate varied performance levels. Despite the subject's critical role in communication, further education, and employability, many students continue to underperform in examinations, hindering their academic progression. Research suggests that students learning styles and their preferred ways of receiving, processing, and retaining information may influence their engagement with instructional materials and, consequently, their academic outcomes. However, in many schools, teaching methods are standardized, often failing to accommodate the diverse learning preferences of students. This mismatch between instructional strategies and students' learning

styles may contribute to low performance, frustration, and reduced motivation in English Language learning.

While several studies have examined learning styles in relation to academic performance, there is limited empirical evidence within the Rivers State context, where socio-cultural, linguistic, and educational factors may uniquely shape students' learning experiences. Understanding how learning styles relate to English Language performance is critical for designing instructional strategies that enhance comprehension, retention, and performance. Therefore, this study sought to investigate the relationship between learning styles and academic performance in English language among public senior secondary school students in Rivers State, Nigeria, to provide data-driven insights for educators and policymakers.

Aim and Objectives of the Study

The aim of the study was to investigate the relationship between learning styles and academic performance in English language among public senior secondary school students in Rivers State, Nigeria. Specifically, the study intends to achieve the following:

- Examine the extent to which visual learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.
- Determine the extent to which auditory learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.
- Find out the extent to which kinesthetic learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.
- Investigate the extent to which reading/writing learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.

Research Questions

Four research questions guided the study:

- To what extent does visual learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?
- To what extent does auditory learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?
- To what extent does kinesthetic learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?
- To what extent does reading/writing learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?

Hypotheses

Four hypotheses further guided the study:

- Visual learning style does not significantly predict students' academic performance in English language in secondary schools in Rivers State.

- Auditory learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.
- Kinesthetic learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.
- Reading/writing learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

CONCEPTUALIZATION

Learning Styles

The basic tenet of learning style is that individuals possess certain characteristics that interact with specific learning experiences and environments, resulting in the enhancement of learning or in making learning more difficult. Learning style is concerned with how students learn, with the personal abilities they apply to learning tasks, and with the means by which they accommodate and assimilate new information. Typically, the concept of learning styles refers to a preferred method of learning. It suggests that everyone has a tendency towards the learning of some kind and that if that performance can be identified, teaching and learning experiences can be offered to help a person learn more effectively (Cavite & Gonzaga, 2023). Learning style refers to a person's preferred way of learning (Warn, 2009 in Nelson, 2022). It is a learner's behaviour, attitude and method of approaching learning in and outside the school settings.

Learning styles are characteristics that are considered especially in selecting the most appropriate methods, techniques and learning strategies. Learning style is the way in which individuals begin to concentrate on, process, internalize and retain new and difficult academic information. Keefe (2002) in Okoye (2018) defined learning styles as the composite of characteristic cognitive, affective and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. Nelson (2022) defined learning style as an individual's natural or habitual pattern of acquiring and processing information in learning situations. Learning style refers to a set of factors, behaviours and attitudes that enhance learning in any situation. How the students learn and how the teachers teach and how the two interact with each other is influenced by different learning styles. Each person is born with certain tendencies toward a particular style and these biological characteristics are influenced by external factors such as cultures, personal experiences and developments. Each learner has different and consistent preferred ways of perception, organization and retention. These learning styles are the indicators of how learners perceive, interact with and respond to the learning environments. Students have different styles of learning and they learn differently from one another. Learning styles are various approaches or ways of learning.

Learning styles have to do with different ways or patterns preferred by learners in processing information to be learned (Gidado, et al., 2023). Learning styles suggest that due to individual differences, individual learners differ in styles of thinking and methods of representing information. The idea of learning styles has been developed as a construct in many areas: cognition, motivation, perception, learning and behaviour (Gidado, et al., 2023). Students have different styles of learning, which means students take in and process information in different ways and patterns; by seeing, hearing, reasoning logically or by reflecting and acting. For instance, some students learn easily when seeing and confirming what the teacher says on the

chalkboard (visual), some by hearing it aloud (auditory) while some by working with their hands (kinesthetic), especially those that are vision impaired.

Psychological literature has revealed that every student has a preferred learning style, whether visual, auditory or kinesthetic. People prefer to process information in different ways and therefore learn more effectively when they receive information in a way that conforms to their preference (Pashler & McDaniel, 2009 in Gidado, et al., 2023). Knowing and understanding one's learning style helps the student to learn more effectively and will enable the individual to capitalize on his/her strengths and then improve skills. As remarked by Lynch and Newton (2015) in Gidado et al., (2023), learning-style based education specifically targeting auditory and visual learners is common practice from kindergarten through post-secondary education. The argument remains that there is no one size fits all approach to education. When it comes to learning some people need to see it, some others need to hear it while others need to do it. Individuals learn better when they receive information in their preferred learning style. Akinbobola (2015) noted that all students have different learning styles and the function of the teacher is to identify these learning styles and find appropriate instructional strategies that will match the preferred styles in order to enhance effective teaching and learning process.

