American Journal of Educational Research, 2017, Vol. 5, No. 8, 848-857
Available online at http://pubs.sciepub.com/education/5/8/3

DOI:10.12691/education-5-8-3

The Effectiveness of a Proposed Program to Teach Core Thinking Skills for 1st Grade Middle Stage Students and Its Impact on Achievement in Family Education

Ebtisam Bakheet AL – Benayyan

Curriculum and Instruction of Home Economics, College of Education, Jeddah University

Abstract The present study aimed to identify the effectiveness of a proposed training program in developing core thinking skills among 1st grade middle stage students, and to identify the impact of the development of core thinking skills through the teaching of family education on the development of the 1st grade middle school students' thinking. It also aimed to identify the impact of developing core thinking skills on the achievement of the 1st grade middle school students through the teaching of family education. Thus, it explores the effectiveness of a proposed training program in developing core thinking skills among the 1st grade middle stage students, and it identifies the impact of the proposed program on the development of achievement and core thinking skills. The experimental methodology based on pre- and post-tests was adopted in this study and the sample consisted of (36) female students of the 1st grade middle school in Jeddah, Saudi Arabia. It revealed the effectiveness of the proposed program in developing core thinking skills of the 1st grade middle school students and its high impact on academic achievement.

Keywords: *effectiveness, core thinking skills, achievement, family education*

Cite This Article: Ebtisam Bakheet AL – Benayyan, "The Effectiveness of a Proposed Program to Teach Core Thinking Skills for 1st Grade Middle Stage Students and Its Impact on Achievement in Family Education." *American Journal of Educational Research*, vol. 5, no. 8 (2017): 848-857. doi: 10.12691/education-5-8-3.

1. Introduction

Because of being gifted with thinking, the man can settle in the earth and manage his life. Therefore, thinking is the highest form of human cognitive activity that could be used to acquire knowledge to develop values, beliefs and interests; give the opportunity to group participation, decision making and judging others; and develop the cognitive and practical skills.

Accordingly, Islam is greatly interested in thinking and calls for its development due to its importance in human life. It helps the person identify the Creator and investigate the secrets of the universe. Moreover, it helps manage one's life and develop one's works. If a person reflects on the Qur'an, one finds many verses that motivate people to think, contemplate, reflect and deliberate. Allah, the Almighty says: "And it is He who spread the earth and placed therein firmly set mountains and rivers; and from all of the fruits He made therein two mates; He causes the night to cover the day. Indeed in that are signs for a people who give thought." (Ar-Ra'd: 3), and "And in yourselves. Then will you not see?" (Adh-Dhaariyat: 21). It is amazing that the Qur'anic verses mentioning derivatives of mind and using it are (644) verses, (16) of which call to thinking.

Thinking is a basic tool of acquiring knowledge. That is, the educational systems no longer aim to only deliver knowledge and facts to students, they also develop and teach thinking. Thus, one can manage life. Al-Naqa [8] believes that the society needs people who know how to learn and handle knowledge technology; fast-adapting to future developments; possess rational insight, scientific thinking, imagination and creativity; and share and apply knowledge and experience.

Unquestionably, information gets older but thinking skills are always new which enables a person to acquire new information. Therefore, thinking is the tool by which a man could face life changes. It helps formulate beliefs, attitudes and perspectives. Consequently, societies pay more attention to developing thinking skills to achieve optimum benefit from their peoples [16].

Due to the importance of thinking in learning and teaching, governments were keen on developing its methods and teaching its skills to learners to help them comprehensively prepare themselves. For example, the 18th Scientific Conference of Curricula and Building Arabs (2006) in Cairo recommended that "the educational system does not only aim to prepare individuals who are capable of coping up with changes, but to prepare those who can make changes and to teach young generations how to respond, and communicate". Saudi Arabia was not away from such developments. The Saudi Ministry of Education applied "Developing Teaching Strategies" in the academic year (2004/2005), under the slogan "Teach me How to Learn". It mainly aimed to give teaching a paradigm shift depending on the student's active role in the learning process [4].

In other words, teaching and developing thinking among students causes more knowledge. Thus, it is

necessary to teach them how to think, otherwise the question "how would they continue learning?" is raised [30].

Additionally, the Ministry of Education [25] confirmed the importance of developing human resources which to accomplish the objectives of education, e.g. comprehensively developing and preparing learners responding to the fast changes in school environment. Consequently, teaching how to think is a must for the modern requirements of educational systems. It helps learners develop their mental capabilities and abilities to invest them in a better way to understand life better. Thus, they have self-confidence and independent thinking and can make rational decisions to adapt to their communities.

