EFFECTS OF CONCEPT MAPPING AND COOPERATIVE TEACHING METHODS ON ACADEMIC PERFORMANCE OF SECONDARY SCHOOL HOME ECONOMICS STUDENTS IN KADUNA STATE, NIGERIA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER DEGREE IN HOME ECONOMICS EDUCATION

DEPARTMENT OF HOME ECONOMICS,
FACULTY OF EDUCATION,
AHMADU BELLO UNIVERSITY,
ZARIA, NIGERIA

MARCH, 2018

DECLARATION

I declare that the work in this dissertationentitled ‘Effects of Concept Mapping and Cooperative Teaching Methods on Academic Performance of Secondary School Home Economics Students in Kaduna State, Nigeria’ has been carried out by me in the Department of Home Economics. The several authors whose materials were used in the course of the work have been duly acknowledged in the text and in the list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other institution.

Taiwo Adeola ADELEKE Date

CERTIFICATION

This dissertationentitled EFFECTS EFFECTS OF CONCEPT MAPPING AND COOPERATIVE TEACHING METHODS ON ACADEMIC PERFORMANCE OF SECONDARY SCHOOL HOME ECONOMICS STUDENTS IN KADUNA STATE, NIGERIA by Taiwo Adeola ADELEKE meets the regulations governing the award of Masters of Education(M.ED) of Ahmadu Bello University, Zaria and is approved for its' contribution to knowledge and literacy presentation.

Date _____

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Prof. A.Z. Mohammed

Chairperson, Supervisory Committee

Date _____

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Dr. M.A. Abubakar

Member, Supervisory committee

Date _____

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Prof. E.E. Adamu

Head, Home Economics department

Date _____

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Prof. S.Z. Abubakar

Dean, School of Postgraduate Studies

DEDICATION

This research work is dedicated to the SSS 2 Foods and Nutrition Students of Government Secondary School, Gyallesu, Government Girls Secondary School, Kongo and Government Secondary School, Tudun Jukun, who were the respondents of this study and whose warm welcome and cooperation made possible the completion of this research work.

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OPERATIONAL DEFINITION OF TERMS

Concept Mapping teaching method: This is a method of teaching that involves the use of diagram or graphical tool that visually represents relationships between concepts and ideas. Most concept maps depict ideas as boxes or circles which are structured hierarchically and connected with lines or arrows.

Cooperative Learningteaching method: This is a method of teaching where students work together in small heterogeneous groups to complete a problem, project or any other instructional goal, while the teacher acts as a guide or facilitator.

Academic Performance: It is the outcome of education, the extent to which a Home Economics student has achieved the set goals.

Graphic organizer: A visual representation of information used to construct meaning. Venn diagrams, storyboards, flow charts and concept maps are examples of graphic organizers**.**

ABSTRACT

This study was conducted to investigate the effects of Concept Mapping and Cooperative Learning Teaching Methods on the Academic Performance of Home Economics Students in Kaduna State, Nigeria. Three objectives were formulated to guide the study, to;determine the effect of Concept Mapping teaching method on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State;ascertain the effect of Cooperative Learning teaching method on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools andcompare the effects of Concept Mapping, Cooperative Learning and lecture teaching methods on the lower level of cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State. In line with the objectives, three research questions and hypotheses were formulated.Quasi experimental design was used for the study. The population comprised of the 11,446 Home Economics students in the 12 Educational Zones in Kaduna state. The sample size for the study was 172 SS2 Students from three secondary schools in Zaria Educational Zone. Purposive sampling technique was used for the Study. Instrument for data collection was a self-designed test: Foods and NutritionAchievement Test Items (FNATI) whose items were selected from West African Examination Council (WAEC)Foods and Nutrition past questions. The reliability of the instrument was established using test retest reliability method. The scores of the pilot tests were analyzed using Chronbach's alpha. A reliability coefficient of 0.80 was realized. The data for the study was collected by the researcher and the exercise lasted for eight weeks. The research questions were answered using mean and standard deviation. All hypotheses were tested at .05 level of significance. The findings of the study revealed

that Concept Mappingand Cooperative Learning teaching methods improved the lower level cognitive domain of learning of Foods and Nutrition students with gain scores of 18.03 and 32.73 respectively. The findings also revealed that comparatively, Cooperative Learning teaching method had the highest gain score (32.73), which implied that it improvedthe lower level cognitive domain of learning of Foods and Nutrition students best. The corresponding hypotheses were tested and hypothesis one was retained with t(114) = -.50, p = .306; $t_{cal} > t_{crit}$. Hypotheses two and three were rejected with p values less than 0.010 ($p < 0.010$), which implied that there was a significant effect of Cooperative Learning teaching method on the lower level cognitive domain of learning of Foods and Nutrition Students. Based on the findings of the study, it was concluded thatConcept Mappingimproved the lower level cognitive domain of learning of Foods and Nutrition students the least. The study concluded that Cooperative Learning teaching method had a positive effect on the lower level cognitive domain of learning of Foods and Nutrition students. Thus, it was recommended that; Cooperative Learning teaching method should be used to teach Foods and Nutrition in secondary schools.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The importance of Education cannot be overemphasized, as it is the foundation of development at all spheres. Education is the bedrock for national development as it is vital to the pace of social, political and economic development of any nation (Mkpa, 2009).Quality education is achieved through effective teaching usually actualized through adopting appropriate methods of teaching.Good education is only established when educational goals are met. One of the determinants of the attainment of these goals isthe academic performance of students and academic performance of students may be enhanced or hindered by the teaching methods adopted by the teacher. Home Economics is a form of Education that is an embodiment of wealth creating vocations which is supposed to be well patronized to the point that poverty level can be reduced.

Teaching and guiding Home Economics learners is the primary function of aHome Economics teacher.The teacher's task entails giving instruction, imparting knowledge, facts, skills, attitudes, interests and aptitude. AHome Economics teacher is expected to be a professional who consciously and deliberately utilizes experience, ideas, skills, competencies, interests, attitudes and mastery of the subject matter to facilitate learning and evaluate students.For learning to take place, the teaching methods adopted by theHome Economics teacher must be effective, otherwise, the purpose of education would be defeated and this could have gross consequences on the developmentof the learner and the nation (Okursoy, 2009).

Home Economics has the potential to play a major role in supporting young people to participate effectively in changing social, cultural and economic development. According toAnyakoha(2007),Home Economics is a field of study that is concerned with improving family life. It does this by finding out the needs of individuals and families, finding ways of meeting these needs, improving the goods and services which families use, preparing people for employment and family life.Home Economics Institute of Australia (HEIA) (2016) posits that the central focus of Home Economics education is the wellbeing of people within the context of their personal, family, community and work roles. Home Economics education is about becoming independent, connecting with others and taking action towards preferred futures that support individual and family wellbeing. Through Home Economics education, students become empowered, active and informed members of the society. The method of teaching adopted in the teaching of Home Economics may have a significant role to play in the attainment of the set goals of Home Economics teachers.

According to literature, method of teaching is the totality of all strategies, techniques and ways that a teacher employs to maximize and facilitate classroom interaction. Method of teaching is a means of conveying facts and decoding messages that eventually result in the realization of stated educational objectives (Mkpa, 2009). Method of teaching is the procedure, orderliness in planning and execution of teaching with an appropriate integration of instructional materials to achieve objectives at the classroom level. There are several methods of teaching that can be employed in the teaching and learning of Home Economics to enhance students' understanding and academic performance.

Academic performance has to do with how well students meet up with educational standards; aims, goals and objectives of education set up for them at a particular time. Academic performance is defined as students' progress, understood as the level of learning and comprehension. (Mamman, 2016). It is how students deal with the academic programmes designed for them and how they cope with or accomplish different tasks given to them by their teachers. Academic performance reflects the outcome of education, the extent to which a student, teacher or institutions have achieved their goal. This is further corroborated by (Nnaobi, 2007)who maintains that performance in teaching and learning process has to do with the attainment of set objectives of instruction. As career competition grows in the working world, the importance of students performing well in school has caught the attention of parents, legislators and government. Academic achievement is commonly measured by examination or continuous assessment; however, there is a general agreement on how it is best tested. In a country like the United States of America (USA), the school achievement is measured by the academic performance index (API).API is a measurement of academic performance and progress of individual schools and itis either in form of number allocation or ranking.In Nigeria, academic performance is measured majorly by the student's performance in external examinations. These examinations include those of West African Examination Council(WAEC), National Examination Council (NECO) and Unified Tertiary Matriculation Examination (UTME)(Chukwudi, 2013). These external examinations are usually compiled by experts and they contain items that are constructed with the use of **Bloom's taxonomy and Table of specification in order to ensure instruments are valid and reliable.**

Bloom's taxonomy is a set of three hierarchical models used to classify educational learning objectives into levels of complexity and specificity. The three lists cover the learning objectives in cognitive, affective and psychomotor domains. The cognitive domain list has been the primary focus of most education and it is frequently used to structure curriculum learning objectives, assessments and activities(Bloom in Ibtihal, Assaly and Smadi 2015). A Table of specification (TOS), sometimes called a test blueprint, is a Table that helps teachers align objectives, instruction, and assessment. Table of specification to (Alade and Omoruyi, 2014) is to ensure that the subject matter content and the course objectives are adequately sampled by the test items. There are many methods that can be adopted by Home Economics teachers in order to enhance the academic performance of the learners. These methods may include Concept Mapping, Cooperative Learning, inquiry, project-based learning, among others.

A concept map refers to graphical tools, which are used in teaching to organize and present knowledge. According to (Howey and Zimpher, 2013)these tools include concepts, which are usually enclosed either in circles or boxes. These circles or boxes demonstrate the relationships between the concepts that are shown by a connecting line that links the concepts. Lucid(2016)posits that a concept map is a diagram or graphical tool that visually represents relationships between concepts and ideas. Most concept maps depict ideas as boxes or circles which are structured hierarchically and connected with lines or arrows.These lines are labelled with linking words and phrases to help explain the connections between concepts.Concept Mapping is a method that allows students to understand the relationships between ideas by creating a visual map of the connections (William and Trochim, 2016). Today, not much has been done particularly in the

teaching of Home Economics with the use of Concept Mappingteaching method.Recently, many researchersSuch as Doğusoy(2012) have reported Concept Mapping as a successful tool for bothteachers and students to teach and learn as it has recorded a plausible influence on the performance of students in accounting and biology (Doğusoy, 2012). They have shown that concept maps have positive effects on academic learning outcomes such as; recall, problem solving, concept learning, repairing previous erroneous conceptualizations and developing critical thinking skills as well as non-academic outcomes such as attitude, perception of self and anxiety (Bıyıklı, 2015; Baş, 2012; Jonassen, 2011 andKapucu, 2008). Okursoy (2009) reveals that concept maps showed a positive effect on academic success after a meta-analysis including 33 studies.

Cooperative Learningteaching method is a method of teaching where students work together in small heterogeneous group to complete a problem, project or any other instructional goal,while the teacher acts as a guide or facilitator. Learners positively depend on each other; through face to face interaction. The learners are assessed individually and held accountable for equally haring and contributing to the mastery of learning goals. The students develop appropriate collaborative and interpersonal skills to teach and encourage each other to learn. They also reflect and assess the effectiveness of growing, for future learning (Kagan, 1994,andJohnson and Johnson, 2008). Cooperative Learningis characterized by the following features: learner-centered, leader-facilitated, learner-active and learning process emphasis.

In summary, Concept Mapping teaching method is considered to beindividualisticin naturewith an emphasis on the process of learning, while Cooperative Learningteaching method is considered to be a group learning method of teaching with

the emphasis on team learning.Concept Mappingand Cooperative Learning have been credited by researchers such Tebabal and Kahssay(2011)to have positive effects on the academic performance of learners in different subjects.The primary purpose of teaching at any level of education is to bring a fundamental change in the learner (Tebabal and Kahssay, 2011), that is to enhance their academic performance. Researches haveshown that the methodologies that teachers employ in the delivery of the lesson may either enhance or hinder effective learning (TebabalandKahssay, 2011). According to a study by Johnson (2008) and Okursoy (2009), on the influence of Concept Mapping and Cooperative Learningteaching methods on the academic performance of students in accounting and biology respectively, it was observed that students who were taught with Concept Mapping and Cooperative Learningteaching methods performed better than those taught with other methods.

The methods of teaching employed by the teachers in the delivery of the curriculum may enhance or hinder the achievement of the set goals. Premised on this, there is the need to investigate the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of secondary school students in Home Economics.

1.2 Statement of the Problem

Foods and Nutrition as a vocational subject is designed to impart certain competencies that are capable of making learners self-reliant and productive members of the society.An objective that can best be achieved only through appropriate teaching methods. The researcher observed that the majority of Foods and Nutrition teachers in Kaduna state use lecture and demonstration methods in the delivery of the subject.In order to buttress this observation, the researcher further interacted with someFoods and Nutrition teachers in secondary schoolsin Kaduna state in order to inquire about the methods they often use in the delivery of Foods and Nutrition lessons. It was confirmed that lecture method is usually used while demonstration method is sparingly used by the teachers. These methods seem not to be yielding good results based on the poor performance of Foods and Nutrition Students in Kaduna State.

Poor performance of secondary school students in Foods and Nutrition subject might be associated with the teaching methods employed by Foods and Nutrition teachers.This calls for the urgent attention of teachers, curriculum planners and the education sector. Uwameiye(2015)confirmed the above statement by remarking that in spite of the laudable objectives of Foods and Nutrition as a subject, students' performance at external examinations like WEAC and NECO has been falling. This is further confirmed with the researcher's visit to the Education Resource Centre (ERC) in Kaduna State where it is documented that the failure rate of Foods and Nutritionstudents in WAEC from 2012-2016 is as follows: 30%, 33%, 30%, 47% and 68% respectively (ERC, 2017). Evident on the foregoing, it is clear that there is a problem with the performance of Foods and Nutritionstudents in our secondary schools in Kaduna State.

Thus raising series of questions,could it be methodology? Could it be inadequate instructional facilities? It is premised on this background that this study investigates the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of Home Economics students in secondary schools in Kaduna State.

1.3Objectives of the Study

The main objective of this study was to assess the effects ofConcept Mapping and Cooperative Learningteaching methodson the academic performance ofHome Economics students in secondary schools in Kaduna state. The specific objectives are to:

1. determinethe effect of Concept Mappingteaching method on the lower level cognitive domain of learning of Foods and Nutritionstudents in secondary schools in Kaduna State;
2. ascertain the effect of Cooperative Learningteaching method on the lower level cognitive domain of learning of Foods and Nutritionstudents in secondary schools and
3. compare theeffectsof Concept Mapping, Cooperative Learning and lecture teaching methods on the lower level of cognitive domain of learningof Foods and Nutritionstudents in secondary schools in Kaduna State.

1.4 Research Questions

Based on the objectives of the study, the following research questions were raised to guide the study;

1. What is the effect of Concept Mapping teaching method on the lower level cognitive domain of learningof Foods and Nutritionstudents in secondary schools in Kaduna State?
2. What is the effect of Cooperative Learningteaching method on the lower level cognitive domain of learningof Foods and Nutritionstudents in secondary schools?
3. What is the difference in the effects of Concept Mapping, Cooperative Learning and lecture teaching methodsonthe lower level cognitive domain of learningofFoods and Nutrition students in secondary schools in Kaduna State?

1.5 Hypotheses of the Study

In line with research questions, the following hypotheses were formulated to guide the study:

1. Concept Mapping teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutritionstudents in secondary schools in Kaduna State;
2. Cooperative Learningteaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutritionstudents in secondary schools;

3. The mean scores of students taught Foods and Nutritionusing Concept Mapping,Cooperative Learning and lecture teaching method do not differ significantly.

1.6 Basic Assumptions of the Study

The study was based on the following assumptions;

1. Concept Mapping teaching method may affect the lower level cognitive domain of learning of Foods and Nutrition students positively.
2. Cooperative Learning teaching method may affect the lower level cognitive domain of learning of Foods and Nutrition students positively.
3. There are various methods of teaching, but some make more impact than the others.

