Effect of Concept Mapping Instructional Strategy on Senior Secondary School Students’ Performance in Home Economics

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Abstract: This study investigates the effects of the concept mapping instructional strategy on Senior Secondary School students’ performance in Home Economics in Akure South Local Government Area of Ondo State, Nigeria. The study adopted the pre-test post-test quasi-experimental design approach. The participants are made up of 199 students selected from the total population of all SS2 Home Economics students in Akure South Local Government Area during the 2022/2023 session. The participants were given pre-tests, post-tests, and retention tests after two weeks. Five major research questions and null hypotheses were raised, answered, and tested. Independent t-test analyses revealed the following: Students taught using the concept mapping strategy performed better than those taught with the conventional method and equally performed better in the two-week retention test. Female students performed better than male students. There is no significant difference in the performance of students in private schools with those in public schools. All the groups showed improved performance for the two-week retention test after been taught using concept mapping strategy. The study showed that the concept mapping strategy is an appropriate method for teaching Home Economics for both male and female students. Among others, the study recommends that seminars should be organized for teachers to emphasize and encourage the use of the concept mapping strategy in teaching science and practical oriented subjects in senior secondary schools.

Keywords: Concept Map: Organizational Performance: Instructional Strategy: Teaching and Learning: High Schools: Nigeria.

1.0 Background to the Study

Home Economics is one of the vocational science subjects taught in both secondary and higher education institutions in Nigeria. It is taught as a fundamental subject and comprises Food and Nutrition, Home Management, and Clothing and Textile. The importance of exposing learners to various components of Home Economics is for individual and societal development, and it has been widely acknowledged that the knowledge and skills to be gained from the subject can make great contribution to young people’s personal and social development such as preparing them for the world of opportunities in a wide range of areas (Egounleti, 2022; Falode & Mustapha, 2022a). The curriculum for the subject is designed with the goal of ensuring learners acquire both the theoretical knowledge and practical skills needed for entrepreneurship and self-reliance. However, achieving the goal of teaching Home Economics in secondary schools requires trained teachers who are competent and can apply appropriate teaching strategies and learning resources among others. This suggests that there is a need for Home Economics teachers to identify and apply the appropriate teaching strategies while teaching the subject. Every good teacher should always look for new strategies and teaching techniques to help learners do better in class. According to Ahmad (2018), learning is a deliberate and complex process. Huffman (2015) noted further that learning involves a complex interacting system that includes environmental, social, motivational, emotional, and cognitive elements. To speed up students’ learning process, numerous teaching and learning strategies have been developed. Learning theories specify the roles of the instructor, students, content, and learning practices developed from those theories. Emaiku (2017) opined that conventional teaching methods are currently popular in Nigerian schools, where passive students and teacher-dominated classroom environments prevail. Researchers and educators from all over the world have started paying close attention to how teaching strategies affect students’ learning and performance. Relating to the aforementioned, Abdulhamid (2016) posited that the method by which students are taught has a significant impact on what they learn. Teachers of Home Economics can use a wide range of instructional strategies to fill various pedagogical gaps in Home Economics classrooms. In Nigeria, over the past few decades, the standard of students’ performance at all educational levels has decreased significantly (Emaiku, 2017). Thus, it is necessary for teachers to understand and make use of appropriate teaching strategies to enhance learning. While educators are not condemning conventional teaching methods such as lecture method, route learning, etc., which are components of the behaviourist school of taught rather, the constructivist view raises standard points in which modern strategies such as concept mapping and activity-based strategies should be integrated into teaching and learning to enhance learning (Wubante et al., 2022; Vintzileos & Ananth, 2010). The teaching method and strategies to be applied during teaching depends not only on the subject but also on the topic. It therefore follows that a teacher can adequately record a difference in their students’ performance when different strategies are employed while teaching a particular topic. Again, this difference in students’ performance may also vary along gender distributions of the students, their level of (technical) exposure, the type of school, students background and so on (Hamadouche, 2023). Thus, it is arguable that even when students are being taught a particular topic with the same teaching strategy, it is possible for the teacher to have significant differences in the teaching outcome. Such differences account for the fact that a particular teaching strategy appropriate for a particular group of students may not be the best approach to use to teach another group (Nnamdi, 2014; Ohanyelu, 2022). A good Home Economics teacher should know all these and take them into consideration for the best outcome.

