

Forward-Thinking And Its Relationship with Decision-Making Skills of The Middle School Mathematics Teachers

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Abstract

The current study aimed to recognize the relationship between Forward-thinking and Decision-making skills of the middle school mathematics teachers. The researcher adopted the descriptive-correlational approach. The research community consisted of middle school mathematics female and male teachers affiliated with the Education Directorate of Babylon. The research sample consisted of (60) female and male teachers, (25) male teachers, and (35) female teachers who are specialists in middle school mathematics and affiliated with the middle schools of the Education Directorate of Babylon. The researcher designed the study tools to collect the data of the study, which was a Forward-thinking test consisted of (20) items, (11) essay type, and (9) topical type, as well as a Decision-making skills test consisted of (18) items, (14) essay, and (4) topical. The researcher made the appropriate statistical analyses to the two test items and their psychometric properties were verified. After using the statistical tools in analyzing the results of applying the two tests, the findings were as follow:

- 1) The sample individuals have an acceptable range of Forward-thinking.
- 2) The sample individuals have an acceptable range of Decision-making skills.
- 3) There is a strong relationship between Forward-thinking and Decision-making skills.

The researcher introduced some recommendations and suggestions for those concerned in the field of research and education according to the research results.

Keywords: Forward-thinking, Decision-making skills.

Chapter (1): Research frame

Research problem:

The future of any nation requires considering how they prepare their children pedagogically and educationally during the subsequence phase. In this regard, the developed countries and some of the developing countries sought to review their pedagogical and educational systems comprehensively to meet the requirements of the 21st century, as education is a means of pedagogy and its path to reach its objectives in progress to keep up with global renaissance in various fields (Obaidan, 2007: 287). To reach the objectives of the pedagogy in Forward-looking, it is essential to understand and realize the relationship between the previous and current knowledge to understand the present and discover the future trends; which leads to change the way of Forward-thinking, modifying the attitudes, and developing the skills to reach a balanced behavior that results in social stability contributes to finding a clear vision for the future (Al-Karaawi, 2001: 7). Bill and Lederman (2003, 352) suggest “the need for providing appropriate opportunities for individuals to help them develop their ideas, and make their own decisions that enable them to practice these skills with understanding and awareness in their life, then they can address the present problems, and prepare for the challenges of the future, taking advantage of what they have in making appropriate decisions in everyday situations.

The researcher believes that the teacher must recognize the Forward-thinking skills, and attempts through this study to recognize the relationship between Forward-thinking and Decision-making skills among the teachers of this subject, that is to help them look forward and guide their students to prepare for the future realities as well as promoting their ability to make good logical decisions in all aspects of life and to behave intelligently in society. The researcher considered studying this problem and recognizing the relationship between Forward-thinking and Decision-making skills among middle school mathematics teachers in the Education Directorate of Babylon.

Therefore, answering the following question will identify the research problem:

Is there a relationship between Forward-thinking and Decision-making skills among middle school mathematics teachers in the Education Directorate of Babylon? And what type? And what are its trends?

Research objectives:

The current research aims to identify the following :

- 1) The extent to which the individuals of the research sample have the elements of Forward-thinking.
- 2) The extent to which the individuals of the research sample have the Decision-making skills
- 3) Recognize the relationship between Forward-thinking and Decision-making skills among the individuals of the research sample.

Research hypothesis :

- There is no statistically significant difference at the significance level (0.05) between the average of real performance and the average of the hypothetical performance among middle school mathematics teachers (as a whole) in the Education Directorate of Babylon in the Forward-thinking test prepared to the mentioned purpose.
- There is no statistically significant difference at the significance level (0.05) between the average of real performance and the average of the hypothetical performance among middle school mathematics teachers (as a whole) in the Education Directorate of Babylon in the Decision-making skills test prepared to the mentioned purpose.
- There is no relationship at the significance level (0.05) between the Forward-thinking and Decision-making skills among middle school mathematics teachers (as a whole) in the Education Directorate of Babylon.

