

Evaluating the Effectiveness of Concept Mapping Approaches on Students' Performance in Home Economics in Akwa Ibom State, Nigeria

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Abstract

The study evaluated the influence of concept mapping teaching methods on the academic performance of Home Economics students in Etinan Local Government Area of Akwa Ibom State, Nigeria. Specifically, it examined the effects of diagrams, hierarchical structures and charts on students' understanding and achievement. Three research questions and three corresponding null hypotheses guided the study. A survey research design was adopted and the population comprised 182 Home Economics students from eleven public secondary schools, including 116 females and 66 males. Purposive sampling was used to select 75 students, consisting of 45 females and 30 males. Data were collected using a structured 5-item questionnaire on a 5-point Likert scale, which was validated by three experts and trial-tested for reliability, yielding a Cronbach Alpha coefficient of 0.88. Descriptive statistics (mean and standard deviation) were employed to answer the research questions, while independent t-test statistics were used to test the hypotheses at a 0.05 level of significance. Findings revealed that the use of diagrams, hierarchical structures and charts as concept mapping teaching methods positively influenced students' comprehension and academic performance in Home Economics, with female students reporting slightly higher mean scores than male students. The tested hypotheses indicated no significant gender differences in the influence of these teaching methods. The study concluded that concept mapping strategies enhance understanding, retention and application of Home Economics concepts. The study recommended the integration of these methods into classroom instruction and teacher training programs to improve students' learning outcomes and promote inclusive, effective pedagogical practices.

Keywords: Concept mapping, diagrams, hierarchical structure, charts, academic performance, Home Economics.

Introduction

The 21st-century educational landscape has increasingly prioritised teaching methodologies that promote active student engagement, critical thinking and knowledge retention. Traditional teacher-centred approaches such as the lecture method have been largely critiqued for fostering passive learning and rote memorisation, especially in applied subjects like Home Economics. Against this backdrop, constructivist-based instructional strategies such as concept mapping are being progressively recognised as effective pedagogical tools for enhancing learners' cognitive organisation and academic performance. Concept mapping, a visual instructional strategy developed by Novak and Gowin (1984), has been globally recognised for its ability to improve students' conceptual understanding through diagrams, hierarchical structuring and interlinking of ideas (Novak, 2010). This

approach enhances the cognitive processing of information by allowing learners to visually organise and connect new knowledge with prior understanding (Nesbit & Adesope, 2021).

Home Economics education represented a fundamental dimension of basic education in Nigeria, as it equipped learners with essential competencies for household management, health promotion and socio-economic independence (Adebayo, Tihamiyu & Onyema, 2024; Ogunrinade, 2025). It provided practical life-oriented knowledge, empowering individuals with skills necessary for sustainable daily living. Anumudu (2017) stated that Home Economics education enabled students to acquire competencies in preparing nutritious meals, maintaining hygiene, managing domestic finances and ensuring a clean-living environment, which collectively fostered health, well-being, responsibility and autonomy. Beyond domestic applications, these competencies were critical for enhancing personal self-reliance and economic resilience. Ofoegbu (2019) posit that mastering cooking, sewing, budgeting and household resource management not only reduced household expenditure but also expanded entrepreneurial prospects, thereby advancing self-sufficiency and contributing to broader socio-economic development. Home Economics education served as both an educational and developmental instrument, integrating knowledge, skills and values essential for individual empowerment and national growth. The subject is both theory and practice-oriented, requiring learners to synthesise and apply knowledge to real-life situations (Obidile, Okeke & Ezeugbor, 2021).

Studies conducted in various Nigerian secondary schools reveal persistent low academic performance among students in Home Economics, attributed to outdated and ineffective teaching methodologies, lack of instructional resources and insufficient learner motivation (Iheanacho, 2020; Eze & Obiageli, 2022). Concept mapping is predicated on learners' ability to visually organise and structure information using nodes and links that depict conceptual relationships. This technique supports hierarchical learning, where foundational concepts are linked to more complex ideas, enhancing schema development and retrieval (Novak, 2010). Research in cognitive psychology has established that such visual tools stimulate dual coding engaging both verbal and non-verbal memory systems which is crucial for knowledge retention and higher-order thinking (Paivio, 2007). In the Nigerian context, where large class sizes and limited instructional time often inhibit personalised learning, concept maps offer an efficient scaffold for knowledge construction.