1.7Significance of the Study

This study assessed the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of Home Economics students in secondary schools in Kaduna state. The results of this study if published through journals, workshops, seminars, trainings, or documented in the library among others, are expected tobe beneficial toHome Economics students,Home Economics teachers,researchers,Home Economics curriculum planners, educational policy makers and professional programme developers.

The students stand to benefit greatly from this study because if effective teaching method is used to teach them, their academic performance will improve. Effective

teaching method would arouse the interest and curiosity of the students, improve learning and performance of the students thereby, bringing about academic excellence, competence and positive self-perception in the students.

The findings of this study are of assistance to Home Economics teachers as it will assist them to select and use the most effective methods of teaching in the delivery of Home Economics lessons, thereby exposing the students to meaningful learning and making it possible for the teachers to attain the educational goals that have been set.

The study is of significance toHome Economics curriculum planners as it will enable them to review and design an appropriate Home Economics curriculum that would simplify teaching and learning of Home Economics. It would assist the Home Economics curriculum planners in establishing appropriate ways of handling Home Economics for maximum productivity. The result will also assist them in preparing and giving effective teaching guide to teachers and influence innovation programmes in Home Economics.

This study will provideeducational policy makers with adequate information about teachers' use of teaching methods and how these affect students' performances. It will also gear policy makers towards taking necessary measures in the area of vocational and technical education to include appropriate in-service training programme and encourage Home Economics teachers to attend seminars, workshops and conferences on the use of various teaching methods for Home Economics.This study has providedHome Economics professional programme developers adequate information about the effectiveness of the two teaching methods. Thereby, helping them prescribe methods of teaching alongside the programmes they develop.

Lastly, for researchers, this study will add to the existing literature and provide a baseline on issues related to effectiveness in the usage of methods of teaching Home Economics subjects.

1.8 Delimitation of the Study

This research study was delimited to the effects of Concept Mapping and Cooperative Learningteaching methods on secondary schools students' academic performance in Home Economics. The indices of academic performance are delimited to the lower level cognitive domain of learning that is, knowledge, comprehension and application. The reason for this is that the first three levels of the cognitive domain is the foundation upon which the higher level of cognitive domain is built. They are paramount to the academic performance of students.

This research was further delimited to only government secondary schools in Zaria Educational Zone, Kaduna State. The research was delimited to Senior Secondary School 2 (SSS 2) students because they are expected to have had adequate exposure to a larger part of the Home Economics curriculum at that level as such would be in better position to respond to the questions for the study.

The researchwas also delimited to Foods and Nutrition as a subject because majority of students at this level (SSS2) opt forthe Foods and Nutrition. The research study is further delimited to four topics from the syllabus of SSS 2. These topics were Eggs, Flourmixture, Seafood and Milk and milk products.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents the reviews of related literature on the effects of Concept Mapping and Cooperative Learningteaching methods on secondary school students' academic performance in Home Economics in Kaduna state, Nigeria. The chapter is presented under the following sub-headings:

2.1 Theoretical Framework

2.2 Conceptual Framework

2.3 Concept Mapping Teaching Method

2.4 Cooperative Learning Teaching Method

2.5 Academic Performance

2.6 Teaching Methods and Academic Performance

2.7 The Concept of Home Economics

2.8 Bloom's Taxonomy of Cognitive Domain

2.9 Review of Related Empirical Studies.

3.0 Summary of Reviewed Related Literature.

2.1 Theoretical Framework of the study

For more than 100 years, educational, developmental, and social psychologists have researched and developed theoretical explanations for how students learn, remember, and, as a result, know. A theoretical framework is a collection of interrelated concepts, or a group of related ideas that provide guidance to a research project (Borgatti, 2006). This study was hinged on meaningful learning theory andsocial interdependence theory.

2.1.1 Meaningful LearningTheory byAusubel (1962)

Ausubel was an American psychologist who contributed significantly to the fields of educational psychology, cognitive science and science education. Ausubel postulated a theory which contrasted meaningful learning from rote learning. In Ausubel's view, to learn meaningfully, students must relate new knowledge (concepts and propositions) to what they already know. He also believes that the most important single factor influencing learning is what the learner already knows. This led Ausubel to develop an interesting theory of meaningful learning and advance organizers. He proposed the notion of an advanced organizer as a way to help students link their ideas with new material or concepts. Ausubel's theory of learning claims that new concepts to be learned can be incorporated into more inclusive concepts or ideas. These more inclusive concepts or ideas are advance organizers. Advance organizers can be verbal phrases (the paragraph you are about to read is about Albert Einstein), or a graphic. In any case, the advance organizer is designed to provide, what cognitive psychologists call, the "mental scaffolding: to learn new information.

According to the meaningful learning theory, students accommodate new concepts and ideas with existing ones that is, those ones already in their cognitive structure. That is, construction of knowledge begins with our observation and recognition of events and objects through concepts we already have. We learn by constructing a network of concepts and adding to them.

In accordance with Ausubel's meaningful learning theory, (Novak, 2010)stresses the importance of prior knowledge in being able to learn (or assimilate) new concepts. He further explains that through meaningful learning, the integration of new concepts into our cognitive knowledge structure occurs through linking the new knowledge to concepts already understood.

Despite the seeming promise of this theory, it has been subject to much debate in literature and decidedly controversial. The controversy centres on a number of issues, one of which according to (Anderson, Spiro and Anderson, 1978)is that there is confusion about Ausubel's meaningful learning theory. Barnes and Clawson (1975) argue that the way in which the theory articulates appropriate design of instructional materials notably advanced organizers is unclear. Lastly, Anderson, Spiro and Anderson (1978) posit that confusing the logic of theory construction with the results of research disqualify the theory from being sufficient to explain the theory of human learning.

This study is related to the meaningful learning theory based the position of DiCecco and Gleason(2002)who assert that when graphic organizers such as concept maps are used in the learning process, they help activate prior knowledge more quickly and effectively and help provide a framework to attach new knowledge and Novak (2010) who posits that a concept map provides a visual demonstration of the relationships

between concepts in our cognitive structure which presumably prolong retention period and enhance the learners' ability to retrieve new materials that has been learnt. It is premised on the above that the researcher intends to investigate the effect of Concept Mapping teaching method on the performance of Home Economics students.

2.1.2 Social interdependence Theory by Johnson & Johnson (1989)

The social interdependence theory by (Johnson and Johnson, 1989)is based on the premise that knowledge is social, constructed from cooperative efforts to learn, understand, and solve problems.According to the proponents of the social interdependence theory, Social interdependence exists when individuals share common goals and each person's success is affected by the actions of the others. Social interdependence is one of the most fundamental and ubiquitous aspects of being a human being and it affect all aspects of our lives. For interdependence to exist there must be more than one person or entity involved, and the persons or entities must have impact on each other in that a change in the state of one causes a change in the state of the others.

The social interdependence theory is related to this study in the sense that the social interdependence relationship that is advocated to bring about positive learning outcome is made available by the Cooperative Learning teaching method. Cooperative Learning teaching method was one of the variables investigated in the present study.

THEORETICAL FRAMEWORK

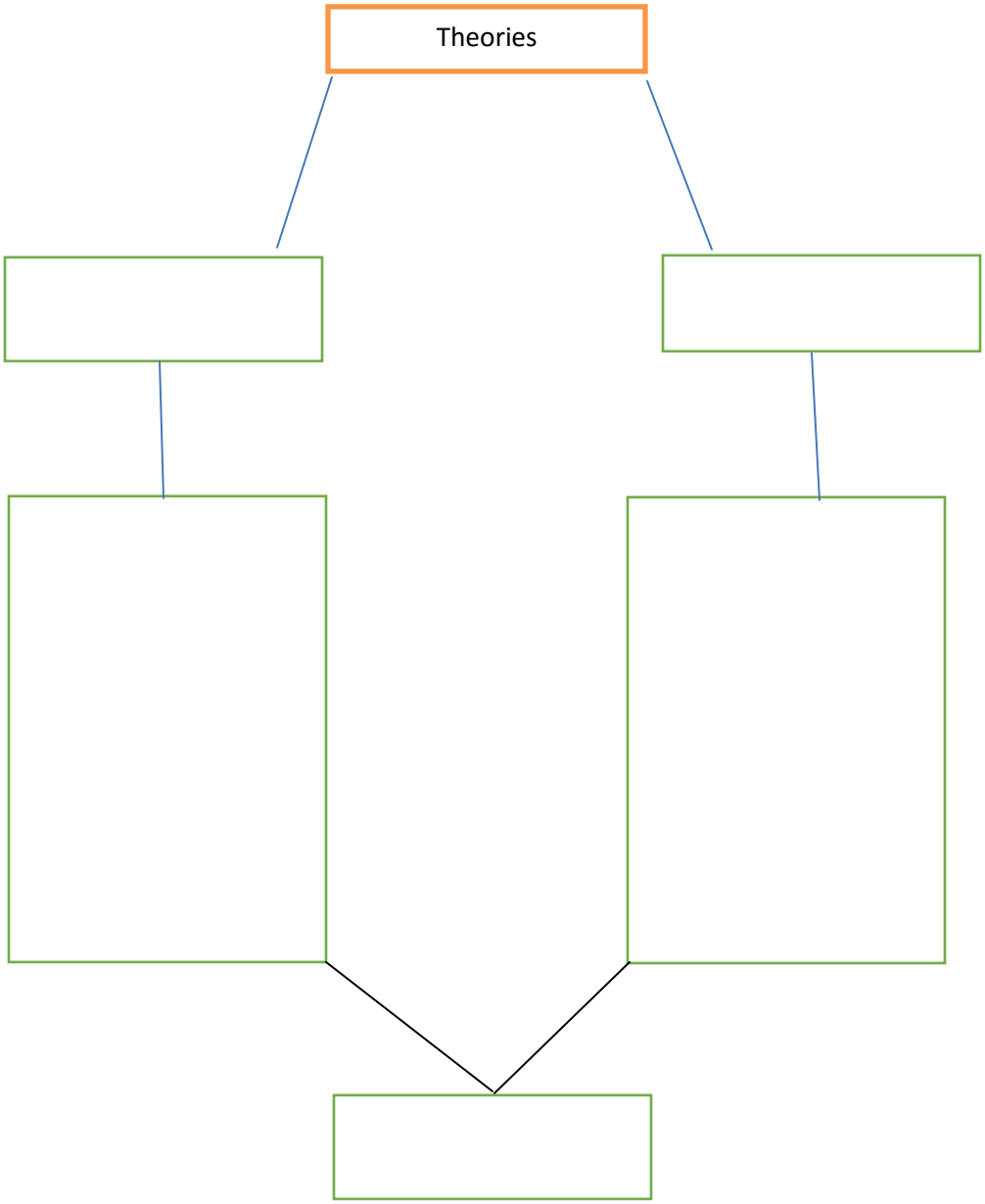


Fig 1

Figure two above shows the theories on which this research work was hinged and how they are relevant to the study.

2.2 Conceptual framework

This is the presentation of the definitions of the different variables of this study. The different variables of the study were explained as theyhave been documented by various authors and scholars.

CONCEPTUAL FRAMEWORK

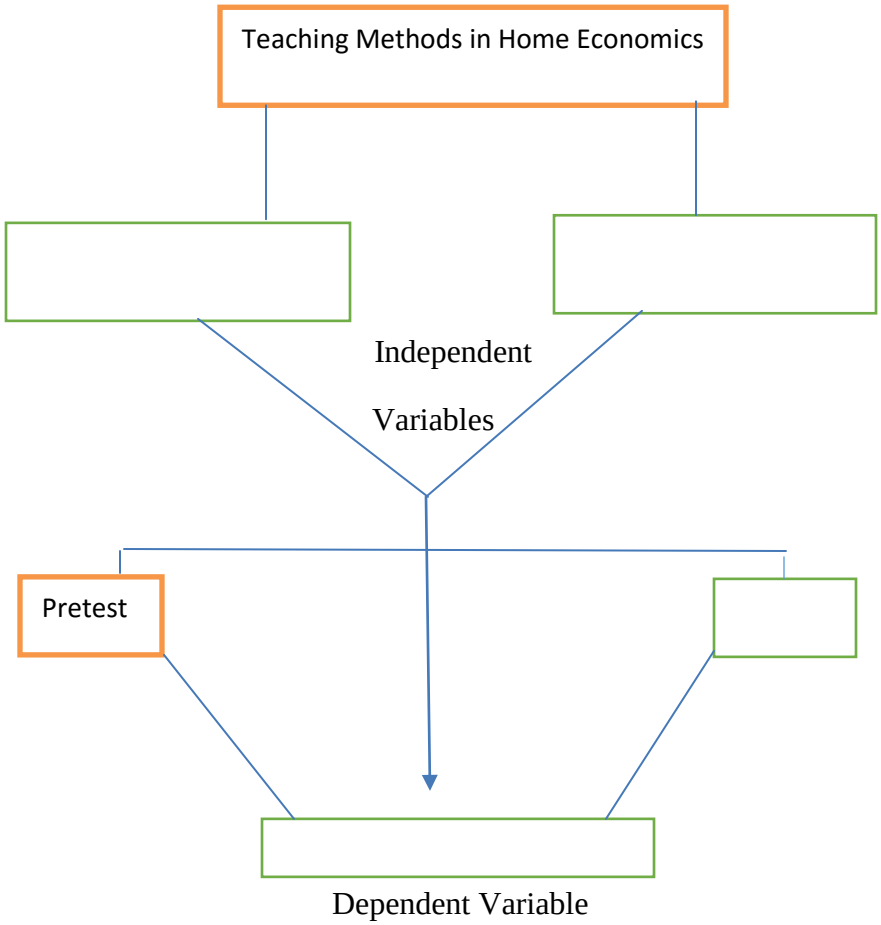


Fig 2

Fig 1 above shows the graphical representation of the dependent variable, independent variables in the study and how they interact.

2.3 Concept of Concept Mapping

Many authors posit that Concept Mapping would be an excellent strategy to enable the students to think about connections between terms being learned, organize their thoughts, visualize relationships between key concepts in a systematic way and reflect on their understanding(Safdar in Novak and Gowin, 2010)The concept has been defined by many authors. According to (Teo and Gay in Trochim, 2006)Concept Mapping is a way of representing knowledge in graph form, where concept maps are the representation of knowledge based on concepts and the links between two or more concepts. In line with Teo and Gay inTrochim (2006)(Birbili, 2015)states that a concept map or conceptual diagram is a diagram that depicts suggested relationships between concepts. It is a graphical tool that instructional designers, engineers, technical writers, and others use to organize and structure knowledge (Novak and Canas, 2006) Novak (2010) adds that Concept Mapping is a technique that allows students to understand the relationships between ideas by creating a visual map of the connections. A concept map is a schematic device for representing the relationships among a set of concepts. A concept is a perceived regularity in events or objects, or records of events or objects, designated by a label (Novak in Brinkerhof and Booth, 2013)

According to Birbili(2015)a concept map is a type of graphic organizer used to help students organize and represent knowledge of a subject. A concept map is a diagram or graphical tool that visually represents relationships between concepts and ideas. Most concept maps depict ideas as boxes or circles (also called nodes), which are structured hierarchically and connected with lines or arrows (also called arcs) (Lucid, 2016). Concept maps mainly consist of nodes (concepts), linkage lines (unidirectional arrow)

and linkage phrases (describing the relationship between two nodes) (Mistades, 2009). These lines are labelled with linking words and phrases to help explain the connections between concepts. Concept maps allow the student to (1) see the connections between ideas they already have, (2) connect new ideas to knowledge that they already have, and (3) organize ideas in a logical but not rigid structure that allows future information or viewpoints to be included. The concept map is an effective teaching tool that is fun, interactive, and effective (Lucid, 2016).

Premised on the different definitions given by various authors, the researcher has come up with a working definition of Concept Mapping as a technique for teaching and learning which visually illustrates the relationships between concepts and ideas. Often represented in circles or boxes, concepts are linked by words and phrases that explain the connection between the ideas, helping students organize and structure their thoughts to further understand information and discover new relationships. Most concept maps represent a hierarchical structure, with the overall, broad concept first with connected sub-topics, more specific concepts, following.

