Review of Contemporary Philosophy
ISSN: 1841-5261, e-ISSN: 2471-089X
Vol 23 (1), 2024
pp. 768 - 799

The Effectiveness of a Proposed Training Program Based on the Cavarella Model in Developing the Skills of Teaching Computational Thinking and Financial Literacy among Mathematics Teachers at the Secondary Stage

[1]Amal Ali Saeed Al-Qannam Al-Dosari, [2]Hanan, Ahmad, Alsaydi

Abah, Education College, King Khalid University

aameq@ hotmail.com

Abah, Education College, King Khalid University

P. OBOX:960 Postal Code :612421 Abah

halsoaydi@kku.edu.sa

Abstract:-

The research aimed to design a proposed training program based on the Cavarella model**,** and to reveal its effectiveness in developing the skills of teaching computational thinking, and the skills of teaching financial literacy among mathematics teachers at the secondary stage, as well as revealing the relationship between the development of teaching skills for computational thinking and the development of financial literacy teaching skills, and to achieve those goals, the experimental approach was used; Teaching computational thinking and financial literacy teaching skills, and the sample consisted of (32) female teachers, and the research reached the following results: The existence of statistically significant differences at the significance level (0.05≥ ∝), between the average scores of secondary school teachers, in the pre- and post-measurements of the application of the observation card for teaching computer thinking skills in favor of the post-application, The results also showed *the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage, where the value of the Cohen coefficient was (1.16)* for skills in total, which indicates a great effectiveness, and also the research found that there are statistically significant differences, at the level of significance (0.05≥ ∝), between the average scores of secondary school teachers, by pre- and post-measurements of the application of The results also showed the effectiveness *of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage; The value of the Cohen coefficient was* (0.966) for the skills as a whole, which means great effectiveness, and the research revealed a positive correlation and statistically significant At the level of significance (0.05), between the skills of teaching computational thinking among mathematics teachers for the secondary stage, and the skills of teaching financial literacy, and based on these results, the research made a number of recommendations and suggestions.

Keywords: Training program - Professional development program - Thinking skills - Caffarella model - Financial literacy - Computer thinking - Financial literacy - Mathematics teachers - Secondary stage.

Received: 07 March 2024 **Revised:** 23 May 2024 **Accepted:** 12 June 2024

Introduction :

The world today in its various countries is living a state of competition for progress and development in various areas of life, including the fields of knowledge and beyond, as the economy based on it is a feature of countries in the twenty-first century, and in response to that, an interest in education has emerged qualitatively and quantitatively, so that the optimal investment for it is achieved, and then contribute to the emergence of a conscious, educated generation that seeks knowledge and invests in it, and thus imposes

There are challenges for education in its various institutions to reconsider its systems and the needs of its elements, because the goal of transferring knowledge and information to students is no longer enough, without attention to developing the ability to think and use higher mental processes.

One of the most important types of thinking associated with mathematics is computational thinking, as it is a complex concept that has links to a number of behaviors in different situations, and overlaps with other concepts such as problem solving and logic (Abu Zeina and Al-Ababneh, 2007), and also overlaps with the skills of the twenty-first century, taking into account that computer science is based on mathematical and engineering thinking, as it includes building systems that are able to interact with the reality of life (Shawahin, 2021), so it can be considered a tool for developing solving skills Problems, and therefore requires the inclusion of computational thinking skills in an essential part of the curriculum, which generated the interest of global educational systems to adopt the teaching of these skills in the curricula (Al-Mashharawi and Siam, 2019), including the mathematics curriculum and its abstract nature and the possibility of deducing and forming various algorithms.

In support of the above, a number of researchers such as: (Al-Dosari and Al-Ghamlas, 2022; Abdel Fattah and Abdel Hakim, 2021; Aql, 2023) mentioned the importance of computational thinking skills to meet the requirements of the future, by acquiring logical methods in deducing and interpreting ideas, mastering the learning process, and developing students' skills that contribute to preparing and qualifying them for the requirements of future life, and this is supported by the study of Wilkerson & Fenwick (2017). By saying that combining the teaching of mathematics and computational thinking skills helps students to think like scientists when dealing with real problems, and to find solutions through accurate predictive models that help describe the patterns and processes that make up scientific and engineering activities, and the International Society for Educational Technology (ISTE) recommended the [1]adoption of computational thinking skills as one of the educational technology skills that students must have, by including them in the content of the curricula, including mathematics.

In 2016, the Computer Society (ACM) organized [2] a conference entitled "Computational Thinking in Education", and a number of conferences and societies specialized in mathematics recommended to integrate content or teaching with their curricula, and the International Conference on Mathematics Education (ICME) at [3]its tenth session in 2008 recommended the need to integrate computational thinking in mathematics education. In 2015, the American Mathematical Association (AMS) organized [4] a conference titled "Computational Thinking in Mathematics", which discussed the importance of computational thinking in mathematics and how to integrate it into the curriculum.

Among the areas of life related to thinking and related to the applications of mathematics: financial literacy, which means familiarity with basic financial concepts, and the ability to apply those concepts to manage financial resources efficiently and effectively to achieve financial security (Ghazal and Barakat, 2020), in line with modern global trends that call for attention to financial education for individuals as one of the most important requirements for sustainable human development, while activating the role of the curriculum by paying attention to teaching and learning strategies that support financial literacy

[1] The International Society for Technology in Education (ISTE)
[2]Association for Computing Machinery
[3] The International Congress on Mathematical Education
4American Mathematical Society

(Zachary).& Finney, 2018), and this is consistent with the philosophy of integrated experiences between mathematics and other subjects and with the trend towards financial education in general (Hassan, 2019), integrating financial literacy skills with classroom mathematics teaching makes students feel complementary between them; and the functionality of mathematics without limiting it to school applications only (Attard & Catherine, 2016), as indicated by the study of Kalou (Khalo, 2014). The mistakes made by students in problems solving financial literacy are due to the use of mathematical laws that are not commensurate with them, and recommended the importance of teaching mathematics through the application of mathematical laws in life financial problems.

Based on the above, and considering mathematics as a way and a pattern of thinking, and developing his skills as one of the goals of mathematics curricula (Ayed, 2015), and in agreement with the statement that educational systems depend on the teacher and his teaching skills, the development efforts for education remain inadequate unless the teacher is a major focus in it, and considering that teacher development is receiving increasing local attention witnessed by the scientific research movement in the Kingdom, and the field movement from the Ministry of Education (Al-Shamrani et al., 2016), so Educational research competed to design training programs to develop thinking teaching skills, due to their suitability to the nature and challenges of this millennium (Adam, 2019), considering that training programs are one of the effective forms of professional development, especially if they are based on a communicative activity aimed at stimulating learning and training and facilitating its achievement, to help the teacher and guide him to extensive knowledge of teaching skills with teaching methods And appropriate strategies under educational conditions and specific goals, which contributes to transforming the education process into an enjoyable and fruitful process (Al-Zuhairi, 2015).

By extrapolating a number of studies in the field of teacher professional development, including training programs, a number of studies recommended the need to train in-service mathematics teachers on teaching skills, as in the study of: (Al-Saeed, 2015; Abu Ghalawa, 2014), as shown by some studies recommended paying attention totraining programs for their role in Developing the teaching skills of mathematics teachers as in the studies of: (Al-Barakati, 2014; Sevin, 2011; Al-Shehri, 2017; Al-Enezi, 2009; Muhammad et al., 2023; Al-Maliki, 2009).

Whereas the design of the training program is more accurate than its planning, because the design depends on models based on theoretical and philosophical foundations, and thus the design of a program that has depth, breadth, skill and deep specialized knowledge (Al-Zawain and Al-Busais, 2022), and among those models is the Caffarella interactive model for program planning, which relies on the multiplicity and diversity of educational alternatives available to provide experiences to learners (Caffarella, 2011), which was developed by Rosmary Caffarella Based on several factors, including the input behavior, the nature of the content provided, and the desired learning outcomes, with the possibility of walking in the steps without order, provided that the steps combined lead to good planning of the program (Shaheen, 2023), and considering the interactive and constructive nature of the model, it shows its suitability for teacher training through an applied and participatory environment.

In line with the Kingdom's Vision 2030, which stipulates a "thriving economy" and aims to continue investing in education and training, and providing students with the knowledge and skills necessary for future jobs, while qualifying and training teachers, the current research called for designing a proposed training program based on the Cavarella model to develop the skills of teaching computational thinking and financial literacy. At the secondary level, mathematics teachers.

1.2 Research problem:

Based on the interest of the Government of the Custodian of the Two Holy Mosques in developing education outcomes, and to achieve the objectives of the Human Capacity Development Program (2021-2025), which focused on the capabilities of the learner and preparing him for the labor market, which requires a flexible and solid educational foundation for all, and a base built from basic skills, which include higher thinking skills such as creative and computational analytical thinking, problem-solving

skills and adaptability, with the Human Capabilities Program emphasizing the importance of effective teaching skills in developing those skills among students.

While the results of reports issued by the Organization for Economic Cooperation and Development (OCED) indicated that there is a weakness in the level of Saudi students in the PISA2018 test compared to other countries participating in the same test (OECD, 2019), The test includes a measurement of problem-solving skills, thinking skills to make sound judgments towards different situations, and life applications of mathematics, including the fields of financial literacy, and this is supported by a number of studies that indicated the weakness of students in a number of thinking skills related to mathematics, and financial literacy as in a study (Adam, 2019; Al-Sarhani, 2014; Salah, 2016; Kanaan, 2020; Al-Maliki, 2015; & Lakkannavar, 2019 Sunagar Khudhair, 2020;).

Despite the teacher's role in developing thinking skills, the reality of teaching has shown a contradiction between the goals he seeks and the teaching skills he implements, as a number of studies have indicated the weakness of current teaching skills aimed at developing thinking skills, including what was mentioned in the study of: (Al-Shehri, 2022; Al-Qahfa and Al-Qaws, 2020), and the weakness of teaching financial culture as a realistic life application associated with mathematics courses at the secondary stage, and my study (Al-Juwaied, 2018; Abu Zeid, 2021) indicated that one of the problems Faced by teaching in light of computational thinking skills, the disparity in the levels of teaching skills of teachers.

In light of what was mentioned by a number of studies that explained the low level of teaching skills to the teacher's lack of knowledge of them, as indicated by the study (Momani, 2017), and what was mentioned by the study of Al-Ajaji (2016) of the weakness of mathematics teachers with teaching skills, and thus reflected in the level of planning educational means that motivate students, maintaining problems related to their real lives, and modifying thinking paths to search for other solutions or different answers to the questions posed, and the conclusion of the study of Obaida (2017) of the existence of deficiencies The performance of mathematics teachers with teaching skills, which is attributed to the lack of a clear vision about some skills, due to the inadequacy of the professional development programs used, and their limitation to general strategies and skills for all disciplines, with deficiencies in the mechanisms for measuring the transmission of the impact of training in the field.