Other variables with roots in psychological and environmental factors might be responsible for the decline in the standard of education and teaching outcomes in Nigeria. This decline in performance standard at the secondary school level is largely caused by the teaching strategies used by school staff. Squeira (2014) emphasized that some approaches to education encourage passive rather than active learning. Researchers and educators have frequently noted the shortcomings of the rigid conventional lecture method for instruction at
certain stages of education such as at the secondary level. A good Home Economics teacher is expected to understand the concepts of teaching methods, approaches, and strategies as well as when to apply them. According to Hassan (2016), teaching methods comprise the approaches and strategies that a teacher uses to successfully carry out their lessons. Mamman (2015), defined teaching strategies as ways of imparting knowledge through a succession of student-centred activities. Daluba (2017) opined that principles and instructional practices make up teaching approaches. The teacher’s instrument for achieving the predetermined lesson aims and objectives are their teaching methods. This study, however, is an experimental one where emphasis has been placed on concept mapping as an optimal teaching strategy.

A concept map is a form of graphic organizer that aids class organization and knowledge representation for learners. The process of using this strategy while teaching and learning is termed concept mapping. Concept maps start with a central notion (or concept) and then extend out to illustrate how that central notion might be subdivided into distinct themes (Falode & Mustapha, 2022b; Hassan et al., 2022). The subordinate concepts in concept maps often derive from the primary concept or idea in a hierarchical structure. However, this kind of visual organizer always allows for modification and the addition of new ideas. The map consists of concepts, which are typically denoted by variously shaped circles or boxes; and relationships between concepts, which are denoted by a connecting line joining two concepts. Ahmed (2018) explains that a concept map is a graphic representation that depicts the connections between various concepts. It is a graphic tool for knowledge organization and representation. He explained further that concept map representation stores statements in the form of implied natural language phrases that describe two or more ideas and their relationships. Students have been encouraged to actively build an awareness of concepts and relationships within topics of interest through concept mapping exercises in educational contexts, Ahmad (2018). The concept map was introduced with the intention of assisting the learner’s effort by externalizing ideas that students are already familiar with and making them visible to help them connect with other new ideas to be learned.

Teachers can use concept maps to measure their students’ comprehension, students can use them to compare their knowledge and renew it collectively. Professionals use the concept mapping strategy to demonstrate and impart their expertise. Concept mapping can be an effective tool to help children develop a high level of cognitive function if applied well. According to John (2016), a concept map is the perfect evaluation tool for teachers to use in tracking the development of and evaluating student learning. Teachers can see what concepts and ideas students do not understand by having students create concept maps, which allows them to do so. Concept maps also allow students to rephrase ideas in their own words and identify incorrect ideas and concepts. Students can better understand and convey a concept and the relationships between its examples and ideas by using this helpful visual thinking and learning tool. Concept mapping is a useful approach to learning that teachers ought to use to assess a students’ level of comprehension (Vintzileos & Ananth, 2010). To achieve the goal of having a student be able to explain each part of a concept map and their reasoning behind each concept as well as the connections they make, it is usually easier to use a computer. A concept map is meant to be continuously changed, added to, and reconstructed as new information and knowledge to be learned.