2.3.1 Features of Concept Mapping

Concept maps have specific characteristics differentiating them from other visual tools and they are as follows;

a. **Concepts**: Concepts are defined as "perceived regularities or patterns in events or objects, or records of events or objects, designated by a label" and are depicted as shapes in the diagram. Linking words/phrases: Linking words or phrases are located on the lines connecting objects in a concept map, and these words describe the relationship between two concepts. They are as concise as possible

and typically contain a verb. Examples include "causes," "includes" and "requires."

b. Propositional structure

Propositions are meaningful statements made up of two or more concepts connected with linking words. These statements are also known as semantic units or units of meaning. Concepts and propositions are the foundation for the creation of new knowledge in a domain. Essentially, a concept map visually conveys a set of propositions about a certain topic.

c. Hierarchical structure

A key element of the concept map is its hierarchical structure. The most general and inclusive concepts are positioned at the top of a concept map with the more specific and exclusive concepts arranged hierarchically below. As such, a concept map is designed to read from top to bottom.

d. Focus question

A focus question defines the issue or problem the concept map needs to solve. Developing a focus question allows you to design with a context in mind and thus helps guide and maintain the direction of your concept map. Within the hierarchical structure, the focus question should be at the very top of the concept map and serve as a reference point.

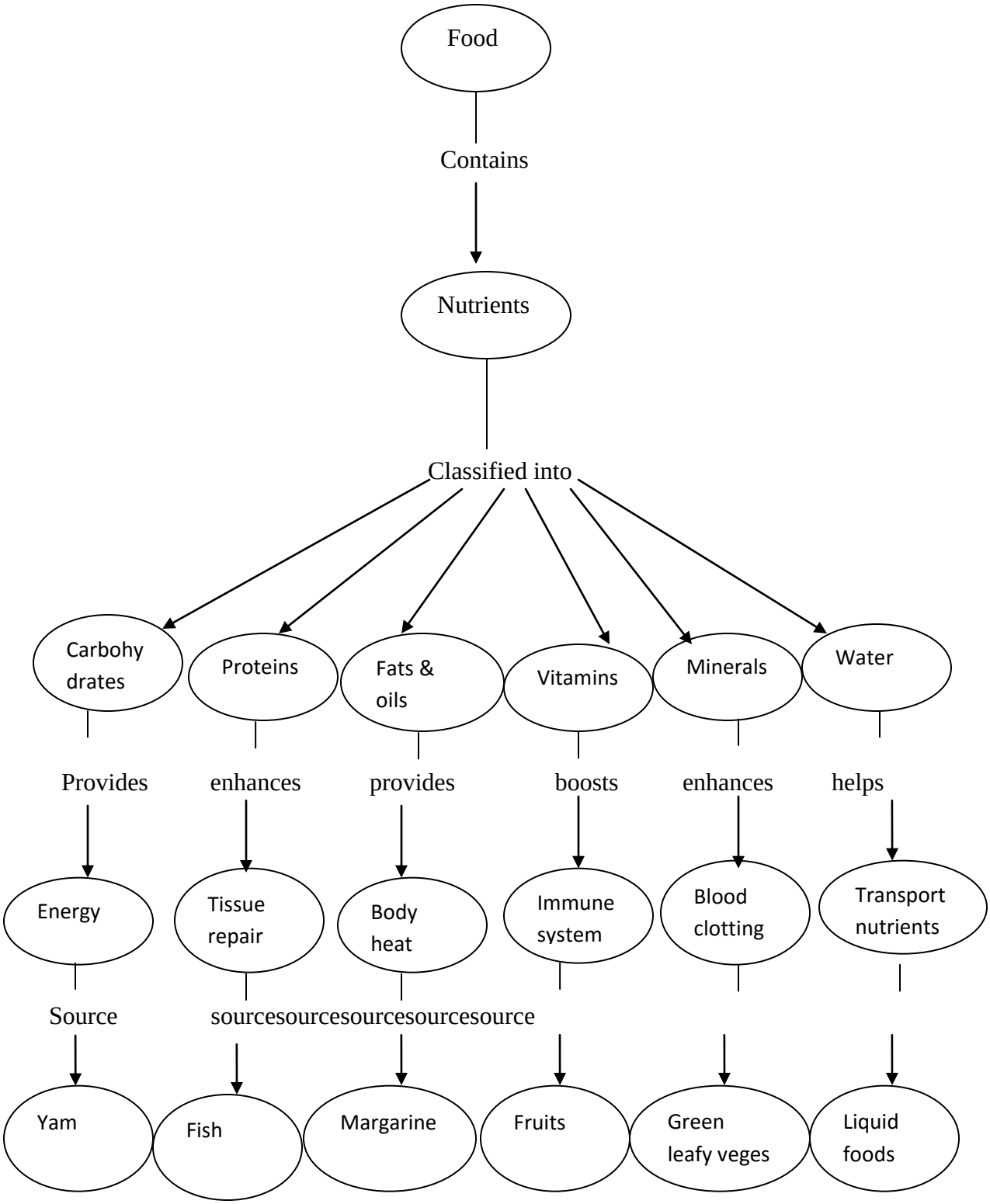
e. Parking lot

Before beginning your concept map, it can be helpful to come up with a list identifying the key concepts that need to be included. Establish a rank ordered list from the most general concept to the most specific. This list is referred to as a parking lot, as you will move the items into the map as you figure out where they fit in.

f. Cross-links

Cross-links are relationships between concepts in different domains of the concept map, allowing you to visualize how ideas within these different domains are connected. Both the cross-links and the hierarchical structure facilitate creative thinking and these cross-links often indicate moments of creativity.

Graphical representation of a Concept Mapping



2.4 Concept of Cooperative Learning

The prospect of Cooperative Learning as a teaching method is obvious to many researchers and the method of teaching is attracting worldwide attention of scholars. Its academic and social advantages are globally recognized (Ding, Xiaobao and Kulm in Faryadi, 2007). George in (Faryadi, 2007)defines Cooperative Learning as the process of acquiring knowledge in a socially packed environment by small groups of students. According to Hall in Faryadi 2007 Cooperative Learning environment refers to a situation which learners with one common cause in their mind strive to achieve one common learning goal. Cooperative Learning is a social teaching strategy in which small groups, each with students of varying levels of ability, use a variety of learning activities to improve their understanding of a topic or subject (Manis, 2012). Manis (2012) further explains that each member of a group or "team" is responsible for learning what is taught, and in turn, each student helps his/her fellow teammates to learn. Students work through a given assignment until all group members successfully comprehend and achieve closure.

According to Johnson and Johnson in Adam(2015)Cooperative Learning is the pedagogical use of small groups of two or more students who work together to maximize their own and each other's learning. (Abdullah and Hassan, 2015) view Cooperative Learning as the instructional approach in which students work together in small groups to maximize their own and each other's learning. They assist and encourage the effort of each other to make sure that all the group members master the lesson in order to achieve their group objective. Panitz in Li and Lam (2013) offers a similar definition; he goes on to add that the teacher maintains control of the learning environment, designs learning

activities, structures work teams, and in his view, does not empower students. Cooperative Learning is a student-centered, instructor-facilitated teaching method. In this method of teaching, a small group of students is responsible for its own learning and the learning of all group members (Kegan in Li and Lam, 2013).

Students interact with each other in the same group to acquire and practice the elements of a subject matter in order to solve a problem, complete a task or achieve a goal. Kagan in Li & Lam, (2013) contributes that in Cooperative Learning the teacher designs the social interaction structures as well as learning activities. Johnson, Johnson and Holubec in Li & Lam (2013) states that in Cooperative Learning students can maximize their own and each other's learning when they work together. He further explains that because of the cooperative nature of this method, students strive for mutual benefit so that all group members gain from each other's efforts. The mindset here is that YOUR success benefits me and MY success benefits you. Each team member realizes that they share a common fate. Collectively it becomes a matter of everyone sinking or swimming. Because no one wants to sink, Cooperative Learning activities are highly motivating (Kagan in Li & Lam, 2013).

A critical element of Cooperative Learning is group team work and team goals that is,within cooperative activities, individuals seek outcomes that are beneficial to themselves and beneficial to all other group members (Slavin in Li & Lam, 2013) In Cooperative Learning situations, there is a positive interdependence among students' goal attainments; students perceive that they can reach their learning goals if and only if the other students in the learning group also reach their goals (Johnson and Johnson in Inuwa, Abdullah and Hassan, 2015). Cooperative Learning is working together to achieve

a joint goal. In Cooperative Learning strategy both high-ability and low-ability students work together to solve a problem because it is heterogeneous in nature.

2.4.1 Elements of Cooperative Learning: There are five basic elements of Cooperative Learning

i. **Positive interdependence**: This occurs when group members believe that they sink and swim together, that is their gains are positively associated (Johnson and Johnson in Inuwa, *et al*, 2015). Students perceive that they need each other in order to complete the group's task ("sink or swim together"). Teachers may structure positive interdependence by establishing mutual goals (learn and make sure all other group members learn), joint rewards (if all group members achieve above the criteria, each will receive bonus points), shared resources (one paper for each group or each member receives part of the required information), and assigned roles (summarizer, encourager of participation, elaborator) (Johnson and Johnson in Inuwa, *et al*, 2015)

ii. **Face-to-face interaction**: Occurs when the class is designed to allow students interactions during the learning period. Students promote each other's learning by helping, sharing, and encouraging efforts to learn. Students explain, discuss, and teach what they know to classmates. Teachers structure the groups so that students sit knee-to-knee and talk through each aspect of the assignment (Johnson, Johnson and Holubec in Li & Lam, 2013).

iii. **Individual accountability**: This occurs when each member in the group is responsible for contributing a share of work towards the group success. Each student's performance is frequently assessed and the results are given to the group and the individual. Teachers may structure individual accountability by giving an individual test

to each student or randomly selecting one group member to give the answer (Johnson, Johnson and Holubec in Li & Lam, 2013).

iv. **Interpersonal and small group skills**: It occurs when there is trust-building, leadership, decision-making, communication, and conflict management skills among the group members. Groups cannot function effectively if students do not have and use the needed social skills. Teachers teach these skills as purposefully and precisely as academic skills. Collaborative skills include leadership, decision-making, trust-building, communication, and conflict-management skills (Kegan in Li & Lam, 2013).

v. **Group processing**: It occurs when the group members are discussing how well they are achieving their goals and maintaining effective working relationships. Groups need specific time to discuss how well they are achieving their goals and maintaining effective working relationships among members. Teachers structure group processing by assigning such tasks as (a) list at least three member actions that helped the group be successful and (b) list one action that could be added to make the group even more successful tomorrow. Teachers also monitor the groups and give feedback on how well the groups are working together to the groups and the class as a whole (Johnson, Johnson and Holubec in Li & Lam, 2013).

2.4.2 Types of Cooperative Learning

There are majorly three types of Cooperative Learning that may be used and they are as follows: formal Cooperative Learning, informal Cooperative Learning and cooperative base groups, (Johnson and Johnson in Adam 2015).

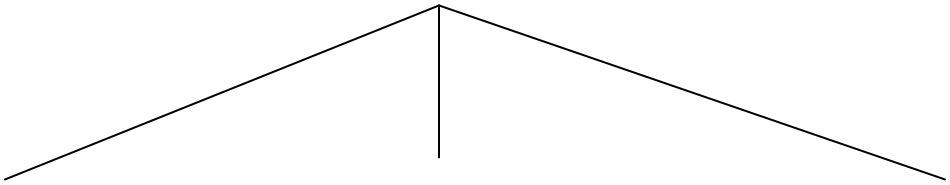
a. **Formal Cooperative Learning:** Formal Cooperative Learning consists of students working together, for one class period to several weeks, to achieve shared learning goals and complete jointly specific tasks and assignments (Johnson, Johnson in (Holubec, 2009). According to Johnson and Johnson in Adam (2015) it is a type of Cooperative Learning which proposes that teachers should tell the students the objectives for the lesson, make several preinstructional planning decisions, clearly explain the task to the students, monitor student learning, intervene to provide assistance, and, finally, evaluate students' learning and help the students evaluate their own learning. Formal learning groups are assigned a task or project and stay together until it is complete. There is a clear structure to these groups set by the teacher that includes task and behavior expectations. Formal learning groups can be heterogeneous or homogeneous, depending on the assignment. Most groups perform well with three to four people, any more than five can become unproductive. Doing a project, solving a series of problems, reviewing for a test, or writing a report are all examples of how formal learning groups can be used in a classroom (Johnson and Johnson in Adam 2015).

b. **Informal Cooperative Learning**: in this type of Cooperative Learning, teachers assign students to work together to achieve a joint learning goal. The learning groups are temporary and meet for small periods of time Johnson and Johnson in Adam (2015). In line with the previous definition, Johnson, Johnson, and Holubec, (2009) suggest that Informal Cooperative Learning consists of having students work together to achieve a joint learning goal in temporary, ad-hoc groups that last from a few minutes to one class period. These groups are short

term and not very structured. They typically involve activities where classmates turn to a neighbor to discuss a problem or concept for a few minutes. Informal groups are generally small, usually consist of two but no more than three people. It's most convenient to use informal learning groups for quick activities such as checking for understanding, brainstorming, quick problem solving, summarizing, or review. These groups are a great way to change up a lecture format by giving students a few minutes to discuss a concept with a peer (Johnson and Johnson in Adam, 2015).

c. **Cooperative base group**: This is heterogeneous in nature, consists of stable membership over a long time period and group members of mixed ability Johnson and Johnson in Adam (2015). Base groups are established to support peer group members throughout the academic year with the goals of making academic progress along with positive cognitive and social development. Cooperative base groups typically are seen in formal Cooperative Learning settings. Kegan in Li & Lam (2013) reports that these groups are different from the previous two in that they are long term support groups. Base groups should last for a minimum of a semester but can be anywhere up to several years. Since they are long term commitments, typically these groups become more than just academic problem solving groups. Members in base groups often become a personal support system for each other, building relationships and trust during the duration of their Cooperative Learning process. The goal of cooperative base groups is that the members develop peer accountability and support each other while learning together (Kegan in Li & Lam, 2013).

Types of Cooperative Learning method of teaching



Informal Learning Groups	Formal cooperative Groups	Cooperative base Groups
Short-term, less Structured, turn to your Neighbor or homogeneous	-stay together until the task is done, structure -facilitates, heterogeneous	long term, features peer support homogeneous
-in any class size -focus attention prior to lecture together -home work - se to break up lecture -"reset," check for understanding, -review what was said, -summarize the main points	-review home work -perform lab experiment -work through a problem -write a report -do a project	-academic support -study for test -personal support -sympathetic -listening

uses

Fig 1 (Johnson and Johnson in Adam, 2015).

A Cooperative Learning classroom setting

Source: Holubec (2009)

2.5 Concept of Academic Performance

In principle, learning process at whatever level should focus on satisfying the immediate and long term needs of the learner, serving as the basis for academic performance. Academic performance refers to what students achieve in their studies and how they cope with or accomplish different learning experience given to them by their teachers. Academic performance is defined as students' progress, understood as the level of learning, comprehension and consolidation of the school curriculum (Gouch 2009 and

Mamman, 2011). According to Ifedili, (2012) academic performance is referred to as the numeric scores of a student's knowledge, representing the degree of a student's adaption to school work and the educational system. Academic performance represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university.

However, academic performance refers to what students achieve in their studies and how they cope with or accomplish different learning experiences given to them by their teachers (Moradeyo, 2015). Academic achievements can be grouped into standardized achievement test or teacher made achievement test. The successes of educational institutions are measured by academic performance or how well a student meets the standards aims, goals and objectives of education set up for them at a particular time by the institution. It is how students deal with the academic programmes designed for them and how they cope with or accomplish different tasks given to them by their teachers. Academic achievement is used to measure a student's cognitive, affective and psychomotor domain. Students' academic achievement can be explained inform of grades obtained from tests or examination on courses taken. Academic Achievement could be positive or negative performance, it could be used for placement of a student to a class, and it is used for formative or summative purpose as in external examination like senior secondary certificate or West African school certificate examinations. It could also be used for diagnostic assessment. If the learning ability is positive, it means pass, while it is failure when the learning ability is negative (Aremu in Okoro, 2013). Academic

performance reflects the outcome of education, the extent to which a student, teacher or institution has achieved their goal.