Learning styles are primarily concerned with how individuals learn and not what they learn. Psychological literature has pointed to the likely influence of learning styles on the individual academic performance. Bethel-Eke and Eremie (2017) in their study discovered that there is a significant relationship reading/ writing learning style and academic performance of junior secondary school students in Rivers State. Also, the study revealed that auditory learning style was positively significantly related to academic performance of junior secondary school students in Rivers State. The study concluded that greater awareness of students' learning preferences of auditory style is a major factor that helps teachers to be more flexible in choosing their methodologies and teaching styles adopted in the classroom. This, according to them is consistent with the findings by Stenberg (1997) in Gidado et al. (2023) who opined that auditory learners tend to achieve more and score better than children with other types of learning styles. Furthermore, Obi et al., (2019) in their investigation of the influence of learning styles on academic performance among undergraduate students found out that visual element had the highest among other styles, with 95%. The research also suggested that there is significant relationship between learning styles of undergraduate science education students and their performance. They concluded in the research that academic performance increases with the type of learning style adopted by students. This was further brought to fore by Fatemeh and Camelia (2018) whose research indicated that students prefer learning with divergent learning styles as it was found to enhance their academic performance in school.

One of the models developed to categorized learning styles into different categories is the VARK model developed by Fleming (2001) in Pritchard (2019). He classified learning styles into four major types: visual (learning through seeing), auditory, (learning through listening), read/writing (learning by reading or writing) and kinesthetic (learning by movement, actions and touch) learning styles. Fleming believes that learners differ in their learning styles, so they may be unilateral in their learning style, that is, they use one of (VARK) styles in their learning, or multiple as they use two or more styles, and they are more flexible than those who learn in an individual style (Fleming & Baume, 2006 in Mahmood et al., 2023). The VARK model focuses on the sensory-perceptual media through which the learner learns, focusing on how the brain represents the experience it encounters, and the method of receiving stimuli with the aim of assimilating them, and that the preferred method used by the learner in organizing and

processing information and experiences is the method that distinguishes him in his learning, his reception of information that comes to him from the environment, as well as his method of solving problems that he encounters during educational situations.

VARCK focuses on how we can receive and impart knowledge with our senses. As an illustration, visual learners prefer maps, charts, graphs, diagrams, brochures, flowcharts, highlighters, different colours, pictures, word pictures and different spatial arrangements. Auditory learners enjoy explaining new ideas to others, discussing topics with other students and their teachers, using tape recorders, attending lectures and discussion groups and using stories. Read/write students prefer lists, essays, reports, textbooks, definitions, printed leaflets, readings, manuals, web pages, and taking notes. Kinesthetic learners love field trips, trial and error, doing things to understand through laboratory experiments and using their senses.

Visual Learning Style

Visual learning style is the learning style which focuses on watching to learn (Olubela & Adebajo, 2019). The individual with visual learning style learns best through visual stimulation. The visual learners are able to read and understand and they study best when reading text and using highlighters as visual stimulation that assists in remembrance. These students benefit when diagrams, videos or similar visuals are used to teach them. The visual learning style often referred to as the spatial learning style, is a way of learning in which information is associated with images. This learning style requires that learners first see what they are expected to know. Olson (2023) defined visual learning style as a learning style where learners absorb and recall information best when it is presented visually.

Visual learners prefer to process and learn information in visual forms such as pictures, charts, or printed information, such as lists or paragraphs. They learn and remember best by seeing and visualizing information. Visual learners learn best by seeing. They excel when they are taught using written materials that they can see such as books, videos computers, charts, flashcards, and other visual aids (Anyia, 2021). This category of learners understands written notes, directions, diagrams, charts, maps and pictures.

People who prefer to learn visually can be categorized into two groups: visual linguistic learners and visual spatial learners. Visual linguistic learners benefit most by reading and writing tasks. They can quickly understand and retain information that is in written form, so materials such as meeting hand-outs, notes in class and textbook assignments work well for those learners (Olubela et al., 2019). Visual-spatial learners do not enjoy reading or writing tasks but instead learn most effectively when graphs, illustrations, colour coding and other visual aids are used to present information (Olubela et al., 2019). People who prefer to learn in this manner tend to associate new information with mental imagery. Visual-linguistic learners like to learn through written language such as reading and writing tasks. They remember what has been written down, even if they do not read it more than once. They like to write down directions and pay attention to lectures if they watch them.