Academic performance is the measure of a student’s success in a subject based on predetermined objectives. The teacher’s employment of an effective teaching strategy aids in the accomplishment of these objectives. Academic performance is described by Edinyang (2014) as the educational result that shows how well a student, teacher, or institution has accomplished its educational objectives. Test or evaluations are frequently used to measure academic performance or achievement. In this study, achievement tests (pre-test and post-test) will be used in measuring students’ performance before and after experimental teaching. Given the importance of Home Economics to the Nigerian economy, it is crucial to discover and implement the best teaching strategies for teaching its topics in senior secondary schools. This is so that Home Economics teachers can effectively instruct and motivate students to achieve the goals and objectives of Home Economics in secondary schools. According to Abdulhamid (2016), for effective teaching to occur, the instructor must inspire, promote, and retain the students’ active participation through the choice of effective teaching
techniques; a harmony between what is taught and how it is taught would be necessary for this. Thus, the effectiveness of teaching Home Economics depends not only on the teacher’s extensive knowledge on the subject but also on the efficacy of the teaching strategy used.

2.0 Review of Related Literature

2.1 Instructional Strategies and Practices

Numerous instructional strategies and practices have been identified as characteristic of effective teaching or have been recognized as characterizing effective teachers. Such instructional strategies and practices have become the core of initial teachers’ education and subsequent professional development training programmes. However, Hoge (2016) stated that the use of identified instructional strategies and practices does not guarantee effective teaching. They are used by teachers in science classrooms. Instructional strategies and practices should only be regarded as characteristic of quality teaching if there is evidence that prove that they generally have a positive effect on student achievement (Eriksson et al., 2018). Emphasising the importance of instructional strategies, Gregory & Chapman (2015) argued that teachers need a wide variety and vast amount of these strategies in order to teach information in a variety of ways. They indicate that this is necessary to address the uniqueness of learners in a classroom. A wide variety of instructional strategies and practices not only addresses the uniqueness of each learner but also enables teachers to develop meaning and understanding for the benefit of learners (Nabea, 2020). The California Department of Education (CDE, 2015) places great responsibility on the role of teachers in relation to instructional strategies.

The CDE (2015) indicated that since a wide range of instructional strategies are available to teachers, effective teachers leverage them to find the best fit between the content to be taught and the adequate strategy for teaching them. Instructional strategies and practices are everything teachers use to aid learners in their learning process, and they serve as the means of achieving effective teaching and learning. Obara & Okoh (2014) explained instructional strategies as everything teachers utilise to interactively enhance, motivate, and facilitate teaching and learning for the achievement of set objectives. Instructional strategies are part of classroom practices (Arends et al., 2017) that are intended to improve learning and student achievement. Nichols (2015) regarded instructional strategies as a subset and one of the components of instructional practices. She defines instructional strategies as techniques that teachers use throughout instruction to support comprehension of the concepts being taught.

2.2 Definition of Teaching Strategies

Researchers define teaching strategies in different ways. According to Herrell & Jordan (2016), teaching strategies are approaches that can be used across curricular areas to support the learning of students. Wandberg & Rohwer (2017) define teaching strategies as the structure, system, methods, techniques, procedures, and processes a teacher uses during instruction. These are strategies the teacher employs to assist students’ learning. In addition, teaching strategies can be used alone or with other approaches. These strategies must suit the needs and abilities of students (Amos et al., 2015).

2.3 Types of teaching strategies

2.3.1 Conventional strategies

Lecturing is considered a conventional strategy because the teachers talk most of the time while students only listen; this means that students are passive learners. Teachers prefer to use this lecturing strategy because
they get to dispense a large amount of information in a short time (Kalmakis, 2016). Some students also prefer this strategy because they like to be passive since they feel familiar and comfortable (Sims, 2015).

2.3.2 Non-conventional strategies

Non-conventional teaching strategies refer to active learning strategies in which students are active learners and fully engaged in the learning process. Princ cited by Nabors (2018) stated that active learning does not entail merely a transmission of information but focuses on developing learners’ skills and increasing students’ attention in the classroom. The techniques teachers use promote creative thinking, students’ involvement and develop problem solving skills (James et al., 2022; Mustapha, 2022). Some active learning strategies are discussion, group work, case studies, concept analysis, games, and concept mapping. Lecture strategy can also be considered non-conventional if the teacher uses active strategies with them such as asking questions throughout the lecture.