Performance of students has for long generated a lot of interest among educators, researchers, government officials, parents, and the students themselves. Many studies have examined the factors that influence students' performance in primary, secondary and tertiary education with the purpose of enhancing learning at these stages and reducing the level of drop-out.The findings of many studies reveal that the interaction between the teacher and learners in the classroom is a key player in the recall and retention level of the learners which will in turn enhance or hinder their academic performance (Moradeyo, 2015).

In Nigeria, academic performance is measured majorly by the students' performance in external examinations. The pattern of grading candidates' scores in examination is such that distinction grades are represented by A1 to B3, credits are represented by C4 to C6 while ordinary pass grades are represented by D7 to F9 (Aremu in Okoro, 2013). The indices of academic performance in Nigeria include: West African Examination Council (WEAC) Examination, National Examination Council (NECO) examination and Unified Tertiary Matriculation Examination (UTME) (Chukwudi, 2013). These examinations are standardized in the sense that they are compiled by experts. **Seasoned experts in various subjects are given the teaching and examination syllabuses and requested to set questions. These are compiled for subsequent scrutiny. Then a second set of experts are invited to examine the questions critically, make necessary modifications and come up with questions that conform to accepTable standards. According to** Chukwudi (2013) the scrutiny involves the cross

checking of the examination content by experts against the prescription of bloom's taxonomy in order to ensure that the items are valid. There are a lot of methods that can be adopted by Home Economics teachers in order to enhance the academic performance of the learners. These methods may include Concept Mapping, Cooperative Learning, inquiry, project-based learning, among others.

2.6 Teaching Methods and Academic Performance

Teachers strive to be more effective in their chosen profession so that students can learn better and many teachers explore several methods in order to attain their set goals. Several authors such as Mkpa (2009) and Kegan in Li and Lam (2013) posit that the method of teaching adopted by the teacher is a key factor that affects the academic performance of students. A teaching method as defined by (Westwood, 2008)comprises the principles and methods used by the teacher to enable student learning. There are many methods of teaching that can be adopted in the delivery of lesson by the teacher; a few of them are lecture method, Concept Mapping method and Cooperative Learning method.

The diversity of students in schools is growing every year, this can be owed to the ease in transportation system, increased migration and the dynamics of the world economy. Students can be from many cultures, ethnic groups, language groups and religious as well as from different economic and social classes and ability levels (Johnson and Johnson in Mamman, 2016). This pluralism and diversity create opportunities that could be accrued with positive or negative outcomes. Johnson and Johnson's position is pointed out in Mamman (2016) that diversity among students can bring about increased achievement and productivity, creative problem solving, growth in cognitive and moral

reasoning, improved relationship and sophistication in interacting and working with peers from a variety of cultural and ethnic background. They further explain that the negative outcome of diversity among students could result in lower achievement, close-minded rejection of new information and negative relationships (Johnson and Johnson in Mamman, 2016). The Cooperative Learning is supported by one of the strongest research traditions in education, with thousands of studies conducted across a wide range of subject areas, age groups, ability levels and cultural backgrounds. The result, in general, suggest that Cooperative Learning develops high-order thinking skills and improve interpersonal relations as well as enhancing motivation and peer relations (Slavin in Li and Lam, 2013).One of the peculiar advantages of Cooperative Learning is that Cooperative Learning exploits the diversified abilities of students to increase their cognitive, psychological and social performance, and as such, it is an effective way to address the problem of individual differences.

Comprehensive meta-analyses have demonstrated that Cooperative Learning structures are related to higher academic achievement than individualistic structures (Mamman, 2016). However, the majority of studies about Cooperative Learning teaching methods were conducted in primary and secondary schools. In recent years, the scholarly interest in Cooperative Learning has increased in higher education research,although, the findings have been contradictory (Jones in Mamman, 2016). In validation of social interdependence theory, a number of studies report Cooperative Learning teaching method to elicit more conscientious effort and stronger commitment to preparation. Nevertheless, the same studies also reflect a number of problems related to cooperation such as freeriding, resentment towards being independent, among others (Finlay and

Filkner, 2005; Hassanien 2007,Kelly and Fatherston, 2008).Mamman (2016) asserts that once diverse students are brought together in the same school and classroom, whether the diversity results in negative or positive outcomes depend largely on whether learning situations are structured competitively, individualistically or cooperatively. Each type of interdependence teaches a set of values and creates patterns of interaction that results in diversity being valued or rejected.

Concept maps are based on Ausubel's Assimilation Theory and Novak's Theory of Learning, which discuss how people learn new information by incorporating new knowledge with knowledge they already possess. Novak stated that "Meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures." Through meaningful learning, the integration of new concepts into our cognitive knowledge structure occurs through linking the new knowledge to concepts already understood. A concept map provides a visual demonstration of these relationships between concepts in our cognitive structure. The origin of concept maps stems is based in constructivism, which discusses how learners actively construct knowledge.

Novak's work stressed the importance of prior knowledge in being able to learn (or assimilate) new concepts: "The most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly. The fundamental idea in Ausubel's cognitive psychology is that learning takes place by the assimilation of new concepts and propositions into existing concept and propositional frameworks held by the learner. This knowledge structure as held by a learner is also referred to as the individual's cognitive structure. Out of the necessity to find a better way to represent

children's conceptual understanding emerged the idea of representing children's knowledge in the form of a concept map. Thus was born a new tool not only for use in research, but also for many other uses. A concept map-centered learning environment implies that concept maps are used throughout the development of a learning unit or module. Concept maps within this environment are likely to be used as the mechanism to determine the level of understanding students have about the topic being studied before the topic is introduced. The maps are then developed, extended and refined as the students develop other activities on the topic and increase their understanding.

The advantages of Concept Mapping can be significant. Students and teachers often remark that they recognize new relationships and hence new meanings or at least meanings they did not consciously hold before mapping. In this sense, Concept Mapping can be a creative activity, and may help foster creativity (Novak and Gowin in Brinkerhof and Booth, 2013). Concept Mapping has been shown to improve test results, student attitudes, and overall enjoyment of the subject matter (Kinchin and Hay, 2000). When Concept Mapping is incorporated as a tool for deeper learning, it has the potential to move students away from surface learning into a deeper mode of learning for understanding. Nonetheless, researches have shown that several problems are associated with the implementation of Concept Mapping in a classroom setting. Historically, assessment using concept maps has been difficult. Concept maps are difficult for many teachers to score because they are unfamiliar with them (Kinchin in Brinkerhof and Booth, 2013). Some researchers began using the maps as an assessment tool, but ended up discontinuing their use for assessment because of these difficulties (Kinchin in Brinkerhof and Booth, 2013). Concept maps often lack reliability and validity. A call for

research in these areas has been made, with minor attempts to answer (Mintzes and Wallace, in Brinkerhof and Booth, 2013).

2.7 The Concept of Home Economics

Home Economics is one of the compulsory pre-vocational subjects taught at junior secondary education level in Nigerian education system. Home Economics also known as family and consumer sciences and in some cases human Ecology is the profession and field of study that deals with the economics and management of the home and the community (Olaitan and Agusiobi in Okoro, 2013). It is a field of formal study including such areas like consumer Education, Institutional Management, Interior Design, Home Furnishing, Cleaning, Handicraft, Sewing, clothing and Textile, Commercial cooking, Nutrition, Food preservation, Hygiene, child Development, managing money and family relationship, Cloth Merchandising, among others. These teach students how to properly function in a family environment and make the world a better place for generations to come.

Home Economics embraces the study and application of liberal arts, natural and social sciences, and their application to everyday life. International Federation for Home Economics (IFHE) (2008) posits that Home Economics is a field of study that draws knowledge from a range of disciplines to achieve optimal and sustainable living for individuals, families and communities. In line with this, Olaitan and Agusiobi, in Okoro, (2013) further explain that Home Economics applies the findings of the physical biological and social sciences to the solving of problems arising in the operation of a home and in the care and welfare of the family. According to Uko-Aviomoh(2015),Home Economics is a skill-oriented field of study that is expected to equip learners with

survival skills that make for self-reliance, employment and paid employment. To facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes. Research has shown that regular poor academic performance by the majority students is fundamentally linked to application of ineffective teaching methods by teachers to impact knowledge to learners (Adunola, 2011). Premised on the above views, it is imperative for Home Economics to achieve her goals at all educational levels. The goals of Home Economics may only be achieved in the classroom during the teacher-student interaction. The choice of method of teaching has a role to play in the accomplishment of the set goals of Home Economics education.

According to the findings of several research studies which investigated the effects of certain teaching methods on the performance of Home Economics students, it was revealed that learner-centered methods of instruction yield better results than the teacher-centered methods (Adunola, 2011). Moradeyo (2015) further explained that this could be as a result of the vocational, skill oriented and manipulative nature of Home Economics as a subject. In line with that, Olaitan and Agusiobi, in Okoro, (2013) assert that active participation of students in their own learning yield better results in a subject like Home Economics .

2.7 Bloom's Taxonomy of Cognitive Learning

Bloom's taxonomy is a set of three hierarchical models used to classify educational learning objectives into levels of complexity and specificity. The three lists cover the learning objectives in cognitive, affective and sensory domains. The cognitive domain list has been the primary focus of most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities (Bloom in Ibtihal, Assaly and Smadi, 2015).

1. **Cognitive Domain:** The cognitive domain is broken into six basic objectives which are knowledge, comprehension, application, synthesis, analysis and evaluation(Hoy and Woolfolk, 2007)
    a. **Knowledge**: This involves recognizing or remembering facts, terms, basic concepts, or answers without necessarily understanding what they mean. Its characteristics may include: Knowledge of specific terminology, specific facts. According to Bloom(2010)the objective of this domain is to show that the student knows. It is usually tested using verbs such as: list, tell, recognize, name, recite, and produce.
    b. **Comprehension:** Involves demonstrating understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating the main ideas. The objective here is to show that the student can use what has been learnt by him/her. The comprehension domain is tested using verbs such as: explain, illustrate, describe, summarize, interpret, expand, convert, measure, among others. (Bloom in Ibtihal, Assaly and Smadi, 2015).

c. **Application:** Here, the test items are to test if the student can apply the knowledge he has. It involves using acquired knowledge, solving problems in new situations by applying acquired knowledge, facts, techniques and rules. This is tested by using verbs such as: demonstrate, apply, use, construct, perform, and choose appropriate procedure, among others. (Bloom in Ibtihal, Assaly and Smadi, 2015).

2.8 Review of Related Empirical Studies

Studies abound on the effect of Concept Mapping and Cooperative Learning teaching methods on the academic achievement of learners. The researcher reviewed related research studies in order to compare the similarities and differences between the previous works and the present study.

Adlaon(2012)conducted a research study on assessment of the effectiveness of concept map as an instructional tool in high school biology. The major objective of the study was to determine the effectiveness of using concept maps in improving the science achievement of SSS2 students. Three objectives, research questions and hypotheses each were formulated to guide the study. The design of the Adlaon (2012) study was quasi experimental research design. The area of the study was Taraba state and the population comprised of 2400 secondary school students in SSS2. The sampling technique used in the Adlaon (2012) study to allocate subjects to control and experimental group was simple random sampling (Table of random numbers). A self-constructed biology achievement test (BAT) was the instrument for data collection and the experiment lasted for six weeks. The data collected were analyzed using simple mean and standard

deviation to answer the research questions and t-test statistical analysis to test the hypotheses. The findings of the Adlaon (2012) study revealed that the students taught biology using concept map teaching method did not perform much better than the same level students in the traditional group. This could be as result of homogeneity of instruction which is an extraneous variable that may affect the findings of the study if not controlled. The researcher took care of that by teaching the two experimental groups herself using well designed lesson plans that suitConcept Mapping and Cooperative methods each.

There are certain differences in the Adlaon (2012) study and the present study. These are: the Adlaon (2012) study compared the effects of Concept Mapping and lecture methods while the present study compared the effects of Concept Mapping and Cooperative Learning; the area of study of the Adlaon (2012) study was Taraba state, while the area of the present study was Zaria in Kaduna state; the procedure for sampling in the Adlaon (2012) study was simple random sampling technique while the current study adopted purposive sampling technique.

However, the Adlaon (2012) study shares some similarities with the present study and they are: the design of the study in Adlaon (2012) study was quasi experimental, same as the design of the present study; the subjects of the Adlaon (2012) study were SSS2 students and the subjects of the current study were SSS2 students as well. Lastly, the statistical instrument for data analysis in the Adlaon (2012) study was simple mean and standard deviation and t-test statistical analysis.

The Adlaon (2012) study did not take care of the homogeneity of the instructional situation across groups. The treatment was administered to the experimental group by the teachers who were used to the conventional lecture method of teaching. The teachers were not exposed to any kind of training on how to construct and deliver lessons using Concept Mapping method. The implication of this is that the teacher could have delivered the lessons to the experimental group haphazardly, which in return was likely not to yield the deserved results. The present study took care of homogeneity of the instructional situation across groups by administering the treatment to the three groups herself using a well-designed lesson plans that suitConcept Mapping and cooperative methods each. However, the findings of the Adlaon (2012) were used in discussing the findings of the present study.

Van (2014)investigated the effect of Cooperative Learning on the achievement and knowledge retention of students in Psychology. Two objectives (to determine the effect of Cooperative Learning on the achievement of grade five students and to assess the effect of Cooperative Learning on the knowledge retention of grade five students) research questions and hypotheses were raised to guide the study. Quasi experimental design was used for the study. The area of the study was rivers state. The population of the study was 110 fifth grade primary education students and the whole population was used for the study. A self-designed Psychology Achievement test (PAT) was used for data collection and t-test was used to analyze the data. After eight weeks of instruction, result showed that those who were instructed using cooperative method achieved significantly higher scores in the achievement and knowledge retention than those who were instructed with lecture based teaching.

The differences between Van (2014) study and the present study are; the subjects of the Van (2014) study were fifth grade primary school students while the subjects of the current study were SSS2 students; the area of the Van (2014) study was rivers state while the area of the present study was Kaduna state.

The similarities between the current study and the Van (2014) study are; the design. Quasi experimental design used in the Van (2014) study was also used in the present study; also, t-test was the instrument for data analysis in the Van (2014) and t test was also used for the analysis of data in the current study.

The Van (2014) study controlled the Hawthorn effect (effect of pretest on posttest) by administering the treatment for eight weekswhich may be long enough for the pretest not to affect the posttest. However, the Van (2014) study did control of extraneous variable such as Subject interaction which may affect the performances of the subjects. Subject interaction occurs when the sample is drawn from the same school and class and this gives room for lickage of treatment from one group to the other. The present study took care of that by using nonequivalent quasi experimental design that is, ensuring that the three groups were drawn from different schools using intact classes. This is to avoid any possible interaction that may arise (inter class discussion) among the groups. However, the findings of the Van (2014) study were relevant in discussing the findings of the present study.

In a related study, Inuwa, Abdullah and Hassan (2015) carried out an investigation on the effectiveness of Cooperative Learning teaching method on students' academic achievement in financial accounting. Two objectives (to determine the effect of Cooperative Learning on the academic achievement of financial accounting students and

to determine effect of Cooperative Learning on the academic achievement of male and female students), research questions and hypotheses guided the study. True experimental design was used for the study and the area of the study was Gombe state. The population comprised of all senior secondary school level two (SSII) financial accounting students and three secondary schools were purposively selected from the three educational districts in Gombe state. The experiment lasted for two weeks and the instrument used for data collection was self-designed Financial Accounting Achievement test (FAAT). The data collected for the study was analyzed using simple mean and t-test. The findings of the study revealed that Cooperative Learning teaching method had a positive influence on students' academic achievement in financial accounting.

There abound a number of differences between the Inuwa, *et al* (2015) study, firstly, the subject of focus of the Inuwa, *et al* (2015) study was financial accounting while the current study is on Home Economics ; The area of the Inuwa, *et al* (2015) study was Gombe state while the area of the present study was Zaria, in Kaduna state. Furthermore, the design used for the Inuwa, *et al* (2015) study was true experimental design while the present study adopted a Home Economics design.