The findings of the study of Bahammam (2021) that the levels of secondary school teachers in teaching skills were average, and mentioned the importance of building programs in professional development to train teachers on teaching skills, while providing the necessary requirements for mastering those skills and following them continuously.

Based on the above, the teacher's need for professional development in the areas of teaching computational thinking skills and financial culture in mathematics, including training programs, and due to the lack of studies - within the limits of the researcher's readings - that dealt with the teacher's training programs targeted for those skills, the current research aimed to address the deficiency in the level of teaching skills of teachers through the design of a proposed training programThe Cavarilla model, and studying its effectiveness in developing the skills of teaching secondary school teachers of computational thinking and financial literacy.

Therefore, it was possible to identify the problem of the current study in the poor levels of mathematics teachers at the secondary stage in the teaching skills of computational thinking and financial literacy.

1.3 Research questions:

The research sought to answer the following questions:

- What is the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage?
- What is the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage?

- What is the correlation between the development of computational thinking teaching skills among mathematics teachers at the secondary stage, and the development of financial literacy teaching skills?

1.4 Aims of Research

The research objective is to:

- Revealing the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage.

- Revealing the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage.
- Revealing the correlation between the development of computational thinking teaching skills and the development of financial literacy teaching skills among mathematics teachers at the secondary stage.

1.5 Importance of research:

First in theory:

- Providing a theoretical framework to enrich the knowledge of practitioners and those concerned with designing training programs in the skills of teaching computational thinking and the skills of teaching financial literacy.
- Research may derive its importance by highlighting financial literacy as one of the main objectives of teaching mathematics at the secondary level.
- Research may contribute to enriching studies in the field of computational thinking and financial literacy in mathematics, with the scarcity of local studies on this topic.

Second, in practice:

- Adopting the development of teaching skills of computational thinking and financial literacy through a training program based on the instructional design model (Cavarella), in line with the philosophy of modern mathematics curricula and the standards of their application.
- Providing an integrated training package that can benefit trainers in the Ministry of Education and its training centers in training mathematics teachers on the skills of teaching computational thinking and financial literacy.
- Provide objective tools represented by two observation cards for teaching skills that support computational thinking and financial literacy.

1.6 Research Limitations:

The search was limited to the following limits:

- Human: A sample of mathematics teachers in the Wadi Al-Dawasir Education Department, who teach secondary school students, with the developmental and mental characteristics of that stage that qualify them to absorb computer thinking skills and financial culture and their applications in mathematics, and the importance of qualifying them for the university stage and the labor market.
- Objective: The skills of teaching computational thinking were classified for (abstraction, algorithmic thinking, analysis, generalization, evaluation) because these skills are consistent with the nature of mathematics in general and the content of the secondary school mathematics curricula.

As for the skills of teaching financial literacy, they were classified into the main teaching skills (planning, implementation, evaluation), taking into account the areas of financial literacy: spending, saving, financial decision-making and investment, because there is a mathematical basis for it at the secondary stage, and the importance of these areas for students at that stage.

- Location: Schools affiliated with the Wadi Al-Dawasir Education Department.
- Temporality: The first semester of the academic year 1445 AH.

1.7 Search terms:

The research includes the following terms:

Teaching Computational Thinking Skills:

Teaching skills Shehata and Al-Najjar (2003) defined it as: "a set of teaching behaviors that the teacher shows in his educational activity inside and outside the classroom to achieve the objectives of a particular curriculum" (p. 303).

Computational Thinking: Stephens & Kadijevich (2020) defined it as: the pattern of thinking about problems in a way that can lead to solutions that can be implemented through a computer, and includes the skills of abstraction of ideas and design algorithms.

The researcher defines procedurally the skills of teaching computational thinking as: a set of teaching behaviors that are expected to be carried out by the mathematics teacher at the secondary stage, centered on the student, using effective teaching methods, activities, strategies, and evaluation methods aimed at learning and teaching mathematics for the secondary stage; Educational and generalized to similar situations, and branching out of the skills: analysis, abstraction, algorithmic thinking, searching for patterns, generalization and evaluation, and the development of these behaviors through a training program, and measuring them using a note card for those skills.

Financial literacy skills:

Financial literacy: defined by the American JumpStart Coalition as: "the ability to use knowledge and skills to effectively manage personal finances in order to achieve lifelong financial security" (JumpStart, 2007).

The skills of teaching financial literacy are defined procedurally as: a set of teaching actions and behaviors practiced by the student-centered mathematics teacher at the secondary stage during her teaching, to help her analyze mathematical financial issues related to spending and savings management, financial decision-making and investment, using mathematical knowledge, and develop it through a training program for them, and measure it using a note card for those skills.

A Training Program Based on The Caffarel Model

Training Program: Ali (2011) defined it as: "a set of compulsory and optional subjects offered to a specific category of learners in order to achieve intended goals in a specific period of time, indicating the number of hours corresponding to each subject, and the trainer, and leading to obtaining a certificate that qualifies the trainee to practice a particular profession" (p. 69).

Caffarella's Model for Instructional Design: **Shaheen (2023) defined it as "a model that relies on the multiplicity and diversity of educational alternatives available to provide experiences to learners through the quantity and quality of the ideas addressed, and the precedence of the order of their presentation based on several factors, including: input behavior, nature of the content provided, and desired learning outcomes" (p. 2).**

The researcher defines the training program based on the Cavarella model procedurally as: a set of knowledge, skills, activities, organized exercises, evaluation tools and training equipment, which are presented in a planned, constructive and integrated manner, and are designed based on the Caffarella model), to develop the skills of teaching computational thinking and financial literacy among mathematics teachers at the secondary stage.

Cavarella **model (Caffarella, 1994):**

The Cafarella model is called the interactive model for program planning, and depends on the multiplicity and diversity of educational alternatives available to provide experiences to trainees, in terms of the quantity and quality of ideas addressed, and the precedence of their presentation order, based on several factors, including input behavior, the nature of the content provided, and the desired training outcomes (Saraya, 2007), where Rosemary Caffarella (2002), one of the few women who wrote extensively about program planning, developed and provided an interactive model, It avoids some of the key weaknesses in many frameworks that are based on the Taylor model tradition,

and its model consists of twelve components that were built based on previous models and theories: 1. Contextualization, 2. Build a solid base of support, 3. Identify program needs, 4. Sort and prioritize program ideas, 5. Developing program objectives, 6. Design educational plans, 7. Develop learning transfer plans, 8. Formulation of evaluation plans, 9. Provide recommendations and communicate results, 10. Selection of formats, tables and staff needs, 11. Preparation of budgets and marketing plans, 12. Forget about on-site facilities and events.

In 1949, Ralph Taylor published his small basic principles, whichaffect curricula and teaching methods, in a book consisting of four main chapters, and these chapters in fact define a model of four stages of planning an educational program: determining educational purposes, selecting educational experiences to achieve those purposes, Organizing educational experiences for effective teaching, evaluating the effectiveness of learning experiences, themodel is simple but not simplified (Caffarella, 1999), it is noted that Taylor's steps were formulated in the form of questions that are studied, and his model is built around the explanations of the procedures through which questions can be answered , and those answers that have been reached on the different people, themes and institutional context, while providing a very tightly structured framework within which educational programs can be designed, but allowing for great flexibility in actual programs during their implementation.Lund, 2020)

The Cavarella model is an educational model based on constructivist theory, which is based on the fact that prior learning is the basis for subsequent learning, as it includes a number of steps followed by the designer to achieve the objectives of training and upgrading trainees (Dakhin, 2017).

It is also a model that relies on the multiplicity and diversity of educational alternatives available, to provide experiences to trainees through a quantity of ideas, relying on a number of factors: input behavior, nature of content, and desired training outcomes, and then determine the basic ideas of the program (Lund, 2020), taking into account the rules of the planning process, And how to provide training experiences that suit the nature of the content and the characteristics of the trainees, and their knowledge and skill background, taking into account the material and human capabilities available for the design of the program, while determining the pre, post, and tracking measures (inside, 2017), because Cavarella developed and built its model based on previous program planning models.

From the above, it can be concluded that the Cavarella model is suitable for designing training programs for teachers, because of its flexibility and interaction, with a focus on practical applications, the nature of the trainees, and the difference in their preferred method of training.

2.3.8 Steps of designing the training program

Planning the training program contributes to achieving a number of precise objectives: exploiting all available energies that contribute to the training activity, providing the necessary solutions to face problems, selecting the most appropriate ones according to the limits of available possibilities, and clarifying the proper methods of communication between training officials and trainers (Satih, 2016).

The steps of designing the program include: identifying program ideas that may come from a variety of sources, either based on personal observations to organizational needs assessments, including subject or content analysis such as analysis into facts, concepts and skills; or procedural analysis to determine tasks by identifying the required steps, and both analysis are suitable for determining the content of the program in an organized manner, and planning for the most diverse and streamlined situations, so Critical incident analysis, a method that relies on asking a range of questions through interviews, is recommended as a tool to help identify needs and appropriate program content (Abdrahim, 2018; Caffarella, 2002).

To set clear objectives for the program, Cavarella distinguished between two types of goals: general goals and objectives, where the goals refer to the general statements of the program's objectives , and may be related to institutional tasks, while the general objectives are related to the expected training results of the program, which focuses mainly on what trainees will learn in general by participating or joining the training program. The objectives of the program are essential for the development of the training plan

and the transfer of training to the field, as used below to evaluate the program (Wiesenberg & Stacey, 2005; Simonson et al., 2019).

This is followed by the steps of designing educational materials and teaching aids; it includes a number of sub-processes: such asformulating learning objectives, selecting and organizing content, selecting educational technologies, and preparing educational evaluation of learning objectives, so that they are within the first step in dividing the educational plan, and they reflect the general program objectives that were formulated in the previous stage to maintain continuity and alignment.Between the set of general objectives and the objectives of the program that focus on the educational outcomes of the program as a whole, while the learning objectives are determined in particular by what the trainee will learn as a result of attending the program, they guide the design and evaluation of the training program, and affect the choice of program content and training methods, and are a tool to assist trainees in directing and monitoring their learning (al.,2019) et (Nurbaeva et al., 2023;Morrison.