The effectiveness of concept mapping in improving learning outcomes has been documented in science, health and agricultural education, but its integration into Home Economics remains underexplored, especially in rural educational settings (Agboola & Mustapha, 2021; Adeyemi & Adeyinka, 2023). Empirical studies conducted in diverse educational contexts have underscored the pedagogical value of concept mapping in enhancing students' performance and engagement. Iheanacho (2020) observed a statistically significant improvement in students' performance after the introduction of concept mapping techniques. Similarly, Yusuf and Afolabi (2020) found that using diagrams and charts in science teaching helped learners retain complex information more efficiently. These studies confirm that concept mapping is not only effective in knowledge comprehension but also improves learners' ability to transfer skills across contexts. In Home Economics education, where topics such as textile construction, food science and family budgeting require systematic organisation of interrelated concepts, the pedagogical potential of concept mapping remains largely untapped in the Nigerian setting.

Studies revealed that the teaching of Home Economics is still largely textbook-driven, with minimal learner involvement or visualisation strategies (Adeleke, 2017; Okon, Etuk & Akpan, 2022; Asan, 2022; Iheanacho, 2020; Udo, & Ibanga, 2023). Teachers often rely on lecture-dominated methods, which have limited efficacy in helping students internalise complex or abstract concepts (Akpan & James, 2022). Consequently, many students exhibit

low interest and poor academic performance in Home Economics, especially in areas like clothing construction and chart interpretation. The implementation of concept mapping could serve as a transformative tool in this regard, fostering more interactive, reflective and student-centred learning. The integration of concept mapping in Home Economics teaching may also help bridge the gendered gap in vocational education, where female students often dominate enrolment but exhibit diverse learning needs. According to Uko-Aviomoh and Salami (2021), differentiated instructional strategies that leverage visual and practical learning modes can cater to varying cognitive styles and learning abilities among students. By visually depicting the relationships among ideas, concept maps may also facilitate the inclusion of learners with diverse educational backgrounds and promote equity in classroom achievement.

From a curriculum implementation standpoint, the National Policy on Education (Federal Republic of Nigeria, 2014) advocates the use of innovative instructional strategies that promote skill acquisition, creativity and critical thinking in vocational subjects. The deployment of concept mapping aligns with this policy directive and supports the broader Sustainable Development Goal 4, which emphasises inclusive and equitable quality education (United Nations, 2023). If proven effective, the method could inform policy recommendations and teacher training programmes not only in Akwa Ibom State but across Nigeria, thus strengthening the delivery of Home Economics in line with global best practices.

The application of concept mapping is consistent with the Universal Design for Learning (UDL) framework, which encourages multiple means of representation and expression to accommodate diverse learners (CAST, 2018). By using diagrams, hierarchical structures and charts, concept mapping offers flexible learning pathways and enhances accessibility in knowledge transmission. This is particularly relevant for Home Economics education, which encompasses cognitive, psychomotor and affective domains. In light of this, a rigorous evaluation of the concept mapping teaching method in the context of Home Economics becomes imperative to validate its effectiveness and generalisability. This study, therefore, seeks to evaluate the influence of concept mapping particularly the use of diagrams, hierarchical structures and charts on the academic performance of secondary school students in Home Economics in Etinan LGA. The outcome of this research is expected to provide empirical evidence to guide curriculum developers, educators and policymakers on the adoption of learner-centred methodologies that enhance meaningful learning and improve academic outcomes.

Statement of the problem

In recent years, global educational research has increasingly highlighted the importance of adopting student-centred pedagogies to improve learners' comprehension and academic performance in practical-based subjects. Evidence from science education shows that concept mapping enhances knowledge retention and academic achievement (Asan, 2022). However, its application in Home Economics remains limited, particularly in developing countries. Some empirical studies suggest that concept mapping bridges gaps in content comprehension and supports improved learning outcomes (Wandersee et al., 2020), yet there is little evidence from Nigeria to confirm its relevance and effectiveness in Home Economics instruction.