Learners who are visual-spatial usually have difficulty with the written language and do better with charts, demonstrations, videos, and other visual materials. They easily visualize faces and places by using their imagination and seldom get lost in new surroundings. To integrate this style into the learning environment, the use of graphs, charts, illustrations, or other visual aids are important. The following are additional characteristics of visual learners:

- Can easily recall information in the form of numbers, words, phrases, or sentence.
- Can easily understand and recall information presented in pictures, charts, or diagrams.
- Have strong visualization or visual memory skills and can look up and see information.
- Make “movies in their minds” of information they are reading.
- Have strong visual-spatial skills that involve sizes, shapes, textures, angles, dimensions.
- Have a good eye for colours, design, visual balance, and visual appeal.
- Pay close attention and learn to interpret body language.
- Have a keen awareness of aesthetics, the beauty of the physical environment and visual media.

Visual learners often favour creating and using visual strategies when they study. Essential strategies for learning for visual learners are provided in the table below:

Table 1: Essential Strategies for Learning for Visual Learners

Strategies	Explanations
Highlight important information	When you read, use coloured highlighter pens to highlight important facts, definitions, formulas, and steps.
Create movies in your mind	Use your visual memory as a television screen with the information that you see or hear moving across the screen as a movie with cameras rolling.
Visualize graphic materials and short sections of printed materials	Examine and visually memorize pictures, charts, graphs, or small sections of printed information. Practice looking away and visualizing the information. Then look back at the material to check your accuracy.
Create visual study tools	Create visual mappings, hierarchies, and comparison charts with several levels of detail to represent information that you are studying.
Use colours and pictures	Enhance your notes, flashcards, or any other study tools by adding colours and pictures so that the information stands out more clearly in your memory.
Copy information in your own handwriting	Creating a visual memory of information you personally write tends to be easier than visualizing printed text.
Use your keen observational skills	Pay attention to physical details of objects and people.
Carry a pen and notepad with you	Be ready to write down information or directions.

Auditory Learning Style

Auditory learning style is a style of learning in which an individual learns more efficiently by listening (Eads, 2022). Auditory learning is a learning style in which people learn most effectively by listening. An auditory learner prefers to listen to the information rather than read it in a text. Olubela et al., (2019) described auditory learning style as a style of learning through listening. Auditory learners prefer to learn by listening. They have good auditory memory and benefit from discussion, lectures, interviewing, learning stories and audiotapes, for example. They remember information better when it is delivered through sound or speech rather than written form. Many auditory learners may experience challenges when they receive instructions or information in written form but can clearly understand them when the information is auditory. These individuals are typically good listeners and can easily remember information that has been spoken.

Students who use this learning style hear lectures and participate in a discussion from which it is easy for them to understand the information better. For individuals who are auditory learners, written works are often difficult for learners in that category; information should

therefore be sufficiently loud to be heard such as tone, pitch and sounds will and comprehension (Olubela et al., 2019). Auditory learners like to receive new information and instructions through listening and speaking. An auditory learner can best absorb information by having a conversation with someone, listening to an audio tape, sitting in a classroom lecture or participating in a presentation. People with this learning preference may enjoy activities that involve brainstorming debate and other vocal exchanges that take place between people. Auditory learners often talk to themselves. They also may move their lips and read out loud. They may have difficulty with reading and writing tasks. They often do better talking to a colleague or a tape recorder and hearing what was said.

Many auditory learners find learning challenging when the data is delivered to them in a written text but have no problem understanding it in an audial form. They store information by how it sounds and often learn new things by reading them aloud or pairing them to non-verbal sounds like music or clapping. For example, children who are auditory learners love music and tend to learn the words of songs more quickly than other types of learners. Anya (2021) noted that auditory learners learn best by paying attention in lecture-based learning environments and on oral reports. They are also the greatest beneficiaries in classroom discussions, spoken directions, and study groups. Their performance is usually at its best during verbal drills and repetition and oral tests.

To integrate this style of learning into the learning environment, the teacher should begin new material with a brief explanation of what is coming. The classroom teacher should conclude with a summary of what has been covered. This is the old adage of tell them what they are going to learn, teach them and tell them what they have learned. The Socratic method of lecturing by questioning learners to draw as much information from them as possible should be emphasized. Clark (2021) pontificated that the teacher should develop an internal dialogue between himself and the auditory learners. The following are additional characteristics of auditory learners:

- They learn best when listening to the information.
- Have a good memory for spoken information.
- Have good public speaking skills.
- Possess strong listening skills.
- Prefer spoken directions.
- Excel in oral presentation and examinations.
- Are distracted by background noises or silence.
- Possess strong communication abilities.
- Like to be read to.
- Are confident to voice their thoughts.
- Can accurately remember details of information heard in conversations or lectures.

Auditory learners often select learning strategies that code or process information through their auditory channels into memory. Table 2 shows essential strategies for auditory learners.