Identifying research terms:

1. Forward-thinking
 - a) Theoretical definition: Al-Hafiz, 2015, defined it as “realizing the problems and the ability to formulate new hypotheses and reach new connections using the available information, searching for solutions, modifying hypotheses and reformulating them when necessary, making suggested alternatives, and finally presenting the results”. (Al-Hafiz, 2015: 29)
 - 4) Operational definition: It is the final score that the male and female middle school mathematics teachers get in the Forward-thinking test, which reflects the extent to which the individuals of the research sample have the elements of Forward-thinking.
2. Decision-making skills
 - a) Theoretical definition: Richard, 2002, defined it as “making a judgment about what to do in a particular situation after analyzing the problem and closely examining the presented alternatives and testing it through specific simulations. (Richard, 2002: 8)
 - b) Operational definition: It is the final score that the male and female middle school mathematics teachers obtain in the Decision-making skills test, which reflects their possession of Decision-making skills.

Chapter (2): Theoretical background

Theme (1): Forward-thinking

First: The concept of Forward-thinking

Thinking is an essential process in our daily life, as it reflects in the learner's way of planning to make his decisions, defining his goals, and helping to consider the test through several of the available prospects due to the search and seek clear and complex information. Thinking is very important in our daily life, as it helps in planning the individual goals and works to reach them, solve a problem, know what we think, take from others or ignore (Razuki & Nabil, 2018: 11-12).

Through thinking, we can make any effective change in our lives, reach solutions to our problems, make our way clear by planning for our future and steps, without it, we become like inanimate objects, we receive and do not send, affected and do not affect, it also a cognitive system that depends on symbols that reflect internal mental processes, either through direct expression or symbolic expression. The main elements of thinking are meanings, concepts, and perceptions. (Youssef, 2011: 143).

Forward-thinking emerged with the beginning of the creation when human beings were attempting to survive natural hazards like torrens, earthquakes, and volcanoes. Then after his stability in social life and the increase of his agricultural and industrial activity, he began planning for the future in a better and positive way for human and economic development. The beginning of Forward-thinking was by Plato in his book *The Republic* when he addressed the nature of society and the appearance of Thomas More's writings about the Utopia of the modern age, and his future envisioning of society (Barqi, 19, 2005).

Second: The significance of Forward-thinking

The significance of Forward-thinking can be identified in the following:

1. Forward-thinking, as a mental process: realizing the problems and being able to formulate new hypotheses and reach new connections using the available information, searching for solutions, modifying hypotheses and reformulating them when necessary, making suggested alternatives, and finally presenting the results. This process requires questioning, mystery hunts, investigation, and imagination to reflect thinking in a mental image, diagrams or ideas. (Masini and Eleonora, 1993: 57).
2. Forward-thinking, as a visualization process: creating a lot of ideas, raising questions about the information obtained, using imagination, meditation, brainstorming, and "What if?" strategy to developing a vision for what the phenomenon will become in the future. This process includes taking advantage of the ideas of others; reach a perception of the phenomenon, unleashing conditioned imaginations, more hard work, and ongoing attempts to live. (Sardar & Zianddin, 1993: 35).
3. Forward-thinking, as a forward-looking process: The process through which an individual discovers, creates, examines, evaluates, and suggests possible, probable, or preferred futures, and then reflected them in prophecies. (Qalala, 2004: 63).
4. Forward-thinking, as a process of expecting: the process through which the individual attempts to create a diverse and possible future image, study the variables that could make this future imagination image. The individual also asks about: - what could be possible? -What is likely to be? -What should be preferred? (Slughter & Richard, 1995: 306).
5. Forward-thinking, as a process of predicting: understanding, and realizing the development of events over a future time extension to know the direction and nature of the change based on using various information about the present, analyzing it, and taking advantage of it to create the preferred and desired future image. (Amara, 1998: 58)
6. Forward-thinking, as a process of solving problems: monitoring and tracking the current problem, suggesting multiple alternatives to what the problem will be in the future, creating an alternate expected image, and developing unfamiliar solutions to it. (Roberston, 1999: 91)
7. Forward-thinking, as a creative-productive process: Through which the individual released from the constraints of the present to possible future, to guide him to the long-term objectives and acquire the measures to be taken to reach the desired objectives through the steps that should be adopted, which in the individual thinking about the future, looking forward, planning, and implementing. (Bear, 1993: 76).

