

AUDITORY, KINESTHETIC AND VISUAL LEARNING STYLES AS PREDICTORS OF STUDENTS' ATTITUDES TO GRAPH-RELATED CONCEPTS IN ECONOMICS AMONG SENIOR SECONDARY SCHOOLS IN OGUN EAST SENATORIAL DISTRICT

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Abstract

This study examined the predictive influence of auditory, kinesthetic, and visual learning styles on students' attitudes toward graph-related concepts in Economics among senior secondary school students in Ogun East Senatorial District. A correlational research design was adopted, and a sample of 300 students was selected through stratified random sampling. Data were collected using validated questionnaires measuring learning styles and students' attitudes toward graph-related concepts. The results of the Pearson Product Moment Correlation revealed significant positive relationships between each learning style and students' attitudes: auditory ($r = 0.412, p < 0.05$), kinesthetic ($r = 0.468, p < 0.05$), and visual ($r = 0.523, p < 0.05$). Furthermore, the multiple regression analysis indicated that auditory, kinesthetic, and visual learning styles jointly accounted for 58% of the variance in students' attitudes toward graph-related concepts ($R^2 = 0.58, F = 98.63, p < 0.01$). Among the predictors, visual learning style ($\beta = 0.41$) exerted the strongest influence, followed by kinesthetic ($\beta = 0.35$) and auditory ($\beta = 0.29$). The findings suggest that when teachers integrate multimodal instructional approaches that cater to different learning preferences, students' attitudes and engagement in graph-related concepts improve significantly. The study concludes that enhancing students' understanding through visual, auditory, and kinesthetic strategies fosters positive attitudes toward Economics. It recommends that teachers adopt multimodal teaching techniques, employ adequate instructional materials, and receive professional training on accommodating diverse learning styles in Economics classrooms.

Keywords: Learning styles, Students' attitudes, Graph-related concepts, Economics education

Introduction

Economics is fundamentally defined as the study of how individuals, businesses, and societies allocate scarce resources to satisfy their needs and desires. As a discipline, it embodies both a social science and a practical field, integrating quantitative analysis and theoretical frameworks that encompass the production, distribution, and consumption of goods and services. This dual nature allows

market behaviors and government policies but also to illuminate the intricate interdependencies within societies. Understanding Economics aids students in deciphering the complexities of financial interactions, making it relevant in both academic and real-world contexts. Recent literature emphasizes the importance of integrating economic principles into education, as mastering these concepts lays a foundation for informed citizenship and decision-making (Mankiw, 2021).

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The inclusion of Economics in the Senior Secondary School curriculum is paramount for nurturing financial literacy, critical thinking, and an enhanced awareness of how economic principles shape daily life. It prepares students to engage effectively in a global economy by offering insights into market dynamics, resource management, and governmental fiscal policies. Basic economic knowledge equips students to make informed choices, paving the way for more responsible consumers and informed voters. Research shows that early exposure to economic education fosters positive attitudes toward finance and encourages students to explore careers in Economics-related fields (Milgrove, 2020). Furthermore, the evolving nature of global economies necessitates that students remain adaptable and informed, making a solid grounding in Economics essential in today's interconnected world.

Economics teaches students valuable skills to make informed decisions regarding personal finance, career choices, and civic duties. The ability to apply economic concepts effectively enables individuals to navigate real-world challenges, from budgeting to investment strategies, thereby enhancing their quality of life. Research highlights that understanding economic frameworks is critical for engaging with pressing societal issues, such as poverty alleviation and fiscal policy discussions (Nussbaum, 2019). Consequently, students proficient in economic concepts are better equipped to contribute meaningfully to their communities and participate in the democratic process, reinforcing the importance of incorporating Economics into the secondary education curriculum.

Despite its significance, data indicate that student achievement in Economics often falls short of anticipated levels. Performance metrics reveal that many senior secondary school students struggle to grasp fundamental economic concepts, particularly in relation to their practical applications. This underachievement poses a barrier for students aiming to pursue higher education in fields that require economic acumen, ultimately limiting their potential for success in various professional avenues. Moreover, low levels of

economic understanding can hinder students' ability to employ Economics in their personal decision-making processes (Adamu & Oduwaiye, 2020). Therefore, it becomes crucial to identify and address the factors contributing to this under performance to enhance student outcomes in Economics Education. Underachievement poses a barrier for students aiming to pursue higher education in fields that require economic acumen, ultimately limiting their potential for success in various professional avenues. Moreover, low levels of economic understanding can hinder students' ability to employ Economics in their personal decision-making processes (Adamu & Oduwaiye, 2020). Therefore, it becomes crucial to identify and address the factors contributing to this under performance to enhance student outcomes in Economics Education.