Table 2: Essential Strategies for Learning for Auditory Learners

Strategies	Explanations
Participate in discussions.	Engage in group activities and express ideas.
Ask questions.	Asking questions shows your interest and provides an opportunity to interact with the teacher.
Work with others.	Use your verbal skills by working with others in a group.
Recite frequently.	Reciting involves stating information out loud, without referring to printed material. Reciting provides immediate feedback about your level of understanding.
Tape lectures.	For lectures in difficult classes, request permission to tape the lectures. Continue to take notes, but back up your notes with the tapes. After class, review only the sections of the tapes that cover the difficult information.
Make your own study tapes.	Read or recite main ideas, facts, and important details into a tape recorder. Studying tapes with your own voice may strengthen auditory memory and recall.
Explain information.	Explain information you are learning to another person or even to an imaginary person.

Kinesthetic Learning Style

Kinesthetic learning style refers to tactile learning, which is learning by doing something (Olubela et al., 2019). Benzion (1999) in Chieke et al. (2018) defined kinesthetic learning style as the process that results in new knowledge or understanding with the involvement of the learners' body movement. This movement is performed to establish new or extend existing knowledge. Kinesthetic learning is a style of learning where individuals prefer to partake in physical activity to engage in meaningful learning. It is a style of processing information through touch and movement. Kinesthetic learners are often described as hands-on learners who require active participation and physical engagement to understand and retain new information fully.

Kinesthetic learners prefer to learn by doing (Pritchard, 2019). They are good at recalling events and associate feelings or physical experiences with memory. They enjoy physical activity, field trips, manipulating objects and other practical first-hand experience. They often find it difficult to keep still and need regular breaks in classroom activities. Kinesthetic learners prefer to process and learn information through large and small muscle movements and hands-on experiences. They learn best by using their hands in "hands-on" learning or by using full body movement. They are able to remember and recall information more readily if they have the opportunity to feel, handle, use, manipulate, sort, assemble, or experiment with concrete objects. Large and small muscles hold memory, so involving movement in the learning process creates muscle memory (Ahmed, 2019).

Olubela et al. (2019) classified kinesthetic learners as dependent on touch or motion. A kinesthetic learner may appear to be easily distracted by exhibiting excess movement, doodling on notes in class or falling asleep during a long presentation. These learners perform best when encouraged to be active. Teaching techniques that benefit kinesthetic learners involve taking stretch breaks during long presentations, performing activities that involve movement, providing opportunity for notes to be written or highlighted and playing music when appropriate. Kinesthetic learners do best while touching and moving. It also has two sub-channels: Kinesthetic (movement) and tactile (touch). They tend to lose concentration if there is little or no external stimulation or movement. When listening to lectures they may want to take notes for the sake of moving their hands. When reading, they like to scan the materials first, and then focus in on the details. They typically use colour highlighters and take notes by drawing pictures

diagrams, or doodling. To integrate kinesthetic learning style into the learning environment, the teacher should use activities to get the learners up and moving. Music can be played when appropriate during activities. The classroom teacher should give frequent stretch breaks or brain breaks. Teachers should ensure that learners are guided through a visualization of complex tasks. Have them transfer information from the text to another medium such as a keyboard or a tablet. The following are additional characteristics of kinesthetic learners:

- They learn through their bodies and their sense of touch.
- They learn quickly and permanently what they do as they are learning.
- Kinesthetic learners are often gifted in physical activities.
- They learn best through hands-on activities.
- They lose interest easily.
- They are easily distracted by their environment.
- They enjoy using manipulatives.
- They are better at problem-solving.
- They work well with their hands in areas such as repair work, sculpting, or art.
- They are well coordinated, with a strong sense of timing and body movement.

Kinesthetic learners often prefer to use strategies that engage their small and large muscles in the learning process. The table below shows essential strategies for learning for kinesthetic learners.

Table 3: Essential Strategies for Learning for Kinesthetic Learners

Strategies	Explanations
Use hands-on learning.	Handle objects, tools or machinery that you are studying
Create manipulatives.	Manipulatives are study tools that you can move around with your hands. For example, create flash cards that you can shuffle, spread out, sort or categorize.
Use exaggerated movements and hand gestures when you study.	Use large muscle movements by engaging in drama, dance, and role playing.
Walk as you recite or practice information.	Use small muscle movement by moving and using hand gestures as you study.
Use creative movement and action-based activities.	Walking with study materials in hand helps some people learn without being distracted by the discomfort of sitting too long.
Use a computer.	For example, if you are studying perimeters in maths, tape off an area of a room and walk the perimeter.
	Type information and create notes, tables and charts. Keyword strokes help create muscle memory that you can use to simulate the actions and recall information.