2.4 Concept Mapping as a Teaching Strategy

A concept map is a special form of a web diagram used for exploring knowledge and gathering and sharing information. Concept mapping is the strategy employed in developing a concept map, which is a visual depiction of concepts, ideas, theories, or questions. Concept maps show existent or new relations. They are aids to processing information, storing, or retrieving information and solving problems. A concept map consists of links among nodes or cells that contain a concept, item, theory, or question. The links are labelled and denote directions with an arrow symbol. Labelled links explain the relationship between the nodes. The arrow describes the direction of the relationship and reads like a sentence.

The study mentioned some reasons for teachers to use concept maps as to gain insight into the ways students view a scientific topic. To investigate how well students understand connections with concepts. To capture the development of students’ ideas over time. To examine valid understandings and misconceptions students hold. To assess the structural complexity of the relationships students depict. In addition, the study reported on the concept maps and what they are used for, some of them are; learning terms, facts, and concepts belonging to a specific subject. Organizing information into meaningful categories. Synthesizing and integrating information, ideas, and concepts. Thinking about the “big picture” and seeing connections between and among concepts. Thinking creatively about a subject. Improving skills for long-term memory retention for accessible knowledge. Improving higher-level thinking skills, strategies, and habits. Using graphics effectively. Providing a wealth of information at a glance. Developing an understanding of a body of knowledge. Making new relations with old knowledge. Exploring new questions and solutions and solving problems.

2.4.1 When working on concept maps, use:

- a- a top-down approach, working from general to specific.
- b- a free association approach by brainstorming nodes and then developing links and relationships.
- c- different colours and shapes for nodes & links to identify different types of information.
- d- different coloured nodes to identify preexisting and new information.
- e- a cloud node to identify a question.
- f- gather information to answer an important question.
2.4.2 Practical applications for students

- Note-taking during lecture
- Group brainstorming
- Planning studies and career
- Providing graphics for presentations and term papers
- Outlining projects, term papers, and presentations
- Refining creative and critical thinking skills about problems, questions, and exploitative ideas

2.4.3 Step-by-Step instructions for learning factual and conceptual knowledge

- Introduce a concept that is familiar to all students or ask students to start discussing from familiar conceptual knowledge.
- Have students write down 10 additional concepts that they can associate with this main concept.
- Ask students to rank the 10 concepts from “most general and inclusive” to “least general and inclusive” or from “most important” to “least important”. This step will require several minutes.
- Tell students to write the “most general” or “most important” concepts near the top of a large piece of paper (poster board or butcher paper are excellent, but regular notebook paper will suffice). Have them enclose this “superordinate concept” in a box or oval. Use pencils instead of pen.
- Explain that you want them to connect concepts from their list, one pair at a time with directional links and most importantly, to label the linking lines. Continue this process until all concepts appear on the map.
- Give students plenty of time (actual amount varies with the level of the class and the difficulty of the question). Encourage them to include a lot of branching and many levels of hierarchy. Place emphasis on cross-linking concepts in one area of the map with those in other areas. Note that they may add as many additional concepts as they wish to make their maps unique and personally meaningful. Remind them that the boxes or ovals should contain only one or two words or a very short and clear description of the concept. Tell them that they may re-draw their maps as often as they wish.
- Encourage creativity. Select several students to share their maps with the class. You could provide transparency for each group to display their maps. Focus attention on appropriate connections between concepts.
- Remind students that concept maps may be a very helpful way to study. They can be used to condense many pages of textbook verbiage into a succinct summary. Concept maps make useful visual aids for presenting relationships between theoretical concepts and help users come up with new research questions or solutions to a problem.
- In the next class, introduce a central concept from your course and ask your students to construct a concept map on this topic. Collect the maps and review them but do not grade them. You may want to suggest ways the maps could be improved.
- Return the maps to the students and suggest that they rethink some of their ideas. Ask them to use different coloured pencils for each iteration so students may depict and emphasize how their ideas change over time. The same map may be used for several class periods, and students may be encouraged to add to, delete, reorganize, or even begin anew whenever they need to do so.