Third: The development requirements of Forward-thinking

Forward-thinking can be developed by:

- 1- Diversify assessment methods appropriate for individual differences between learners, which helps motivate them to think positively
- 2- Respect the opinion and ideas of the learners, and direct these ideas correctly
- 3- Putting the learners in a life situation similar to reality, that helps them to develop their thinking
- 4- Providing an appropriate educational environment
- 5- Achieving effective classroom interaction and communication
- 6- Using appropriate language that is understandable to the learners, which helps support the thinking process.
- 7- Arranging teaching steps in a way that attracts the attention and thinking of learners
- 8- Using diverse and direct learning strategies and techniques.

(Ziada, 2008: 25-30) (Abu Musa, 2017: 68).

Forth: Teaching Mathematics and Forward-thinking:

Forward-thinking is one of the thinking patterns that require collecting and analyzing information and using it to suggest multiple and varied solutions and alternatives for what the problem will be in the future, as well as develop innovative and unconventional solutions (Abu Mousa, 2017 90). Therefore, mathematics is suitable for developing Forward-thinking skills, as it provides an opportunity for the learner to use the available data and information and thinking about how to use that information and integrate them with his previous experiences to find new and unfamiliar solutions to solve mathematical problems. Saleh (2015, 16) believes that using Forward-thinking skills enables the learner to reach new connections using the available information, enables him to modify and reformulate these connections when necessary. Mathematics also including problems and life situations which makes the learner train to realize the relationships and connections between its elements, enabling him to obtain deep vision and an accurate understanding of the problem and predict the appropriate solution to it.(Obeid, Mufti, and Elijah, 2000, 43).

Fifth: Hafez (2015, 125) classified Forward-thinking skills to:

- 1- Prediction skill: the skill that the individual uses to predict the results of actions, emerging things, and create an image for the course and outcome of upcoming events based on the previous experience
- 2- Forecast skill: the skill that the person uses to think about what will happen in the future. It includes some skills: making personal choices, formulating a hypothesis, distinguishing between assumptions, and verifying coherence or otherwise
- 3- Imagine skill: the process through which we can create an integrated image for the events in a future period. This image is affected by the factors of innovation and science fiction in an attempt to develop this future vision. This skill includes many skills: setting priorities, identifying points of view, identifying points of view, and ask questions skill
- 4- Future problems-Solving skill: It is that skill that is used to analyze and develop strategies aimed at solving a difficult question, a complex situation, or a problem that impedes progress in an aspect of life. It includes Sub-skills: accessing information, note-taking, establishing criteria, identifying and applying Procedures, evaluating alternatives, and drawing conclusions skills.

Theme (2): Decision-making skills

First: The concept of Decision-making skills

Fathi Jarwan (2005) mentioned that the Decision-making process is “a complex thinking process, which aims to choose the best alternatives or solutions available to the individual in a particular situation, to reach the desired objective.”(Jarwan, 2005: 103).

Richard (2002) mentioned that Decision-making is the process of making a judgment about what should be done in a particular situation after analyzing the problem and closely examining the alternatives presented and testing it through specific simulations.

(Richard, 2002: 8).

Second: Decision-making steps:

Some scientists believe that the Decision-making process must be within certain steps, and this process aims to eventually reach appropriate and right decisions, through which problems can be addressed with the required efficiency. (Qasim, 2001, 54-56), and (Mohammed, 2012: 149-147).

The Decision-making steps are as follow:

- 1- Identify the problem: is the first step of the Decision-making steps. It is to diagnose the problem, namely, identify its nature, what it is, its dimensions, and its effects and causes.
- 2- Searching alternatives: to search for alternative solutions or decisions. It is based on a series of assumptions and predictions evaluated by the decision-making skill to identify the expected results, then exclude weak alternative till reach a shortlist of them
- 3- Evaluating alternatives: identifying the positives and negatives according to specific evaluation criteria such as the possibility of implementation, the effects of implementation. This step requires an effective prediction process for the consequences of each alternative. It is useful in reducing the number of alternatives, after presenting and neglecting that do not meet the minimum criteria set. The alternatives must be evaluated to understand that contains a set of the most acceptable outcomes and that achieve the desired objectives
- 4- Choosing the best alternative: it is the top of the Decision-making process, in which the decision-maker practices his judgment. It is based on choose among alternatives according to their expected results and compares with the goals or criteria derived from
- 5- Act on the decision: It is wrong to think that the task of any decision-maker is over when the required decision is adopted because the decision is not to approve it, but is to Act on it. The decision-maker must also define his objectives accurately to benefit from the assessment mechanisms and analysis which help to make the decision and implement it in the right way.