Home economics (family education) is an applied science that contributes to the development of life aspects based on information from natural, social, and art sciences. It is a fast-changing and developing field according to the development of sciences where information is derived. It also helps improve family life which is the nucleus of society. Additionally, it provides learners with the necessary information, skills, attitudes, and values to keep their integrity physically, mentally, and emotionally.

To study home economics, the female students need to develop thinking skills, e.g. core thinking skills that cover imagination, observation, comparison, deduction, and concepts' expression. According to Mahmoud [23], they are simple cognitive skills representing a basis of the compound and complex thinking and higher processes"

Ketteringham [21] argues that "concentration, data collection, remembering, organization, analyzing, generation, and integration are the most important core thinking skills". He adds that social studies are responsible for preparing learners to define, understand and find solutions to the problems of the society.

To develop them, a suitable environment should be provided to maintain core thinking skills among learners. Al-Bonyan (2010) refers to the importance of preparing a suitable classroom environment for developing higher-order thinking skills among the female students by learning and training on the use of the different scientific methods and preparing the appropriate and self-motivating conditions.

Additionally, it can become a habit of the teacher who believes that (Learning is Thinking). Accordingly, educational activities in the classroom can be the axis of teaching specific thinking skills by reinforcing and relating the skill to the different life issues. It becomes a part of future thinking [26].

To continue employing thinking skills in a course, Langrehr [22] suggests that the teacher should always remember the following open questions that may help him/her: What is your evidence about ...?; what are your standards for ...?; How ... can be classified?; Try to predict ...; and what would you deduce from this announcement ...? They and other similar questions should always be asked by the teacher because modern teachers are teachers of thinking not publishers of content and information.

Thus, it is highly important to develop and teach the skills and processes of thinking that are valid and renewable regarding their benefit in manipulating information. Sternberg (1991) argued that "while knowledge and information are extremely important and often get older, thinking skills are always new to enable us acquire and deduce knowledge regardless of time, place or type of knowledge that use thinking skills" [18].

Clearly, teaching and developing students' thinking provides them with the tools required to effectively handle any type of future information or variables. Thus, teaching for thinking is getting more important for personal success and community progress.

Accordingly, it is important to develop the core thinking skills among students in order to achieve the basics of sciences, including home economics, and use them in the present and future.

1.1. Statement of the Problem

While teaching core thinking skills is a major objective to be achieved by many communities, few Arabic studies tackled that topic. To the author's knowledge, few local and Arab studies covered them. Accordingly, the current study is significant.

Based on the international attitudes of teaching thinking skills, recommendations of the international and Arab conferences, and literature, the author believes in the importance of teaching thinking. She created a program to teach core thinking skills for 1st grade middle stage students to be taught and measure its effectiveness on developing thinking and achievement in family education. Therefore, the problem of the study can be defined in asking the following major question: What is the effectiveness of a proposed program to teach core thinking skills for 1st grade middle stage students? What is its impact on achievement in family education? It is further sub-divided into the following minor ones:

What is the effectiveness of the proposed program in developing core thinking skills for 1st grade middle stage students? What is its impact on achievement in family education?

What is the impact of developing core thinking skills by teaching family education on developing the thinking of 1st grade middle stage students?

What is the impact of developing core thinking skills by teaching family education on the achievement of 1st grade middle stage students?

1.2. Objectives

The present study aims at:

1. Exploring the effectiveness of the proposed training program in developing core thinking skills among 1st grade middle stage students.
2. Defining the impact of developing core thinking skills by teaching family education on developing thinking among 1st grade middle stage students.
3. Defining the impact of developing core thinking skills by teaching family education on the achievement of 1st grade middle stage students.
4. Investigating the effectiveness of the proposed training program in developing core thinking skills among 1st grade middle stage students and its impact on developing core thinking skills and achievement.

1.3. Hypotheses

1. There are statistically significant differences at the level of (0.05) between 1st grade middle stage students' means in the pre- and post-tests of core thinking skills, in favor of the post-test.
2. There are statistically significant differences at the level of (0.05) between 1st grade middle stage students' means in the pre- and post-achievement tests, in favor of the post-test.
3. There is a positive impact of teaching (food and nutrition) and (security and safety at home) units using core thinking skills on improving achievement and developing thinking among 1st grade middle stage students by calculating Eta-squared (n2).