Reading/Writing Learning Style

Reading and writing learning style is a type of learning style in which people prefer to read and write in order to learn more effectively. Malik (2020) described reading and writing learning style as a style of learning in which learners prefer to learn through written words. Malik (2020) opined that there is some overlap with visual learning, these types of learners are drawn to expression through writing, reading articles or books, writing in diaries, looking up words in the dictionary and searching the internet for just about everything. A reading and writing learner prefers to learn through the use of words. These individuals learn best through reading text-heavy materials or through the process of writing. They typically enjoy researching information

by studying books, reports and presentations. A learner who prefers reading and writing enjoys carrying out written assignments where they can express their thoughts through words. They also enjoy receiving hand-outs or written instructions and procedures to refer to when learning new concepts.

Mahmood et al. (2023) averred that reading and writing learners prefer that educational experiences are presented to them written or spoken, and they have the desire to write down all educational experiences, as well as have high skills in receiving, preparing and processing written and new experiences, which make their awareness of educational experiences better through written and read media. They have the ability to read and write well and are familiar with organizing lecture and taking notes (Chaudhly et al., 2020). Elechi (2023) maintained that many teachers and students have a strong preference for this style of learning. Reading and writing learners usually catch every word from their teachers and they never miss out on hand-out and references. Such students like taking notes verbatim which they reread over and over again. They find writing, reading articles, and taking notes to be most helpful when learning.

To integrate this learning preference into the learning environment, the teacher should encourage note taking in the classrooms. This will help the learners to benefit meaningfully in class. The teacher should provide clear and concise written instructions. This will help the students to tackle assignments, tasks and projects more easily. The use of visual aids appropriately should be emphasized by the teacher. Reading and writing learners will benefit from visual aids that are textual in nature. Using charts, diagrams and graphs that include plenty of written content will help them to better understand concepts. The teacher also should provide writing assignments in his teaching plan. He should encourage learners to expand on their ideas, organise their material, and re-write them until they are clear and concise. The following are the additional characteristics of reading and writing learners:

- They learn best by reading and taking notes.
- They tend to remember information that they read or write down.
- They learn best by writing and rewriting information.
- Often take notes verbatim in class.
- Do well with multiple choice and easy tests.
- Use lists, headings, dictionaries, glossaries and definitions to understand concepts.
- While they prefer to read quietly, sometimes they like to read aloud.
- Their notes may be very personalized and difficult to understand for anyone but themselves.
- They like to get written feedback on their progress.
- They can write in a very articulate way, more so than when they talk.

Reading and writing learners often favour creating and using reading and writing strategies when they study. Essential strategies for learning for reading and writing learners are provided in the table below:

Table 4: Essential Strategies for Learning for Reading and Writing Learners

Strategies	Explanations
Rewrite in your own words.	For a reading and writing learner, one of the easy ways to help commit something to memory is to rewrite it in your own words.
Write explanations of visual, auditory and kinesthetic concepts	If a reading and writing learner is watching a presentation in class, he or she should take down notes for easy memorization. He or she can as well take notes for charts and graphs.
Highlight key parts of notes	Since learners make a lot of notes, it is important key parts of notes are highlighted for easy reference.
Rewrite notes again	Rewriting notes will help clear up any mistakes and help the information sink in better.
Put revision flashcards up in visible places	When it comes to studying for exams, putting their flashcards upon display in different places around the home can help.

THEORETICAL FRAMEWORK

Dunn and Dunn Learning Styles Model (1975)

Kenneth Dunn and Rita Dunn developed a learning style model that emphasizes the need to match an individual's learning style with the instructional methodology used to approach teaching experiences (Atkinson, 2017). The matching of these two spectrums leads to higher motivation and greater intake of knowledge for the student. The Dunn and Dunn learning style model is based on the postulation that each learner has his/her strengths when it comes to learning. This learning model is developed out of a desire to empower and educate teachers and parents to analyze and motivate their children and students, to optimize their education to their unique learning preferences. This model recognizes that children learn differently, and some children need to be taught differently. The Dunn and Dunn Learning Style model illustrates a range of significant variables that may affect a person's ability to concentrate and learn. Some variables are believed to be biologically imposed; others are more inclined to develop and change as we grow and mature.

Dunn and Dunn's learning style model looks at five different preferences including environmental influences, emotional influences, sociological influences, physiological influences and psychological influences (Atkinson, 2017). Environmental influences refer to the immediate instructional environment. Does the student prefer to learn in quiet environment, with music or noise? How much light do they need? What temperature is the environment and even the seating preference?

Emotional attributes are related to the motivation, persistence and even the responsibility of the student. Is the student willing to conform to the learning task as more associated with non-conformity? Is the student willing to be responsible to face academic task? Sociological influences impact the social preferences of the learning environment. Is the student an independent or social learner? Do they prefer to learn in pairs with peers or even in small groups? Students may even enjoy working in a variety of these options. Physiological influences concern how the student physically engages their learning environment. What are their perceptual preferences (visual, audio, kinesthetic, read/write)? What time of the day are they most effective as learners?

