Mathematical Connections and Their Relationship to Strategic Intelligence Among Students of Mathematics Department in The Colleges of Education

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Abstract: The present research aims to study the relationship between mathematical Connections and strategic intelligence for students of the mathematics department in the College of Education by answering the following questions:

1. Do students of the Department of Mathematics in the College of Education possess mathematical Connection skills?
2. Do students of the mathematics department in the College of Education possess strategic intelligence?
3. What is the direction and strength of the Connectional relationship between mathematical Connections and strategic intelligence among students of the Mathematics Department in the College of Education?

In order to achieve the goal of the research and answer its questions, the researcher developed a set of hypotheses and the research community was identified, which represents students of the mathematics departments in the Faculties of Education in Baghdad Governorate (College of Education for Pure Sciences - Ibn Al-Haytham / Baghdad University and the College of Education Al-Mustansiriya University). The fourth is from the mathematics department at the College of Education, Ibn al-Haytham, as it consisted of (130) male and female students, divided into (79) male and (51) female students.

Keywords: Connections, Strategic, Students

RESEARCH PROBLEM

Many studies have confirmed a weakness in the students' ability to perceive, form and find mathematical correlations, as in the study (Al-Taie, 2016), (Obaid, 2018), (Daoud, 2019), (Al-Shammari, 2020) and either the study (Khalil, 2015), (Al-Hamiri, 2019) in which there is support for a weak strategic intelligence among the students of the research sample, although it is not a specialty. The two concepts of mathematical correlations and strategic intelligence are among the modern concepts linked to international standards that enable building a perception of the usefulness of mathematics, and accordingly, the research problem is represented in The following question:

Do students of the mathematics department in the Faculties of Education have mathematical correlations and strategic intelligence? Is there a correlation between the mathematical linkages and their strategic intelligence?

The importance of the research: - The importance of the current research lies through its variables, mathematical correlations, and strategic intelligence, and can be explained through:

1. It sheds light on the mathematical interconnectedness skills that students must develop, recognizing the interconnections between mathematical subjects with each other, and between mathematics and other fields of study within mathematics, and between mathematics and other school subjects, and highlighting the role of mathematics in the lives of learners, which helps them adapt to environmental situations. And the role of mathematical correlation in developing students' main abilities in solving non-traditional problems and mathematical coherence of ideas.
2. Knowing the concepts, dimensions, and importance of strategic intelligence, which is considered one of the modern topics, as it is one of the basic requirements in promoting and developing patterns and characteristics as it is an integrated system, and it is related to a type of mental abilities that the student, leader or strategic thinker needs and because it is the core of the thinking process. Cases of scarcity or limitations of information, which requires a broad understanding of the requirements of the surrounding environment and the search for the best ways to excel.
3. The importance of research appears in the target group in the research, which is the university stage (the research community), which represents the last stage of study for many students, in which students prepare for work, because of its important and fundamental impact as the future teachers graduate.

4. Providing tests to measure areas of mathematical correlations, to help researchers and make use of them in the field of teaching mathematics.
5. Providing a measure for measuring strategic intelligence in its five dimensions, which contributes to assisting researchers and benefiting from it in the field of teaching mathematics. Curriculum designers and field training programs can also benefit from the results of this study by knowing the relationship between these variables and how to improve the level of both mathematical correlations and strategic intelligence at Mathematics department students, which leads to improving the quality of educational outcomes in universities.
6. Take advantage of the results of the research in ascertaining and knowing the extent to which students of the fourth stage of the mathematics department in the two faculties of education possess the fields of mathematical correlations as well as the dimensions of strategic intelligence.
7. The study provides theoretical educational literature that provides the Arab library with new information on these topics.

Research objectives
The current research aims to study the relationship between mathematical coherence skills and the dimensions of strategic intelligence for students of the Mathematics Department in the College of Education, and the following questions arise from it:
1. Do students of the Department of Mathematics in the College of Education possess mathematical coherence skills?
2. Do students of the mathematics department in the College of Education possess strategic intelligence?
3. What is the direction and strength of the correlational relationship between mathematical correlations and strategic intelligence among students of the Mathematics Department in the College of Education?

Research hypotheses
To achieve the research objectives, the following null hypotheses were formulated:
1. There is no statistically significant difference at the level of significance (0.05) between the mean actual and hypothetical performance of students of the Mathematics Department in the College of Education in the mathematical correlations test.
2. There is no statistically significant difference at the level of significance (0.05) between the average real and hypothetical performance of the students of the Mathematics Department in the College of Education in the strategic intelligence scale.
3. There is no statistically significant correlational relationship at a significance level (0.05) between the fields of mathematical correlations and the dimensions of strategic intelligence among students of the Mathematics Department in the College of Education.