1.4. Significance

The present study is significant because:

1. It copes with the international educational attitudes that call for developing the learner's core thinking skills.
2. It helps teachers create a program to develop core thinking skills as part of using the curriculum's content.
3. It guides decision makers and stakeholders of education in KSA to the importance of teaching core thinking skills in the curriculum.
4. To the author's knowledge, it is one of few studies on teaching and developing core thinking skills among 1st grade middle stage students. Such skills are badly required to identify due to their importance in the educational field in terms of the modern trends of family education.
5. Its results can be applied to the educational institutions to use them in planning the educational programs for middle stage.
6. It is a pioneering attempt in the field because it is, to the author's knowledge, the first study in Jeddah, KSA.

1.4. Limitations

- *Objective limitations*: It is limited to applying a proposed program in developing core thinking skills for 1st grade middle stage students and measuring its impact on achievement in family education. It was applied to (food and nutrition) and (security and safety at home) units taught as part of family education for 1st grade middle stage students.
- *Human limitations*: It is applied to a group of 1st grade middle stage students.
- *Spatial limitations*: School (36) in Jeddah, KSA.
- *Temporal limitations*: A questionnaire was applied in the second semester of 2016/2017.

1.5. Definition of Terms

Program:

According to the lexicon of Arabic language (1990), it is "an action plan for a certain work". The present study defines it as "a design of a set of actions and practices that are pre-settled by the author to develop core thinking skills through family education among 1st grade middle stage students".

Effectiveness:

Al-Mo'jam Al-Waseet (1990) defines it as "a description of all that is effective". According to Shehata and Al-Najjar (2003) it id the impact of experimental treatment as an independent variable on the dependent ones. Also, it is the impact of the independent factor(s) on the dependent one(s). It is statistically estimsated by Eta-Squared or by estimating the practical significance of the statistical indicator in the analysis of statistical data. Sometimes, it is "the appropriateness of treating the correct objective". In addition, it is "the impact of experimental treatment, as a as an independent variable, on the dependent ones" (Al-Sa'eed, 1997).

It is procedurally defined as defining the desired change by the proposed program in developing core thinking skills and improving the achievement in family education among 1st grade middle stage students.

Core thinking skills:

According to the Association for Supervision and Curriculum Development ASCD (1995), they are "separate cognitive processes considered as the bases of thinking structure and cover eight major skills and twenty minor ones" [22]. They are cognitive processes considered the basic pillars of thinking [26].

The author procedurally defines them as the ability of 1st grade middle stage to practice mental activities that provoke thinking. They are measured by their responses to the items of core thinking skills test that was prepared by the author.

Achievement:

According to Al-Kasbany [7] it is "the information and skills acquired by learners as a result of studying a specific topic or unit"

It is procedurally defined as the scores of 1st first grade middle stage students in the achievement test prepared by the author on (food and nutrition) and (security and safety at home) units.

1.5. Theoretical Framework

The importance of core thinking skills:

Thinking and its skills play a vital role in the life of learners because they enable them to acquire new horizons in many fields. Thinking helps learners improve their cognitive achievement. Education does not only aim to deliver information to learners, it also aims to give them insights into how to employ that information in their present and future life. Teaching thinking helps benefit from and invest in the creativity of students to meet their needs which would help them properly grow up and handle life requirements.

Core thinking skills are related to students' mental abilities and performing many cognitive processes that are required to improve their achievement. Wilson defined thinking skills as "the mental processes performed to collect, memorize, and store information by the actions of analysis, planning, evaluation, drawing conclusions and making decisions" (Sa'ada, 2006). They are important because of their role as an active tool that enable students to develop their knowledge and improve achievement.

Mahmoud [23] argues that they are important because they are not separated but they are interactive. They are integrated and interrelated and can help make rational judgments. If they are used in the classroom, they become processes. They are known as activities and efforts if performed by students through multiple roles to understand, solve problems, and improve cognition and productivity.

Marzano et al. [24] assure that teaching core thinking skills may occur at any educational stage. Additionally, teaching each skill must not be separated from teaching the others. Nofal and Abu-Jado [26] believe that the importance of incorporating thinking and its skills into curricula occurs because they get improved if incorporated. Hence, Marzano et al. made a list of twenty-one essential thinking skills under eight major categories to provide a method required by students to organize their own thinking skills to become good thinkers.

Trying to explore the relation of core thinking skills to other thinking fields, Marzano et al. prove that they are necessary and essential for employing other dimensions of thinking. They can be used to employ processes of metacognitive, critical or creative thinking.