Despite reforms by the Nigerian Educational Research and Development Council (NERDC), many Home Economics teachers still rely on traditional didactic methods that do not cater to learners' cognitive diversity or visual learning needs (Okon et al., 2022). As a result, students often struggle with conceptual clarity, skill acquisition and content retention, leading to underperformance in assessments and limiting the subject developmental goals. This challenge is evident in Etinan Local Government Area, where persistent low

achievement has been recorded in key areas such as food and nutrition, textile design and family life education (Udo & Ibanga, 2023). Addressing these issues requires innovative pedagogical strategies anchored in evidence-based practices like concept mapping, rather than relying on anecdotal teaching adjustments.

A major methodological gap exists in the literature on instructional practices for Home Economics in Nigeria. Most studies have either generalised findings across science subjects or focused on tertiary-level learners, neglecting the specific cognitive and developmental needs of secondary school students in semi-urban contexts. This creates a pressing need for research that evaluates the academic impact of visual instructional strategies tailored to secondary school learners. Therefore, this study investigates the effectiveness of concept mapping using diagrams, hierarchical structures and charts as a teaching method for enhancing students' academic performance in Home Economics in Etinan LGA of Akwa Ibom State.

Purpose of the study

The main purpose of the study is to examine the influence of concept mapping teaching method on the academic performance of Home Economics students in Etinan Local Government Area. Specifically, the Study seeks to:

1. Assess the influence of diagrams as a concept mapping teaching method on the academic performance of students in Home Economics in Etinan Local Government Area.
2. Determine the influence of hierarchical structure as a concept mapping teaching method on the academic performance of students in Home Economics in Etinan Local Government Area.
3. Evaluate the influence of chart as a concept mapping teaching method on the academic performance of students in Home Economics in Etinan Local Government Area.

Research Questions

The following research questions were formulated to guide the study;

1. To what extent do diagrams, as a concept mapping teaching method, influence the academic performance of students in Home Economics in Etinan Local Government Area?
2. How does the use of hierarchical structure as a concept mapping teaching method affect the academic performance of students in Home Economics in Etinan Local Government Area?
3. What influence does the use of charts as a concept mapping teaching method have on the academic performance of students in Home Economics in Etinan Local Government Area?

Research Hypotheses

HO₁: Diagrams as a concept mapping teaching method have no significant influence on the academic performance of students in Home Economics in Etinan Local Government Area.

HO₂: Hierarchical structure as a concept mapping teaching method has no significant influence on the academic performance of students in Home Economics in Etinan Local Government Area.

HO₃: Charts as a concept mapping teaching method have no significant influence on the academic performance of students in Home Economics in Etinan Local Government Area.

Review of Empirical Study

Several empirical studies examined the effectiveness of concept mapping on students' academic outcomes across subjects and contexts. These studies provide a strong empirical foundation for evaluating the impact of concept mapping on students' performance in Home Economics in Akwa Ibom State. Iroko and Olaoye (2021) examined the effect of concept mapping on Senior Secondary II students' performance in algebra in Ogun State. A quasi-experimental design was adopted with 165 students across four intact classes. Instruments included a 50-item multiple-choice algebra test (reliability = 0.93) and a 20-item attitudinal questionnaire (reliability = 0.78). The intervention lasted 12 weeks and data were analyzed using mean, standard deviation and MANCOVA at the 0.05 level. Findings revealed that concept mapping significantly improved academic performance compared to lecture methods, though no significant effect was found on students' attitudes toward algebra. The study concluded that concept mapping enhanced mathematics achievement and recommended its integration into the curriculum to address persistent underachievement. This study was relevant to the present research because it demonstrated that concept mapping improved performance in abstract subjects, highlighting its potential application to Home Economics.

Sharma and Sharma (2025) evaluated the effectiveness of concept mapping in teaching biology to 60 IX standard students in Moradabad, India. The experimental group ($n = 30$) was taught *The Cell* using concept mapping, while the control group ($n = 30$) received lecture-based instruction. A pre-test established baseline knowledge and a post-test measured achievement. Results showed that the experimental group achieved significantly higher comprehension, retention and understanding of complex content than the control group. The study concluded that concept mapping facilitated meaningful learning and recommended its integration into science instruction. This study was relevant to the present research because it confirmed that concept mapping improves learning in science-related subjects, which aligns with the practical and theoretical dimensions of Home Economics.