Psychological influences concern how the learner processes and responds to information and ideas. Are students detail-oriented? Global oriented? Reflective oriented? The analytical or

detailed learner likes the details. The global learner looks more at the big picture. They like to see how the information fits into a whole. Reflective learners need space to contemplate new information. The impulsive learner is swift to respond. They will quickly shoot their hands in the air to answer a question. The implication of this learning model is that teachers can learn to use learning styles as a corner stone of their instructions and students can learn to capitalize on their learning style strengths when concentrating on new or difficult academic materials.

Table 5: Description of Dunn and Dunn Learning Style Elements

Stimuli	Elements
1. Environmental stimuli preferences	Sound, light, temperature, and design preferences
2. Emotional stimuli preferences	Motivation preference, persistence preference, responsibility preference, and structure preference
3. Sociological stimuli preferences	Self, pair, peers/team, adult and varied preferences
4. Psychological stimuli preferences	Global/Analytic styles, Impulsive/Reflective preferences
5. Physiological stimuli preferences	Perceptual strength, intake, time and mobility preferences.

Source: Dunn and Dunn Learning Model (1984)

METHODOLOGY

This study adopted a correlational research design to examine the extent to which learning styles, predict academic performance in English language among public senior secondary school students in Rivers State, Nigeria.

The study was conducted in Rivers State, a diverse and economically significant state in Nigeria. Created in 1967, it spans a land area of 11,077 km², with Port Harcourt as its capital. Rivers State has a population of over 7.4 million as of 2023 and is notable for its rich crude oil and natural gas reserves, as well as other mineral resources. The state consists of 23 Local Government Areas (LGAs) and 311 public senior secondary schools. The schools host a mix of students across gender, socio-economic backgrounds, and academic ability, ensuring a representative sample for the study.

The population of the study comprised 63,846 Senior Secondary School One (SS1) students from the 311 public schools, with 30,440 males and 33,406 females. A sample of 480 SS1 students was drawn from 12 LGAs across the three senatorial districts: Rivers West, Rivers East, and Rivers South East. The sample size was initially calculated using Taro Yamane's formula, yielding 398, which was rounded up and later increased to 480 to enhance the robustness of the findings.

A multistage sampling technique was employed. First, four LGAs were randomly selected from each senatorial district. Five schools were then randomly chosen from each selected LGA, and eight SS1 students were randomly selected from each school, ensuring equitable representation across zones, schools, and individual students.

Data collection instruments included a self-structured questionnaire, the Learning Styles Questionnaire (LSQ), and an English Language Performance Test (ELPT). Section A of the LSQ gathered demographic data, while Section B focused on learning styles, using a modified Likert scale ranging from Very High Extent (4) to Very Low Extent (1).

Validation was conducted by experts in Measurement and Evaluation, Educational Psychology, and English language, who assessed the instruments for content and face validity. The instruments' reliability was established via test-retest for the LSQ, yielding subscale

coefficients ranging from .761 to .890, and Cronbach's alpha for the ELPT (.832), indicating high reliability suitable for fieldwork.

The instruments were administered with the cooperation of school principals and teachers, supplemented by research assistants to ensure proper distribution and retrieval. All 480 questionnaires were successfully returned. Data were analyzed using simple linear regression at a .05 level of significance, with SPSS version 29 employed for statistical computations. This analysis enabled the determination of the predictive relationships between cognitive styles, learning styles, self-efficacy, and students' academic performance in English language.

RESULTS

Research Question One: To what extent does visual learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?

Hypothesis One: Visual learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

Table 6: Summary of simple linear regression model of visual learning style on students' academic performance in English language

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.845 ^a	.714	.711	3.2587	
ANOVA Associated with Simple Regression					
	Sum of Squares	Df	Mean Square	F-value	P-value
Regression	2987.1940	1	2987.194	53.456	.001 ^b
Residual	7831.236	133	55.881		
Total	19852.363	134			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Visual Learning Style

Table 6 showed the model summary of visual learning style on students' academic performance in English language in public senior secondary schools in Rivers State. The simple linear regression model gave a coefficient of .845, R^2 of .714 and adjusted R^2 of .711. This showed that visual learning style accounted for 71% variation in the students' academic performance in English language in public senior secondary schools in Rivers State. This therefore indicated that to a very high extent, visual learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.

The table also revealed the results of ANOVA associated with simple regression which yielded an F-value of 53.456 gotten at degree of freedom between 1 and 133 with its corresponding p-value of .001 which is less than the chosen level of significance ($p < .05$), showing that null hypothesis is rejected. It therefore, indicated that, visual learning style significantly predicted students' academic performance in English Language in public senior secondary schools in Rivers State.

Research Question Two: To what extent does auditory learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?