The author believes that core thinking skills include concentration (e.g. formulating objectives), data collection (e.g. observation), memorization (e.g. coding and recalling), organization (e.g. comparison and categorization), analysis (e.g. defining features and components and recognizing key ideas), generation (e.g. inference and prediction), integration (e.g. summarizing), and evaluation (e.g. setting standards). They are illustrated, as follows:

A. Concentration:

It is paying attention to specific information. It is activated when students feel that there is a problem or a perplexing situation. It helps pay attention to collect small pieces of information, concentrate on them and neglect others, and solve problems such as formulating objectives. Al-Sayed (2010) believes that formulating objectives provides learners with clear understanding by offering the experience necessary for positive adaptation to the lesson and providing appropriate thinking methods that help teachers define the type of activities for achieving the objectives and selecting appropriate evaluation methods to improve the process of learning and teaching.

B. Data collection:

It is an intellectual skill used in getting information from its appropriate sources according to their appropriate categorization. It is important because a learner needs to collect information from its appropriate sources under knowledge explosion, multiple information sources, and diversity of information on one topic.

For example, observation refers to getting information by one or more senses. It is a mental process that requires the presence of something that provokes attention. It is the appropriate base of many other thinking skills. That is, good observation helps get better quantitative and qualitative information.

It can be applied according to certain steps including recognizing the thing or action to be observed, defining the sense(s) to be used, thinking deeply about it and defining its specific features, documenting the results of the observation and comparing them to reality, and finally judging the process of applying the skill.

C. Memorization:

It is the skill of memorizing information in the long-term memory. It provides students' memories with information to be retrieved if required. It is essential to help students use the information they got earlier. It covers many minor skills such as coding and recalling. Coding refers to the ability of connecting small pieces of information together in the long-term memory in the form of shortcuts to be easily retrieved. It can be improved using various teaching methods, e.g. concept and mind maps.

Recalling is the process by which saved information are recalled. Al-Sallety [11] argues that previously stored information can be retrieved. This depends on the power of memory traces and their relation to the significances of retrieving. In other words, learning represents getting and storing information while memorization is the process of recalling stored information.

D. Organization:

It stands for a group of actions used to organize information so that it would be easy for students to understand it. It helps focus on the information to be learned, record it in memory, transfer it from short-term to long-term memory, and link old and new information together. It covers comparison and categorization. Comparison can be defined as the skill used to examine two things or ideas in order to identify similarities and differences between them. It increases students' ability to recognize similarities and differences among things, ideas, and concepts. In addition, it adds the element of anticipation and excitement. This process happens on examining the features related to two topics, ideas, or things by making a list of their differences and similarities and summarizing them, such as asking students to identify similarities between the banana and lemons or among the rabbit, deer, and cow.

Categorizing information means the ability to collect information about things according to their common aspects and categorize them together. It is essential for building students' cognitive referential framework and identifying the characteristics, sequence, and hierarchy of things in their category. Abdullah [1] argues to work well, the memory requires a comprehensive rational. Accurately, it requires more effort in categorizing, sequence, and hierarchy. This process includes reviewing data to be categorized, remembering the previous related information, selecting an item, searching for a similar one, and inserting a heading to gather all similar items.

E. Evaluation:

It is an organized process of collecting and analyzing information in order to evaluate the quality and rationality of ideas. It contributes to address deficiencies and upgrade strengths. Moreover, it provides individuals with the skills of constructive criticism and illustrating the achievement of objectives. It covers the skill of building standards which means assigning a group of standards to judge the quality and value of ideas. It helps set accurate criteria to judge, categorize, and evaluate things and to accurately make decisions. The steps of applying this skill are defining a standard for judging a specific topic, suggesting several related sub-standards, being acquainted with available related facts, remembering previous related information, and making use of previous experience in assigning the standards.

F. Generation:

It is a mental process that aims to get a lot of ideas and alternatives. It helps develop and improve ideas, connect previous ideas to the generated ones, and create innovative ones. It implies inference and prediction. Inference refers to thinking beyond the available information to bridge the gaps. Thus, it helps make discussions about a problem through some logical steps and contributes to interpreting the problem and making an appropriate decision based on deductions. It is conducted by identifying the problem in hand; identifying relations, patterns, and features; increasing fluency of potential ideas to interpret the phenomenon; and analyzing the ideas to select the appropriate one. Prediction is a mental process that enables students to anticipate what can happen in the future according to the logical sequence of events. According to Kattamy [20], it is the learners' ability to use their previous information to anticipate a future event or phenomenon.

Jawdat [19] believes that prediction is an essential element for proposing hypotheses or experimental solutions for a problem and finding appropriate solutions. In addition, it employs thinking to propose more solutions. Thus, it is an important element for identifying causal relations of phenomena. This skill can be applied by collecting data, analyzing them, finding potential patterns and categories, and predicting possible results from the proposed data and information to be categorized according to the possible hypotheses.