Third: Characteristics of the decision-maker:

Characteristics of the decision-maker have defined by (Shams Al-Din Abdullah, 2005: 34) and (Salamah Hussein, 2000: 92) as follow:

- 1) To have a holistic view.
- 2) To be well conversant with techniques and methods of Decision-making.
- 3) To be objective and realistic.
- 4) To be Quick-witted in situations that requires quick decision-making.
- 5) To have the mental qualities such as the ability to understand, study, judge, evaluate, and mental acuity.
- 6) To have the pedagogical and cultural characteristics such as credibility, realism, broad-mindedness, and scientific thinking.

Forth: The relationship between Decision-making and Problem-solving:

There are similarities between the two process of Decision-making and Problem-solving, both of which includes a series of steps that begin with a problem and end with a solution, and both of them includes various alternatives or solutions assessment according to selected criteria to reach a final decision. The main difference between them lies in the realization of the solution. In the process of Problem-solving, the individual remains without a satisfactory answer and attempts to reach a practical and reasonable solution to the problem. In the process of Decision-making, the individual may start with possible solutions, and his task is to reach the best of these solutions that reach the objective. There are other differences, including that:

1. Values play a major role in the decision-making process, especially when analyzing alternatives and assessing the importance of criteria.
2. Alternatives are evaluated in the decision-making process simultaneously or all at once, not step by step, as in problem-solving.
3. The decision-making process includes quantitative and qualitative criteria used to judge the appropriateness of the alternative.
4. There is no objectively correct alternative in the decision-making process, and there may be more than one acceptable alternative.

(Growan, 1999: 125)

Third Chapter: Methodology and procedure of research

First: Research Method:

The researcher used Descriptive Method of the correlations to achieve the goals of the research.

Second: Research Community

The research community includes male and female teachers of mathematics enrolled in middle schools in Babel Education Directorate their numbers are (301) , (110) male teacher by (36.54%) and (191) female teacher by (63.46 %) distributed on central governorate and subdistricts.

Third Research Sample

(60) male and female teachers were chosen by (20%) from the overall community of the research in randomness manner, by (25) male teacher by (22.72%) of the total number of teachers, distributed on (#) and according to their total percentages in every (#)

Fourth: Research tools

The steps of develop Forward Thinking test

In following an explanation of each step:

1- identifying the concept of Forward Thinking:

the concept of Forward Thinking was identified in the study terminology, the components of this concept were conducted according to the resources, literatures, and some studies, researches that concluded it also according to the description of the Theoretical background which also conducted previously in the study also.

2- Identifying the skills of Forward Thinking:

A number of researchers indicated the importance of categorizing the skills of Forward Thinking unevenly, however, the adopted the categorization (AL-Hafez 2015) which are (prediction skill, forecast skill , imagine skill, problem solving skill). Thus, he categorized every fundamental skill to the fields he conducted in the current study to built the test.

3- presentation of skills for the arbitrators

the researcher presentation of Forward Thinking Skills after being identified and the fields for each of them by its draft vision to a group of arbitrators specialized with teaching methods for mathematics to give their opinion and observations about the validity of these abilities, according to the opinion and reviews the confirmation which reached (80%) and above from the arbitrators and was conducted as it is

4- formulate the test paragraphs

Given the importance of Forward Thinking, and because of the non-existence of a test that measure Forward Thinking for mathematics teachers definitely, also the study relied on studies and literatures that indicated Forward Thinking, mathematical problems were identified, situations that requires a mathematical proficiency from the teachers which appears in their mental abilities, the test version will be a Draft version consisted of (28) paragraph (items) with (18) paragraph of the Essays type, and (10) paragraph of the topical type.