Hypothesis Two: Auditory learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

Table 7: Summary of simple linear regression model of auditory learning style on students' academic performance in English language

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.868 ^a	.753	.751	3.2754		
ANOVA Associated with Simple Regression						
		Sum of Squares	Df	Mean Square	F-value	P-value
Regression		3847.184	1	3847.184	96.909	.000 ^b
Residual		5875.476	148	39.699		
Total		9722.660	149			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Auditory Learning Style

Table 7 showed the model summary of auditory learning style on students' academic performance in English language in public senior secondary schools in Rivers State. The simple linear regression model gave a coefficient of .868, R^2 of .753 and adjusted R^2 of .751. This showed that auditory learning style accounted for 75% variation in the students' academic performance in English language in public senior secondary schools in Rivers State. This therefore implied that to a very high extent, auditory learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.

The table also revealed the results of ANOVA associated with simple regression which yielded an F-value of 96.909 gotten at degree of freedom between 1 and 148 with its corresponding p-value of .000 which is less than the chosen level of significance ($p < .05$). The null hypothesis is rejected. It therefore, suggested that, auditory learning style significantly predicted students' academic performance in English language in public senior secondary schools in Rivers State.

Research Question Three: To what extent does kinesthetic learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?

Hypothesis Three: Kinesthetic learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

Table 8: Summary of Simple Linear Regression Model of Kinesthetic Learning Style on Students' Academic Performance in English Language

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.749 ^a	561	.558	3.2754		
ANOVA Associated with Simple Regression						
		Sum of Squares	Df	Mean Square	F-value	P-value
Regression		2143.127	1	2143,127	77.831	.001 ^b
Residual		7315.246	48	49.434		
Total		9458.373	49			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Kinesthetic Learning Style

Table 8 showed the model summary of kinesthetic learning style on students' academic performance in English language in public senior secondary schools in Rivers State. The simple linear regression model gave a coefficient of .749, R^2 of .561 and adjusted R^2 of .558. This showed that kinesthetic learning style accounted for 56% variation in the students' academic performance in English language in public senior secondary schools in Rivers State. This therefore implied that to a high extent, kinesthetic learning style predicts students' academic performance in English language in public senior secondary schools in Rivers State.

The table also revealed the results of ANOVA associated with simple regression which yielded an F-value of 77.831 gotten at degree of freedom between 1 and 48 with its corresponding p-value of .000 which is less than the chosen level of significance ($p < .05$). The null hypothesis is rejected. It therefore, suggested that, kinesthetic learning style significantly predict students' academic performance in English Language in public senior secondary schools in Rivers State.

Research Question Four: To what extent does reading/writing learning style predict students' academic performance in English language in public senior secondary schools in Rivers State?

Hypothesis Four: Reading/writing learning style does not significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

Table 9: Summary of simple linear regression model of reading/write learning style on students' academic performance in English language

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.839 ^a	.704	.701	3.2330		
ANOVA Associated with Simple Regression						
		Sum of Squares	Df	Mean Square	F-value	P-value
Regression		3642.180	1	3642.180	90.184	.000 ^b
Residual		5775.176	143	40.386		
Total		9722.660	144			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Reading/Write Learning Style

Table 9 showed the model summary of reading/writing learning style on students' academic performance in English language in public senior secondary schools in Rivers State. The simple linear regression model gave a coefficient of .839, R^2 of .704 and adjusted R^2 of .701. This showed that reading/writing learning style accounted for 70% variation in the students' academic performance in English language in public senior secondary schools in Rivers State. This therefore indicated that to a very high extent, reading/writing learning style predicted students' academic performance in English language in public senior secondary schools in Rivers State.

The table also revealed the results of ANOVA associated with simple regression which yielded an F-value of 90.184 gotten at degree of freedom between 1 and 143 with its corresponding p-value of .000 which is less than the chosen level of significance ($p < .05$). The null hypothesis is rejected. It therefore, indicated that, reading/writing learning style significantly predicted students' academic performance in English language in public senior secondary schools in Rivers State.

DISCUSSION

Visual Learning Style and Students' Academic Performance

Table 6 of research question one and hypothesis one displayed that the extent to which visual learning style predict students' academic performance in English language is very high in public senior secondary schools in Rivers State, while the result of the corresponding hypothesis indicated that visual learning style significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

This finding is in agreement with the study of Chukwu and David (2019) who recorded that visual learning style significantly predicted academic performance of public senior secondary school students in Abia State. This is probably because learning by visual style makes learning concrete and real which enhance academic performance of students

Anya (2021) supported that visual learning style significantly predicted academic performance of public senior secondary school students in Imo State. This result is probably because what the students see they retain and recall easy, which improves students academically.

Uche and Amadi (2022) also revealed that visual learning style significantly predicted academic performance of public senior secondary school students in Abia State. This result is probably because visual learning makes use of designs, patterns, shapes and the different formats that are used to convey information, which enhances academic performance of such learners.