The similarities that the present study shares with the Inuwa, *et al* (2015) study are that the subjects of both studies were SS2 students. The sampling technique used in the Inuwa, *et al* (2015) study was purposive and that was also used in the present study.

The Inuwa, *et al* (2015) study did not take care of Hawthorn effect that is, the effect of pretest on posttest because the experiment lasted for two weeks. This is an extraneous variable which may affect the findings of the study as the period between the pretest and posttest may not be long enough. Meanwhile, the present study lasted for

eight weeksand according to documented literature, eight weekis long enough as not to permit the pretest to affect the posttest scores or to interfere with the experimental treatment. Also the items were reshuffled before administering the posttest to the subjects. However, the findings of the Inuwa, *et al* (2015) study were useful in discussing the findings of the current study.

Alshammari (2015)conducted a research study on Effect of Cooperative Learning on Academic Performance of College Students in geography. One objective (to determine the effect of Cooperative Learning on the academic performance of college students in geography), research question and hypothesis guided the study. The design of the study was quasi experimental design. The area of the study was Saudi Arabia and the population was colleges in Saudi Arabia, simple random sampling technique was used to select the sample for the experiment. The instrument for data collection was a self-designed instrument. A pretest was conducted before the experiment was carried out while a posttest was also carried out after the experiment. The experiment lasted for four weeks and the data collected was analyzed using mean and standard deviation to answer the research question and t-test to test the hypothesis at a 0.05 level of significance. The finding of the study revealed that the students taught with Cooperative Learning method have a higher academic achievement compared to the ones taught with lecture method.

The differences between the Alshammari (2015) study and the current study are: in the Alshammari (2015) study the comparison was between Cooperative Learning and the conventional lecture method only while the current study focused on Concept Mapping and Cooperative Learning and lecture teaching method; the subject used in the Alshammari (2015) study was geography while the present study is focused on Home

Economics ; the area of the Alshammari (2015) study was Saudi Arabia while the area of the current study is Zaria in Kaduna state Nigeria and lastly, the subject of the experiment were college students while the subjects of the current study were SSS2 students.The Alshammari (2015) study and the current study are similar in the sense that the design used for the Alshammari (2015) study which was quasi experimental design was also used for the current study. The Alshammari (2015) study did not specify the domain of learning being tested by the instrument in the study but the instrument of the current study tested the subjects on the first three levels of the cognitive domain of learning. However, the findings of the Alshammari (2015) study were significant when the current study discussed its findings.

Uwameiye (2016) also carried out a study on Cooperative Learning method of teaching and Students' Academic Achievement in Home Economics. The research was guided by one research question (Do students exposed to cooperative method of teaching show better academic achievement than those exposed to traditional lecture method?) and one hypothesis. The research design was a quasi-experimental design. The area of the study was Edo state and the population of the study was junior secondary school students in Edo state. A simple random sampling technique (Table of random numbers) was utilized to select a total of 169 students for the study. The instrument used was the Home Economics Achievement test (HEAT). Data collected from the pretest and posttest was analyzed using mean, standard deviation and t-test at 0.05 level of significance. The findings of the study revealed that students who were taught withCooperative Learning method had a better achievement compared to those taught with the conventional method.

The differences between the above study carried out by Uwameiye in (2016) and the present study is that the area of the study were not the same. The similarities between the Uwameiye (2016) study and present study are: quasi experimental design used for the Uwameiye (2016) study was also used for the present study; the statistical tool used for data analysis used in Uwameiye (2016) study was also used for the present study.

The Uwameiye (2016) study investigated the effect of Cooperative Learning teaching method on the academic achievement of students holistically, while the present study focused on the effect of Cooperative Learning teaching method on the first three levels (lower levels) of the cognitive domain of learning.

Yavuz (2016)conducted a research study which investigatedthe effect of the Concept Mapping teaching method compared to the traditional teaching method. The objective of the study was to investigate the experimental studies which test the effectiveness of Concept Mappingteaching method compared to traditional teaching method. Meta-analysis was used to calculate the effect size of the Concept Mapping method on academic success. Therefore, the analysis included experimental studies between 2000 and 2015 which compared the Concept Mapping teaching method and the traditional method. The area of the study was Turkey and the population was 216 masters and doctoral theses and 114 articles. Among these, 73 studies were randomly selected and used for the study. These were then combined through meta-analysis. At the end of the study, the Concept Mapping instructional strategy was determined to have a significantly positive effect on the Turkish students' academic success.

The differences between the two studies abound. The design for the Yavuz (2016) study was a meta-analysis while the current study adopted a quasi experimental

designdesign. Also, the area of the Yavuz (2016) study was Turkey, while the area of the present study was Zaria in Kaduna State, Nigeria.

The only similarity between Yavuz (2016) study and the present study is that the Yavuz (2016) study investigated the effect of Concept Mapping on academic achievement. The Yavuz (2016) study collected and analyzed secondary data (utilized findings from other studies that have been conducted) whereas, the present study collected and analyzed primary data from primary sources. However, the present study made use of the findings of the Yavuz (2016) when discussing its findings.

In another study, Mamman (2016) investigated the effect of Cooperative Learning teaching method on the academic performance of business education students in corporate accounting in universities in South-west Geo-political Zone. The study was guided by five objectives, one of which was to determine the effect of Cooperative Learning teaching method on the academic performance of students in corporate accounting. Five null hypotheses were also formulated in line with the objectives of the study. The study adopted a quasi experimental research design, the population of the study comprised of 119 300 level business education accounting option students.Purposive sampling technique was used to select 99 students from the target population. The instrument used for the data collection was a self-designed performance test titles corporate account achievement test (CAPT). The study was conducted within a period of five weeks. Mean and standard deviation was used to answer the research questions while the hypotheses were tested using regression statistics, t-test and one way analysis of variance. All hypotheses were tested at 0.05 level of significance. The results of the Mamman (2016) study revealed that the students taught corporate accounting with

Cooperative Learning method of teaching had a better performance than those taught with lecture method. The study therefore concluded that Cooperative Learning teaching method had an effect on the academic performance of students. The study further recommended that Cooperative Learning teaching methods should be used to teach corporate accounting in universities.

The Mamman (2016) study was carried out in the universities while the current study was situated in secondary schools, another factor that differentiates the current study from the Mamman (2016) study is that the area of study in the Mamman (2016) study was South-west Geo-political Zone while the current study was carried out in Kaduna state, Nigeria. However, the Mamman (2016) study share some similarities with the current study, one of which is that the design used for the Mamman (2016) study was also used in the current study. The Mamman (2016) study was conducted in five weeks and three topics were treated, this may not be long enough time to discern the effect of the teaching method. The current study was carried out in eight weeksand this period of time is said to be long enough. The findings of Mamman (2016) study were however useful when discussing the findings of the current study.

2.8 Summary of Reviewed Related Literature

The first aspect of the review of related literature clarified the theoretical framework on which the study was built. The present study was hinged on meaningful learning theory and social interdependence theory. The meaningful learning theory posits that to learn meaningfully, students must relate new knowledge (concepts and propositions) to what they already knowand the Social interdependence theory postulates

that the group members are interdependence and achieve better when they cooperatively work. The chapter further reviewed literature on Concept Mapping teaching method, Cooperative Learning teaching method, their principles and how to use them in order to bring about the best results in the attainment of educational goals.

Many research studies have been carried out on the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of students, however, the researcher observed from the literature reviewed so far that none of the related literature specified the domains of learning that the instruments for the studies were testing. The researcher also observed that from the literature reviewed so far, none of the studies assessed the performance of Home Economics students using concept map teaching method. The researcher further discovered that none of the past studies adapted WAEC Foods and Nutrition past questions for the instruments. Also, none of the past studies reviewed so far used a Table of specification as a guide for setting the research instruments. Thisstudy therefore filled these existing gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the methodology that was used for carrying out this research study. It is presented under the following sub-headings:

3.1 Research Design

The design of this study was quasi experimental design. Specifically the study adopted a pretest-posttest nonequivalent group quasi experimental design. A quasi experimental design is simply defined as not a true experiment, which implies that in quasi experimental design, the sample that represent the target population is not randomly selected from the target population. Quasi experimental design is also a type of design that allows purposive selection of the sample from the population. The nonequivalentquasi experimental design refers to an experiment where existing groups are not divided but rather used for the experiment in their intact forms. A pretest-posttest

is the process whereby the participants are studied before and after experimental manipulation. This, according to Raymond(2013)is to be able to compare the effect of the treatment on the subjects. Nonequivalent quasi experimental design was considered appropriate for the study because the design implies the use of intact classes which will control one of the extraneous variablethat is, Subject interaction which may affect the performances of the subjects. There were two experimental groups for this study and a control group. The two experimental groups were exposed to different treatments for the purpose of this study and the control group was taught with the regular lecture method. The design of the study is presented graphically as follows;

The Pretest-Posttest Non Equivalent Group Design

O1 × O2

O3 × O4

O5 O6

Where:

O_1 is pretest for treatment group 1,

× is the treatment,

O_2 is posttest for treatment group 1,

O_3 is the pretest for treatment group 2,

O_4 is the posttest for treatment group 2,

O_5 is pretest for control group and

O_6 is posttest for control group (Kolo, 2003).

3.2 Population for the study

The target population for this study comprised of all the Foods and Nutrition students in SSS 2 in the 12 educational zones in Kaduna state. The population distribution total is eleven thousand, four hundred and forty six(11,446) presented below according to the educational zones:

Table 3.1: Population of the study

S/N	Zone	Number of Students
1	Anchau	1208
2	Birin-Gwari	778
3	Giwa	340
4	Godo-godo	1220
5	Kachia	1232
6	Kaduna	1249
7	Kafanchan	1119
8	Lere	767
9	Rigachukun	720
10	Sabon-tasha	1210
11	Zaria	1156
12	Zonkwa	447
Total		**11,446**

Source: Ministry of Education,Kaduna State Nigeria, 2015.

3.3 Sample and Sampling Procedure

The sample size for this study was 172 (6.6%) SS2 students selected from three secondary schools in Zaria Educational Zone. This is based on the fact that quasi experimental design does not necessitate the use of enormous sample size. The schools andstudents were purposively selectedbecause they offeredFoods and Nutrition as a subjectand they shared the same geographical characteristics. These three schools were selected because quasi experimental design permits the sampling procedure. The breakdown of the sample is presented in Table3.2

Table3.2 Sample Size for the Study

S/N	School	Number
1	Government Girls Secondary School (Kongo), Zaria	56
2	Government Secondary Sch. T/Jukun	69
3	Government Secondary School Gyallesu	47
Total		172 (6.6%)

The procedure for sampling was purposive sampling technique. Purposive sampling is a sampling technique where the researcher purposively selects some subjects from the population based on characteristics that are of interest to the researcher. The characteristics peculiar to the three schools selected are; the three schools shared the same geographical characteristicsand the students are most likely to possess almost the same chronological characteristics. This is because they were both government owned

schools and the criteria for admission and placement into classes are the same. This was an attempt to control other intervening variables such as geographical location that could affect the performances of the students.

3.4 Instrument for Data Collection

The instrument for data collection wasFoods and Nutrition achievement testitems (FNAT I). The instrument hadtwosections, section A and B. Section A contained a 10 item multiple choice questions while section B also contained 10 essay question items (see appendix B). The questions tested the first three levels of the cognitive domain of learning; knowledge, comprehension and application. The items in section A of the instrument tested the knowledge level while the items in section B tested the comprehension and application levels of the cognitive domain of learning. The coverage of the test items was in accordance with the contents covered by the researcher with the students. The test items were extracted from WAEC Foods and Nutrition past questions(2010-2016) and the items were also selected using a Table of specification in order to ensure that the items are evenly distributed across the contents and the levels of the cognitive domain of learning (see appendix A). The researcher decided to adapt WAEC past questions because she thought it would be of a better standard, the students were being prepared for WAEC examination and their exposure to the standard of WAEC questioning might prepare them better for the task ahead. The test items that were used for the pretest were also used for the posttest but the items were reshuffled before administering as posttest (see appendix C).

3.4.1 Validation of the Instrument

The instrument for data collection for the study (FNAT) contained items selected from WAEC Foods and Nutrition past questions.Face and content validity were conducted by the researcher's supervisors, their comments and corrections were incorporated and effected in the test items. The instrument was also validated by three experts who are Senior Lecturers in Department of Measurement and Evaluation in the Department of Science Education, Ahmadu Bello University Zaria, their comments and corrections were also incorporated in the instrument. The Table of specification and lesson plan were validated by the researcher's supervisors. Their comments were incorporated and corrections were also effected.

3.4.2 Pilot study

A pilot study was carried out in Government Girls Secondary School Pada, Zaria. The school was selected for the pilot study because it is part of the population for the study but not part of the sample that was used for the main study. 33 SSS 2 students offering Foods and Nutrition took part in the pilot study. The pretest was administered to the students and the posttest was also administered to the same students after two weeks. The test was administered by the researcher and the time allowed for the test was 1:30mins. The test items were marked by the researcher and the scores of the students were subjected to statistical analysis.

3.4.3 Reliability of the Instrument

The reliability of the instrument was determined by subjecting the scores of the test and retest to statistical analysis, the scores were analyzed using Chronbach's Alpha. The reliability coefficient calculated for the instrument was 0.805. This reliability coefficient is high (close to one) therefore, the instrument is considered reliable. Nworgu (2006)states that reliability coefficients of 0.805 and above are high and the instruments for which they are calculated are reliable

3.5. Procedure for Data Collection

The study was conducted during the regular school term lesson periods. The researcher collected a letter of introduction from the Head of Department of Home Economics, Ahmadu Bello University Zaria. The letter was presented to the Coordinator, Zaria Zonal Education office. The researcher was then given introduction letters addressed to the individual schools where the research was carried out. The researcher presented the letters to the principals of the schools where the study was conducted. Subject to the approval of the letter, the researcher proceeded to Home Economics Department of the schools in order to be introduced to the Foods and Nutrition teachers and students. The researcher familiarized with theHome Economics teachers and students by interacting with them for the first two days of the first week of the experiment. The pretest (FNAT I) (see appendix B)was administered to the three groups of the study by thethird, fourth and fifth days of the first week of the experiment, the researcher taught experimental group one using Concept Mapping method,

taughtexperimental group two but with Cooperative Learning method of teaching and also taught the control group using lecture method. The treatment was administered for eight weeks, during the treatment period, each group met once a week for a period of 80 minutes. At the end of the treatment a posttest (FNAT I) (see appendix C) was administered to the subjects of the study for duration of one hour thirty minutes.

3.6 Procedure for Data Analysis

The research questions were answered using mean and standard deviation. Null hypotheses one and two were tested using independent-samples t test statistics, this is in line with Flom (2010) who states that t-test statistics can be used to determine if two sets of data are significantly different from each other while hypothesis three was tested using analysis of co variance (ANCOVA). ANCOVA was considered appropriate for the study based on the position of Flom (2010)who states that when testing main and interaction effects of a categorical variable on a continuous dependent variable with covariates ANCOVA should be used. All the hypotheses were tested at 0.05 level of significance.

Decision rule: For the mean, any group among the three groups with the highest mean value was categorized to have performed best. In the test of hypotheses, where the calculated t value was less than the Table value **(<)**, the null hypothesis was rejected; this implied that there was a significant effect. Whereas, where the calculated t value was equal to or greater than the Table value**(≥)**, the null hypothesis was retained. This implied that there was no significant effect.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

This chapter presents the results and the data analysis for the study presented under the following sub-headings:

4.1 Answers to Research Questions

4.2 Tests of Hypotheses

4.3 Summary of Major Findings

4.4 Discussion of Major Findings

4.1 The answers to the research questions of the study are presented in Tables 4.1 to 4.6 as follows:

Research Question One: **What is the effect of Concept Mapping teaching method on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State?**

Table 4.1: Mean scores and Standard Deviation (SD) of Effect of Concept Mapping Teaching Method on the Lower Level Cognitive Domain of Learning of Foods and Nutrition students

Methods	N	Pretest		Posttest		Gain
		$\bar{X}$	SD	$\bar{X}$	SD	Score
Concept Mapping	47	35.23	11.88	53.26	14.61	18.03

Source: Field survey (2017).