As for organizing content, the model proposes a number of conditions: including presenting concepts and ideas of key terms at the beginning and then emphasizing them during the training stages, then presenting familiar and less difficult materials to participants and then the most difficult, and making sure that the basic knowledge and skills are present in the trainees before moving to the content based on them, and when organizing the content, it is necessary toTaking into account: the time allowed, the nature of the trainees and their ability to absorb the content, the context in which the training will take place, in addition to the characteristics of the trainees, their previous knowledge, the nature of the content and the time factor, and the choice of educational methods has identified Cavarilla factors that must be taken into account, namely: the objectives of the training, trainers, trainees, and trainees, context, transfer of training, content, and characteristics of the training environment, diversity, limitations, limits, regulations, time limits; Wiesenberg & Stacey, 2005) , (Simonson et al.,2019).

As for the context of training, it is the main factor that is taken into account in the preparation of the training plan, as in-person training differs from the Internet, and therefore extends to the choice of educational methods, and the use of strategies based on constructivist theory such as simulation, and problem-based training is appropriate for trainee teachers while encouraging their participation and cooperation. (Abdrahim, 2018)

As for the types of educational assessments, Cavarella described three types of educational assessments: assessment on entry, evaluation of resources and processes, and evaluation of results, the purpose of evaluation upon entry: directing the professional development process by measuring the trainee's previous knowledge and readiness for learning, because evaluation helps the process and resources to improve the process and their educational materials, either Evaluate the results to determine whether the training program achieved the expected learning outcomes, after which all previous data is used to enrich the overall evaluation of the training program.. (Abdurrahim, 2018; Wiesenberg & Stacey, 2005)

The training transfer plan emphasizes the success of the application of knowledge, while ensuring that the trainees in the program transfer what they have learned in the context of their work, as it is a principle of constructivist theory to provide the following educational conditions for the trainees; Support diverse perspectives and use multiple representational methods, encourage self-learning, and promote self-awareness of the knowledge building process . Wiesenberg & Stacey, 2005

2.3.9 Steps of **the Caffarella** model:

The Cavarella model is a competency-based design model, used to design training programs focused on achieving specific results, and Cavarella (Caffarella, 2002) and Al-Zwain and Al-Busais (2022) mentioned its steps as follows:

- **Contextualization: includes understanding the organization, available resources, people, what needs to be accomplished, good negotiating capabilities, and identifying strengths and trends.**
- **Building a solid support base: including access to the support of learners, teachers, staff, community stakeholders, and decision makers.**

- **Identify program ideas: This includes knowledge of the sources used to identify, generate and evaluate ideas, and develop a model for making appropriate assessments of the situation.**
- **Sorting and prioritizing program ideas: by identifying prioritized, applicable ideas, and sorting them into two groups: appropriate for educational activities, and requiring alternative interventions.**
- **Developing program objectives: These include formulating learning objectives that reflect measurable and measurable learning outcomes, quantitative and qualitative methods, and understanding of alternative interventions.**
- **Design educational plans: include the development of clear and understandable learning objectives, consistent with expected training outcomes, selection and organization of content based on learning imperatives, and the use of technologies that support training outcomes, and appropriate for trainees.**
- **Develop learning transfer plans: through the knowledge of the program participants, the nature of the design, the content, the changes required to apply what has been rehearsed, the organizational context, the community and community forces, and the use of the techniques most useful to the participants: mentoring and coaching groups, support groups, feedback, and discussions.**
- **Formulate evaluation plans: develop evaluation procedures, exploit different opportunities for data collection, identify data collection methods, and consider how to analyze data.**
- **Provide recommendations and present results: by reviewing and correcting the program, finalizing the design, and following up to clarify questions or challenges, to benefit from similar programs.**
- **Selection of formulas, schedules and needs of teachers: by identifying those in charge of implementing the program, from inside or outside the institution, and identifying their needs and requirements.**
- **Preparing budget and marketing plans: estimating the cost of development, design and evaluation, determining funding, accurate budget records, and estimating program returns.**
- **Coordination between facilities and events: includes determining facilities and location, developing a positive atmosphere, the ability to make changes to the site, granting benefits to program participants, rewards and incentives.**

2.3.10 Features of the Carvarella model:

The model is based mainly on the principles and practices of adult learning, which makes it different from other models, andprovides practical ideas for decision-making and completing program planning tasks, because the program planning process according to this model is a negotiating process, and the components and tasks of the training model are presented as a guide to practice rather than the application process.Step by step, where all the required ingredients (components and tasks) are mixed together to create a usable product, and those specific ingredients and their content may vary depending on the final product required, and at the same time accept modification and development Caffarella, 1999; Caffarella & Daffron, 2013).

The Cavarel model is based on the multiplicity and diversity of available educational alternatives, to provide experiences to trainees through the quantity and diversity of ideas addressed, and the order of presentation based on a number of factors: such as input behavior, nature of the content provided, and desired training outcomes **(**Caffarella**,** 2011).

2.3.11 Components of the Caffarella model

The interactive program planning model for Caffarella consists as stated in (Caffarella, 1999; Caffarella & Daffron, 2013):

Component I: Recognizing the Program Context

- This component focuses on understanding internal structural support related to the planning process, such as operating procedures, decision-making processes, formal lines of authority, financial resources and information systems.

- Identify key persons who should be involved in the planning process, including senior management, supervisory staff, participants, planning and education staff, and external parties.

- The designer must have knowledge of the culture of the organization(s) with which he works, and familiar with the economic, social and political environments of the planning situation.

Component Two: Using Negotiation Skills Effectively

- This component emphasizes the importance of identifying all stakeholders involved in the planning process and understanding the power relations between them.

- Ensure that all stakeholders have a place at the planning table and that their voices are heard.

- Forming alliances and using them in positive ways is useful during the planning process.

- Dealing ethically throughout negotiation processes.

Component Three: Identifying Program Ideas

- Identify sources to use in generating ideas for the program.

Determine the best way to identify these ideas, which can be done through a formal needs assessment, conversations with colleagues or written material.

Component Four: Sorting and Prioritizing Ideas

- Assess whether the educational program represents an appropriate response to the identified ideas and problems.

- Make sure to prioritize these ideas, with clear criteria for choosing one idea over another.

Component Five: Developing Program Objectives

- Write clear program objectives that address participant learning, the changes that will result from that learning, and the operational aspects of the program.

- Review the objectives as the program develops and implements.

Component Six: Preparation for Learning Transfer

- Identify key learners who are part of the transfer process.

- Choose useful transportation strategies and decide when to use them.

Component VII: Formulation of Evaluation Plans

- This component emphasizes the need to determine which assessment approach will be used and how data will be collected.

- Determine how data will be analyzed and used for future program activities.

Component VIII: Identify coordinations, schedules and staff needs

- Make decisions on the format and schedule of the program, as well as determine the requirements of the staff.

- Choose the most appropriate program format, such as face-to-face or distance learning, and this decision depends on factors such as the nature of the content, the target audience and the resources available.

- Determine the schedule of the program, with the dates, times and duration of the program sessions.

- Identify the needs of employees for the program. This includes determining whether any external consultants or experts are needed to support the implementation of the programme.

Component Nine: Budgeting and Marketing Plans

- This component includes estimating the expenses associated with the program and determining how the program is funded.

- Estimate programme expenditures, including costs of materials, resources, personnel, facilities and any other related expenses.

- Consider how the program is funded. This may include seeking funding from external sources, securing care or using internal resources.

- Prepare promotional materials, conduct a targeted marketing campaign, andcreate materials that effectively convey the value and benefits of the program to the target audience.

Component Ten: Design of Educational Plans

- Design the educational aspects of the program, including setting clear learning objectives, selecting and sequencing content, and developing educational materials.

Develop clear and understandable learning objectives, which define what participants should be able to know, do, or understand by the end of the program.

- Define the content and sequence of the program in a logical and coherent manner, identifying and organizing key topics in a logical order and ensuring their alignment with the learning objectives.

- Develop or compile educational materials, which may include creating presentations, handouts, activities, or other resources that support the delivery of content.

- Choose appropriate instructional techniques and assessment strategies, so that they align with the focus of learning objectives and help assess participants' progress and understanding.

Component XI: Coordination of on-site facilities and events

- Coordinate the logistical aspects of the program, including securing appropriate facilities, overseeing on-site arrangements, and creating a positive learning environment.

- Obtain appropriate facilities for the program, this may include booking meeting rooms, classrooms or other spaces that can accommodate participants and support program activities, or an electronic training platform.

- Secure facilities and supervise all on-site arrangements. Ensure the availability of necessary equipment, materials and resources, and address any technical or logistical issues.

- Create a positive climate for learning, welcoming participants, setting a positive tone and creating an environment conducive to learning and participation.

- Establish a monitoring system and make changes in the program during its presentation, allowing flexibility and adaptation based on participant feedback or unforeseen circumstances.

Component Twelve: Communicating the Software Value

- Effective communication between relevant stakeholders, to demonstrate the value of the program.

- Prepare the program report in a format appropriate to the target audience, so that this report summarizes the program's objectives, activities, results and any other relevant information.

- Produce a program report in a timely manner, preferably proactively, taking into account the needs and interests of the public, and ensuring that the report reaches them in a timely manner.

- Promote and share the program's achievements in appropriate places, such assharing success stories, testimonials, or other evidence of the program's effectiveness to generate interest and support.

Notes from the previous components of the model is its focus on providing teacher-related learning experiences, the model's ability to adapt to a variety of teacher needs and training contexts, its interest in active, collaborative learning, and it can be used to improve training outcomes and promote lifelong learning.

Due to the importance of training programs based on the Cavarilla model, they have been addressed by many researches and studies, including:

Studies that dealt with the impact and effectiveness of training programs for mathematics teachers, such as the study of Al-Qaisi (2015), which aimed to identify the impact of training mathematics teachers on the use of a proposed model in the effective in providing them with some teaching skills, and the study found that there are statistically significant differences at the level of ($\alpha \leq 0.05$) between the average performance of mathematics teachers on the performance scale of effective teaching skills for the benefit of the experimental group, and the study of Al-Shaalan (2022), which aimed to determine the effectiveness of a training program in algebraic reasoning and perception of meaning in developing the practice of secondary school teachers, and the performance of their students, and the results of the study showed differences between the average ranks of teachers' grades in favor of the experimental group.

As well as a study (Jassim and Hamad, 2018), which aimed to build a training program based on international standards (TIMSS & PISA) and reveal its impact on the development of the mathematical strength of mathematics teachers, and to achieve the goal, it adopted the semi-experimental approach by designing the experimental and control groups, and used the mathematical strength test as a tool, The results of the study showed that there were statistically significant differences between the two groups in favor of the experimental group, and the study of Abdel Ghaffar and Al-Sheyab 2020, which aimed to reveal the effectiveness of a training program based on the curriculum of developmental processes in developing planning skills for teaching and realistic evaluation among mathematics teachers, and the study adopted the descriptive and qualitative approach, using observation and interview cards, and the results showed the effectiveness of the training program in developing realistic planning and evaluation skills among the study sample .