Advantages of using concept maps are: Concept maps help students see the “big picture” and visualize relationships. Concept maps are good for processing and storing large amounts of information. Through links, concept maps present information in a dynamic manner. Concept maps help students develop their meta-cognitive skill. While the disadvantages of using concept maps are: the use of concept maps makes comparative ranking of students’ work difficult. All concept maps look similar. Evaluation is more time consuming for the instructor (compared to a multiple-choice question). In the process of scoring concept maps,
a grading rubric is used for consistency. Students who have developed strong skills for factual memorization might resist and be intimidated by concept maps that require their seeing relationships between concepts, ideas, theories, questions, etc. Students who are used to thinking at higher levels (as graduate students usually are) may find concept maps boring and time-consuming.

2.4 Objectives of the Study

The major objective of this study is to examine the effect of the concept mapping strategy on the academic performance of senior secondary school students in Home Economics. Other specific objectives include to:

1. determine the difference in the performance of students taught with the concept mapping strategy and those in the control group taught with the conventional method.
2. determine the difference in the performance of male and female Home Economics students taught using the concept mapping strategy.
3. examine the difference in the performance of students from private schools and those from public schools taught with the concept mapping strategy.
4. examine any dissimilarity in the performance of students (male and female combined) from rural and urban schools taught Home Economics using the concept mapping strategy.
5. evaluate the performance of students two weeks after treating a topic using the concept mapping strategy.

2.6 Research Questions

This research will answer the following research questions:

- Is there any difference in the performance of students taught Home Economics using the concept mapping strategy and those taught with the conventional method?
- Is there any disparity in the performance of male and female students taught Home Economics using concept mapping strategy?
- Is there any disparity in the performance of students from private schools and those from public schools taught Home Economics using concept mapping strategy?
- Is there any difference in the performance of students from rural schools and those from urban schools taught Home Economics using concept mapping strategy?
- Is there any difference in the retention performance of students tested two weeks after using concept mapping to treat a topic in Home Economics?

2.7 Research hypotheses

Null hypothesis one (H₀ 1): There is no significant difference between the performance of students taught Home Economics with concept mapping and those taught with the conventional method.

Null hypothesis two (H₀ 2): There is no significant difference in the performance of male and female students taught Home Economics using concept mapping strategy.

Null hypothesis three (H₀ 3): There is no significant difference in the performance of students from private and public schools taught Home Economics using concept mapping.
Null hypothesis three (Hₐ 4): There is no significant difference in the performance of students from rural and urban schools taught Home Economics using concept mapping.

Null hypothesis eight (Hₐ 5): There is no significant difference in the retention performance of the students tested two weeks after using concept mapping to treat a topic in Home Economics.

3.0 Materials and Methods

The Research design adopted for this study is the pre-test post-test quasi-experimental design. This design is suitable for this research as it allowed the researcher collect data on students’ academic performance using the concept mapping and control group teaching strategy. To apply this design, the researcher gave pre-tests to students to determine their initial competence in all relevant aspects of the topic taught in Food and Nutrition, Home Management, and Clothing and Textile while using the conventional teaching strategy before exposing them to the treatment variable (concept mapping) after which post-tests and retention tests after two weeks were conducted. The population for this study comprised all senior secondary Home Economics students of the 2022/2023 academic session in all the government secondary schools and private secondary schools in the Akure South Local Government Area of Ondo State, making up seven hundred and seven (707) SS2 students.