The summary of results presented on Table 4.1 shows the mean score of students taught with Concept Mapping method of teaching. Students in the Concept Mapping method had a mean score of 35.23 and standard deviation of 11.88 for pre-test while a mean score of 53.26 and standard deviation of 14.61 were obtained in their post-test. The gain score of students taught with Concept Mapping method is18.03this indicates that the Concept Mappingmethod improved the lower level cognitive domain of Foods and Nutrition students in secondary schools in Kaduna state.

Research Question Two: **What is the effect of Cooperative Learning teaching method on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools?**

Table 4.2: **Mean scores and Standard Deviation (SD) on Effect of Cooperative Learning Teaching Method on the Lower Level Cognitive Domain of Learning of Foods and Nutrition students:**

Methods	N	Pretest		Posttest		Gain
		$\overline{X}$	SD	$\overline{X}$	SD	Score
Cooperative Learning	56	34.01	14.00	66.75	17.20	32.74

Source: Field survey (2017).

The summary of results presented on Table 4.3 shows the mean score of students taught with Cooperative Learning method of teaching. Students in the Cooperative Learning method had a mean score of 34.01 and standard deviation of 14.00 for pre-test while a mean score of 66.75 and standard deviation of 14.96 were obtained in their post-test. The gain score of students taught with Cooperative Learning is32.74. This implies that Cooperative Learning group was effective and it improved the lower level cognitive domain of Foods and Nutrition students in secondary schools in Kaduna state.

Research Question Three: What is the difference in the effects of Concept Mapping, Cooperative Learning and lecture teaching methods on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State?

The answer to research question threeis presented inTable 4.3:

Table 4.3: Mean scores and Standard Deviation (SD) on the difference of the effects of Concept Mapping, Cooperative Learning and Lecture Teaching Methods on the Lower Level Cognitive Domain of Learning of Foods and Nutrition students:

Methods	N	Pretest		Posttest		Gain
		$\bar{X}$	SD	$\bar{X}$	SD	Score
Concept Mapping	47	35.23	11.88	53.26	14.61	18.03
Cooperative Learning	56	34.01	14.00	66.75	17.20	32.74
Lecture Method	69	33.16	12.13	54.75	16.26	21.59

Source: Field survey (2017).

The data presented on Table 4.3 show the mean scores of students taught with Concept Mapping, Cooperative Learning and lecture methods of teaching. Students in the Concept Mapping method had a mean score of 35.23 and standard deviation of 11.88 for pre-test while a mean score of 53.26 and standard deviation of 14.61 were obtained in their post-test. Students in the Cooperative Learning method had a mean score of 34.01 and standard deviation of 14.00 for pre-test while a mean score of 66.75 and standard deviation of 14.96 were obtained in their post-test. On the other hand, students in the lecture method group recorded a mean score of 33.16 and standard deviation of 12.13 in their pre-test and on the post-test they had a mean score of 54.75 and standard deviation

of 16.26. Comparatively the gain score of students taught with Cooperative Learning is the highest of the three methods while those taught with lecture method have higher gain score than the Concept Mapping teaching method. This is an indication that Cooperative Learning teaching method was most effective amongst the three methods of teaching that were studied in this research work.

4.2 Test of Hypotheses

The three null hypotheses for this study were tested at 0.05 level of significance using independent t test to test hypotheses one and two, while ANCOVA was used to test hypothesis three.The summaries are presented on Tables 4.4 to 4.7 as follows:

Hypothesis one: Concept Mapping teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State

Table 4.4: t-test analysis on test of effect of Concept Mapping Teaching Method on the lower level cognitive domain of learning of Foods and Nutrition students

Group	N	$\bar{X}$	SD	t value	df	p value
Concept Mapping	47	53.26	11.88			
				-.507	114	.306
Lecture method	69	54.75	16.26			

Source: Field Survey (2017)

Students in the Concept Mapping method had a mean score of 53.26 and standard deviation of 14.61 on the other hand, students in the lecture method group recorded a mean score of 33.16 and standard deviation of 16.26. The data also generated a t(114) = -.50, p = .306. The calculated p value(.306) is greater than the Table value (.05), $t_{cal} > t_{crit}$. Therefore, the null hypothesis which stated that Concept Mapping teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students was therefore retained. This implies that the mean score of students taught Foods and Nutrition using Concept Mapping teaching method is nothigher than mean score of students taught food and nutrition using lecture method. Therefore, Concept Mapping teaching method had no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State.

Hypothesis Two: **Cooperative Learning teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools.**

Table 4.5: t-test analysis of effect of Cooperative Learning Teaching Method on the lower level cognitive domain of learning of Foods and Nutrition students

Group	N	$\bar{X}$	SD	t value	df	p value
Cooperative Learning	56	66.75	14.00			
				3.737	123	.000
Lecture method	69	54.75	16.26			

Source: Field Survey (2017)

Students in the Cooperative Learning method had a mean score of 66.75 and standard deviation of 14.00 on the other hand, students in the lecture method group recorded a mean score of 54.75 and standard deviation of 16.26. The data also generated a t(123) = 3.373, p = .000. The calculated p value (.000) is less than the Table value (.05), $t_{cal} < t_{crit}$ thus: the null hypothesis which stated that Cooperative Learning teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students was therefore rejected. This implies that the mean score of students taught Foods and Nutrition using Cooperative Learningteaching method differed significantly from the mean score of students taught food and nutrition using lecture method. Therefore, Cooperative Learning teaching method had a significant effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State.

Hypothesis Three: **The mean scores of students taught Foods and Nutrition using Concept Mapping, Cooperative Learning and lecture teaching method do not differ significantly**

Table 4.6: ANCOVA on test of difference in the mean scores of students taught Foods and Nutrition using Concept Mapping, Cooperative Learning and lecture teaching method

Source	Type III sum of squares	df	Mean square	F	Sig
Corrected Model	5824.563[a]	3	1941.521	1941.521	.000
Intercept	89236.016	1	89236.016	383.702	.000
PRE	1060.546	1	1060.546	4.560	.034
MTHD	3982.122	2	1991.061	8.561	.000
Error	39071.041	168	232.566		
Total	619104.000	172			
Corrected Total	44895.605	171			

Source: Field Survey (2017) KEY: PRE: Pretest

MTHD: Teaching Methods

Table 4.6 shows significant difference in the mean score of students exposed to Foods and Nutrition using Concept Mapping, Cooperative Learning and lecture teaching method. The obtained value of F(170) = 8.561 is significant .000 formain method effect (P< 0.05), $p_{cal} < p_{crit}$ thus the null hypothesis which states that the mean scores of students taught Foods and Nutrition using Concept Mapping, Cooperative Learning and lecture teaching method do not differ significantly was rejected.This implies that there is significant difference in the mean score of students taught Foods and Nutrition using Concept Mapping, Cooperative Learning and lecture teaching method.

Table 4.7: Scheffe test of comparison of the difference between the mean scores of students taught Foods and Nutrition using Concept Mapping, Cooperative Learning and Lecture Teaching Method

Teaching Method (i)	Teaching method (j)	Mean Difference (i) – (j)	Sig
Concept Mapping	Cooperative Learning	-12.048*	.001
	Lecture	-1.498	.876
Cooperative Learning	Lecture	10.550*	.001
	Concept Mapping	1.498	876
Lecture	Cooperative Learning	-10.550*	.001

The mean difference is significant at the 0.05 level

Table 4.7 shows the comparison of means of the groups. The mean difference between Concept Mapping and Cooperative Learning is -12.04 which is significant at 0.05 because the observed p value is less than .05 (MD= -12.04; P =.001). The mean difference between Concept Mapping and lecture method was -1.498 and the P value was not significant at .05 because the observed p value is greater than .05 (MD = 12.048; P = .876). The mean difference between Cooperative Learning and lecture method is -10.550 which is significant at .05 because the observed p value is less than .05 (MD = -10.550; P = .001). This implies that the mean of the three groups are significantly different from one another. Thus, it can be concluded that Cooperative Learning teaching method had significantly better effect than the other methods while in the same vein; lecture method was significantly higher than Concept Mapping teaching method.

4.3 Summary of Major Findings

Based on the analyses of the data, the following findings were obtained:

1. Concept MappingTeaching Method improved the Academic Performance inFoods and Nutrition Students.
2. Cooperative LearningTeaching Method improved the Academic Performance of Foods and Nutrition Students
3. Cooperative Learning teaching method yielded significantly better result than Concept Mapping and Lecture methods.

4.4 Discussion of Major findings

The purpose of this study was to assess the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of Home Economics students in secondary schools in Kaduna state Nigeria. In order to carry out this research, three research objectives were formed, in line with the objectives, three research questions were raised, and three null hypotheses were formulated. The findings of research question one reveal that Concept Mapping Method improved the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State with a gain score of 18.03. gain score of students taught with Concept Mapping was lower than those taught with lecture method, which implies that Concept Mapping teaching method did not improve the lower the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State better than the Lecture Method. The test of hypothesis one also reveals that there was a statistically significant difference in the mean score of students taught Foods and Nutrition using

Concept Mapping and Cooperative Learning. These findings are contrary to what was anticipated because of the attributes of Concept Mapping method of teaching according to the report of Yavuz (2016) who reports that Concept Mapping method of teachinghas a significantly positive effect on the academic performance of students. From the stand point of DiCecco and Gleason (2002) when graphic organizers such as concept maps are used in the learning process, they help activate prior knowledge more quickly and effectively and help provide a framework to attach new knowledge. In accordance with the view of DiCecco and Gleason (2002), Novak (2010) also posits that a concept map provides a visual demonstration of the relationships between concepts in our cognitive structure which presumably prolong retention period and enhance the learners' ability to retrieve new materials that has been learnt. These claims are grounded in the meaningful learning theory of Ausubel (1962) who propounds that the most important factor influencing the quantity, clarity and organization of the learner's present knowledge is the cognitive structure and that the way to strengthen the cognitive structure is by using advanced organizers.

The findings of this study are in tandem with the findings of the study of Adloan (2012). In the Adloan (2012) study, the major objective was to determine the effectiveness of using concept maps in improving the science achievement of SS2 students. The findings of the Adloan (2012) study revealed that the students taught biology using Concept Mapping method did not perform better than the same level students in traditional group. In the Adloan (2012) study, the poor performance was attributed to homogeneity of instruction. This current study took care of that extraneous variable by means of the researcher teaching the three groups herself. The findings of

these studies bring into perspective the likely cause(s) of the poor performance of the concept map groups. The subject thought in the Adloan (2012) study was a science based subject (biology), likewise, the subject thought in the current study was also science based (Foods and Nutrition); could it then be that Concept Mapping as a method of teaching is not suitable for science based subjects? Lack of the use of technology in the planning and executing Concept Mapping teaching method may also be a cause of the poor performance. This finding implies that Concept Mapping Method of teaching is not suitable and should not be used for the teaching of Foods and Nutrition in secondary schools.

Contrary to the findings of the present study, Yavuz (2016) conducted a research study which investigated the effect of the Concept Mapping teaching method compared to the traditional teaching method. Meta-analysis was used to calculate the effect size of the Concept Mapping method on academic success and at the end of the study, the Concept Mapping teaching method was shown to have a significantly positive effect on the Turkish students' academic success. The Yavuz (2016) study included the compilation of the findings of 33 studies which investigated the effectiveness of Concept Mapping. The implication of the findings of the Yavuz (2016) study is that Concept Mapping teaching method was effective in most of the studies involved in the meta-analysis. Although, there is a geographical variation between the current study and the Yavuz (2016) study and this could be a key factor which influenced the findings of the studies. The variation could be attributed to access to technology in teaching which may most likely enhance the use of the concept map to the maximum. Interestingly, majority of the subjects of the current study are deficient in the use of English language, that

is,they have challenges understanding, reading and writing in English language, although, their class teacher helped in translating the lesson and test items to the language they best understand (Hausa), but convincingly, this would not have been sufficient enough to help the students understand and respond properly to test items in English language. This could be a key factor in explaining the reason for the poor performance of the learners. Surprisingly, the individualistic nature of Concept Mapping teaching method may be another pointer that can help understand why the students performed badly. Comparatively, Cooperative Learning method allows the students to share ideas, depend on each other positively and take account of their own learning and the learning of other group members. This opportunity was observed to enhance the learning of the students being that it is a factor that is not characterized with Concept Mapping teaching method, it could explain why they performed poorly compared to their counterparts.

The findings of this study further shows a response answer to research question two that the gain score of students taught with Cooperative Learning was higher than those taught with lecture method. This implies that Cooperative Learning method had a positive effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools in Kaduna State. In the test of hypothesis two, it was also revealed that the mean score of students in the Cooperative Learning group differ in a statistically significant way. The results of objective two and hypothesis two agrees with the findings of Van (2014) who investigated the effect of Cooperative Learning on the achievement and knowledge retention of students in Psychology. The results of the Van (2014) study showed that those who were instructed using Cooperative Learning method achieved significantly higher scores in achievement and knowledge retention than those

who were instructed with lecture based teaching. This trend of results were anticipated because of the promisingly numerous characteristics of Cooperative Learning teaching method, characteristics such as heterogeneousness of the group, positive interdependence and most especially the learner-centeredness of the method. Slavin in Li & Lam (2013) opines that a critical element of Cooperative Learning is group team work and team goals that is,within cooperative activities, individuals then to seek outcomes that are beneficial to themselves and beneficial to all other group members. This critical element may be the edge that Cooperative Learning method has over other teaching methods.

The findings of this study further agrees with the findings of Alshammari (2015) who conducted a research study on effect of Cooperative Learning on academic performance of college students in geography. At the end of the research study, the findings revealed that the students taught with Cooperative Learning method had a higher academic achievement compared to the ones taught with lecture method. Furthermore, Inuwa, Abdullah and Hassan (2015) carried out an investigation on the effectiveness of Cooperative Learning teaching method on students' academic achievement in financial accounting, the findings of the research study revealed that Cooperative Learning teaching method had a positive influence on students' academic achievement in financial accounting. The answer to research question three revealed that Cooperative Learning teaching method was most effective amongst the three methods of teaching that were studied in this research work. In furtherance to that, the corresponding hypothesis also confirmed that the mean score of students thought with Cooperative Learning significantly differ from the Concept Mapping and lecture methods. These findings further agree with the findings of Mamman (2016) who investigated the effect of

Cooperative Learning teaching method on the academic performance of business education students in corporate accounting in universities in South-west Geo-political Zone. At the end of the study, it was observed that the students taught corporate accounting with Cooperative Learning method of teaching had a better performance than those taught with lecture method. Uwameiye (2016) also carried out a study on Cooperative Learning method of teaching and students' academic achievement in Home Economics and in the same vein, the findings of the Uwameiye study agrees with the findings of the current study. The students who were taught withCooperative Learning method had a better achievement compared to those taught with the conventional method.