Research boundaries
The current search limits are defined in:
1. Fourth-year students in the Department of Mathematics in the College of Education in Baghdad Governorate (Al-Mustansiriya University / College of Education, University of Baghdad / College of Education for Pure Sciences - Ibn Al-Haytham) for the academic year 2020-2021).
2. Key mathematical skills (interconnections in the same field, interconnections between fields of mathematics, interconnections with daily life and interconnections with other fields of study)
3. Dimensions of strategic intelligence (foresight (visual vision), systems thinking (thinking with the logic of systems), future vision, motivation (motivation), partnership).

Defining terms
1- Mathematical Connections: These were defined by:
• (Qasim, 2018) that it "is a process that makes mathematics of integrated importance and a convergent pattern, through the connection of mathematical ideas with other ideas to build an integrated mathematical structure that enables students to connect mathematical ideas to each other, and focuses on the links and relationships between the various topics in mathematics, and the link In daily life and other sciences (Obaid, 2018: 13)
Mathematical correlations are known as:
It is the building of students of the fourth stage of the Department of Mathematics in the College of Education for links between mathematical topics within mathematics (for interconnections in the same field), interconnections between fields of mathematics, interconnections between mathematics and other fields of study, and interconnections between mathematics and everyday life measured by the total degree students obtain through the answer On the test that will be prepared for this purpose.
2- Strategic Intelligence: Known by each of: -

• (Al-Azzawi, 2008) that: The process or tool for gathering information that provides decision-makers with the knowledge that supports them in making those decisions, and enables them to respond to the environment in which the institution is located, and then analyze the information to enhance their capabilities for future planning and forecasting, and adapting to environment variables, In a sequential framework aimed at the intellectual path towards what is happening now and what will happen in the future.
 (Al-Azzawi, 2008: 140)
• (Hebron, 2015) that: the mental capacity that is characterized by comprehensiveness and uniqueness of thinking and its use according to a strategic perspective and facing cases of lack of information and its scarcity, helps the individual to think logically and harmony and compatibility with the complex environment characterized by rapid change by understanding the variables and surrounding conditions as well as helps to choose methods Successful in making decisions, solving problems and distinguishing from others.
 (Hebron, 2015: 24)
• Strategic intelligence is defined operationally as: It is a measure of the level of strategic intelligence among students of the mathematics department in the two faculties of education in its five dimensions (foresight (visual vision), systems thinking (thinking with the logic of systems), future vision, motivation (motivation), partnership). Students obtain it (the research sample) by answering the paragraphs of the strategic intelligence scale that will be prepared for this purpose.

RESEARCH METHODOLOGY
Descriptive research methodology (Correlations and Relationships Study Approach) was adopted.

Research Community
The community is represented by students in mathematics departments for both genders in the colleges of education (in Baghdad governorate), which are distributed over the Al-Mustansiriya University / College of Education, and the University of Baghdad / College of Education for Pure Sciences - Ibn Al-Haytham only for the morning study and for the academic year (2020-2021), as the number of students reached the stage The fourth of the mathematics department in the College of Education / Al-Mustansiriya University (242) male and female students distributed into (132) male and (110) female students, and the number of students of the fourth stage of the mathematics department in the College of Education for Pure Sciences - Ibn Al-Haytham / University of Baghdad (155) male and female students distributed into (97) male and (58) female students.

Research sample
The basic research sample was determined from students of the fourth stage of the mathematics department in the College of Education for Pure Sciences - Ibn Al-Haytham / University of Baghdad, and the number of students of the Department of Mathematics, the fourth stage, University of Baghdad / College of Education, Ibn Al-Haytham (155) distributed to (97) students And (58) female students, and after excluding (25) male and female students, the sample constituted 39% of the total community.