The study of Al-Saad and Al-Zoghbi (2022) also aimed to reveal the impact of a training program based on teaching practices in accordance with the standards (NCTM) in obtaining the pedagogical knowledge of mathematics teachers and their beliefs towards it, and the study followed the semi-experimental approach, and the study sample consisted of 20 teachers, and the study used a test in pedagogical knowledge and a questionnaire for beliefs towards it, The results of the study showed that there were statistically significant differences between the arithmetic averages in the dimensional application in favor of the experimental group, and the study recommended focusing on developing the teaching practices of mathematics teachers**,** in addition to the monthly study (2022), which aimed toidentify The effectiveness of a training program based on the STEM input in developing creative teaching skills among mathematics teachers at the secondary stage, and the study used the semi-experimental approach, in an experimental group that application before and after and the study is appointed by 33 teachers, and the study used a note card to measure primary teaching skills, and the results of the study showed the effectiveness of the training program in developing creative teaching skills among teachers and recommended the study in directing educational supervisors to follow up on teachers' application of creative teaching skills.

On the other hand, some studies dealt with the effectiveness of training programs based on educational design models, including the study of Abu Sweireh (2009), which aimed to build a training program based on instructional design in light of training needs, and to reveal the impact of the training program in developing some technological skills among teachers, and explained the effectiveness of the training program based on instructional design in light of the training needs to develop some technological skills for teachers. And the study of Sayed (2022), which indicated that there were statistically significant differences at the level of (0.05) between the average scores of efficiency of designing a lesson plan in mathematics according to the (TPACK) model among teachers between the pre- and post-application in

favor of the post-one, after they obtained the training program based on the aforementioned design model.

As well as the study of Al-Jeraiwi (2018), which aimed to know the effectiveness of a training program based on the ADDIE educational design model to develop the skills of designing and producing training workshops among university students, and the study sample consisted of 52 female students and the researcher used the experimental method, and the research tools consisted of a cognitive test and an observation card, and the results of the study showed that there were statistically significant differences between the average scores of female students in the pre- and post-measurement in the cognitive test, The study also recommended the design of training programs by taking advantage of instructional design models, and also the study of Mamoun (2018), which stated that the educational program based on instructional design has a positive impact on the teaching skills of teachers, while the study of Shechtman et al., 2010), and the study of Landsten (Lundsten, 2008), which found that there was no significant relationship between teachers' professional development and teaching practices, and the Dale study (2022), which found that training through instructional design-based programs contributed to the development of problem-solving skills, communication skills, and life skills in general.

On the other hand, some studies appeared that dealt with the effectiveness of the Cavarella model, such as a study within (2017), which aimed to identify the impact of the Kohlberg and KavarYalla models on the development of creative writing skills among students of the College of Education, and the research sample consisted of 32 students to apply the Kohlberg model, thirty-four students to apply the Cavari No, and 34 As a student as a control group, the researcher used the experimental method, and the study sample was a creative writing skills test, and the study found that the experimental group to which the Cavarel model was applied was superior to other groups, and the study of Khader and Muhammad (2023) aimed to identify the impact of the KaVarela model on the achievement of fourth-grade literary students in sociology, and the study sample consisted of two experimental groups of 31 female students, and a control group of 33 students, and the study used the experimental method, and the study applied the achievement test and the cognitive thinking scale as study tools, and the study reached results, including the superiority of the students in the experimental group who studied according to the model Cavarel A on the students of the control group.

Second: Commenting on the research literature:

The research literature included training programs based on the Cavarella model for educational design, professional development for teachers, including training programs and their concept, educational design, its concept and importance, its most prominent models, and its relationship to the design of training programs, including: the Cavarella model, and its link to the design of training programs for adults, including teachers, its concept and steps, and the requirements for designing training programs, in addition to a number of studies aimed at building a training program based on instructional design in light of training needs; (Abu Sweireh, 2009; **Al-Jeraiwi, 2018; Khader and Mohammed, 2023), and a study that dealt with the positive impact of training programs on teachers' teaching skills as stated in a study (**Abdul Ghaffar and Al-Shayab, 2020; Al-Shehri, 2022), **and studies that allocated the effectiveness of training programs for teachers in teaching skills for mathematics teachers at the secondary stage as a study (**Al-Awad, 2016; **Al-Qaisi, 2022).).**

A review of previous studies shows the following:

- **The current research has benefited from previous research and studies in preparing the theoretical framework in all its axes, preparing its tools, designing the training program, preparing the two research tools, determining its methodology, determining the procedures followed, identifying the appropriate statistical methods to answer research questions, verifying the validity of its hypotheses, and interpreting its results.**

- **The current research may be distinguished in combining the skills of teaching financial literacy and computer thinking, and in using the appropriate Cavarella model to design training programs for teachers in order to develop these skills, because it depends on the interaction of teachers during the stages of building and implementing the program, and the multiplicity of alternatives to training activities.**

Third: Research Hypotheses:

The research seeks to verify the validity of the following hypotheses:

- There were no statistically significant differences at the significance level (0.05) between the average scores of computer thinking teaching skills to female teachers in the pre- and post-applications.
- There were no statistically significant differences at the significance level (0.05) between the average scores of financial literacy teaching skills for female teachers in the pre- and post-applications.

There is no statistically significant positive correlation at the significance level (0.05) Between the development of the skills of teaching computational thinking, and the development of the skills of teaching financial literacy.

Search Procedures

Building a proposed training program based on the Cavarella model to develop the skills of teaching computational thinking and financial literacy:

The program is directed to mathematics teachers at the secondary stage to develop the skills of teaching computational thinking and financial literacy, and the program was built according to the following steps:

- **Program Building**

It is designed and implemented according to the components and steps of the Cavarella model.

Duration of the training program:

The program lasted 5 training days (5 hours per day), in addition to two training workshops (8 hours (two days each) for each workshop, bringing the total to 5× 5 + 16 = 41 hours.

- **Main and sub-headings of the training program:**

The training program consisted of 5 main headings, under which a number of sub-headings fall as follows:

Table (3-3)

Components of the training program

Subtitles	**Headline**
Thinking and its relationship with mathematics - thinking and achievement in mathematics - the concept of computational thinking - the historical emergence of computational thinking - the characteristics of computational thinking.	Computational thinking
Analysis - abstraction - algorithmic thinking - searching for patterns - generalization - evaluation	Computational thinking teaching skills
The concept of financial literacy - the relationship between financial literacy and mathematics - financial literacy and the PISA framework	Financial Literacy
Planning – Implementation – Evaluation	Areas of Teaching Financial Literacy

Planning a lesson according to computational thinking skills Planning a lesson according to the skills of teaching financial literacy	Applications for presenting lessons according to the skills of teaching computational thinking and financial literacy

Training activities used in the training program:

The activities used in the training program varied between individual and group activities, bilateral activities for dialogue and self-learning in groups and individually, workshops, and presentations, in order to diversify taking into account the different characteristics and experiences of teachers, thus achieving the desired goals.

Training methods used in the training program:

There are many training methods used in the training program, to suit the nature of the content and the type of activity and in line with the characteristics of the teachers' learning, and the methods used can be summarized as follows: dialogue and discussion, brainstorming, open discussion, problem solving, micro-teaching, cooperative learning, games, induction, self-learning, summarization, practical application, self-learning.

Means and training techniques for the training program:

Means were used to implement the training according to its existing philosophy, where presentations, videos, websites, applications on smartphones, and the most prominent programs, applications and websites that were used in the implementation of the training activities were: Microsoft Teams, PowerPoint, Padlet, Sudoku - Suduku puzzles, Magic Cube, Google Forms, Miro, Canva, Google Drive, YouTube . YouTube

Evaluation methods:

1- Diagnostic Evaluation:

- Apply activities on some teaching and cognitive skills of computational thinking and financial literacy.

2 - Formative Evaluation:

- Evaluate the teachers during the presentation of the training program on an ongoing basis through collaborative activities, discussions, and brainstorming sessions.

– Evaluating the performance of teachers through the implementation of teaching skills, during workshops.

- Provide individual activities that measure each teacher's understanding of what was presented, the extent to which she understands it and her ability to practice it, while providing continuous feedback and reinforcement.

- Evaluating the work of cooperative groups on an ongoing basis through the training group evaluation form.

3 . Post-calendar :

- Practical application at the end of the third, fourth and fifth days; the teachers apply what has been actually trained through the headquartersof mathematics at the secondary stage.

- Submit the trainer's evaluation forms and the training program at the end of the training program.

Research Tools:

First: A note card to measure the level of computer thinking teaching skills among secondary school mathematics teachers

The current research adopted a note card to determine the level of performance of mathematics teachers at the secondary stage for the skills of teaching computational thinking - prepared by the researcher -, where Al-Laqani and Al-Jamal (2013) defined the observation card as "a list that includes the performance group to be observed, in order to identify the extent to which the teacher practices it in natural situations" (p. 141), and the card was chosen as a tool to achieve the objectives of the research being one of the tools Able to determine the level of teaching skill, by providing the observation card with accurate data on the teaching skills necessary in the light of computational thinking, with its ability to determine the teacher's need for the training program, by collecting data on the targeted teaching skills realistically, by providing accurate data on the availability of teaching skills necessary for mathematics teachers, in relation to the six main computational thinking skills, before and after the training program.

Verify the truth of the notes card statements:

The authenticity of the note card statements has been validated in two ways :

A- Apparent honesty (arbitrators' sincerity):

The apparent honesty was represented in presenting the content of the card to a group of arbitrators specialized in the field of curricula and teaching methods, to ensure the clarity of the phrases, their belonging to the basic skill, the integrity of the linguistic wording, and to consider the gradation of the card, its extent and appropriateness, and their expression of their opinions Appendix (5).

Where the observation card received approval for most of its phrases from the arbitrators on its axes and phrases, and they had a number of observations about the axes of the note card and its phrases from deleting, adding, or modifying some phrases, or the method of dividing them, and the purpose of the arbitration was to express an opinion about it in terms of: The appropriateness of the axes of the observation card to the subject of the research, and the extent of The appropriateness of each sub-skill to the main one, the clarity of the skill phrases under each axis, and the soundness of their wording.

The final image of the observation card was formulated: According to the opinions of the arbitrators, the amendments were made, and the researcher reached a note card for the skills of teaching computational thinking in its final form, as it contained 25 skills divided into six main skills: analysis, abstraction, algorithmic thinking, pattern search, evaluation and generalization.

B- Sincerity of internal consistency:

The internal consistency of card phrases was verified by calculating Pearson's correlation coefficient between each card phrase and the sum of the key skill scores to which the phrase belongs.