The multi-stage sampling technique was employed for this study. The first stage required the use of purposive sampling to select schools that have students in senior secondary two class offering Home Economics from the entire population. Then the random sampling technique was used in selecting the schools and students that will participate in each control and experimental group to gather the required data, both male and female. Due to the relatively low number of enrolments in Home Economics in senior secondary schools, twenty (20) students were chosen from each school with equal disparity in gender: ten (10) for each gender. Group A will form the treatment groups (taught with concept mapping) while Group B will be taught using the conventional method. The students were taught in their classrooms. The researcher and class teachers (research assistants) taught the students with the conventional and concept mapping methods differently. One school each was selected from the population of rural secondary schools, urban secondary schools, private schools, and unity schools. Therefore, the total sample size (number of Home Economics students and participants) rounded up to one hundred and ninety-nine (199). The schools selected from the entire population are listed below:

The instrument for data collection was a multiple-choice test consisting of a 25-item Achievement Test in Home Economics (ATHE), which was developed by the researcher. This is in line with the research conducted by Huhu and Suleman (2017) who adopted a similar data collection instrument for their study. Students were tested based on the topics they were taught in the Home Economics subjects. Each of the questions had four (4) answerable options, A to D. Depending on factors like time, resources, and the topic being taught, hands-on activities were included during the assessment. Before administering the test instrument, it was subjected to face validity to ensure consistency and that it was free of errors; it was pilot tested by students in different locations but not at the locations selected for experimentation. Colleagues in the same field critiqued the instrument and made their suggestions which were taken into consideration. Finally, a copy was sent to the research supervisor for comments/suggestions and once approved, the final copy was printed. To ensure reliability of the instrument, it was first tested among students in different locations before administering the instrument to the target sample. The pilot test was analysed using Cronbech alpha, which revealed the reliability coefficient of 0.78. This value indicates that the instrument is reliable.

Research assistants, as trained and instructed by the researcher, were employed to facilitate data collection. The researcher and the class teachers taught the students in their classes; the lesson plans were prepared by the researcher. The lesson content and research instrument (test questions) were the same for all
groups in terms of the content coverage as well as the time frame and mode of evaluation. The only difference in the instructional activity was when the mode of teaching would differ by using either concept mapping or the conventional method of teaching. The research instrument was administered to each group’s participants immediately after they were taught, and each student was graded over 100. The same instrument was used for the pre-test, post-test, and retention test administered. Pre-tests were given before teaching then post-test were conducted immediately after teaching and retention tests were conducted after two weeks. The schools used are: Akpomu Community High School (rural school), Impact High School (private school), Federal Government Girls’ College, Akure (unity school/girls only). Oyemekun Grammar School (public school/single), St Peter Unity School, Akure (mixed/boarding). Simple descriptive statistics (means and standard deviations) were used to answer all the research questions. The data collected were subjected to the t-test statistics to compare students’ performance with each teaching strategy. All null hypotheses were tested at 5% level of significance.

4.0 Results of the Study

4.1.1 Research Question One and Ho 1
Is there any difference in the performance of students taught Home Economics using the concept mapping strategy and those taught with the conventional method?

Table 4.1.1 T-test Showing Descriptive and Inferential Analysis of Research Question One and Ho 1

<table>
<thead>
<tr>
<th>Test scores_1</th>
<th>Groups compared</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Max.</th>
<th>Min.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concept mapping_1B1</td>
<td>9</td>
<td>14.44</td>
<td>1.333</td>
<td>16</td>
<td>14</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Conventional_1A2</td>
<td>9</td>
<td>8.89</td>
<td>2.369</td>
<td>12</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1.1 shows the result of an independent t-test of students taught Home Economics with both concept mapping and the conventional method. The group taught with concept mapping has the mean score of 14.44 while the group taught with the conventional method has the mean score of 8.89. Accordingly, the maximum–minimum scores of the groups are 16:14 and 12:7, respectively. This means that there is a difference in the performance of students taught Home Economics with the concept mapping strategy compared with those taught with the conventional method. Those taught with concept mapping performed better.

4.1.2 Research Question Two and Ho 2
Is there any difference in the performance of male and female students taught Home Economics using concept mapping strategy?