Search Tools
First: - Mathematical Connections Test:
1. Objective of the test: The current test aims to measure the mathematical correlations of students of the mathematics department in the Faculties of Education.
2. Defining the fields of mathematical correlations: After reviewing the literature from books and studies that dealt with mathematical interrelationships, such as the book on quality assurance in educational curricula (standards, processes and expected outputs), (Al-Saeed and Abdel Hamid Al-Nasser, 2010), and a book of strategies in teaching and evaluating mathematics learning (Al-Badawi) The theoretical background of these studies was used in identifying the areas of mathematical correlations, which are (interconnections within mathematics (in the same field), interconnections between fields of mathematics, interconnections with daily life and fields of study) Other)
3. Presenting the fields to a number of specialists: a questionnaire was prepared and presented to a number of referees and specialists, to find out their opinions of the suitability of the research sample for any of the three fields according to their experience and in light of their opinions and with an agreement of 80% or more. .
4. Determining the scientific material: It was done through reviewing the content of the scientific material for the fourth stage in the mathematics department, down to the lower stages, and other sources useful in this aspect.
5. Formulation of test paragraphs: (30) paragraphs of the type of objective paragraphs were prepared, with (10) paragraphs for each field, presented to specialists in the field of mathematics and methods of teaching it, in order to find out their validity and suitability for the research sample, and simple modifications were

made to some paragraphs where I got (80%) of their opinions agreed to this amendment, and thus the test was ready in its preliminary form.

6. Preparation of instructions: Instructions for the test were prepared and attached to the test.

7. Exploratory application: To ensure the clarity and understanding of the test paragraphs by the exploratory application sample and the clarity of the instructions for answering them, the test was applied to an exploratory sample of 30 members from among the fourth stage students in the Mathematics Department of Al-Mustansiriya University on Monday 2/22/2021 To calculate the appropriate time for the test, the average time for the first and last (5) of them was calculated, so the appropriate time was (60) minutes.

8. Application to the statistical analysis sample: The test was applied to the statistical analysis sample that consisted of (200) male and female students from the fourth stage of the Mathematics Department of Al-Mustansiriya University on Tuesday 2/2/2021.

9. Correcting the test: Model answers were set for the test items, and one score was given for the correct answer and zero for the wrong answer for each paragraph, so the total score for the test became (30) marks.

10. Psychometric properties of the test:

Interpreted	SIGN	T CALCULATE R	Hypothesized mean	standard deviation	SMA	sample	variable
SIGN. Decrease	0.00	-7.32	15.00	3.98	12.45	130	**Interconnections**

1- Honesty:

A- Apparent truthfulness: The test in its initial form was presented to a number of experts and specialists in the field of mathematics and methods of teaching it to judge its validity, which numbered 36 (()) to find out its suitability for the research sample and to verify the correctness of its wording and to make the amendments they deem appropriate, and based on their opinions, the paragraphs that were amended were amended. It needs to be modified and I got an agreement of 80% or more regarding the final version of the test after making simple adjustments.

B- Validity of construction

It was found

1- The degree of a paragraph is related to the degree of the field to which it belongs.

2- The subject score is related to the test score as a whole.

3- The internal linkages between the test areas and the test as a whole. It turned out that all the correlational relationships referred to previously are a statistical function at the level of significance (0.05) and the degree of freedom (198) since the calculated T-values were greater than the tabular amount (1.96), and this is a high indication of the internal consistency between the test items.

2- Stability of the test: The Alpha Cronbach method was used to test mathematical correlations and the degree of stability calculated using the Alpha Cronbach equation was (0.838). This result is good and can be reassured. (Al-Nabhan, 2004: 240)

10- Analyzing the test items statistically: After the answers of the survey sample students were corrected and arranged in descending order, the highest (27%) of those with the highest grades and the lowest (27%) of the lowest grades were taken, as the number of students in each group reached (54) Male and female students, and the difficulty and ease coefficient was found for the paragraph whose ranges ranged between (0,20 - 0,80) and could be acceptable and it is recommended to keep it.

(Al-Dulaimi and Adnan, 2002: 65)

The formula related to the paragraph discrimination coefficient was adopted to the paragraph, and the results showed that all of these paragraphs have the ability to distinguish that is acceptable, as they ranged between 0.56 (-0.83) *, and the paragraph is acceptable if the percentage of its discrimination factor is (20%) or more. (Al-Zahir and others, 1999: 132)

C- Effectiveness of alternatives: The effectiveness of alternatives for the substantive paragraphs was found, and it was found that the wrong alternatives attracted students of the lower group more than the upper group by not less than 5% of the total students, and thus all of them are camouflaged.

Second: Strategic Intelligence Scale:

1- Determining the objective of the scale: Identifying the strategic intelligence of the fourth stage students in the mathematics department in the Faculties of Education.