First: The results of internal honesty (construction truthfulness) for the dimensions of the observation card to develop the skills of teaching computational thinking To verify the validity of the internal construction of the observation card using Pearson's correlation coefficient The tool was applied to an exploratory sample of (8) parameters outside the research sample from Sulayil Governorate, and then the corrected correlation coefficient was calculatedPearson for the correlation of each paragraph with the dimension to which the paragraph belongs, and the criterion of having statistical significance for the link of the paragraph with the axis and the tool as a whole was adopted to keep the paragraph in the tool as in the following table:

Table (3-4)

Correlation coefficients between the scores of each note card statement and the overall score for computational thinking teaching skills

Circular		Evaluation		Algorithmic thinking		Pattern recognition		abstractions		Analysis	
Correlation	M	Correlation	M	Correlation	M	Correlation	M	Correlation	M	Correlation	M

coefficient		coefficient		coefficient		coefficient		coefficient		coefficient	
**,870	23	**,845	18	*,767	13	**,889	10	*,762	6	**,872	1
**,941	24	**,851	19	**,949	14	**,990	11	**,893	7	*,821	2
**,923	25	**,874	20	**,874	15	**,990	12	*,738	8	**,991	3
		**,870	21	**,874	16			**,918	9	*,766	4
		870,**	22	**,955	17					**,872	5

** D statistically at the significance level (0.01) * D statistically at the significance level (0.05)

The results in Table (3-4) indicate that the correlation coefficients between the paragraphs of each dimension and the total degree of the dimension are statistically significant at the significance level (0.01) and some at the significance level (0.05), which indicates that the card has a high honesty that allows it to be applied in the study.

Stability of the note card:

The stability of the observation card was verified, using the method of agreement of the observers, where the researcher, in cooperation with the mathematics supervisor, applied it to an exploratory sample of mathematics teachers in the secondary stage, numbering (8) secondary school teachers in schools on a sample that differs from the basic research sample, after introducing it to the observation card and training it to use it., with agreement on the basis of observation and procedures, and the observation was made simultaneously, through the presence of the researcher and supervisor a regular class for each parameter, and observation of performance using the card, and then calculate the coefficient of stability between the two observations using the following Cooper equation:

Stability coefficient = (number of times of agreement / number of times of agreement + number of times of disagreement× (100

Table (3-6)

The results of calculating the stability of the observation card Developing the skills of teaching computational thinking

The

Coefficient of stability	**Number of variations**	**Number of times agreement**	**Dimensions**
94,6%	5	89	Analysis
92,4%	7	86	abstractions
86%	9	53	Pattern recognition
94%	7	113	Algorithm
86%	15	96	Evaluation
86%	9	54	Circular
90,4%	52	491	Total

stability coefficient was (0.90), which is a value that expresses a high stability coefficient of the

observation card that can be based on the final application of the card, and after verifying the truthfulness and stability, the note card was produced in its final form.

Note Card Application:

After confirming the sincerity and stability of the research tool, and after obtaining a letter to facilitate the task from the Wadi Al-Dawasir Education Department, Appendix (6), the researcher began to apply the observation card in the first semester of the academic year 1445 AH on a sample of 32 teachers, where the researcher held a meeting with the secondary school teachers in the target group, to clarify the purpose of the research classroom visit and the importance of observing the realistic teacher, and it has nothing to do with it. Evaluating job performance, and coordination was made with teachers to review their teaching plans to ensure that the lessons provided are suitable for the required skills. The visit plan was prepared accordingly, and the steps were detailed in the search procedures.

Second: A note card for the skills of teaching financial literacy among secondary school mathematics teachers

The card was adopted as a tool to collect the required data from the sample of female teachers, to know the level of their practice of financial literacy teaching skills.
The authenticity of the note card statements has been validated in two ways :

- Apparent honesty (arbitrators' sincerity):

The apparent honesty was represented in presenting the content of the card to a group of arbitrators specialized in the field of curricula and teaching methods, to ensure the clarity of the phrases, their belonging to the basic skill, the integrity of the linguistic wording, and to consider the gradation of the card, its appropriateness and their expression of their opinions.
The final image of the observation card: According to the opinions of the arbitrators, amendments were made, and the researcher reached a note card for the skills of teaching financial literacy in its final form, as it contained skills divided into three main skills: planning, implementation and evaluation.

- Sincerity of internal consistency:

To verify the sincerity of the internal structure of the observation card using Pearson's correlation coefficient, the tool was applied to an exploratory sample of (8) parameters from the research community and from outside its sample, and then the Pearson corrected correlation coefficient was calculated for the correlation of each paragraph with the dimension to which it belongs, and the criterion of having statistical significance for the link of the paragraph with the axis and the tool as a whole was adopted to keep the paragraph in the tool as in the following table:

Table (3-8)

Correlation coefficients of the sub-skill with its main skill to develop the skills of teaching financial literacy

Evaluation				Implementation				Planning	
Correlation coefficient	Paragraph number	Correlation coefficient	Paragraph number	Correlation coefficient	Paragraph number	Correlation coefficient	Paragraph number	Correlation coefficient	Paragraph number
*,810	22	*,808	17	**,939	12	*,796	6	**,842	1
		**,884	18	**,886	13	**,843	7	**,854	2
		**,914	19	*,818	14	**,868	8	**,885	3
		**,930	20	**,968	15	*,815	9	**843	4
		841,**	21	**,960	16	**,968	10	*809.	5

** D statistically at the significance level (0.01) * D statistically at the significance level (0.05)

The results in Table (3-8) indicate that the correlation coefficients between the paragraphs of each dimension and the total degree of the dimension are statistically significant at the significance level (0.01) and some at the significance level (0.05), which indicates that the card has a high honesty that allows it to be applied in the research.

Stability of the note card:

The stability of the observation card was verified, using the method of agreement of the observers: where the researcher, in cooperation with the mathematics supervisor, applied it to an exploratory sample of mathematics teachers in the secondary stage, numbering (8) secondary school teachers in the schools of the Wadi Al-Dawasir Education Department - other than the basic research sample - after introducing it to the observation card and training it to use it, where the observation is carried out simultaneously, through the presence of the researcher The supervisor has a regular share for each parameter, observing the performance using the card, and then calculating the stability coefficient between the two observations using the following Cooper equation:

Stability coefficient = (number of times of agreement / number of times of agreement + number of times of disagreement× (100

Table (3-10)

The results of calculating the stability of the observation card Developing the skills of teaching financial literacy

Coefficient of stability	Number of variations	Number of times agreement	Dimensions
%92.32	8	95	Planning
%96	9	220	Implementation
%94.6	7	125	Evaluation
%94.8	24	440	Total

The stability coefficient was (94.8), which is a value that expresses a high stability coefficient of the observation card that can be used in the final application of the card.

3.6 Research Implementation: Research Procedures

The research experience was applied after reaching the final image of the program and tools, with the aim of identifying the effectiveness of the training program, verifying the validity of the research hypotheses, answering its questions, and the research was carried out in the first semester of the academic year 1444/1445 AH, as follows:

Phase I: Trial Preparation Phase

Before you start applying the search experiment, the following steps were performed:

- Obtaining the approval of the Deanship of Graduate Studies on the research plan (Appendix (8))
- Designing research materials (skills lists, training program) and building research tools (computer thinking teaching skills note card, financial literacy teaching skills note card), and presenting them to a number of specialists from university faculty members, in addition to educational supervisors and mathematics teachers, to arbitrate the training program, Verify the apparent validity of the tools and ensure their suitability for application and safety in terms of formulating phrases, their clarity and the extent of their affiliation to the axes of the tools, and the training program and research tools were modified according to the opinions of the arbitrators (Appendix 2).
- Obtaining official approval from the Deanship of Graduate Studies at King Khalid University to apply research materials and tools, and directing the letter of the Department of Education Wadi Al-Dawasir to facilitate the researcher's task.

- Obtain the official letter from the Planning and Information Department to facilitate the researcher's task and allow her to apply research tools directed by the Department of Education to secondary schools.
- Approving the application of the training program under the umbrella of the Training and Scholarship Department at the Wadi Al-Dawasir Education Department, and issuing accredited certificates for teachers.
- At the beginning of the second week of the first semester, the Assistant for Educational Affairs, the Director of Educational Supervision, and the supervisors of mathematics were contacted to clarify the plan of the training program and the mechanism for applying research tools, determine the research meeting at the Department of Education of Wadi Al-Dawasir, and determine an exploratory sample of (8) teachers from the Sulayil Education Office of the Wadi Al-Dawasir Education Department.
- The research tools were applied to the survey sample, where each teacher was visited by the researcher and the educational supervisor, and observed in the same class, in order to verify the stability of the observation card use.
- The observation card was applied to all 32 female teachers of the Al-Dawasir Education Department.
- Before implementing the program, the teachers were discussed about their previous training experiences in computational thinking and financial literacy, the proposed educational alternatives, and preferred training methods, and a questionnaire link was sent using Google Forms) to choose the timing of the training program and the attached workshops, the method of presenting them, and the appropriate suggestions, according to the Cavarella model.Directed to adult education and training, one of the principles of which is to discuss trainees in training alternatives to ensure that the brother with their opinions and suggestions accordingly.
- Determining the time of application of the training program starting from the sixth week of the first semester of the year 1444/1445,
- Issuing a circular with the names of secondary school teachers nominated to join the training program directed to their schools, and including the program and its details on the training platform.
- After completing the application of the training program, the researcher applied the observation after the teachers, and the post-application was a week after the application of the program and the training workshops, in the academic weeks (tenth - eleventh - twelfth).

3.7 Statistical Research Methods:

A set of statistical methods were used through the Statistical Package for Social Sciences (SPSS), twenty-fifth edition, to analyze and process quantitative data according to the following:

After applying the research tools, the data was unloaded into tables to process their data statistically through the Statistical Packages Program (SPSS), and a set of statistical methods were used that aimed to carry out the inferential analysis process.

Research results, discussion and interpretation

This chapter dealt with a presentation of the results of the research reached by answering the research questions, presenting them according to their sequence, and then discussing the results and interpreting them in the light of previous studies and the theoretical literature that was previously addressed.

First: Presentation of search results:

1- The results related to answering the first question, which reads: What is the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage?

The previous question was answered through the first hypothesis test of the research hypotheses, which stated: " There are no statistically significant differences at the level of significance (0.05) between the average scores of the skills of teaching computer thinking to teachers in the pre- and post-applications

", where the researcher applied the observation card before on secondary school mathematics teachers, by attending a regular class for each teacher in the secondary school classes, and observing and monitoring her performance in light of the performance level options corresponding to each sub-skill: (High, medium, low, non-existent), then training the teachers on the training program, after which the observation card was reapplied to the teachers, taking into account the opportunity to observe the teacher for another lesson, whether in the pre- or post-application of the observation card, in the event that the lesson is weakly related to computational thinking skills.