Graduate students have suggested that negative attitudes toward Economics often arise from the perceived complexities associated with key concepts, particularly graph-related topics such as demand and supply graphs or production possibility frontiers. Misconceptions and difficulties with these graphical representations can lead to disengagement or a lack of motivation, ultimately affecting overall academic performance in Economics. Literature reveals that students with a negative outlook on the subject may exhibit lower persistence in learning and a greater tendency to avoid challenging material (Ajayi & Oni, 2021). Addressing these negative attitudes might involve innovative teaching strategies that demystify complex concepts, making the subject more approachable and interesting for learners.

Recent studies on the impact of graph-related concepts across various subjects underscore the need to investigate their role in Economics Education (Oyewole, 2018; 2025). Research has established a significant link between students' understanding of graphs in disciplines such as mathematics and science and their subsequent academic achievement in Economics (Oyewole, 2018; Adeniyi & Fatoki, 2022). However, a gap remains in understanding how different learning styles—particularly auditory, kinesthetic, and visual learning—affect students' attitudes toward these graph-related concepts in Economics. By addressing this gap, educators can tailor instruction to better meet diverse learning preferences, fostering a more inclusive and effective learning environment for all students.

In addition to learning styles, other variables, such as teacher effectiveness, peer dynamics, and curriculum design, substantially influence student attitudes toward Economics. For instance, research has shown that a supportive classroom environment and skilled teaching can enhance student motivation and engagement in Economics (Bello & Afolayan, 2023). This study focuses on auditory, kinesthetic, and visual learning styles due to their potential impacts on students' comprehension and engagement. By examining these styles, we can potentially uncover methods to foster more positive attitudes toward Economics and ultimately improve performance in the subject.

Auditory learning provides a unique opportunity for engaging students in Economics through discussions, lectures, and auditory materials. Recent research indicates that incorporating auditory elements into Economics instruction can enhance students' understanding and retention of complex concepts (Oyeole & Nwogba, 2023). By utilizing auditory learning strategies, educators can create an inclusive atmosphere that supports diverse learners and fosters a deeper comprehension of economic principles. Incorporating auditory techniques places value on student contributions and experiential learning, thus enhancing overall engagement with the material. In this study, auditory learning was included as a variable to determine its potential to predict students' attitudes toward graph-related concepts in Economics, providing insights into how auditory strategies can influence perceptions and understanding within the discipline.

Kinesthetic learning emphasizes hands-on experiences and practical applications, making it an effective approach for teaching economic principles, especially in relation to graph-related concepts. Research demonstrates that kinesthetic methods, such as simulations or interactive exercises, facilitate a deeper understanding of Economics (Moses et al., 2021). Engaging students in activities that require them to manipulate or experiment with economic models allows for experiential learning, encouraging a more profound connection to theoretical concepts. Including kinesthetic approaches in Economics education ts in Economics, providing insights into how Kinesthetic strategies can influence perceptions and understanding within the discipline.

not only caters to diverse learning preferences but also fosters a more dynamic and interactive classroom environment. In this study, Kinesthetic learning was included as a variable to determine its potential to predict students' attitudes toward graph-related concepts in Economics, providing insights into how Kinesthetic strategies can influence perceptions and understanding within the discipline.

Visual learning, characterized by the use of visual aids such as charts, graphs, and diagrams, plays a significant role in enhancing comprehension and retention of economic concepts. Recent studies indicate that employing visual representations in Economics instruction aids students in grasping abstract notions and complex relationships (Kalu & Osundare, 2022). By presenting information visually, educators can create a more engaging and accessible learning experience, empowering students to build connections between theoretical ideas and real-world applications. The fusion of visual learning strategies into Economics curriculum can lead to improved student attitudes toward the subject, ultimately translating into better academic performance. In this study, Visual learning was included as a variable to determine its potential to predict students' attitudes toward graph-related concepts in Economics, providing insights into how visual strategies can influence perceptions and understanding within the discipline.