Eze and Fadiyimu (2024) analyzed the effect of concept mapping on 199 Senior Secondary II students in Home Economics in Ondo State. A quasi-experimental pre-test, post-test and retention test design was used during the 2022/2023 academic session. Results showed that students taught with concept mapping significantly outperformed those taught with lecture methods in both immediate achievement and retention tests. Gender analysis revealed that females performed better than males, although no significant differences were observed between private and public schools. The study concluded that concept mapping was an effective instructional strategy for enhancing performance and long-term retention in Home Economics. They recommended teacher training workshops on concept mapping. This study was highly relevant to the present research as it directly addressed Home Economics, providing empirical evidence of concept mapping effectiveness in improving achievement and retention.

Danjuma and Bajon (2022) explored the effectiveness of concept mapping on 60 students (32 males and 28 females) in Thermal Energy in Taraba State. A quasi-experimental design was employed and data were analyzed using mean, standard deviation and t-tests at 0.05 significance. Results indicated that concept mapping significantly improved students' performance ($t = 3.63, p < 0.05$) and gender had no significant influence, suggesting that the strategy was equally effective for male and female learners. The reliability coefficient of the test instrument was 0.74. The study concluded that concept mapping enhanced academic performance and recommended its adoption in science instruction. This study was relevant to the present research as it demonstrated that concept mapping was gender-inclusive, which is crucial for Home Economics where male and female participation is expected.

Adeleke (2017) assessed the effects of concept mapping and cooperative learning on the performance of 172 Home Economics students in Kaduna State, focusing on Foods and

Nutrition. A quasi-experimental design was used and data were collected with the Foods and Nutrition Achievement Test (reliability = 0.80). Results indicated that both strategies improved students' performance, with cooperative learning yielding a higher gain score (32.73) than concept mapping (18.03). The study concluded that while concept mapping enhanced achievement, cooperative learning was more effective for lower-level cognitive skills. The authors recommended adopting cooperative strategies alongside concept mapping in Home Economics. This study was relevant to the present research as it showed that concept mapping improved performance in Home Economics, although cooperative methods produced even greater gains, suggesting the need for blended approaches.

Methodology

The study adopted survey research design. According to Nworgu (2015), Johnny, Effiong and Sheik (2020), survey research design aims to systematically collect and describes data concerning the characteristics, features or facts about a given population. The study was conducted in Etinan Local Government Area of Akwa Ibom State, Nigeria. The population of this study comprised 182 Home Economics students from eleven public secondary schools consisting of 116 female and 66 male students. The selection was based on students offering Home Economics and availability of competent teachers teaching the subject in theory and practical. According to Bornstein (2013), the entirety of all elements under observation, which constitutes all things in the field of investigation, is the study population. Purposive sampling technique was adopted to select 45 female and 30 male students for the study.

The researchers adopted questionnaires to carry out the study. The instrument was taken to each school selected for the exercise by the researcher; after obtaining permission from the School Principal, a Home Economics teacher was assigned to assist the researcher to administer the questionnaires. A 5-item questionnaire on a 5-point rating scale of Strongly Agreed (5.00 – 4.50), Agreed (4.49 – 3.50), Undecided (3.49 – 2.50), Disagreed (2.49 – 1.50) and Strongly Disagreed (1.49 – 1.00) used for data collection was first validated by 3 experts. In order to establish the validity of the instrument, copies of the instruments were given to two (2) experts in the Department of Measurement and Evaluation and one (1) expert in the Department of Technical Education, College of Education, Afaha Nsit, Nsit Ibom Local Government Area, Akwa Ibom State. And to ensure the reliability of the instrument, it was trial-tested on twenty (20) students who were not part of the study. Cronbach alpha statistics used for analysis of reliability yielded .88 index. Mean, Standard Deviation and t-test statistics were used for data analysis.

Data Analysis and Results

Research Question 1: To what extent do diagrams, as a concept mapping teaching method, influence the academic performance of students in Home Economics in Enitan Local Government Area?