After reaching all the data, the differences between the average performance scores of the teachers were tested before and after the application of the proposed training program for the computational thinking teaching skills observation card for the six main skills: analysis, abstraction, pattern recognition, algorithmic thinking,evaluation,generalization, and its sub-skills.

To verify the validity of the hypothesis, the arithmetic means, standard deviations and test (T) for the associated samples were calculated as in Table (4-1).

Table (4-1) Arithmetic averages, standard deviations, and the value of (T) for the two interrelated groups of the pre- and post-application of the observation card for computational thinking teaching skills

Significance level	Significance value	Value of t	Standard deviation	Arithmetic mean	Degrees Freedom	Number	audition	Dimensions
0.05	0,015	2.583	,40	2.06	31	32	southern	**Analysis**
			30,	2.28		32	Go away	
0.05	0,027	2.328	,40	1.84	31	32	southern	**abstractions**
			33,	2.04		32	Go away	
0.05	0,016	2.556	,39	1.66	31	32	southern	**Pattern recognition**
			36,	1.90		32	Go away	
0.05	000.	4.253	,34	1.56	31	32	southern	**Algorithmic thinking**
			19,	1.87		32	Go away	
0.05	0,001	3.560	,28	1.45	31	32	southern	**Evaluation**
			25,	1.70		32	Go away	
0.05	0,008	2.856	,35	1.48	31	32	southern	**Circular**
			22,	1.69		32	Go away	
0.05	,000	6.580	,19	1.69	31	32	southern	**Total**
			11,	1.93		32	Go away	

The results in Table (4-1) indicate that the values of the "T" test to indicate the differences between the averages of the scores of the pre- and post-application of teaching skills for teachers were (2.583), (2.328), (2.556), (4.253), (3.560), (2.856) and all of these values were statistically significant, which means that there are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the average scores of The pre-application, and the average scores of the post-application of the observation card, and the differences were in favor of the post-application with the six main teaching skills of computational thinking skills: analysis, abstraction, pattern recognition, algorithmic thinking, evaluation, generalization, and thus the alternative hypothesis is accepted,which states that "There are statistically significant differences at the level of significance (0.05) between the average scores of the tribal application, After applying the proposed training based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage, the null hypothesis was rejected, which reads " There are no statistically significant differences at the level of significance (0.05) between the average scores of the pre-application and the average scores of the post-application." for the observation card and the total score of the card, which indicates an improvement in the level of teachers' skills in teaching computational thinking at the level of main skills and sub-skills, through the existence of differences between the pre- and post-application in favor of the post-application.

To verify the effectiveness of the training program in developing the skills of teaching computational thinking to secondary school mathematics teachers, the Cohen equation (d) was found for the six main skills, and for the skills as a whole using the equation (Goulet-Pelletier & Cousineau, 2018):

=(μ1-μ2)/psd d=(mean differences)/(standard deviation)

Table (4-2) The results of the Cohen equation to reveal the size of the effect of the training program for teaching computational thinking skills

Potency / Volume	D values	Standard deviation	Differences between averages	Arithmetic mean	Application	Skill
medium	0.46	,46	,212	2.28	Go away	**Analysis**
				2.06	southern	
medium	0.41	,49	,203	2.04	Go away	**abstractions**
				1.84	southern	
medium	0.45	,53	,239	1.90	Go away	**Pattern recognition**
				1.66	southern	
medium	0.75	,41	,312	1.87	Go away	**Algorithmic thinking**
				1.56	southern	
medium	0.62	,40	,256	1.70	Go away	**Evaluation**
				1.45	southern	
medium	0.50	,41	,208	1.69	Go away	**Circular**
				1.49	southern	
big	1.16	,21	,245	1.93	Go away	**Total Grade**
				1.69	southern	

It is clear from Table (4-2) that the values of d were respectively: (0.46), (0.41), (0.45), (0.75), (0.62), (0.50), which are values that indicate the size of the average impact of the training program when skills: (analysis, abstraction, pattern recognition, algorithmic thinking, generalization and evaluation), and the value of the Cohen coefficient was (1.16), which is a value greater than (0.8). Cohen (1988) stated that the levels of impact size are as follows:

big	**medium**	**Tiny**	**Impact size levels**
0,8	0,5	0,2	D value

Thus, the results indicate the effectiveness **of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage.**

2- The results related to answering the second question, which reads: What is the effectiveness of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage?

The previous question was answered through the second hypothesis test of the research hypotheses, which stated: "There are no statistically significant differences at the level of significance (0.05) between the average scores of the skills of teaching financial literacy to teachers in the pre- and post-applications", where the researcher applied the observation card before on secondary school mathematics teachers, by attending a regular class for each teacher in the secondary school classes, and observing and monitoring her performance in light of the performance level options corresponding to each sub-skill: (High, medium, low, non-existent), then training the teachers on the training program, then reapplying the observation card to the teachers, taking into account the opportunity to observe the teacher for another lesson, whether by the pre- or post-application of the observation card, in the event that the lesson is weakly related to the skills of teaching financial literacy.

After reaching all the data, the differences between the average performance scores of the teachers were tested before and after the application of the proposed training program for the financial literacy teaching skills observation card for the three teaching skills: planning, implementation, evaluation, and its sub-skills.

To verify the validity of the hypothesis, the arithmetic averages, standard deviations and test (T) for the associated samples were calculated as in Table (4-3).

Table (4-3) Arithmetic averages, standard deviations, and the value of (T) for the two related groups for the pre- and post-application of the observation card for the training program in developing the skillsof teaching financial literacy among mathematics teachers at the secondary stage

level Significance	**Significance value**	**Value of t**	**Standard deviation**	**Arithmetic mean**	**Degrees Freedom**	**Number**	**Observation**	**Dimensions**
0,05	0.000	4.221	,35	1.97	31	32	southern	**Planning**
			25,	2.31		32	Go away	
0,05	0.000	3.110	,23	2.21	31	32	southern	**Implementation**
			14,	2.33		32	Go away	
0,05	0.004	4.17	,44	2.38	31	32	southern	**Calendar**

level Significance	Significance value	Value of t	Standard deviation	Arithmetic mean	Degrees Freedom	Number	Observation	Dimensions
		7	33,	2.65		32	Go away	
0,05	0.000	5.467	,25	2.19	31	32	southern	**Total**
			12,	2.40		32	Go away	

Function at significance level (0.05)

The results in Table (4-2) indicate that the values of the "T" test to indicate the differences between the averages of the scores of the pre- and post-application of the teaching skills of the teachers amounted respectively to (4,221), (3.11), (4,177), and all these values were statistically significant, which means that there are statistically significant differences at the significance level ($\alpha \leq 0.05$) between the average scores of the pre- and post-application scores of the observation card, and the differences were in favor ofPost-application of the three main teaching skills of the skills of teaching financial culture: planning, implementation, evaluation, and thus the alternative hypothesis is accepted, which states that "there are statistically significant differences at the level of significance (0.05) between the average scores of the pre-application, and the average scores of the post-application of the total score of the card and each of its dimensions, after applying the proposed training program based on the Cavarella model To develop the skills of teaching financial literacy among mathematics teachers at the secondary stage, the null hypothesis was rejected, which reads "There are no statistically significant differences at the level of significance (0.05) between the average scores of the pre-application, and the average scores of the post-application of the observation card and the total score of the card.

In order to verify the effectiveness of the training program in developing the skills of teaching financial literacy to secondary school mathematics teachers, the Cohen equation (d) for the six main skills, and for the skills as a whole, was found in the following table:

Table (4-4) The results of the Cohen equation to reveal the size of the impact of the training program for teaching financial literacy skills

Potency / Volume	D values	Standard deviation	Differences between averages	Arithmetic averages	Observation	Skill
medium	0.746	,46	,34	2.31	Go away	**Planning**
				1.97	southern	
medium	0.549	,20	,11	2.33	Go away	**Implementation**
				2.21	southern	
medium	0.738	,37	,27	2.65	Go away	**Evaluation**
				2.38	southern	
big	0.966	,21	,20	2.40	Go away	**Total Grade**
				2.19	southern	

Cohen (1988) stated that the levels of effect size are as follows:

big	medium	Tiny	Impact size levels
0,8	0,5	0,2	D value

It is also clear from Table (4-4) that the values of the Cohen coefficient amounted respectively: (0.746), (0.549), (0.738), which are values that indicate the average effectiveness of the training program when skills: (planning, implementation and evaluation), and amounted to (0.966) for the skills as a whole, which means great effectiveness, and therefore the results indicate the effectiveness **of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage.**

3- The results related to answering the third question, which reads: Is there a correlation between the skills of teaching computational thinking and the skills of teaching financial literacy among mathematics teachers at the secondary stage?

To answer the question, and to identify the correlation between computational thinking skills and financial literacy teaching skills, the validity of the hypothesis of the third research was verified, which stated that "there is no statistically significant correlation at the significance level (05.0 ≥ α) between the skills of teaching computational thinking and the skills of teaching financial literacy among mathematics teachers at the secondary stage ", by calculating Pearson's correlation coefficient between the skills of teaching computational thinking and the skills of teaching financial literacy, the results were as follows:

Table (4-5) Pearson's correlation coefficients for the relationship between the development of computer teaching skills and the development of financial literacy skills

Total Grade	Evaluation	Implementation	Planning	Financial literacy teaching skills
				Computational thinking teaching skills
**,546	*,430	**,473	489,**	Analysis
,060	,017	,025	289,	abstractions
**,482	*,418	*,351	478,**	Pattern recognition
,023	,005	,039	066,	Algorithmic thinking
,135	,028	,057	384,*	Evaluation
,069	,144	,112	083,	Circular
*,368	,257	,304	390,*	Total

D at significance level **0.01 * D at significance level 0.05

Table (4-5) shows that there is a positive and statistically significant correlation between the dimensions of computational thinking teaching skills and financial literacy teaching skills in general, where the correlation value was (0.368), and thus the alternative hypothesis is rejected, which states that "there is no statistically significant correlation at the significance level of 0.05 ≥α between the skills of teaching computational thinking and the skills of teaching financial culture among mathematics teachers The secondary stage in the dimensional application For the observation card, the null hypothesis is accepted, which reads "There is a statistically significant correlation at the significance level of 0.05 ≥α between the skills of teaching computational thinking and the skills of teaching financial literacy among mathematics teachers at the secondary stage in the dimensional application of the observation card.