5- preparing test instruction

for completing the Draft vision of the test paragraph, the test instruction were conducted, bearing in mind that it must be clear, Not to let any paragraph without an answer, notice indicates that the grades they were obtain are for the scientific research and not for any other purposes.

6- the test was presented for the arbitrators

the test paragraphs were presented by the amount of (28) paragraphs (18) essay paragraph, Topical paragraphs on a number of arbitrators, to judge its validity and make sure of its appropriation for measuring the factor in which it was made for, after making sure that all the paragraphs were granted the conformation of (80%) of the arbitrators.

Statistical analysis for the test paragraphs of Forward Thinking.

A- The difficulty of test items :

It was found that coefficient of difficulty and ease for the paragraphs and the results were ranging from (0.22-0.78). Since the most of the resources indicates that coefficient of difficulty and ease which range from (0.20 - 0.80) might be reasonable.

B- Discrimination power of tests items

The distinguishing power of the paragraphs has been found, with values ranging from 0.22 to 0.52, and according to the Abel criterion, all paragraphs are confirmed.

C- Effectiveness of incorrect alternatives:

when applying the formula for the effectiveness of incorrect alternatives, all the effectiveness coefficient of negative alternatives has been found to mean that all faulty alternatives are effective.

Psychometric Properties to test Forward Thinking

The validity of the test:

A-face validity:

Theface validity of the test was verified by means of the examiners' point of view by ensuring that the instructions and paragraphs of the test were clear as it was applied to the survey sample. Theface validity of the test was also verified from the point of view of the unexamined persons by presenting the test in the initial form to the competent arbitrators.

B- content validity :

The content validity to test Forward Thinking was confirmed by extracting the difficulty and ease coefficient, the distinction coefficient, and the effectiveness of the faulty alternatives for all paragraphs.

C- construct validity:

The internal validity of the Forward Thinking test was verified as follows:

- The correlation factor of the grade of each test paragraph and the overall test score:

The Pearson correlation coefficient was used, and the results showed that all test paragraphs were statistically significant except paragraph (14), with a correlation coefficient of 0.185 and it was not

statistically significant, and other coefficients values ranging from 0.185 to 0.789, which is a good indication of the validity of test building.

Test reliability

A- Forward Thinking test reliability:

The Cronbach's alpha reliability formula was selected in which it was adopted for the test, and the calculated reliability coefficient (0.793) was a good and high value indicating the test reliability indicating the test validity for measuring Forward Thinking.

B- the reliability of Forward Thinking test correcting

10 papers were selected randomly to verify the correction reliability, then the selected papers were re-corrected by another mathematics teacher. Using the Cooper equation, the ratio of agreement between researcher and teacher (0.92) which are a high coefficient reliability range. Since the paragraph is acceptable and good whether its formula (0.75) and over.

the steps of develop decision-making skill test :

In following an explanation of each step:

1- identifying the Concept of decision-making skill:

The concept of decision-making skill used in the current study has been defined to suit the nature of the study, therefore to define the terms contained in the title of the study and also against the theoretical background.

2- identifying the concept of decision-making skill:

For the purpose of drafting decision-making skill test paragraphs, a number of previous criteria, tests and studies on decision-making skill and some areas of decision-making and on how to identify areas that measure these skills were examined. Having considered these measures, the areas of decision-making skill have been identified and their number has become the primary (10) which covers decision-making skill.

3- presentation of skills for the arbitrators

the researcher demonstrated Forward Thinking Skills after being identified and the fields for each of them by its draft formula to a group of arbitrators specialised with teaching methods for mathematics to give their opinion and observations about the validity of these abilities, according to the opinion and reviews the confirmation which reached (80%) and above from the arbitrators and was conducted as it is

4- formulate of test paragraphs

Given the importance of decision-making skills and the absence of a test that measures the decision-making skills of specific mathematics teachers, studies and literature on decision-making skills have been used. The test is consisted of 21 paragraphs as an initial version, 17 paragraphs, and 4 paragraphs of the Topical type.

5- preparing test instruction

for completing the Draft formula of the test paragraph, the test instruction were conducted, bearing in mind that it must be clear, Not to let any paragraph without an answer, notice indicates that the grades they were obtained are for the scientific research and not for any other purposes.