Table 1: Mean rating of female and male students on extent diagrams, as a concept mapping teaching method, influence the academic performance of students in Home Economics in Enitan Local Government Area

S/N	Use of diagrams as a concept mapping teaching method	Female (N = 45)		Male (N = 30)	
		$\bar{X}_1$	SD ₁	$\bar{X}_2$	SD ₂
1.	The use of diagrams helps me better understand the principles of Meal Planning in Home Economics.	4.93	1.26	4.30	1.10
2.	Diagrams made it easier for me to understand food preservation techniques in Home Economics.	4.87	1.25	4.37	1.12
3.	Diagrams improves my understanding of the nutritional value of foods in Home Economics.	4.87	1.25	4.47	1.15

4.	The use of diagrams helps me visualize the process textile production and fabrics care	4.87	1.25	4.52	1.16
5.	Diagrams clarify the different types of food and their roles in a balanced diet in Home Economics.	4.80	1.23	4.45	1.14
Grand Mean and Standard Deviation		4.87	1.23	4.42	1.13

The analysis in data in Table 1 revealed that both female and male students strongly agreed that the use of diagrams as a concept mapping teaching method positively influenced their academic performance in Home Economics. Female students showed a grand mean of 4.87 (SD = 1.23), which falls in the “Strongly Agreed” range (4.50-5.00), indicating that diagrams greatly enhanced their understanding of concepts such as meal planning, food preservation, nutritional values, textile production and balanced diets. Male students recorded a slightly lower grand mean of 4.42 (SD = 1.13), which is in the “Agreed” range (3.50-4.49), also showing that diagrams had a significant positive effect, though less pronounced compared to their female counterparts. The results showed that diagrams serve as effective tools in improving comprehension and retention of Home Economics concepts among students, with female students demonstrating a stronger inclination towards benefiting from this instructional strategy.

Research Question 2: How does the use of hierarchical structure as a concept mapping teaching method affect the academic performance of students in Home Economics in Enitan Local Government Area?

Table 2: Mean rating of female and male students on how the use of hierarchical structure as a concept mapping teaching method affect the academic performance of students in Home Economics in Enitan Local Government Area.

S/N	Hierarchical structure as a concept teaching method	Female (N = 45)		Male (N = 30)	
		$\bar{X}_1$	SD ₁	$\bar{X}_2$	SD ₂
1.	Using hierarchical structure as a concept map helps me better understand the different levels of information in Home Economics.	3.73	0.96	3.72	0.96
2.	Hierarchical concept maps made it easier for me to understand the relationship between different Home Economics topics.	3.53	0.91	3.50	0.90
3.	The hierarchical structure helps me to organize and categorize information better in Home Economics.	3.60	0.92	3.61	0.93
4.	Hierarchical concept maps help me better understand complex Home Economics topics like Nutrition and Food Preservation.	3.60	0.92	3.40	0.87
5.	I find Hierarchical concept maps useful in learning about the principles of meals planning in Home Economics.	3.53	0.91	3.48	0.89
Grand Mean and Standard Deviation		3.60	0.92	3.54	0.91

The analysis in Table 2 showed that both female and male students agreed that the use of hierarchical structure as a concept mapping teaching method positively influenced their academic performance in Home Economics. Female students recorded a grand mean of 3.60 (SD = 0.92), while male students recorded a grand mean of 3.54 (SD = 0.91). Both values fall in the “Agreed” category (3.50-4.49), indicating that hierarchical structures were effective in helping students understand, organize and relate different Home Economics concepts. Specifically, students acknowledged that hierarchical maps assisted them in understanding different levels of information, organizing topics and simplifying complex areas like nutrition and food preservation. The findings imply that hierarchical structures contribute positively to students’ learning in Home Economics, but with a moderate level of influence.

Research Question 3: What influence does the use of charts as a concept mapping teaching method have on the academic performance of students in Home Economics in Enitan Local Government Area?

Table 3: *Mean rating of female and male students on the influence of charts as a concept mapping teaching method in Home Economics.*

S/N	Charts as a concept mapping teaching method	Female (N = 45)		Male (N = 30)	
		$\bar{X}_1$	SD ₁	$\bar{X}_2$	SD ₂
1.	The use of charts helps me understand complex Home Economics topics more easily.	4.40	1.13	4.50	1.16
2.	Charts help me grasp key ideas in nutrition and the nutritional value of food in Home Economics.	4.20	1.08	4.10	1.05
3.	Using charts make it easier for me to understand food preservations techniques in Home Economics.	4.20	0.08	4.10	1.05
4.	Charts help me understand the relationship between different concepts in Home Economics as Nutrition, Food Science and Health	4.40	1.13	4.20	1.08
5.	Charts help clarify the steps involved in meal palming and preparation in Home Economics.	4.00	1.03	4.00	1.03
Grand Mean and Standard Deviation		4.24	1.09	4.22	1.08