***4.2* Discussion and interpretation of research findings:**

1- Results related to answering the first question of the research:

The results of the data analysis of the teaching skills observation card for computational thinking skills revealed that there were statistically significant differences at the level of ($\alpha \leq 0.05$) **between the average scores of mathematics teachers in the pre- and post-application in favor of the post-application, which indicates the effectiveness of the training program based on the Cavarella model on the skills of teaching computational thinking to mathematics teachers for the secondary stage.**

These results are consistent with the results of previous studies, which indicated the effectiveness of training programs to develop the skills of teaching computational thinking, as in the study of Abu Hussein (Abuhussain, 2018**), and at the level of observation card axes, the level of performance of teachers in the dimensional application showed an improvement, as in the study** of Tang (Tang, 2020), **which indicates that the teachers understand the concept of computational thinking and its skills.**

These results are also consistent with the results of a number of previous studies that highlighted the positive impact or effectiveness of teacher training programs in developing their teaching skills, in general, as in the results of the study of Reichert et al**., 2020, which showed that the training program contributed to improving their teaching skills, as well as the study** of Bower et al., 2017). **Which pointed to the effectiveness of the teacher's professional development, including training programs in developing computational thinking skills.**

2- Results related to the answer to the second question of the research:

The results of the data analysis of the teaching skills observation card for the fields of financial literacy revealed that there are statistically significant differences at the level of ($\alpha \leq 0.05$) between the average scores of mathematics teachers in the pre- and post-application, which indicates the effectiveness of the training program based on the Cavarella model on the skills of teaching financial literacy to mathematics teachers for the secondary stage.

These results are consistent with the results of previous studies, which indicated the effectiveness of training programs to develop the skills of teaching financial literacy, as well as the study of: (;Compen et al., 2019; Fesenko, 2018 Ahmadi and Faqihi, 2022), and at the level of the axes of the observation card, the level of performance of the parameters in the post-application showed an improvement, as in the study of Villagómez & Hidalgo (2017), which indicates the teachers' understanding of the concept of financial literacy and its fields, which contributed to helping teachers to quality teaching, and with the study of **Dituri et** al. (Dituri et al., 2019). **Which indicates the teachers' understanding of the concept of financial literacy and the skills of teaching financial literacy.**

This result is also consistent with the review study of the impact of attending training programs for teachers on the development of financial literacy teaching skills, the results of which showed the effectiveness of the programs on the performance of their students with financial literacy applications, which indicates the high teaching skills of teachers for financial literacy as studied by Compn et al. (2019).

This result may be attributed to the activities provided in the training program based on realistic financial literacy applications through teaching mathematics such as seasonal discounts, the stock market and the budget of the Kingdom of Saudi Arabia, with examples from the student's textbook, and the training methods used within the training program based on the model based on dialogue and discussion, to achieve a deeper understanding of how to integrate the concepts of financial literacy and its applications through teaching mathematics, while addressing the areas of budget, investment and savings. And its applications, which are consistent with the study of Louis et al. (2024), **which showed the effectiveness of training programs for teachers that include in the content of their training skills to teach financial literacy, especially in the areas of budget, investment, savings and banking.**

3 - Results related to the answer to the third question of the research:

The results of answering the third question revealed a positive correlation between the skills of teaching computational thinking and the skills of teaching financial literacy at the level of significance $\alpha \leq 0.05$**, and this result is consistent with the study of Jayaraman** (Jayaraman, 2018), **which showed that students educated in financial literacy using the skills of teaching computational thinking, showed superiority in financial literacy compared to others, and with the study of Tularam** (Tularam, 2013**). Which found that mathematical thinking skills, including analysis and abstraction, and critical thinking skills such as evaluation, contributed to understanding complex financial models and making informed financial decisions.**

This result is also consistent with the study of Banks (2010), **which found a link between thinking skills in teaching mathematics, such as understanding and solving problems, with financial literacy skills such as savings and investment, and with the study of** Lusardi (Lusardi, 2015), **which showed that enhancing thinking skills and financial literacy contributes to preparing secondary school students so that they are able to make complex financial decisions in the future, if all previous skills are developed in Real-life contexts, as shown in the International Student Assessment Program**. PISA

This result can be attributed to the content of the training program for the skills of teaching computational thinking, and the skills of teaching financial culture together, in addition to holding practical workshops for lessons to combine these skills in one lesson planning, implementation and evaluation, while discussing observation with the trainees and among them, providing feedback, and continuing communication with some trainees until after training, to apply in the classroom, and on the other hand, it is difficult to attribute the existence of the relationship between computational thinking skills and financial literacy skills because one exists without the other, and ignoring the existence of Content for all these skills in the training program, and this is supported by the study of Akcay et al., 2022, **which showed that the availability of thinking skills such as the twenty-first century skills of teachers does not necessarily mean that the skills of teaching financial literacy among mathematics teachers are high, but their training must include aspects of financial literacy.**

Summary of research results

The research aimed to design a proposed training program based on the Caffarella model**,** and to reveal its effectiveness in developing the skills of teaching computational thinking, and the skills of teaching financial literacy among mathematics teachers at the secondary stage.

The research concluded the following results:

- There were statistically significant differences, at the significance level ($0.05 \geq \propto$), between the average scores of secondary school teachers, between the two measurementsof the pre- and post-application of the observation card of the skills of teaching computational thinking in favor of the post-application.

- The effectiveness *of the proposed training program based on the Cavarella model in developing the skills of teaching computational thinking among mathematics teachers at the secondary stage*, as the values of the Cohen coefficient were respectively: (0.41, 0.46, 0.45, 0.75, 0.62, 0.50), and amounted to 1.16 for skills in total, which means that there is great effectiveness.

- There were statistically significant differences, at the significance level ($0.05 \geq \propto$), between the average scores of secondary school teachers , between the two measurementsof the pre- and post-application of the financial literacy teaching skills observation card , in favor of the post-application.

- The results also showed the effectiveness *of the proposed training program based on the Cavarella model in developing the skills of teaching financial literacy among mathematics teachers at the secondary stage*; that the values of the Cohen coefficient amounted respectively: (0.746), (0.549), (0.738), which

indicate the average effectiveness of the training program when skills: (planning, implementation and evaluation), and amounted to (0.966) for the skills as a whole, which means great effectiveness.

− The research found a positive correlation between the skills of teaching computational thinking among mathematics teachers at the secondary stage, and the skills of teaching financial literacy.

Study recommendations:

- Educating mathematics teachers about the importance of paying attention to computational thinking skills, as one of the types of thinking related to mathematics and related to the orientation towards artificial intelligence.
- Mathematics teachers activate computational thinking skills while teaching them to develop them among their students.
- Paying attention to the concepts of financial literacy contained in mathematics books, while making sure to employ them within mathematics lessons.
- Inviting experts in the preparation of professional development programs for teachers, to pay attention to targeted training programs in the fields of financial literacy and the development of teaching skills.

Research Proposals:

The current research is an introduction to future research and studies that address other aspects that may complement or add to it, and the proposed research and studies include:

- Studying the impact of a training program based on the Cavarella model on developing the skills of teaching financial literacy for the third intermediate grade as a target group for PISA tests.
- Studying the effectiveness of a training program based on other design models to develop the skills of teaching computational thinking among middle or secondary school mathematics teachers.

.

Acknowledgments

- The authors extend their appreciation to the Deanship of Research and Graduate Studies at King Khalid University for funding this work through Large Research Project under grant number RGP2/501/45

References:-

[1] Abu Zeina, Fareed, andAbabneh, Abdullah. (2007). *Curricula for teaching mathematics for the first grades*. Dar Al-Masira.

[2] Shawahin, Khair Suleiman. (2021). *School Curriculum in Computational Thinking*, Rikaz for Publishing and Distribution.

[3] Abu Sweireh, Ahmed Ismail. (2009). *A training program based on instructional design in light of the training needs to develop some technological skills among technology teachers*.[Master's Thesis, Islamic University .]House of the system.

[4] Al-Mashharawi, Hassan, and Siam, Muhannad. (2019). The extent to which computational thinking skills are included in the programming course for the seventh grade in Palestine, *Hebron University Journal for Research*, 15(1), 180-209.

[5] Al-Dosari, Najoud, Al-Ghamlas, Khaled. (2022). The effectiveness of a proposed training program to develop the skills of using computational thinking in teaching among computer and information technology teachers. *Journal of Educational Sciences*, 3(1), 497-534.

[6] Al-Shamrani, Saleh, Al-Shamrani, Saeed, Al-Barsan, Ismail, Al-Durrani, Bakil. (2016). Highlights on the results of the Gulf countries in the study of international trends in science and mathematics TIMSS2015. *Center of Excellence in Research in the Development of Science and Mathematics*, King Saud University.