G. Integration:

It is connecting and standardizing the information of mutual relations which would make them much easier to be understood and integrated to increase understanding. It implies summarizing that refers to the students' ability to find the key idea of a topic and concisely express it. Therefore, it helps retain ideas in mind, organize information according to priority, and avoid monotony in long topics. Summarizing can be applied by identifying the topic or text to be summarized, deleting unnecessary information that would not impair meaning, replacing some ambiguous words with easy-to-understand ones, writing down key ideas and words, and formulating the summary accordingly.

H. Analysis:

It refers examining the available pieces of information and their relationships. It helps identify the components, features, reasons, and internal characteristics of ideas. Moreover, it contributes to recognizing the relations and patterns. It implies recognizing features and components and recognizing key ideas. On one hand, recognizing features and components represents students' ability to differentiate things from each other and identify their characteristics and parts. It helps identify the characteristics, components, and aspects of correlation and their results. It can be applied by identifying a topic or incident to be recognized, examining its most prominent features, and summarizing them in key points.

On the other hand, recognizing key ideas is a skill whereby students can identify the ideas of a specific educational topic. It helps increase their understanding, cognition, and concentration while studying. It can be applied by generally examining the topic, reviewing its headings and subheadings, reading the abstract to have a general idea before getting into details, asking specific questions which would make studying meaningful, and reading the topic which aims to recognize and understand key ideas.

2. Literature Review

Al-Jendy et al. [6] aimed to identify the impact of applying the strategies of dimensions of learning model in developing core thinking skills among the 5th scientific grade students. The sample consisted of (114) students of the 5th scientific grade, divided into three equal groups. While the first group was taught by the strategy of concentrating on knowledge of the dimensions of learning model, the experimental group was taught by the strategy of concentrating on issues of the dimensions of learning model, and the third group was taught by the traditional strategy. Thus, a test on core thinking skills was made covering (21) sub-skills. Results showed that the first and second experimental groups outperformed the control one in the test of core thinking skills and the organization of educational content which would contribute to improving core thinking skills.

Adeyemi [2] aimed to investigate the methods employed to reorganize higher education in Nigeria. Thus, critical thinking skills become a feature of the young generations to be able to solve problems. They would be a source of power for the Nigerian society. The study specifically handled the concept, significance, and teaching of critical thinking especially higher education students. Finally, it makes recommendations on how to effectively apply it. It concluded that critical thinking paves the way to achieve personal success, national peace, progress, and development. Thus, it must be seriously adopted by the concerned authorities for the common good. Teachers in classrooms employ a higher level of cognition. They adopt appropriate teaching methods such as the Socratic Method, survey-based learning, problem-solving,… etc. that suit the development of critical thinking among students. Moreover, it recommended that learners should not only acquire knowledge and skills related to critical thinking, they should apply them to everyday life, as well.

Al-Masa'eed [9] explored the impact of an educational program of teaching core thinking skills on their development and achievement in geography among 6th grade students. It tackled the following core thinking skills: comparison, categorization, ordering, representing information, symbolization, and recalling. The author taught these skills to the participants of the experimental group by direct learning. Then, they were taught some topics of geography using them. Results indicated statistically significant differences in the average performance in the core thinking skills test between the experimental and control groups favoring the experimental. Also, there were statistically significant differences in the average achievement in geography between the students of the experimental and control groups favoring the experimental.

Cano and Hewitt [13] investigated the interrelationships among thinking styles, learning styles, and academic achievement. The study was conducted on a sample of

university students in Spain of (210) students, with an average age of (19) years and a standard deviation of (1.41). The authors adopted a list of thinking styles made by Sternberg in 1991 which consisted of (104) items to measure thinking styles; and a list for measuring learning styles covering sensory experience, effective experimenting, mental perception, and reflective observation. They were applied in Spanish. Then, the authors estimated and analyzed the achievement scores, correlation coefficients, regression analysis, and variance analysis. Results showed that there was a positive significant relation between thinking styles and reflective observation and that there was a lower relation between thinking and learning styles (experience, experimenting, and perception). Regression analysis indicated that achievement was related to thinking and learning styles.

Cunninjham [15] aimed at exploring the effectiveness of the enrichment educational program in developing critical thinking skills of non-verbal intelligence test and inference skill among the members of the experimental group compared to those of the control one. The author applied the program to two private schools of those with lower educational abilities in the USA. The program was applied to the experimental group over a scholastic year with pre- and post-tests on the thinking skills under study. Results indicated that there were statistically significant differences between the two groups in critical thinking skills, inference skill, and non-verbal tests in favor of the experimental group.