This trend of results was obtained from different studies that were situated in different geographical locations, across different levels of education, across different subjects/discipline and across different years (between 2012 and 2017). Premised on this, it is quite evident that Cooperative Learning teaching method is effective in the teaching of Home Economics and other subjects at all levels of education. Contrary to the anticipated, in the literature reviewed so far, and with the findings of the present study, Concept Mapping teaching method is not as productive as Cooperative Learning and even the lecture method. This can be owned to some factors that can be improved on by future research studies. Such factors could be the adequacy of the planning and delivery of a concept map lesson and the use of modern technology in the planning and executing of a Concept Mapping teaching method. Concept Mapping teaching method could also be experimented with subjects in other disciplines other than science subjects. Overall, it must be borne in mind that this study was only conducted on a small group of students over a short period of time. Further research is hence needed to determine the long term

effect of Concept Mapping teaching method on a larger number of students before generalized conclusions can be drawn.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the Summary, Conclusion and Recommendations of the study. It is presented under the following sub-headings:

5.1 Summary

5.2 Conclusion

5.3 Contribution to Knowledge

5.4 Recommendations

5.5 Suggestions for further studies

5.1 Summary

This study was carried out to assess the effects of Concept Mapping and Cooperative Learning teaching methods on the academic performance of Home Economics students in secondary schools in Kaduna state. In order to carry out this research, three research objectives, three research questions and three null hypotheses were formulated. Quasi experimental design was used for the study. The population comprised of the 11,446 Home Economics students in the 12 educational zones in Kaduna state. The sample size for the study was 157 SS2 students selected from three secondary schools in Zaria Educational Zone. The sampling procedure adopted was purposive sampling technique. The instrument for data collection was a self-designed test (FNAT I) whose items were selected from WAEC Foods and Nutrition past questions. The instrument for data

collection was validated by the researcher's supervisors and three experts from Department of Psychology and Science Education. A pilot study was conducted using 33 SSS2 students. The reliability of the instrument was determined using test retest reliability method. The scores of the pilot tests were analyzed using Chronbach's alpha. A reliability coefficient of 0.805 was realized. The data for the study was collected by the researcher and the exercise lasted for eight weeks. The research questions were answered using mean and standard deviation. Hypotheses one and two were tested using independent t-test while hypothesis three was tested using ANCOVA. The findings of the study among others revealed that:

1. The data for the study to answer research question one was analyzed and it revealed in Table 4.1 that Concept Mapping teaching method had a negative effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools with the gain score of 18.03 while lecture method had a gain score of 21.59. Hypothesis one tested on Table 4.4 revealed that Concept Mapping teaching method does not significantly affect the lower level cognitive domain of learning of Foods and Nutrition students with a calculated value greater than the critical value (p = .306)
2. The result of data analyzed to answer research question two as presented in Table 4.2 showed that Cooperative Learning method had a positive effect on the lower level cognitive domain of learning of Foods and Nutrition students in secondary schools, with a gain score of 32.74 while lecture method had a gain score of 21.59. Hypothesis two tested on Table 4.5 revealed that cooperative earning teaching method significantly affect the lower level cognitive domain of learning

of Foods and Nutrition students with a calculated value greater than the critical value ($p < .001$).

5.2 Conclusion

Based on the findings of the study, it was concluded that Concept Mapping teaching method did not improve the lower level cognitive domain of learning of Foods and Nutrition students, the study further concluded that Cooperative Learning teaching method has a significant effect on the lower level cognitive domain of learning of Foods and Nutrition students. This is an implication that Cooperative Learning teaching method is more effective than Concept Mappingteaching method.

5.3 Contributions to Knowledge

The study established that;

1. Concept Mapping teaching method has no significant effect on the lower level cognitive domain of learning of Foods and Nutrition students with a calculated value greater than the critical value ($p = .306$).
2. Cooperative Learning teaching method has a significant effect the lower level cognitive domain of learning of Foods and Nutrition students with a calculated value greater than the critical value ($p < .001$).

5.4 Recommendations

Based on the findings of the study, the following recommendations were made;

1. Cooperative Learning teaching method should be used by teachers to teach Foods and Nutrition in secondary schools.
2. Home Economics programme developers should prescribe methods of teaching such as Cooperative Learning teaching method with the programmes they design.
3. Ministry of Education should train and retrain teachers in order to keep them current about new researches on teaching methods and their achievements.
4. Federal and state Government should make available the infrastructures and learning environment that will enhance the use of Cooperative Learning teaching method.
5. Non-Governmental Organizations should invest in education by providing technology based classroom environment that can help the teacher plan and execute lessons using Concept Mapping teaching method.

5.5 Suggestions for further Study

1. A similar study to determine the effect of Cooperative Learning on the higher level cognitive domain of learning of Foods and Nutrition students.

2. A similar study to investigate the effects of Concept Mapping on the academic performance of students in Art related subjects.

3. A study to assess the effect of Cooperative Learning teaching method on the affective domain of learning of Home Economics students.

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APPENDIX A

DEVELOPMENT OF TABLE OF SPECIFICATION

Constructing a Table of specification is to prepare a suitable two-way chart that relates the instructional objective to the instructional content and thus, specifies the nature of the test sample. A chart in Home Economics lessons in Senior Secondary School one and two is presented on Table 3 below. This indicates both the total number of test items and the percentage of the test items allotted to each objective and each area of content.

The researcher will teach four topics in six lessons as:

1. Seafood (one lesson)
2. Flour mixture (two lessons)
3. Food study (Eggs) (one lesson)
4. Milk and milk products (two lessons)

Constructing an evaluation test blue print (Table of specification) showing the distribution of twenty (20) test items in the following weighted behavioral objectives: knowledge (50%), Comprehension (30%) and Application (20%).

The working process showing the number of questions is shown as follows:

Step I

Knowledge (50%) = $50 \times \frac{20}{100} = 10$ items

Comprehension (30%) = $30 \times \frac{20}{100} = 6$ items

Application (20%) = $20 \times \frac{20}{100} = 4$ items

Total = 20 items

Step II

Knowledge 10 items

Seafood	$\frac{1}{6} \times 10 = 2$
Flour mixture	$\frac{2}{6} \times 10 = 3$
Food study (Eggs)	$\frac{1}{6} \times 10 = 2$
Milk and milk products	$\frac{2}{6} \times 10 = 3$
Total	10 items

Comprehension 6 items

Seafood	$\frac{1}{6} \times 6 = 1$
Flour mixture	$\frac{2}{6} \times 6 = 2$
Food study (Eggs)	$\frac{1}{6} \times 6 = 1$
Milk and milk products	$\frac{2}{6} \times 6 = 2$
Total	6 items

Application 4 items

Seafood	$\frac{1}{6} \times 4 = 1$
Flour mixture	$\frac{2}{6} \times 4 = 1$
Food study (Eggs)	$\frac{1}{6} \times 4 = 1$
Milk and milk products	$\frac{2}{6} \times 4 = 1$
Total	4 items

The numbers of items computed are inserted in the cells. But for topics calculated that ended in decimal points, the researcher used her discretion and round off to the nearest whole number so that the total number of items will still remain accurate.

Table 3: Table of Specification of the Test Items

	LOWER LEVEL OF COGNITIVE DOMAIN OF LEARNING			
CONTENTS	**KNOWLEDGE**	**COMPREHENSION**	**APPLICATION**	**TOTAL**
Seafood Fish	**2**	**1**	**1**	**4**
Flour Mixture	**3**	**2**	**1**	**6**
Food Study (Eggs)	**2**	**1**	**1**	**4**
Milk and Milk Products	**3**	**2**	**1**	**6**
Total	**10**	**6**	**4**	**20**

Adopted from Ibtihal (2015).

From Table 3, it would be seen that of the four topics, fish attracted four questions, flour mixtures six questions, eggs four questions and milk and milk products attracted six questions. While for the objectives, the knowledge level had (10) items as the highest. The application level had the least. The distribution of number of items in each cell (that is for each objective level and topic) is a reflection of the emphasis and the importance the researcher attached to these areas. With a Table of specification of this nature designed the researcher then proceeds to construct the test items.

APPENDIX B

FOODS AND NUTRITION ACHIEVEMENT TEST ITEMS (FNAT I)

SECTION A: Pretest

INSTRUCTION: You are required to answer ALL questions in sections A and B on the question paper. Tick [√] the correct answer in the options in section A and provide answers to questions in section B in the spaces below the questions.

Time Allowed: 1hr 30mins

1. An example of white fish is
a. Catfish
b. mackerel
c. Cod
d. Lobster
e. Oysters

2. Identify the dish prepared using a kneaded dough.
a. Hotcross buns
b. Cheese pastry
c. Queen cakes
d. Canary pudding
e. Oven tray

3. Which of the following nutrients is **NOT** present in an egg
a. Carbohydrate
b. Fat
c. Mineral
d. Protein
e. Water

4. The souring of milk is due to the presence of
a. Sucrose
b. Lactose
c. Lactic acid
d. Ascorbic acid
e. Fructose

5. The ability of pudding batter to hold air is due to the presence of
a. Yeast
b. Baking powder
c. Bicarbonate of soda
d. Egg
e. Nutmeg

6. Which of the following is **NOT** a shell fish
a. Herrings
b. Lobster
c. Molluses
d. Oysters
e. Shrimps

7. Which of the following is **NOT** true of a fresh egg
a. Does not have unpleasant smell
b. Feels heavy and the shell slightly rough
c. Floats when put in salted water
d. Makes no sound/noise when shaken
e. Has an oval shape

8. Milk is added to tea in order to
a. Add flavor
b. Increase the tanin
c. Make it white
d. Reduce the caffeine
e. Add spice

9. The most suitable utensil for baking queen cakes is
a. Baking tray
b. Cake pan
c. Loaf tin
d. Patty tin
e. Oven rack

10. Types of milk obtained directly from the cow with all the nutrients intact is called ---------milk

a. Condensed
b. Evaporated
c. Fresh whole
d. Skimmed
e. Powdered

SECTION B

INSTRUCTION: Answer ALL questions in this section on the question paper

1. Outline how a brine test is conducted on an egg

---

2. List four pieces of equipment used in the preparation of a rough puff pastry

I. ---

II. ---

III. ---

IV. ---

3. List and explain two uses of egg in cookery

I. ---

II. ---

4. Explain why flour is sieved before baking

---

5. Which is the best form of milk for the aged?

6. Explain how fish stock is made

---

7. Explain why salt is added to flour

---

8. List two types of milk

I. ---

II. ---

9. Differentiate between dressed fish and fillet fish

---

10. State two nutrients present in milk

I. ---

II. ---

APPENDIX C

FOODS AND NUTRITION ACHIEVEMENT TEST ITEMS (FNAT I)

Section A: Posttest

INSTRUCTION: You are required to answer ALL questions in sections A and B in the question paper. Tick ☑ the correct answer in the options in section A and provide answers to section B in the spaces below the questions.

Time Allowed: 1hr 30mins

1. The ability of pudding batter to hold air is due to the presence of
a. Yeast
b. Baking powder
c. Bicarbonate of soda
d. Egg
e. Nutmeg

2. The most suitable utensil for baking queen cakes is
a. Baking tray
b. Cake pan
c. Loaf tin
d. Patty tin
e. Oven rack

3. Which of the following nutrients is **NOT** present in an egg
a. Carbohydrate
b. Fat
c. Mineral
d. Protein
e. Water

4. Which of the following is **NOT** a shell fish
a. Herrings
b. Lobster
c. Molluses
d. Oysters
e. Shrimps

5. An example of white fish is
a. Catfish
b. mackerel
c. Cod
d. Lobster
e. Oysters

6. Identify the dish prepared using a kneaded dough.
a. Hotcross buns
b. Cheese pastry
c. Queen cakes
d. Canary pudding
e. Oven tray

7. Types of milk obtained directly from the cow with all the nutrients intact is called ---------milk
a. Condensed
b. Evaporated
c. Fresh whole
d. Skimmed
e. Powdered

8. Which of the following is **NOT** true of a fresh egg
a. Does not have unpleasant smell
b. Feels heavy and the shell slightly rough
c. Floats when put in salted water
d. Makes no sound/noise when shaken
e. Has an oval shape

9. Milk is added to tea in order to
a. Add flavor
b. Increase the tanin
c. Make it white
d. Reduce the caffeine
e. Add spice

10. The souring of milk is due to the presence of
a. Sucrose
b. Lactose
c. Lactic acid
d. Ascorbic acid
e. Fructose

SECTION B

INSTRUCTION: Answer ALL questions in this section on the question paper

1. Explain how fish stock is made

---

2. State two nutrients present in milk

III. ---

IV. ---

3. Which is the best form of milk for the aged?

---

4. Outline how a brine test is conducted on an egg

---

5. List and explain two uses of egg in cookery

III. ---

I. ---

---

6. Differentiate between dressed fish and fillet fish

---

7. List four pieces of equipment used in the preparation of a rough puff pastry

V. ----------

VI. ----------

VII. ----------

VIII. ----------

8. List two types of milk

III. ----------

I. ----------

9. Explain why salt is added to flour

---

10. Explain why flour is sieved before baking

APPENDIX D

MARKING SCHEME

FOODS AND NUTRITION ACHIEVEMENT TEST ITEMS (FNAT I)

SECTION A: PRETEST

1. **C**
2. **A**
3. **A**
4. **C**
5. **D**
6. **A**
7. **B**
8. **D**
9. **D**
10. **C**

Two marks for each answer. Total of 20 marks

SECTION B

1. Place and egg in a bowl of water, if the egg sinks, it is still fresh. If the egg floats, it is no longer fresh. (2marks)
2. Bowl,
   Rolling pin
   Chopping board
   Dough scraper (4marks)
3. Source of protein: the white part of the egg is a source of protein
   Binding agent: egg is used as a binding agent when cooking, e.g. it is used in the preparation of yam balls as a binding agent. (4marks)
4. When air is sieved, it collects air among the particles as they fall from the sieve into the bowl, thereby, removing air from the flour. (2marks)
5. Skimmed milk. (2marks)
6. Wash of ice and blood from the fish,
   Put in a stock pot and season as desired,
   Put on fire and slow cook for about 30mins and
   Bring down and drain the stock from the fish. (5marks)
7. Salt is added to flour to boost the flavor, tighten the gluten structure and add strength to the dough. It also helps the dough to hold to carbon dioxide gas that is formed during fermentation. (2marks)
8. Whole milk
   Skimmed milk
   Unpasteurized milk (2marks)
9. Dressed fish is the fish whose fins, head and tail are removed and prepared whole without slicing it while fillet fish is a boneless fish which has been cut or sliced away from the bone by cutting lengthwise. (5marks)
10. Calcium, Vitamin D, Magnesium, Sodium, Potassium, Fat, Protein, Iron, Vitamin C, Vitamin B-12, Vitamin B-6. (2marks).

Total of 30 marks.

APPENDIX E

MARKING SCHEME

FOODS AND NUTRITION ACHIEVEMENT TEST ITEMS (FNAT I)

SECTION A: POSTTEST

1. **D**
2. **D**
3. **A**
4. **A**
5. **C**
6. **A**
7. **C**
8. **B**
9. **D**
10. **C**

SECTION B

1. Wash of ice and blood from the fish,
   Put in a stock pot and season as desired,
   Put on fire and slow cook for about 30mins and
   Bring down and drain the stock from the fish. (5marks)

2. Calcium, Vitamin D, Magnesium, Sodium, Potassium, Fat, Protein, Iron, Vitamin C, Vitamin B-12, Vitamin B-6. (2marks)
3. Skimmed milk. (2marks)
4. Place and egg in a bowl of water, if the egg sinks, it is still fresh. If the egg floats, it is no longer fresh. (2marks)
5. Source of protein: the white part of the egg is a source of protein
   Binding agent: egg is used as a binding agent when cooking, e.g. it is used in the preparation of yam balls as a binding agent. (4marks)
6. Dressed fish is the fish whose fins, head and tail are removed and prepared whole without slicing it while fillet fish is a boneless fish which has been cut or sliced away from the bone by cutting lengthwise. (5marks)
7. Bowl,
   Rolling pin
   Chopping board
   Dough scraper (4marks)
8. Whole milk
   Skimmed milk
   Unpasteurized milk (2marks)
9. Salt is added to flour to boost the flavor, tighten the gluten structure and add strength to the dough. It also helps the dough to hold o to carbon dioxide gas that is formed during fermentation. (2marks)
10. When flour is sieved, it collects air among the particles as they fall from the sieve into the bowl, thereby, removing air from the flour. (2marks)

Total of 30 marks.

APPENDIX F

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	One
SCHOOL:	Government Secondary School Gyallesu
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the learners to learn seafood
TOPIC:	Seafood
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of fish found in local and sea water 2. Explain the nutritional value of sea food
PREVIOUS KNOWLEDGE:	The students are familiar with local water

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and Class work**
1. The teacher shares the students into groups of four(s) using a simple ballot system, 2. The teacher introduces the lesson 3. The teacher gives study materials to each group, 4. The teacher supervises the learners,	The learners sit together with their group members according to the ballot they picked, The learners listen, Each group of learners study the materials in turns, Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views on the topic of discussion. Each group	For this lesson, each group of four students used the following: A pictorial chart showing the different types of fishes found in local and sea water, Foods and Nutrition textbook	1 List four types of fishes found in sea water 1 Mention two types of fishes found in local water. In conclusion, seafood was the focus of the lesson and the students were guided to learn the different fish types that are found in local and sea water.	Class work 1 List two nutrients found in sea fish, Assignment 1 Read about flour.