[7] Adam, Mervat Muhammad. (2019). The effectiveness of Scamper's idea generation strategy in developing achievement, mathematical thinking, and learning retention among fifth grade primary school students. *Educational* Journal,33(132), 301-346
[8] Al-Zuhairi, Haidar Abdul Karim. (2015). *Effective Teaching – Strategies and Skills.* Dar Al-Yazouri.
[9] Ghazal, Muftah, Barakat, Murad. (2020). Financial literacy as a key mechanism for promoting financial inclusion in the Arab countries, *Contemporary Economic Research*, 3(1), 46-56.
[10] Al-Saeed, Reda Massad; Abdelhay, Zizi Al-Sayed (2015, 8-9 August). *Developing the teaching of mathematics in Egypt and the Arab world in light of excellence* standards [View paper.] Fifteenth Annual Scientific Conference of the Egyptian Society for Mathematics Education: "Teaching and Learning Mathematics and Developing Skills of the Twenty-first Century", Association for Mathematics Education, Egypt.
[11] Al-Barakati, Nevin Hamza (2014). The effect of using a training program based on effective teaching on the development of achievement and decision-making skills among students of mathematics teaching methods at um Al-Qura University. *Journal of Mathematics Education*, 17(1), 92-154.
[12] Al-Zawain, Fartaj, Al-Busais, Hatem. (2022). *Designing educational programs*. Dar Al-Masila for Publishing and Distribution.
[13] Olive, good. (2001). *Teaching Design: A Systemic Vision*. The world of books.
[14] Monthly, I don't mind Ali. (2022). The Effectiveness of a STEM-Based Training Program in Developing Creative Teaching Skills among Secondary Mathematics Teachers, *King Khalid University Journal of Educational Sciences*, 9(5), 255-292.
[15] Al-Shaalan, Siham Hamad. (2022). The impact of a training program based on algebraic reasoning and perception of meaning on the development of secondary school teachers' teaching practices and the performance of their students in algebraic reasoning. *Journal of Mathematics Education*, 6(25), 223-260.
[16] Al-Juwaied, Mashael, and Obeikan, Reem. (2018). Training needs of computer teachers to use and teach computational thinking skills. *International Journal of Educational Research*, 42(3), 237-280.
[17] Al-Jeraiwi, Siham Salman. (2018). The effectiveness of a training program based on instructional design using electronic information sources to develop the skills of designing and producing training workshops among students of Princess Nourah bint Abdulrahman University, *Al-Fath Magazine*, (74), 110-141.
[18] Al-Qahfah, Ahmad, and Al-Qaws, Muhammad. (2020). The availability of quality standards of teaching performance among mathematics teachers in the Nadera Directorate. *Journal of Psychological and Educational Sciences*, 324-345.
[19] Al-Qaisi, Tayseer Khalil. (2015). The Effect of Training Mathematics Teachers on Using a Proposed Model of Effective Learning in Their Acquisition of Some Teaching Skills and on Their Students' Achievement and Attitudes towards Mathematics, *International Specialized Educational Journal*, 4(3), 59-77.
[20] Al-Anzi, Miteb bin Zaazou (2009). The effectiveness of a training program to provide mathematics teachers with mathematical problem-solving strategies to develop the ability to solve mathematical problems, mathematical thinking and attitude towards mathematics among their students. *Journal of Reading and Knowledge,* (98), 94-70.
[21] Malki, Abdulmalik Mesfer (2009). The effectiveness of a proposed training program on providing mathematics teachers with some active learning skills and on the achievement and attitudes of their students towards mathematics. *Journal of Reading and Knowledge, Egypt*, (96), 138-160.
[22] Momani, Muhammad. (2019). Teaching competencies of vocational education teachers from their point of view: a field study in a governorate in Jordan. *Rawafed Magazine*, 3(1). 116-140.
[23] Abu Zeid, Amani Mohammed. (2021). An enrichment program based on immersion in science to develop computational thinking skills and digital cooperation among middle school students. *Journal of the Faculty of Education, Ain Shams*, (45), 163-208.
[24] Al-Zawain, Fartaj, Al-Busais, Hatem. (2022). *Designing educational programs*. Dar Al-Masila for Publishing and Distribution.

[25] Olive, good. (2001). *Teaching Design: A Systemic Vision*. The world of books.
[26] Saad, Saif, Zoubi, Ali. (2022). *The Impact of a Training Program Based on Teaching Practices According to NCTM Standards on Improving Teachers' Pedagogical Knowledge and Beliefs Towards Mathematics*, [Unpublished PhD Thesis], Yarmouk University.
[27] Al-Shehri, Zafer Abdullah. (2017). A *proposed training program based on cognitive learning theory to develop teaching practices among mathematics teachers at the primary stage and their attitudes towards* it [unpublished doctoral thesis], College of Education, King Khalid University.
[28] Monthly, I don't mind Ali. (2022). The Effectiveness of a STEM-Based Training Program in Developing Creative Teaching Skills among Secondary Mathematics Teachers, *King Khalid University Journal of Educational Sciences*, 9(5), 255-292.
[29] Bahamam, Ahmed Salem. (2021). The Level of Secondary School Teachers' Possession of Creative Teaching Skills from Their Students' Point of View in Light of Some Variables, *Journal of the College of Education*, (100), 189-254.
[30] Hassan, Shaima Mohammed. (2019). A proposed unit in financial literacy for the development of economic concepts and estimation of the functional value of learning mathematics among middle school students. *Journal of Mathematics Education*, 6(22), 34-84.
[31] Jassim, Bassem, Hamad, Salwa. (2018). Building a training program based on international testing standards (TIMSS&PISA in developing the mathematical strength of mathematics and mental mathematics teachers for their students), *Journal of the Faculty of Education, Assiut University*, 2(37), 571-602.
[32] Mr. Hoveyda. (2022). A proposed training program based on the TPACK model to develop its competencies and technical beliefs produced in teaching mathematics among student teachers at the College of Education. *Journal of Mathematics Education*, 25(5), 192-244.
[33] Shaheen, Ahmed. (2023). Comparison of three of the most popular foreign instructional design models, *instructional design and e-learning*. Retrieved 4/4/2024 at the link https://www.id4arab.com/2013/03/instructional-design-models.html
[34] Shehata, Hassan; (2003). *Dictionary of Educational and Psychological Terms*. Egyptian Lebanese House.
[35] Sharari, Diab Moqbel. (2010). *The reality of including economic concepts in geography courses at the secondary stage*. [Unpublished PhD thesis], College of Education, um Al-Qura University.
[36] Inside, Turkish sky. (2017). The effect of the models of Kohlberg and Cavarbel developers on the development of creative writing skills among students of the College of Education. *Journal of the Faculty of Basic Education for Educational Sciences and Humanities*, (41), 1818-1834.
[37] Obeida, Nasser Al-Sayed. (2017). A proposed training program based on the research lesson (Lesson Study) and a statement of its impact on the development of creative teaching skills and attitudes towards employing them among mathematics teachers at the primary stage. *Journal of Mathematics Education*, 20(4), 52-110.
[38] Ayed, Abdulaziz. (2015). *The effectiveness of a proposed program based on active learning in developing mathematical thinking skills and numerical sense among primary school students* [PhD thesis, Institute of Educational Studies, Cairo University], Dar Al-Manzouma Information Database.
[39] Abdul Ghaffar, Rana, Al-Shayyab, Moaz. (2020). The *effectiveness of a training program based on the curriculum of developmental processes in developing the skills of planning for teaching and realistic assessment among mathematics teachers*, [Master's Thesis, Yarmouk University], Dar Al-Manzouma Information Database.
[40] Mohammed, Jalal and Khader, Abdullah. (2023). The effect of the Cavarella model on the cognitive preference of fourth grade literary students in sociology. *Tikrit University Journal of the Humanities*, 30(4), 352-375.
[41] .Satih, Mustafa. (2016). *Evaluation of the impact of training*. King Fahd National Library

[42] Abdrahim, N. A. (2018). Program Planning Model: A theoretical guide for designing online distance education courses. *International Journal of Academic Research in Business and Social Sciences*, 8(12), 46-67.
[43] Abuhussain, W. T. M. A., & Mhmoud, W. T. (2018). Training Teachers in the Use of Programming and Computational Skills in the Classroom. *Journal of educational and psychological sciences*, 2(9), 149-160.
[44] Attard, Catherine. (2016). *Mathematics +Money= Engagement Final Report. Centre for Educational Research*. Western Sydney University.
[45] Bower, M., Wood, L. N., Lai, J. W., Highfield, K., Veal, J., Howe, C., ... & Mason, R. (2017). Improving the computational thinking pedagogical capabilities of school teachers. *Australian Journal of Teacher Education*, 42(3), 53-72.
[46] Caffarella, R. S. (1999). Planning programs for adults: An interactive process. *Adult Learning,* 10(2), 27-29.
[47] Caffarella, R. S., & Daffron, S. R. (2011). *Model building in planning programs: Blending theory and practice1*،Adult Education Research Conference.
[48] Caffarella, R. S., & Daffron, S. R. (2013). *Planning programs for adult learners: A practical guide*. John Wiley & Sons.
[49] Compen, B., De Witte, K., & Schelfhout, W. (2019). The role of teacher professional development in financial literacy education: A systematic literature review. *Educational Research Review*, 26, 16-31.
[50] Dituri, P., Davidson, A., & Marley-Payne, J. (2019). Combining financial education with mathematics coursework: Findings from a pilot study. *Journal of Financial Counseling and Planning*, 30(2), 313-322.
[51] Khalo, X. (2014). Analysis of grade 10 mathematical literacy students' errors in financial mathematics.
[52] Farhan, M., Rafi, H., Rafiq, H., Siddiqui, F., Khan, R., & Anis, J. (2019). Study of Mental Illness in Rat Model of Sodium Azide Induced Oxidative Stress. J. Pharm. Nutr. Sci, 9, 213-221.
[53] OECD, (2019), PISA 2018 Assessment and Analytical Framework, PISA, OECD.
[54] Jayaraman, J. D., Jambunathan, S., & Counselman, K. (2018). The connection between financial literacy and numeracy: A case study from India. *Numeracy*, 11(2), 5.
[55] Jump Start Coalition for Personal Financial Literacy (2007) National standards in K-12personal finance education: with Benchmarks, *knowledge statements and Glossary*. (3rd Edn) Washington D.C
[56] Lund, L. (2020). When school-based, in-service teacher training sharpens pedagogical awareness. *Improving Schools*, 23(1), 5-20.
[57] Lundsten, J. A. (2008). Algebraic reasoning in grades two through five: Effects of teacher practices, characteristics and professional development (Doctoral dissertation, Johnson & Wales University).
[58] Nurbaeva, D. M., Abylkassymova, A. E., Nurmukhamedova, Z. M., & Erzhenbek, B. (2023). Retracted: The Role of Educational Programs in the Development of Secondary Education (on the Example of Training Mathematics Teacher).
[59] Morrisom, G. R., Ross, S. M., Kalman, H. K., & Kemp, J. E. (2011). Designing Effective Instruction. (6th Eds.)
[60] Reichert, J. T., Barone, D. A. C., & Kist, M. (2020). Computational Thinking in K-12: An Analysis with Mathematics Teachers. *Eurasia Journal of Mathematics, Science and Technology Education*, *16*(6).
[61] Simonson, M., Zvacek, S. M., & Smaldino, S. (2019). Teaching and learning at a distance: Foundations of distance education 7th edition. Language Learning & Technology, (4)1, 16-19.
[62] Stephens, M., & Kadijevich, D. M. (2020). Computational/algorithmic thinking. Encyclopedia of mathematics education, 117-123
[63] Shechtman, N., Roschelle, J., Haertel, G., & Knudsen, J. (2010). Investigating links from teacher knowledge to classroom practice, to student learning in the instructional system of the middle-school mathematics classroom. Cognition and instruction, 28(3), 317-359.
[64] Tang, X., Yin, Y., Lin, Q., Hadad, R., & Zhai, X. (2020). Assessing computational thinking: A systematic review of empirical studies. Computers & Education, 148, 103798.

[65] Tularam, G. A. (2013). Mathematics in finance and economics: importance of teaching higher order mathematical thinking skills in finance. E-Journal of Business Education and Scholarship of Teaching, 7(1), 43-73

[66] Wiesenberg, F., & Stacey, E. (2005). Reflections on teaching and learning online: Quality program design, delivery and support issues from a cross-global perspective. Distance Education, 26(3), 385-404.

[67] Wilkerson, M. H., & Fenwick, M. (2017). Using mathematics and computational thinking. Helping students make sense of the world using next generation science and engineering practices, 181-204.