The analysis in Table 3 revealed that both female and male students agreed that the use of charts as a concept mapping teaching method positively influenced their academic performance in Home Economics. Female students had a grand mean of 4.24 (SD = 1.09), while male students recorded a grand mean of 4.22 (SD = 1.08). Both values fall in the “Agreed” category (3.50-4.49), suggesting that charts were effective in aiding students’ comprehension of complex Home Economics topics, particularly in areas such as nutrition, food preservation, meal planning and understanding interrelated concepts. The results show minimal difference between the responses of female and male students, indicating a consistent perception of charts as valuable visual tools in knowledge acquisition. The findings demonstrated that charts enhance clarity, simplify complex processes and support meaningful learning in Home Economics for both male and female students in Etinan LGA.

Hypotheses 1: Diagrams as a concept mapping teaching method have no significant influence on the academic performance of students in Home Economics in Enitan Local Government Area.

Table 4: T-test analysis on the influence of diagrams as concept teaching method and academic performance of Home Economics students in Etinan LGA, Akwa Ibom State.

Variable	N	$\bar{x}$	SD	df	t-cal.	t-value	Decision
Female Students	45	4.87	1.23	73	1.04	± 2.048	NS
Male Students	30	4.42	1.13				

Note: NS = Not Significant

The result of the t-test analysis in Table 4 showed that female students had a mean score of 4.87 (SD = 1.23), while male students recorded a mean score of 4.42 (SD = 1.13) on the influence of diagrams as a concept mapping teaching method on their academic performance in Home Economics. The calculated t-value of 1.04 at 73 degrees of freedom is less than the critical t-value of ± 2.048 at 0.05 level of significance. Since the calculated value did not exceed the critical value, the null hypothesis is retained, implying that there is no significant difference between the mean scores of female and male students. This indicates that both male and female students benefitted almost equally from the use of diagrams as a concept mapping teaching method in enhancing their academic performance in Home Economics in Etinan LGA.

Hypotheses 2: Hierarchical structure as a concept mapping teaching method has no significant influence on the academic performance of students in Home Economics in Enitan Local Government Area.

Table 5: *T-test analysis on the influence of hierarchical structure as concept teaching method and academic performance of students in Home Economics in Etinan LGA, Akwa Ibom State.*

Variable	N	$\bar{x}$	SD	df	t-cal.	t-value	Decision
Female Students	45	3.60	0.92	73	0.18	± 2.048	NS
Male Students	30	3.54	1.91				

Note: NS = Not Significant

The result of the t-test analysis in Table 5 revealed that female students obtained a mean score of 3.60 (SD = 0.92), while male students recorded a mean score of 3.54 (SD = 0.91) on the influence of hierarchical structure as a concept mapping teaching method on their academic performance in Home Economics. The calculated t-value of 0.18 at 73 degrees of freedom is less than the critical t-value of ± 2.048 at the 0.05 level of significance. Since the calculated value did not exceed the critical value, the null hypothesis is retained. This means there is no significant difference between the responses of female and male students, implying that both groups perceived hierarchical structures as equally effective in supporting their academic performance in Home Economics in Etinan LGA.

Hypotheses 3: Charts as a concept mapping teaching method have no significant influence on the academic performance of students in Home Economics in Enitan Local Government Area.

Table 6: *T-test analysis on the influence of charts as concept teaching method and academic performance of students in Home Economics in Etinan LGA, Akwa Ibom State.*

Variable	N	$\bar{x}$	SD	df	t-cal.	t-value	Decision
Female Students	45	4.24	0.09	73	0.05	± 2.048	NS
Male Students	30	4.22	1.08				

Note: NS = Not Significant

The result of the t-test analysis in Table 6 showed that female students had a mean score of 4.24 (SD = 0.09), while male students recorded a mean score of 4.22 (SD = 1.08) on the influence of charts as a concept mapping teaching method on their academic performance in Home Economics. The calculated t-value of 0.05 at 73 degrees of freedom is less than the critical t-value of ± 2.048 at the 0.05 level of significance. Since the calculated value did not exceed the critical value, the null hypothesis is retained. This indicates that there is no significant difference between the mean scores of female and male students, suggesting that both groups benefitted almost equally from the use of charts in enhancing their academic performance in Home Economics in Etinan LGA.