6- the test was presented for the arbitrators

the test paragraphs were presented by the amount of (21) paragraphs (17) were from essay paragraphs, Topical paragraphs on a number of arbitrators, to judge its validity and make sure of its appropriation for measuring the skills in which it was made for, after making sure that all the paragraphs were granted (80%) of the arbitrators' agreements

The clarity of the test instructions and paragraphs and the elapsed time

The clarity of the test instructions and paragraphs and the elapsed time In order to make sure of the clarity of the test instructions, the items and the duration of the test, the researcher applied the test to a survey sample of 50 teachers and schools randomly selected from the schools of the. **Babil Governorate** during the researcher's supervision of the application, he found that most of the test paragraphs were understandable, and the instructions for the answer were clear. Except for (3) paragraphs that were deleted as unclear and the researcher recorded the end time of the first and last answers to the test, which were (55-65) accurate, thus the elapsed time to answer the test was (60) minutes.

statistical analysis for the test paragraphs of Forward Thinking.

A- the difficulty of test paragraphs:

It was found that coefficient of difficulty and ease for the paragraphs and the results were ranging from (0.24-0.78). Since the most of the resources indicates that coefficient of difficulty and ease which range from (0.20 - 0.80) might be reasonable.

B- discrimination power of tests items

discrimination power of tests items been found, with values ranging from 0.20 to 0.67, and according to the Abel criterion, all paragraphs are acceptable.

C- Effectiveness of incorrect alternatives:

when applying the formula for the effectiveness of incorrect alternatives, all the effectiveness coefficient of negative alternatives has been found to mean that all incorrect alternatives are effective.

Psychometric Properties to test Forward Thinking

The validity of the test:

A-face validity:

The face validity of the test was verified by taking the examiners' point of view by ensuring that the instructions and paragraphs of the test were clear during its application to the survey sample. The apparent veracity of the test was also verified from the point of view of the unexamined persons by presenting the test in the initial form to the competent arbitrators.

B-the validity of the content:

The validity of the content was confirmed in the test of decision-making skill by extracting the difficulty coefficient, ease factor, distinction factor, and effectiveness of the faulty alternatives for all paragraphs.

C- Construct validity:

The internal reliability of the Forward Thinking test as follows:

- The correlation coefficient of the grade of each test paragraph and the overall test score:
The Pearson correlation coefficient was used, and the results showed that all test paragraphs were statistically significant, The values of the other coefficients ranged between (0.280-0.731), which is a good indicator of the validity of the construction of the test.

Test reliability

Making decisions skill

The Cronbach's alpha reliability formula was selected in which it was adoptive for the test, and the calculated reliability coefficient (0.766) was a good and high value indicating the test reliability indicating the test validity for measuring Forward Thinking.

B- the reliability of Forward Thinking test correcting

10 papers were selected randomly to verify the correction reliability, then the selected papers were re-corrected by another mathematics teacher. Using the Cooper formula, the ratio of agreement between researcher and teacher (0.94) which are a high coefficient reliability range. Since the paragraph is acceptable and good whether its coefficient was (0.75) and more.

Fifth: the final application of the tests

The tests were applied to the 60 teachers and male and female teacher by 25 male teacher and 35 female teacher. The tests were scheduled and the sample members were informed in coordination with the Secondary El Malak Section of the Directorate of Education and under the Mission Facilitation Manual, after which the examiners' answers were corrected and the results were dealt with statistically.

Sixth: Statistical methods

The following statistical methods were used (difficulty coefficient, discrimination coefficient, effectiveness of incorrect alternatives, Cooper equation, Pearson correlation coefficient, Cronbach's alpha reliability equation, Kuder Richardson formula, single sample (T) test, (T) test for two independent samples)

Forth Chapter: Presentation and interpretation of results

In this chapter, the researcher will present the results of the research obtained through spss version 23, which will then be interpreted with conclusions, recommendations and proposals.