Table 4.1.2 T-test Showing Descriptive and Inferential Analysis of Research Question Two and Ho 2

<table>
<thead>
<tr>
<th>Test scores_2</th>
<th>Groups compared</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Max.</th>
<th>Min.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Male participants taught with concept mapping (2A)  
Female participants taught with concept mapping (2B)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Max</th>
<th>Min</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private school students taught with concept mapping</td>
<td>10</td>
<td>11.60</td>
<td>3.28634</td>
<td>16</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Public school students taught with concept mapping</td>
<td>10</td>
<td>10.00</td>
<td>1.94365</td>
<td>13</td>
<td>7</td>
<td>0.358</td>
</tr>
</tbody>
</table>

The table above shows the result of an independent t-test of students from private and public schools taught Home Economics using concept mapping. The group from private schools has the mean score of 11.60 while the group from public schools has the mean score of 10.0. The maximum–minimum scores of the private- and public-school groups are 16:7 and 13:7, respectively. This implies that there is a slight difference in the performance of students from private and public schools taught Home Economics using concept mapping strategy.

4.1.4 Research Question Four and H₀ 4

Is there any difference in the performance of students from rural schools and those from urban schools taught Home Economics using concept mapping strategy?

<table>
<thead>
<tr>
<th>Groups compared</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Max.</th>
<th>Min.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students from urban school</td>
<td>19</td>
<td>8.6842</td>
<td>2.21241</td>
<td>13</td>
<td>5</td>
<td>0.449</td>
</tr>
<tr>
<td>Students from rural school</td>
<td>18</td>
<td>8.0714</td>
<td>2.30265</td>
<td>12</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

The table above shows the result of an independent t-test of students from rural schools and those from urban schools taught Home Economics using concept mapping. The group from urban schools has the mean score of 8.6842 while the group from rural schools has the mean score of 8.0714. The maximum–minimum scores of the urban- and rural-school groups are 13:5 and 12:5, respectively. This means that there is no significant difference in the performance of students from rural and urban schools taught Home Economics using concept mapping strategy.
Table 4.1.4 shows the result of an independent t-test of students from urban and rural schools taught Home Economics using the concept mapping strategy. The group from urban schools has the mean score of 8.68 while the group from rural schools has the mean score of 8.07. The maximum–minimum scores for both urban and rural groups are 13:5 and 12:5, respectively. This implies that there is a slight difference in the performance of students from rural and urban schools taught Home Economics using concept mapping. Students from urban school have a higher mean score showing that they performed better than the students from rural school.

4.1.5 Research question Five and $H_0$ 5

Is there any difference in the performance of students tested two weeks after treatment?

There is no significant difference in the performance of the students tested two weeks after treatment.

There is no significant difference in the performance of the students tested two weeks after treatment.

T-test: retention for students taught with concept mapping

<table>
<thead>
<tr>
<th>Concept mapping 1B1</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>68.764</td>
<td>0.9850</td>
<td>0.021</td>
</tr>
<tr>
<td>Retention</td>
<td>76.36</td>
<td>1.044</td>
<td></td>
</tr>
</tbody>
</table>

The table above shows the result of students taught Home Economics with concept mapping and their achievement scores for a retention taken two weeks after teaching. There is a higher mean score in their performance after two-week treatment, and the difference is significant ($0.021 < 0.05$). Hence, there is significant difference in their performance from those taught using the conventional method and tested after two weeks.