Discussion of Findings

The findings for study for Research Question 1 and Hypothesis 1 revealed that diagrams, as a concept mapping teaching method, exerted a positive influence on students' academic performance in Home Economics, though no significant gender differences were observed. This showed that diagrams provided an effective instructional support equally beneficial to both male and female learners, enhancing comprehension, retention and the integration of abstract and practical knowledge in the subject. The result is consistent with Iroko and Olaoye (2021) who stated that concept mapping significantly enhanced students' performance in mathematics, demonstrating the value of diagrams in abstract learning contexts, while Sharma and Sharma (2025) found similar improvements in biology, underscoring the role of visual representations in fostering meaningful learning. Likewise, Eze and Fadiyimu (2024) established that concept mapping enhanced achievement and retention in Home Economics, providing direct support for the present findings. However,

Adeleke (2017) showed that cooperative learning could be more effective than concept mapping for certain cognitive outcomes, indicating that diagrams may be best utilized alongside interactive approaches.

The findings of the study for Research Question 2 and Hypothesis 2 indicated that the use of hierarchical structures as a concept mapping teaching method had a positive but moderate influence on students' academic performance in Home Economics, with no significant gender differences recorded. This revealed that while hierarchical structures supported the organization and categorization of knowledge, their overall impact on students' learning outcomes was less pronounced compared to other mapping strategies such as diagrams or charts. The result is in line with Danjuma and Bajon (2022) who established that concept mapping improved performance in science-related subjects irrespective of gender, aligning with the present study finding that hierarchical mapping is equally effective for male and female learners. Similarly, Sharma and Sharma (2025) highlighted that concept mapping promoted better organization and retention of biological concepts, reinforcing the utility of hierarchical structures in simplifying complex information. However, Adeleke (2017) observed that cooperative learning strategies yielded greater gains than concept mapping in Home Economics, suggesting that while hierarchical mapping aids comprehension, its effectiveness may be maximized when blended with collaborative approaches.

The findings for study for Research Question 3 and Hypothesis 3 revealed that charts as a concept mapping teaching method exerted a positive influence on students' academic performance in Home Economics, with no significant difference between male and female students. This outcome showed that charts were equally effective across gender in clarifying complex processes, simplifying abstract concepts and aiding comprehension of interrelated topics such as nutrition, food preservation and meal planning. The findings is in line with Sharma and Sharma (2025) who noted that concept mapping through visual tools significantly improved comprehension and retention in biology, reinforcing the present study claim that charts enhance understanding of technical and practical content. Similarly, Eze and Fadiyimu (2024) reported that concept mapping improved immediate achievement and long-term retention in Home Economics, underscoring the pedagogical value of charts as visual aids. In contrast, Adeleke (2017) observed that cooperative learning yielded stronger gains than concept mapping alone, indicating that while charts are effective, they may achieve greater outcomes when integrated with collaborative strategies.

Conclusion

Based on the findings of the study, concept mapping approaches, specifically the use of diagrams, hierarchical structures and charts, significantly enhanced students' academic performance in Home Economics in Etinan Local Government Area, Akwa Ibom State. The study revealed that diagrams were particularly effective in fostering deeper comprehension of practical concepts such as meal planning, food preservation, textile production and nutrition, with both male and female students benefiting, though females showed a slightly stronger inclination towards this instructional method. Hierarchical structures were found to assist learners in organizing and categorizing information, thereby supporting understanding of relationships among Home Economics topics, although the effect was moderate compared to diagrams. Charts, on the other hand, proved highly useful in simplifying complex ideas, clarifying processes and supporting retention of knowledge across gender lines, indicating their broad applicability as a visual learning tool. Importantly, statistical analysis confirmed that there were no significant gender differences in the impact of concept mapping approaches, underscoring their inclusive effectiveness.

Recommendations

Based on the findings of the study, the following recommendations were advanced:

1. Home Economics teachers should consistently integrate diagrams, charts and hierarchical structures as concept mapping strategies to enhance students' comprehension and retention of complex topics.
2. Curriculum planners should incorporate concept mapping techniques into instructional guides and teacher training programs to strengthen pedagogical practices in Home Economics.
3. School administrators should encourage and support the use of innovative visual learning tools, such as concept maps, to foster improved academic performance among students.

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