First Hypothesis:

The researcher used a single sample (t) test, showing that the calculated value (5,569) is greater than the tabular value (2) at the significant level (0.05) and with a free degree equal (59), thereby the zero hypothesis is rejected and accepting the alternative hypothesis in favor of the real mean:

Group:	Mean score	Standard deviation	Standard error	The calculated T Value	The tabulated T Value
Real mean	65.183	18.338	2.367	5.569	2
Hypothesis mean	52				

Interpretation and discussion of results

The results showed that the sample members had Forward Thinking, and that the reasons why teachers had the components of Forward Thinking were:

- Recent training courses have provided for the use of modern teaching methods to cope with the evolution and explosion of contemporary knowledge.
- Changing the mathematics curriculum for the middle school has a significant impact on the development of the teacher's information and provided him with more researches, thoughts and reasoning.
- Activation of the important role of higher degree holders in the competence of mathematics teaching methods in Babylonia education has had an impact on the clarification and use of modern teaching techniques and strategies.
- **Second Hypothesis:** The researcher used a single sample t test, showing that the calculated t value (2,114) is greater than the tabular value (2) at the semantic level (0.05) and with a free degree (59), thereby the zero hypotheses rejected and accepting the alternative hypothesis in favour of the real mean:

Group:	Mean score	Standard deviation	Standard error	The Scheduled T Value	The Scheduled T Value
Real mean	63.217	15.447	1.994	2.114	2
Hypothesis mean	59.5				

Interpretation and discussion of results

The results show that members of the sample have decision-making skills, and that one of the reasons why male and female teachers have decision-making skills is that modern middle school curricula contain subjects and questions that develop thinking in general and, in turn, make the teacher creative in the classroom and be able to make decisions effectively. This is due to recent subjects, questions at the end of math classes that require the teacher and student to make the right decision, and from these questions (challenge, think, numeric sense, discuss, which answers are correct) and other questions.

Third Hypothesis:

The Pearson correlation coefficient has been used, with the correlation coefficient (0.826) at 0.05 and free degree value (58). To determine the value of the correlation coefficient, the calculated T test for the correlation coefficient (33.29) is greater than the tabular value, and thus the correlation coefficient (0.826) is positive and strong, so the zero hypothesis is rejected and the alternative hypothesis is accepted:

variable	individuals number	Mean	Standard deviation	Standard error	Coefficient of correlation value	TT value of correlation indication
Forward Thinking	60	63.183	18.338	2.367	0.826	33.29
Decision-taking skill	60	63.217	15.447	1.994		

Presentation and interpretation of results

With regard to the third hypothesis, the results showed a positive and strong correlation between the scores of the sample members in Forward Thinking test and the decision-making skill test. The correlation coefficients showed

that they were relativistic, i.e., the increase of Forward Thinking test followed by an increase in the decision-making skill test and vice versa, indicating the correlation between the components of Forward Thinking and the areas of decision-making skill.

Forth theme: conclusions, proposals and recommendations:

First: conclusions

In the light of the results of the research, the following can be concluded :

- The research sample posses the components of Forward Thinking.
- the members of the research sample have the components of making decisions skill.
- There is a strong relationship between most mental abilities, including Forward Thinking and decision-making skills.

Second: recommendations

In the light of the results of the study, the following were recommended:

- Curriculum designers in the Ministry of Education must take into account the components of Forward Thinking (expectation skill, prediction skill, visualization skill, future problem solving skill, and other skills), as well as decision-making skills in building and developing mathematics curricula in general and mathematics for the middle school in particular, as well as taking into account the exercises and archaeological questions that require Forward Thinking and decision-making.
- Mathematics teachers must be aware of the importance of future thinking and decision-making for him and its reflection on his or her students.
- The continuing establishment of training courses for mathematics teachers at all levels in colleges of education in order to develop their mathematical information keep abreast of new developments in the educational process and make these courses compulsory annually and serve as the basis for the allowance.

Third proposals :

- **Conduct** a similar study on mathematics teachers for other levels and students.
- Conduct a similar study on the faculty students of the Mathematics Department, particularly fourth level , as it is an important phase.
- Conduct a similar study for the same educational level in other governorates and compare the results.
- Perform a study on the relationship between Forward Thinking and other types of thinking, whether for teachers or students.
- Perform Pilot studies using modern teaching strategies and methods that will develop Forward Thinking and decision-making skills for students and at all levels.

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