Tebbs [31] investigated teachers' estimation of self-efficacy in teaching thinking skills. It was an exploratory study trying to answer three questions: What is the level of self-efficacy necessary for teaching thinking skills? What are the differences between teachers as for self-efficacy in teaching thinking skills? What are the variables that explain the huge variance among teachers as for self-efficacy in teaching thinking skills? To answer these questions, the sample consisted of (12) teachers in Britain. Results showed that teachers considered self-efficacy very necessary for teaching thinking skills. Additionally, self-efficacy differed according to the topic being taught and depended on the nature of the training that teachers previously had and the appropriateness of the training to teach thinking skills. It appeared that the variance between teachers in teaching thinking skills was due to some factors, including high-level training, variety of experience and training, high-level creative thinking, and the relation to scientific thinking and analysis. These factors provide teachers with high level of self-efficacy for teaching thinking skills.

Grigorrenko and Sternberg [17] tackled the relation of thinking styles to some students' abilities and academic performance. The study was applied to a sample of excellent students in the US aged 12-15 years. The sample consisted of (199) students. The authors adopted an aptitude test and the list of thinking styles made by Sternberg in 1991. By analyzing correlation coefficients, they found out that there was a positive significant correlation at the level (0.05) between thinking styles and academic achievement. It also appeared that students' academic performance could be predicted by thinking styles and they were partially independent from the mental abilities and intelligence.

Chiodo and Sai [14] investigated the opinions of social studies teachers about their knowledge of critical thinking skills and how far they adopted teaching methods to improving them. The sample consisted of (21) high-school teachers of social studies who were interviewed in order to know their opinions on critical thinking skills and they were observed in classrooms by an observation card. Results indicated the low level of their knowledge about critical thinking skills. In addition, it appeared that they slightly employed the methods of improving critical thinking skills.

Tsai [32] investigated the perspectives of high-school teachers in China about critical thinking skills in social studies and how far they knew about them. The sample consisted of (22) teachers. The interview was the tool of collecting data about the concept of critical thinking and how far they practiced its skills. Results showed that social studies teachers ignored the concept and that students did not acquire critical thinking skills. Also, it appeared that only seven out of eleven teachers practiced critical thinking skills.

Commenting on literature:

Reviewing literature showed that:

1. The present study agreed with some studies, e.g. Al-Jendy et al. [6] and Al-Masa'eed [9], in the core thinking skills (comparison, categorization, ordering, representing information, symbolization and recalling).
2. It matched some studies, e.g. Al-Jendy et al. [6], Al-Masa'eed [9] and Cunninjham [15], that improving core thinking skills increased students' abilities of understanding and achievement. However, it differed from Tebbs [31] that focused on teachers' abilities to teach thinking skills.
3. It matched some studies, e.g. Al-Jendy et al. (2013), Al-Masa'eed [9], Tsai [32] and Cunninjham [15], in adopting the experimental method by applying the study on experimental groups of students. However, it differed from Tebbs [31] that applied the analytical approach to a sample of teachers.
4. It agreed with Al-Masa'eed [9] in the adopted learning style, i.e. direct teaching. However, it differed from other studies such as Al-Jendy et al. [6] that applied the strategy of dimensions of learning model, Cunninjham [15] that adopted an enrichment educational program, Tebbs [31] that applied a training program to teachers, and Chiodo and Sai [14].
5. It is unique in being applied to family education.
6. The author made use of literature in formulating the problem, identifying the variables, formulating the hypotheses, preparing the theoretical framework, and creating the tools.

3. Procedures

A. Methodology:

The author adopted the descriptive method in collecting data for writing the theoretical framework and literature review and in making the tests. Moreover, she adopted the quasi-experimental method because it is appropriate for the purpose of the study. The study analyzed the impact of

experimental factor(s) as an independent variable (i.e. the program) on dependent factors (i.e. core thinking skills and the achievement test). It adopted the experimental methodology based on pre- and post-tests for one group [5]. The program was applied to the sample after testing and retesting the tools.

B. Population and Sampling:

Population: The 1st grade middle stage female students in school (36) in Jeddah, KSA. They were distributed to (5) classes.

Sample: Class (1/A) was selected and the sample comprised (34) students; (3) students were excluded.

Table 1. The number of students in the sample:

Grade	Number	Excluded	Total number
First	34	3	31

B. Tools:

1. The achievement test:

It was created by the author aiming at measuring the cognitive achievement of students in (food and nutrition) and (security and safety at home) units.