5.0 Discussion of Findings

The findings presented in Section 4.1 corresponds with that of Dan (2016) who found that teaching strategies comprising different instructional strategies, flexible grouping, and teaching approaches had the most significant impact on students’ achievement in science subjects. The analysis of Table 4.1.1 revealed that there is significant difference in the performance of students taught Home Economics with concept mapping and those taught with the conventional method. This indicates that students taught with the concept mapping strategy performed better than their counterparts taught with the conventional method. Ozcan & Uzuntiryaki-Kondakci (2017) examined the effects of concept mapping on the academic achievement and retention of male and female undergraduate students in a general chemistry course. They found that both male and female students taught with the concept mapping strategy performed better and had higher retention rates than those who were taught without the strategy. The result of this study also corresponds with that of Mocinic (2018) who concluded following his findings that education has changed and teaching should change as well. Teachers should use active strategies in the classroom to motivate learners and improve their engagement in the learning process. Thus, teaching methods that involve active strategies like concept mapping are crucial for teaching Home Economics as a science subject.
However, Table 4.1.2 showed that no significant difference exists in the performance of male and female students taught Home Economics with the concept mapping strategy. It is in line with Duran (2016) who found that both male and female students taught with concept mapping had higher academic achievement than those taught without the strategy. This finding suggests that the method is equally suitable for both male and female students. However, the improvement in academic achievement was greater for female students in urban schools than for the male students in rural schools. Ozcan & Uzuntiryaki-Kondakci (2017) found that there is no significant difference in the academic performance and retention rates of male and female students taught with concept mapping. Another study conducted by Tatar (2016) investigated the effects of concept mapping on the academic achievement of male and female middle school students and their attitude towards mathematics. The study found that both male and female students who were taught using concept mapping had higher academic achievement and more positive attitudes towards mathematics than those who were taught without the strategy. However, the improvement in academic achievement and attitudes was greater for female students than for the male students.

Table 4.1.3 showed that there is no significant difference between the performance of students from both private and public schools taught Home Economics using concept mapping strategies. This finding reflects that of Outmatch & Luo (2019) who studied the effectiveness of concept mapping on high school students in private and public schools. They found that while both groups of students showed improvement in their understanding of complex scientific concepts, the private school students showed greater improvement in their overall achievement scores. The researchers suggest that this may be due to the differences in instructional methods or teachers’ competence. Ali & Arshad (2020) also found that both private and public school students showed general improvement in their language skills after using concept mapping strategies, but private school students showed slightly greater rates of improvement. The researchers suggest that this may be because private school students generally have higher levels of English proficiency to begin with. Li & Li (2018) found that concept mapping had positive effects on student achievement across all subjects, and that the effect was more significant for students in private schools than for those in public schools. The authors suggest that this may also be because private school students generally have better access to resources and a higher level of academic motivation. This finding could be because both groups were equally motivated by the teaching approach. The result of the study also revealed that there is no significant difference in the performance of students from rural schools and those from urban schools as well as students in boarding school and those in day schools. Across the groups, the students generally showed better improvement after two weeks and the differences between this performance and the initial performance are significant. This suggests that the students show good retention rates after being taught using the concept mapping strategy.

6.0 Conclusion and Recommendation

This research has provided valuable insight into the effects of the concept mapping instructional strategy on senior secondary school students' performance in Home Economics. The findings unequivocally demonstrate that this teaching approach is a powerful tool for enhancing students' achievement in the subject. As we navigate the ever-evolving landscape of education, it is clear that innovative instructional strategies like concept mapping have the potential to reshape and optimize the learning experience, empowering students to excel academically. These findings underscore the importance of incorporating such pedagogical methods into the curriculum to unlock the full potential of our students and pave the way for a brighter future in the field of Home Economics education. Based on the results of the null hypotheses tested, this study concludes that the concept mapping teaching approach improves students' achievement in Home Economics. However, some recommendations from these study are: Seminars should be organized for teachers to emphasize the use of concept mapping and other appropriate teaching strategies in teaching science and other practical-oriented subjects. This strategy can be introduced by curriculum developers to ensure that the curriculum’s objectives are met, and that content is created to ensure higher-order learning. Since textbooks are the main handbook for
teaching concepts to students, it is vital for textbook authors to provide well-rounded materials containing excellent content, methodology, real-world applications, and assessment tasks. Idea maps and concept mapping exercises should be included as well. Concept mapping can be used as an evaluation method by examination bodies. Additionally, they can support the use of idea mapping as a tool for formative and summative evaluation. As a result, teachers will be forced to employ it as a teaching–learning strategy in classrooms. Emerging teaching–learning strategies such as concept mapping should be included in the curriculum of preservice and in-service teaching programs to train teachers and make them knowledgeable in their philosophical foundation, theoretical underpinnings, and practical application.

7.0 References of the Study