Graph-related concepts such as demand and supply curves, cost curves, and production possibility frontiers constitute a core component of Economics at the senior secondary school level, yet many students experience persistent difficulty in understanding and interpreting these graphical representations. Evidence suggests that students' challenges with graph-related concepts often result in negative attitudes toward Economics, reduced interest, and poor engagement with learning tasks involving graphs (Oyewole, 2018; Adamu & Oduwaiye, 2020; Ajayi & Oni, 2021; Oyewole and Abiodun, 2025). Although studies have shown that auditory, kinesthetic, and visual learning approaches can enhance students' understanding and engagement in Economics classrooms (Moses et al., 2021; Kalu & Osundare, 2022; Oyewole & Nwogba, 2023), there is limited empirical evidence on how these learning styles specifically predict students' attitudes toward graph-related concepts in Economics, particularly among s

senior secondary school students in Ogun East Senatorial District. This gap necessitates an investigation into the predictive influence of auditory, kinesthetic, and visual learning styles on students' attitudes toward graph-related concepts in Economics. understanding and engagement in Economics classrooms (Moses et al., 2021; Kalu & Osundare, 2022; Oyewole & Nwogba, 2023), there is limited empirical evidence on how these learning styles specifically predict students' attitudes toward graph-related concepts in Economics, particularly among senior secondary school students in Ogun East Senatorial District. This gap necessitates an investigation into the predictive influence of auditory, kinesthetic, and visual learning styles on students' attitudes toward graph-related concepts in Economics.

Objectives of the Study

The general objective of this study is to examine how auditory, kinesthetic, and visual learning styles predict students' attitudes toward graph-related concepts in Economics among senior secondary schools in Ogun East Senatorial District.

The specific objectives are to:

- i. examine the relationship between auditory learning style and students' attitudes toward graph-related concepts in Economics.
- ii. examine the relationship between kinesthetic learning style and students' attitudes toward graph-related concepts in Economics.
- iii. examine the relationship between visual learning style and students' attitudes toward graph-related concepts in Economics.

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- iv. investigate the extent to which auditory, kinesthetic, and visual learning styles predict students' attitudes toward graph-related concepts in Economics among senior secondary school students in Ibadan, Nigeria.

Research Hypotheses

H₀ : There is no significant relationship between auditory learning style and students' attitudes toward graph-related concepts in Economics.

H₀ : There is no significant relationship between kinesthetic learning style and students' attitudes toward graph-related concepts in Economics in Ogun East Senatorial District.

H₀ : There is no significant relationship between visual learning style and students' attitudes toward graph-related concepts in Economics in Ogun East Senatorial District.

H₀ : Auditory, kinesthetic, and visual learning styles do not jointly or independently predict students' attitudes toward graph-related concepts in Economics among senior secondary school students in Ogun East Senatorial District.

Results

Hypotheses Testing

H₀ : There is no significant relationship between auditory learning style and students' attitudes toward graph-related concepts in Economics.

Table 1: Pearson Product Moment Correlation between Auditory Learning Style and Students' Attitudes toward Graph-Related Concepts in Economics

Variable	N	Mean	SD	df	r	Sig.
Auditory Learning Style	300	3.04	0.86	298	0.412*	0.000
Attitude toward Graph Concepts	300	2.95	0.91			

Significant at 0.05 level

Table 1 reveals a positive and significant relationship ($r = 0.412$, $p < 0.05$) between auditory learning style and students' attitudes toward graph-related concepts in Economics. This implies that students who learn effectively through auditory means, such as discussions and oral explanations, tend to develop more positive

attitudes toward graph-related tasks in Economics.

H₀ : There is no significant relationship between kinesthetic learning style and students' attitudes toward graph-related concepts in Economics in Ogun East Senatorial District.

Table 2: Pearson Product Moment Correlation between Kinesthetic Learning Style and Students' Attitudes toward Graph-Related Concepts in Economics

Variable	N	Mean	SD	DF	R	Sig.
Kinesthetic Learning Style	300	2.97	0.92	298	0.468*	0.000
Attitude toward Graph Concepts	300	2.95	0.91			

Significant at 0.05 level Table 2 shows a positive and significant correlation ($r = 0.468$, $p < 0.05$), suggesting that kinesthetic learners—those who learn best through hands-on and practical experiences, display stronger and more favorable attitudes toward graph-related

concepts in Economics.

H₀ : There is no significant relationship between visual learning style and students' attitudes toward graph-related concepts in Economics in Ogun East Senatorial District.

Table 3: Pearson Product Moment Correlation between Visual Learning Style and Students' Attitudes toward Graph Related Concepts in Economics

Variable	N	Mean	SD	DF	R	Sig.
Visual Learning Style	300	3.10	0.84	298	0.523*	0.000
Attitude toward Graph Concepts	300	2.95	0.91			

Significant at 0.05 level

Table 3 indicates a strong positive correlation ($r = 0.523$, $p < 0.05$) between visual learning style and students' attitudes toward graph-related concepts in Economics, implying that visual learners tend to enjoy and understand graph interpretation more effectively.