- Controlling the test (Validity – Reliability):

Validity: The test was submitted to a group of specialists in curriculum and methods of teaching and a group of female educational supervisors on family education. Then, it was modified according to their notes. Finally, it was created in its final form.

Reliability: In order to calculate the reliability coefficient, the Statistical Package for the Social Sciences (SPSS) of Alpha Coefficient was adopted. It was (0.91) which was high, indicating that the test measured what it claims to measure; i.e. (cognitive achievement of (food and nutrition) and (security and safety at home) units), as shown in Table 2.

Table 2. Reliability coefficient of evaluating the reliability of the achievement test and the overall tool

No.	Domain	Cronbach's Alpha (α)
1	Food and nutrition unit	0.92
2	Security and safety at home unit	0.90
The overall tool		0.91

Table 2 shows that all the values of reliability coefficients of the test domains were appropriate for the study purposes; they ranged from (0.90) to (0.92). The value of the overall reliability coefficient was (0.91) indicating that the test was appropriate to be applied and that its results could be trusted.

- Pre-achievement test:

The pre-test was made in order to evaluate the sample's achievement level of the concepts of (food and nutrition) and (security and safety at home) units.

- Core thinking skills test:

It was created by the author after reviewing some books on thinking teaching and applications.

- Objective of the test: Measuring the thinking level of 1st grade middle stage students through core thinking skills.
- Discrimination coefficient of the items: The discrimination of core thinking skills items was calculated; its value was above the assigned appropriate range (0.57).
- Reliability of core thinking skills test: In order to calculate the reliability coefficient, SPSS was used and Alpha Coefficient was calculated. It was (0.92) which was high indicating that the test measured what it was claimed to measure; i.e. how far students master core thinking skills.

4. Statistical Analysis and Results of the Study

The present study aimed at testing the following hypotheses:

1. There are statistically significant differences at the level of (0.05) between students' average scores on the pre- and post-tests of core thinking skills in favor of the post-test.
2. There are statistically significant differences at the level of (0.05) between students' average scores on the achievement test in favor of the post-test.
3. There is a positive impact of teaching (food and nutrition) and (security and safety at home) units using core thinking skills on improving achievement and developing thinking among 1st grade middle stage students by calculating Eta-squared (n2) to measure the effect size on the related groups.

To test the first hypothesis, T-Test was applied to two related groups in order to identify the significance of differences between the students' average scores in the pre- and post-tests of core thinking skills in favor of the post-test, as shown in Table 3.

Table 3 shows that there are statistically significant differences at the level of (0.05) between students' average scores on the pre- and post-tests of core thinking skills in favor of the post-test. Also, there are statistically significant differences on its components (i.e. concentration, data collection, remembering, organization, analysis, generation, integration, and evaluation).

These results are attributed to the need of 1st grade middle stage students to be trained on core thinking skills to perform inference and deduction and compare the acquired information in family education. They matched the results of Al-Jendy et al. [6], Al-Masa'eed [9], and Cunninjham [15].

To test the second hypothesis, t-test was applied to two related samples in order to determine the significance of differences between the students' average scores in the pre- and post-achievement tests in favor of the post-test, as shown in Table 4.

Table 4 shows that there are statistically significant differences at the level of (0.05) between students' average scores on the achievement test in favor of the post-test of (food and nutrition) and (security and safety at home) units, as follows:

- Food and nutrition unit:

Table 4 showed that T-Value was (3.181) which was higher than the value at the level of (0.05), indicating that there were statistically significant differences between the students' average scores on the achievement test in favor of the post-test which would prove the improvement of achievement in food and nutrition unit.

Table 3. Results of T-Test showing differences between the students' average scores of the pre- and post-tests of core thinking skills of in favor of the post-test

No	Domain		Arithmetic Mean	Standard Deviation	T	Significance Level
1	Concentration	Pre-test	3.42	0.766	2.296	*0.037
		Post-test	3.96	0.612		
2	Data collection	Pre-test	3.22	0.855	2.289	*0.032
		Post-test	3.45	0.798		
3	Remembering	Pre-test	3.46	0.718	2.297	*0.040
		Post-test	3.94	0.645		
4	Organization	Pre-test	3.29	0.867	2.294	*0.063
		Post-test	3.29	0.786		
5	Analysis	Pre-test	3.44	0.665	2.553	*0.055
		Post-test	3.89	0.699		
6	Generation	Pre-test	3.25	0.861	2.832	*0.083
		Post-test	3.35	0.865		
7	Integration	Pre-test	3.45	0.638	2.258	*0.072
		Post-test	3.93	0.812		
8	Evaluation	Pre-test	3.25	0.788	2.639	*0.059
		Post-test	3.66	0.930		
The overall mean of variables		Pre-test	3.34	0.750	2.432	*0.055
		Post-test	3.68	0.787		

* Statistically significant at the level of (0.05), T-Value at the level of (0.05).