5. The teacher asks the evaluation questions, 6. The teacher makes correction in the responds of the learners where necessary.	member help one another to learn by using communication skills to share ideas and listen to one another's ideas Each learner responds to the question, sharing their views one after the other. The learners listen			

APPENDIX G

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	Two
SCHOOL:	Government Secondary School Gyallesu
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn flour mixture
TOPIC:	Flour mixture
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students are familiar with flour

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and Class work**
1. The teacher shares the students into groups of four(s) using a simple ballot system, 2. The teacher introduces the lesson 3. The teacher gives study materials to each group, 4. The teacher supervises the learners,	The learners sit together with their group members according to the ballot they picked, The learners listen, Each group of learners study the materials in turns, Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views on the topic of discussion. Each group member help one another	For this lesson, each group of four students used following: A pictorial chart showing the different types of fishes found in local and sea water, Foods and Nutrition textbook	1 List four types of fishes found in sea water 2 Mention two types of fishes found in local water. In conclusion, seafood was the focus of the lesson and the students were guided to learn the different fish types that are found in local and sea water.	Class work 1 List four types of four mixture Assignment 2 Read about raising agents

	to learn by using communication skills to share ideas and listen to one another's ideas			
5. The teacher asks the evaluation questions	Each learner responds to the question, sharing their views one after the other.			
6. The teacher further explains responds of the learner and award marks based on the responds	The learners listen and take notes			

APPENDIX H

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	Three
SCHOOL:	Government Secondary School Gyallesu
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn flour mixture
TOPIC:	Flour mixture
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students are familiar with flour

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

INSTRUCTIONAL TECHNIQUE:

Teachingactivities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1. The teacher shares the students into groups of four(s) using simple ballot method, 2. The teacher introduces the lesson 3. The teacher gives study materials to each group, **4.** The teacher supervises and guides the learners to learn,	The learners sit together with their group members according to the ballot they picked, The learners listen, Each group of learners study the materials in turns, Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views	For this lesson, each group of four students used the following Foods and Nutrition textbook A chart showing the different raising agents	1 Mention two types of flour 2 Mention four raising agents In conclusion, flour mixture was the focus of the lesson and the students were guided to learn the different flour types and raising agents that are used in dough making.	Class work 1 List four raising agents you know Home work 2 Read about eggs.

	on the topic of discussion. Each group member help one another to learn by using communication skills to share ideas and listen to one another's ideas Each learner in each group responds to the question, sharing their views one after the other. The learners listen and take note			
5. The teacher asks the evaluation questions, **6.** The teacher further explains responds of the learner and award marks based on the responds				

APPENDIX I

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	Four
SCHOOL: Gyallesu**AGE OF LEARNERS:**	Government Secondary School
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
TOPIC:	Eggs
GENERAL OBJECTIVES:	To guide the learn about eggs
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. Identify different types of eggs 2. Discuss the nutritive value of eggs 3. Test and choose fresh eggs 4. Describe the uses of eggs in cookery
PREVIOUS KNOWLEDGE:	The students are familiar with eggs

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1. The teacher shares the students into groups of four(s) using simple ballot technique,	The learners sit together with their group members according to the ballot they picked,	Different types of fresh eggs Bowls of water Foods and Nutrition textbook	1 Mention two uses of eggs in cookery 2 Mention three types of eggs In conclusion, eggs was the focus of the lesson and the students were guided to learn the different egg types and how they are used in cookery	Class work 1 Describe the nutritive value of eggs Assignment 1 Read about milk and milk products
2. The teacher introduces the lesson	The learners listen,			
3. The teacher gives study materials to each group,	Each group of learners study the materials in turns,			
4. the teacher guides the learners to learn,	Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views on the topic of discussion. Each group			

	member help one another to learn by using communication skills to share ideas and listen to one another's ideas Each learner responds to the question, sharing their views one after the other. The learners listen and take note			
5. The teacher asks the evaluation question **6.** The teacher further explains responds of the learner and award marks based on the responds				

APPENDIX J

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	Five
SCHOOL:	Government Secondary School Gyallesu
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn milk and milk Products
TOPIC:	Milk and milk products
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. Discuss the nutritive value of milk and milk products 2. List milk products 3. State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1 The teacher shares the students into groups of four(s) using ballot system, 2 The teacher introduces the lesson 3 The teacher gives study materials to each group, **4** The teacher oversees the activities of the learners and guides them to learn, 5. The teacher asks the evaluation	The learners sit together with their group members according to the ballot they picked, The learners listen, Each group of learners study the materials in turns, Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views on the topic of discussion. Each group member help one another to learn by using communication skills to share ideas and listen to one another's ideas Each learner responds to the	A chart showing different types of milk A chart showing the nutrients in milk Home Economics textbook	1 Mention two milk products 2 Mention three types of milk 3 Mention the nutrients found in milk In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.	Class work 1 List five uses of milk Assignment 2 List three dishes made from milk

question, 6. The teacher further explains responds of the learner and award marks based on the responds	question, sharing their views one after the other. The learners listen and take note			

APPENDIX K

COOPERATIVE LEARNING TEACHING METHOD LESSON PLAN

WEEK:	Six
SCHOOL:	Government Secondary School Gyallesu
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	55 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn milk and milk Products
TOPIC:	Milk and milk products
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. Discuss the nutritive value of milk and milk products 2. List milk products 3. State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

Cooperative Learning Model: The teacher will do part of the teaching with the students and explain different procedures. The students within a group are then responsible for making sure everyone in the group understands the concepts, how to solve problems, and answer discussion questions. When the class is completed, each group is evaluated on the products of the discussion activity. Individuals are evaluated on their independent quiz following the discussion.

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1 The teacher shares the students into groups of four(s) using simple ballot system, 2 The teacher introduces the lesson 3 The teacher gives study materials to each group, **4** The learners read the study materials while the teacher supervises and guides them to learn, 5. The teacher asks the	The learners sit together with their group members according to the ballot they picked, The learners listen, Each group of learners study the materials in turns, Each group share ideas and ask one another questions regarding the topic in focus. The learners respond to the questions raised in the group and share views on the topic of discussion. Each group member help one another to learn by using communication skills to share ideas and listen to one another's ideas Each learner responds to the	For this activity, each group used: A chart showing different types of milk A chart showing the nutrients in milk Home Economics textbook	1 Mention two milk products 2 Mention three types of milk 3 Mention the nutrients found in milk In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.	Class work 1 List five uses of milk Assignment 2 List three dishes made from milk

evaluation question, 6. The teacher further explains responds of the learner and award marks based on the responds	question, sharing their views one after the other. The learners listen and take note			

APPENDIX L

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	One
SCHOOL:	Government Girls Secondary School Kongo
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Seafood
GENERAL OBJECTIVES:	To guide the learners to learn seafood
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of fish found in local and sea water 2. Explain the nutritional value of sea food
PREVIOUS KNOWLEDGE:	The students are familiar with local water

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment**
1. The teacher introduces the topic 2. The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts. 3. The teacher explains the concepts in the maps, 4. The teachers asks the evaluation questions, 5. The teacher further explains	The learners listen, The learners study the concept map as the teacher draws and relate the concepts to what they already know, The learners listen The learners share their views about the topic in focus by drawing their concept map using their pattern The learners	A pictorial chart showing the different types of fishes found in local and sea water, Foods and Nutrition textbook	1 List four types of fishes found in sea water 2 Mention two types of fishes found in local water. In conclusion, seafood was the focus of the lesson and the students were guided to learn the different fish types that are found in local and sea water.	Class work 1 Draw a concept map showing fish, fish types and nutrients in fish Assignment 2 Read about flour

the concepts and expanciates on the learners responses to the questions and the maps they drew	listen			

APPENDIX M

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	Two
SCHOOL: Kongo**AGE OF LEARNERS:**	Government Girls Secondary School
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the
TOPIC:	Flour mixture
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students are familiarwith flour

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1. The teacher introduces the topic 2. The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts. 3. The teacher explains the concepts in the maps, 4. The teachers asks the evaluation questions, 5. The teacher further explains the concepts and expanciates on the learners responses to the questions	The learners listen, The learners study the concept map as the teacher draws and relate the concepts to what they already know, The learners listen The learners share their views about the topic in focus by drawing their concept maps using different patterns The learners listen	Home Economics textbook	1 Mention two types of four 2 Mention four raising agents In conclusion, flour mixture was the focus of the lesson and the students were guided to learn the different flour types and raising agents that are used in dough making.	Class work 1 List four raising agents you know Home work 2 Read about eggs

APPENDIX N

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	Three
SCHOOL: Kongo**AGE OF LEARNERS:**	Government Girls Secondary School
TOPIC:	Flour mixture
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the
TOPIC:	Flour mixture
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students are with flour

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment and class work**
1. The teacher introduces the topic 2. The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts. 3. The teacher explains the concepts in the maps, 4. The teachers	The learners listen, The learners study the concept map as the teacher draws and relate the concepts to what they already know, The learners listen The learners share their	Home Economics textbook	1 Mention two types of four 2 Mention four raising agents In conclusion, flour mixture was the focus of the lesson and the students were guided to learn the different flour types and raising agents that are used in dough making.	Class work 1 List four raising agents you know Home work 2 Read about eggs.

asks the evaluation questions, 5. The teacher further explains the concepts and expanciates on the learners responses to the questions through their individual concept maps	views about the topic in focus The learners listen and make corrections on their concept maps			

APPENDIX O

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	Four
SCHOOL:	Government Girls Secondary School Kongo
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Eggs
GENERAL OBJECTIVES:	To guide the
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. Identify different types of eggs 2. Discuss the nutritive value of eggs 3. Test and choose fresh eggs 4. Describe the uses of eggs in cookery
PREVIOUS KNOWLEDGE:	The students are familiar with eggs

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment**
1. The teacher introduces the topic 2. The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts. 3. The teacher explains the	The learners listen, The learners study the concept map as the teacher draws and relate the concepts to what they already know, The learners listen	Fresh eggs Bowls of water Foods and Nutrition textbook	1 Mention two uses of eggs in cookery 2 Mention three types of eggs In conclusion, eggs was the focus of the lesson and the students were guided to learn the different egg types and how they are used in cookery	Class work 1 Describe the nutritive value of eggs Assignment 2 Read about milk and milk products

concepts in the maps, 4. The teachers asks the evaluation questions, 5. The teacher further explains the concepts and expanciates on the learners responses to the questions	The learners share their views about the topic in focus by drawing their own concept maps in their notebooks The learners listen			

APPENDIX P

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	Five
SCHOOL:	Government Girls Secondary School Kongo
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn Milk and milk Products.
TOPIC:	Milk and milk products
OBJECTIVES:	At the end of the lesson, the students should be able to: 1 Discuss the nutritive value of milk and milk products 2 List milk products 3 State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment**
1. The teacher introduces the topic 2. The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts. 3. The teacher explains the concepts in the maps, 4. The teachers	The learners listen, The learners study the concept map as the teacher draws and relate the concepts to what they already know, The learners listen The learners share their views	A chart showing different types of milk A chart showing the nutrients in milk Home Economics textbook	1 Mention two milk products 2 Mention three types of milk 3 Mention the nutrients found in milk In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.	Class work 1 List five uses of milk in cookery Assignment 2 List three dishes made from milk

asks the evaluation questions, 5. The teacher further explains the concepts and expanciates on the learners responses to the questions	about the topic in focus by drawing their own concept maps in their notebooks The learners listen			

APPENDIX Q

CONCEPT MAPPING TEACHING METHOD LESSON PLAN

WEEK:	Six
SCHOOL:	Government Girls Secondary School Kongo
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
GENERAL OBJECTIVES:	To guide the students to learn Milk and milk Products.
TOPIC:	Milk and milk products
OBJECTIVES:	At the end of the lesson, the students should be able to: 1 Discuss the nutritive value of milk and milk products 2 List milk products 3 State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

INSTRUCTIONAL TECHNIQUE:

Teaching activities	**Learning activities**	**Resource and Materials**	**Evaluation and conclusion**	**Assignment**
1. The teacher introduces the topic 2 The teacher draws concept maps on the board by drawing the circles, inputting the concepts in the circle from the parking lot, connecting the circles with arrows with a word to show the relationship between the concepts 1 The teacher explains the concepts in the maps	The learners listen, The learners draw the maps in their notebooks, The learners listen	Home Economics textbook	1 Mention two milk products 2 Mention three types of milk 3 Mention the nutrients found in milk In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.	Class work 1 List five uses of milk Assignment 2 List three dishes made from milk

APPENDIX R

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	One
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Seafood
OBJECTIVES:	At the end of the lesson, the students should be able to: 1. List types of fish found in local and sea water 2. Explain the nutritional value of sea food
PREVIOUS KNOWLEDGE:	The students are familiar with local water

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activity**	**Assignment**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1 List two nutrients found in sea fish, Assignment Read about flour
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	
Conclusion	In conclusion, seafood was the focus of the lesson and the students were guided to learn the different fish types that are found in local and sea water.		

APPENDIX S

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	Two
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Flour mixture
GENERAL OBJECTIVES:	To guide the At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students arefamiliar with flour

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activity**	**Assignment and class work**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1. List four raising agents you know Home work Read about eggs.
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	
Conclusion	In conclusion, flour mixture was the focus of the lesson and the students were guided to learn the different flour types and raising agents that are used in dough making.		

APPENDIX T

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	Three
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Flour mixture
GENERAL OBJECTIVES:	To guide the At the end of the lesson, the students should be able to: 1. List types of flour mixtures 2. Discuss types of flour mixture 3. List the different raising agents
PREVIOUS KNOWLEDGE:	The students familiar are with flour

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activities**	**Assignment and class work**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1 List four raising agents you know Home work Read about eggs.
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	
Conclusion	In conclusion, flour mixture was the focus of the lesson and the students were guided to learn the different flour types and raising agents that are used in dough making.		

APPENDIX U

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	Four
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Eggs
GENERAL OBJECTIVES:	To guide the At the end of the lesson, the students should be able to: 1. Identify different types of eggs 2. Discuss the nutritive value of eggs 3. Test and choose fresh eggs 4. Describe the uses of eggs in cookery
PREVIOUS KNOWLEDGE:	The students are familiar with eggs

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activity**	**Assignment**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1 Describe the nutritive value of eggs Assignment
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	2 Read about milk and milk products
Conclusion	In conclusion, eggs were the focus of the lesson and the students were guided to learn the different egg types and how they are used in cookery.		

APPENDIX V

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	Five
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Milk and milk products
GENERAL OBJECTIVES:	To guide the students to learn Milk and milk Products. At the end of the lesson, the students should be able to: 1. Discuss the nutritive value of milk and milk products 2. List milk products 3. State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activity**	**Assignment**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1. List five uses of milk Assignment 2. List three dishes made from milk
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	
Conclusion	In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.		

APPENDIX W

LECTURE TEACHING METHOD LESSON PLAN

WEEK:	Six
SCHOOL:	Government Secondary School T/Jukun
AGE OF LEARNERS:	
LEVEL:	SSS2
NO OF STUDENTS:	56 Students
DURATION:	80 minutes
TOPIC:	Milk and milk products
GENERAL OBJECTIVES:	To guide the students to learn Milk and milk Products. At the end of the lesson, the students should be able to: 1 Discuss the nutritive value of milk and milk products 2 List milk products 3 State the uses of milk
PREVIOUS KNOWLEDGE:	The students are familiar with milk

INSTRUCTIONAL TECHNIQUE:

Steps	**Teacher's activity**	**Students' activity**	**Assignment**
Introduction	The teacher introduces the topic	The students listen to the teacher	Class work 1 List five uses of milk Assignment 2 List three dishes made from milk
Explanation	The teacher explains the concepts to the students.	The students listen to the teacher	
Conclusion	In conclusion, milk and milk products was the focus of the lesson and the students were guided to learn the different types of milk, nutrients in milk and the uses of milk.		