H₀ : Auditory, kinesthetic, and visual learning styles do not jointly or independently predict students' attitudes toward graph-related concepts in Economics among senior secondary school students in Ogun East Senatorial District.

Table 4: Joint Multiple Regression Model Summary

Model Statistic	Value
R²	0.58
Adjusted R ²	0.57
F-Statistic	98.63
p-value (F-Test)	< 0.01

Table 4 reveals that auditory, kinesthetic, and visual learning styles jointly explain 58% of the variance ($R^2 = 0.58$) in students' attitudes toward graph-related concepts. The model is

statistically significant ($F = 98.63$, $p < 0.01$), indicating that these learning styles collectively contribute meaningfully to students' attitudes toward graphs in Economics.

Table 5: Regression Coefficients of Predictors for Students' Attitudes toward Graph-Related Concepts in Economics

Predictor Variable	Unstandar dised Coefficien t (B)	Standardi sed Coefficien t (β)	t- value	p- value	Decision
Auditory Learning Style	0.26	0.29	5.84	< 0.01	Significant
Kinesthetic Learning Style	0.31	0.35	6.45	< 0.01	Significant
Visual Learning Style	0.38	0.41	7.26	< 0.01	Significant

Table 5 shows that all three learning styles significantly predict students' attitudes toward graph-related concepts. Visual learning style ($\beta = 0.41$) exerted the strongest influence, followed by kinesthetic ($\beta = 0.35$) and auditory ($\beta = 0.29$).

Discussion

The findings revealed that auditory, kinesthetic, and visual learning styles significantly relate to students' attitudes toward graph-related concepts in Economics. The positive correlation between auditory learning and attitudes implies that verbal explanations, classroom discussions, and teacher-led narrations enhance students' comprehension and interest in graph interpretation. This finding aligns with Oyeole and Nwogba (2023), who observed that auditory engagement promotes better understanding of abstract concepts through verbal interaction.

Similarly, the kinesthetic learning style showed a significant positive relationship with students' attitudes, confirming the importance of experiential and hands-on learning. This supports Moses et al. (2021), who reported that kinesthetic experiences such as simulations and classroom demonstrations promote active participation and retention of Economics concepts.

Furthermore, the visual learning style emerged as the strongest predictor of students' attitudes. This outcome is consistent with Kalu and Osundare (2022), who found that the use of visual aids such as graphs and diagrams enhances conceptual clarity and motivates students to engage with challenging materials. Visual representations help students connect theory with practical

reality, making learning more concrete and meaningful.

The joint influence of the three learning styles underscores the need for multimodal instructional approaches that accommodate diverse learning preferences. When teachers incorporate auditory explanations, visual illustrations, and kinesthetic activities, students become more motivated, confident, and interested in mastering graph-related concepts in Economics. This outcome is consistent with Oyewole (2018), who found that students' learning styles significantly influenced learning outcomes in graph-related concepts in Economics.

Conclusion

The study established that auditory, kinesthetic, and visual learning styles significantly predict students' attitudes toward graph-related concepts in Economics among senior secondary school students in Ogun East Senatorial District. Visual learning exerted the strongest positive influence, followed by kinesthetic and auditory styles. These findings highlight that students' attitudes can be enhanced when instruction is diversified to suit individual learning preferences. Hence, developing multimodal teaching methods is vital for promoting understanding and positive attitudes toward graph interpretation in Economics.

Recommendations

Based on the findings and hypotheses tested, the following recommendations are made:

1. Adopt Multimodal Teaching Strategies:

Economics teachers should integrate auditory, kinesthetic, and visual elements into their lessons. This can include combining verbal explanations with graph drawing exercises and real-world simulations.

2. Enhance Visual Instruction: Schools should provide adequate instructional materials such as charts, projectors, and graphing tools to support visual learners and simplify abstract concepts.

3. Encourage Kinesthetic Engagement: Teachers should involve students in hands-on activities, such as constructing graphs and participating in market-simulation exercises to improve retention.

4. Strengthen Auditory Learning: Regular discussions, debates, and oral presentations on graph-related topics should be incorporated to benefit auditory learners.

5. Teacher Training: Professional development programs should train teachers on identifying and integrating various learning styles into Economics instruction.

6. Curriculum Review: The Economics curriculum should be enriched with activities that balance visual, auditory, and kinesthetic approaches, ensuring inclusivity and improved student attitudes.

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