Table 4. results of t-test showing differences between the participants' average scores of the achievement test in favor of the post-test

No.	Domain	Sample	Arithmetic Mean	Standard Deviation	T- value	Significance Level
1	Food and nutrition unit	Pre-test	3.61	0.812	3.181	*0.035
		Post-test	3.88	0.718		
2	Security and safety at home unit	Pre-test	3.91	0.784	2.611	*0.040
		Post-test	3.91	0.760		
Total		Pre-test	3.76	0.798	2.896	*0.037
		Post-test	3.88	0.739		

* Statistically significant at the level of (0.05), T-Value at the significance level of (0.05) = 2.0.

- Security and safety at home unit:

Table 4 showed that T-Value was (2.611) which was higher than the value at the level of (0.05), indicating that there were statistically significant differences between the students' average scores on the achievement test in favor of the experimental group which would prove the improvement of achievement in security and safety at home unit in the post-test.

This result was attributed to the positive impact of the program applied to the students of the experimental group for teaching core thinking skills. It improved their achievement in (food and nutrition) and (security and safety at home) units. They were more capable of inferring, deducing, and comparing; their achievement in these units was improved.

It matched the results of Al-Masa'eed [9] that indicated that there were statistically significant differences in the means of achievement between the experimental and control groups in favor of the experimental group.

The third hypothesis "there is a positive impact of teaching (food and nutrition) and (security and safety at home) units using core thinking skills on improving achievement and developing thinking among 1st grade middle stage students by calculating Eta-squared (n2) to measure the effect size on the related and non-related (independent) groups.

In order to measure the effect size of meta-cognitive strategies (d) on developing the concepts among students in the post-test, the author calculated Eta-Squared (η2) using the following function:

$$\eta^2 = t^2 / \left(t^2 + df\right).$$

Where (η^2) represents Eta-Squared expressing the ratio of the total variance in the dependent variable that could be attributed to the independent variable, "t^2" represents T-Value, and (df) represents the degree of freedom.

By using "η2", the value of (d) could be calculated which expressed the effect size of proposed program using the following function:

$$d = 2\sqrt{\eta^2 / 1 - \eta^2}.$$

The levels of effect size for each scale can be calculated by:

"d" value = 0.2 small, 0.5 medium, and 0.8 high.

"η^2" value = 0.01 small, 0.06 medium, and 0.14 high.

Table 5. The values of "T", "η2" and "d"; and the effect size of each domain of core thinking skills

Independent variable	Dependent variable	T-value	df- value	η^2	d-value	Effect size
Food and nutrition unit	Achievement	3.181	30	0.15	0.9	high
Security and safety at home unit	Achievement	2.611	30	0.16	0.8	high
Overall mean of variables		2.896	30	.015	085	high

The above table shows that the effect size of core thinking skills in achievement is high which means that the total variance of the level of developing core thinking skills among the experimental group is because of the impact of core thinking skills in achievement in family education. Applying the achievement test proved that there were statistically significant differences in favor of the post-test. It was due to applying the training program helped students invest their actual powers, set goals, organize knowledge, evaluate their performance, and check the accomplishment of goals. Hence, they were internally motivated. Learning became more productive after employing the acquired core skills such as inference, deduction, and comparison. Hence, achievement and understanding increased.

5. Conclusion

It could be concluded that:

- There are statistically significant differences at the level of (0.05) between 1st grade middle stage students' average scores on core thinking skills test in favor of the post-test of the domains (concentration, data collection, remembering, organization, analysis, generation, integration, and evaluation).
- There are statistically significant differences at the level of (0.05) between 1st grade middle stage students' average scores on the achievement test in favor of the post-test of (food and nutrition) and (security and safety at home) units.
- There is a positive impact of teaching (food and nutrition) and (security and safety at home) units using core thinking skills on improving achievement and developing thinking among 1st grade middle stage students by calculating Eta-squared (n2) to measure the effect size on the related groups.

6. Recommendations

-Holding training courses for family education teachers in order to develop their practice of core thinking skills and teach them to students.

-Adding cooperative activities to the family education book of 1st grade middle stage and organizing the content in a way that improves core thinking skills among students.

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