Auditory Visual Learning Style and Students' Academic Performance

Table 7 of research question two and hypothesis two revealed that the extent to which auditory learning style predict students' academic performance in English language is very high in public senior secondary schools in Rivers State, while the result of the corresponding hypothesis indicated that auditory learning style significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

This finding is in harmony with the study of Alikali (2019) who found that auditory learning style influenced the academic performance in Mathematics of secondary school students in Plateau State. This is because students decode information when they have heard. Students find it difficult to flow with learning if they cannot hear very well due to one factor or the other.

Kiribati (2019) also supported that auditory learning style significantly relate to academic performance in Mathematics of secondary school students in Kenya. This is probably because auditory learners need to hear and speak before they can read and write. They learn best through verbal lectures, group discussions, radio, mobile phones, speaking and discussion. Alexander (2022) also supported the study as he recorded that auditory learning style influenced the academic performance of students in secondary school in Rivers State, which is consistent with the present study

Kinesthetic Visual Learning Style and Students' Academic Performance

Table 8 of research question three and hypothesis three showed that the extent in which kinesthetic learning style predicts students' academic performance in English language is high in public senior secondary schools in Rivers State; while the result of the corresponding hypothesis indicated that

kinesthetic learning style significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

This present finding is in line with the study of Ahmed (2019) who found that kinesthetic learning style influenced the academic performance in Mathematics of secondary school students in Zamfara State. This is because kinesthetic learners learn very fast through practical and life experience which enhance their level of retentions and recalls.

Chima (2019) also revealed that kinesthetic learning style influenced the academic performance in Mathematics of secondary school students in Anambra State. This is probably because kinesthetic learners are more engaged when they can physically interact with their learning environment. This heightened engagement can lead to better focus and increased motivation to learn, positively impacting academic performance.

Petrides et al. (2019) also collaborated that kinesthetic learning style was significantly related to academic performance college students in Norway. This is probably because kinesthetic activities often involve muscle memory, which can help these learners retain information more effectively. Engaging multiple senses through hands-on learning can reinforce concepts and improve long-term retention.

Reading/Writing Learning Style and Students' Academic Performance

Table 9 of research question four and hypothesis four showed that the extent to which reading/writing learning style predict students' academic performance in English language is very high in public senior secondary schools in Rivers State, while the result of the corresponding hypothesis indicated that reading/writing learning style significantly predict students' academic performance in English language in public senior secondary schools in Rivers State.

This present finding is in agreement with the study of Elechi (2023) found that reading/writing learning style influenced academic performance in Biology of secondary school students in Plateau State. This is probably because the read and write learners are able to translates and express abstract concept into words and essays which leads to academic excellent.

Malik (2020) also revealed that reading/writing learning style was significantly related to academic performance college students in Denmark. This is probably because the read and write learners prefer printed words and texts as a means of information intake; they also prefer textbooks, lecture notes, or handouts as a source of learning assistance to improve on academic performance. Mahmood et al. (2023) also supported that reading/writing learning style influenced the academic performance of secondary school students in Edo State. This is probably because the read/write students perform well after reading and writing out instructions. They study better through note taken from lecture or from difficult reading materials.

CONCLUSION

This study has investigated the relationship between learning styles and academic performance in English language among public senior secondary school students in Rivers State, Nigeria. The findings suggested that students preferred modes of learning like visual, auditory, kinesthetic, or reading/writing play a significant role in shaping their engagement with instructional content and their overall performance. Recognizing and accommodating diverse learning styles enhances comprehension, retention, and motivation, leading to improved academic outcomes. The study highlights that uniform teaching approaches may not adequately address the varied needs of

students, potentially contributing to underperformance. Integrating strategies that cater the different learning preferences assist educators create more inclusive and effective learning environments. The interplay between learning styles and academic performance provides valuable insights for teachers, school administrators, and policymakers seeking to improve English language performance and overall educational quality in Rivers State.

Recommendations

Based on the findings, discussion and conclusion of this study, the following recommendations are made:

- Teachers should incorporate visual aids such as charts, diagrams and videos into lessons. PowerPoint presentations, mind maps, and visual storytelling should be used to enhance understanding and retention of English language concepts.
- Auditory teaching methods like lectures, discussions, podcasts, and audio recordings should be utilized by teachers. Students should be engaged in oral presentations, debates, and group discussions to reinforce their learning through listening and speaking.
- Teachers should provide opportunities for essays, written reports, reading comprehension exercises and research projects so as to help read/write learners. Encourage note-taking and the use of written summaries to consolidate their learning.
- Government should implement hands-on activities and experiential learning opportunities. Use role-playing, dramatizations and physical activities that involve movement to help kinesthetic learners grasp language concepts. Teachers should encourage the use of manipulative and real-life simulations to make learning more tangible.

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