2- Determining the dimensions of the scale: After reviewing the educational literature and in light of previous studies, the dimensions of the strategic intelligence scale were determined into five dimensions, which are:

1 - Foresight

2- Systems Thinking (System Thinking)

3- Future vision

4- Motivation

5- Partnership

* The tabular value is 1.96 at a level of significance of 0.05 and with a degree of freedom of 106

3- Presenting the dimensions to the arbitrators and the specialists: they were presented to a group of arbitrators and specialists.

4- Formulating the scale paragraphs: The initial image of the scale was developed, which consisted of (40) paragraphs distributed over the dimensions by (8) paragraphs for each dimension.

5- Preparation of instructions: The instructions for correction were prepared by specifying five alternatives according to the five-point Likert scale, which are (agree, strongly agree, neutral, disagree, disagree strongly). The previous five responses take scores (1,2,3,4,5) on Ranking and thus the total score of the scale became 200 degrees.

6- Exploratory application: The scale was applied to an initial exploratory sample of the fourth stage students in the College of Education - Department of Mathematics at Al-Mustansiriya University, whose number reached (30) students to know and clear the scale instructions and its paragraphs, while extracting the necessary time, as it was applied on Monday 2/2021 22 / The average time required to answer the scale for the first five students and the last five was (45) minutes.

7- Verify the scale:

A- Apparent truthfulness: The scale was presented in its initial form to a number of (36) arbitrators and specialists, to judge the validity and suitability of each paragraph to the dimension to which it belongs in addition to the alternatives for answering the scale's paragraphs and their weights and based on their opinions, the paragraphs that need to be modified have been amended. And I had an agreement of 80% or more regarding the final version of the scale after making simple adjustments.

 B- Validity of construction: It was found

 1- The degree of the paragraph is related to the degree of the dimension to which it belongs.

2- The score for the paragraph is related to the degree of the scale as a whole.

3- The internal correlations between the scale dimensions and the scale as a whole.

 It became clear that all the correlational relationships referred to previously are a statistical function at the level of significance (0.05) and the degree of freedom (198) since the calculated T-values were greater than the tabular amount (1.96), and this is a high indication of the internal consistency between the scale paragraphs.

8- Stability of the scale: The Cronbach Alpha method was used for the strategic intelligence scale, and the degree of reliability was achieved

Calculated using the Cronbach alpha equation is (0.86). This result is good and can be reassured about, after which the scale is ready to be applied to the basic sample. (Al-Nabhan, 2004: 240)

Final application: To achieve the objectives of the current research, the Mathematical Correlations Test and the Strategic Intelligence Scale with its five dimensions were applied to the basic sample of (130) male and female students by (79) male and (51) female students from the fourth stage of the Mathematics Department in the College of Pure Sciences - Ibn Al-Haitham / University of Baghdad, on 3/15/2021 on Monday.

Presentation and interpretation of research results:

The first question: Do students of the mathematics department in the College of Education possess mathematical correlations skills?

The following null hypothesis was derived from it:

There is no statistically significant difference at a significance level (0.05) between the average real and hypothetical performance * of students of the Mathematics Department in the College of Education in the Mathematical Correlations Test.

The T-test for one sample was used to measure the difference between the average real performance and the average hypothetical performance * of the students of the research sample for mathematical correlations, and the result was as in the table below.

* Hypothetical mean of the test = total number of paragraphs x 1/2

* Hypothetical test mean = total number of paragraphs x ½

From the table it becomes clear that the arithmetic average of the students' real performance in mathematical correlations is (12.45) and a standard deviation of (3.98), while the value of the hypothetical average (15.00) shows that the true average is less than the hypothetical average, where it can be said that the level of students is less than the hypothetical level, to know the significance of the difference, the T-value was calculated for one sample as it reached (-7.32), which is greater than the tabular value of (1.96) at the level of significance (0.05) and with a degree of freedom (129). This means that students of the mathematics department do not possess mathematical correlations skills because The difference is statistically significant.

This result may be due to their poor training in mathematical correlation skills due to the small number of examples and exercises aimed at developing mathematical coherence skills in mathematics curricula from the school stages.

The world may also be due to the poor presentation of mathematics subjects in a sequence that leads to linking them with each other, or interest in them, and to the limited use of educational technologies in university teaching.

Interpreted	SIGN	T CALCULATER	Hypothesized mean	standard deviation	SMA	sample	variable
SIGN. Height	0.00	38.66	120	11.99	160.66	130	Strategic intelligence

The second question: Do students of the mathematics department in the College of Education possess strategic intelligence?

The following null hypotheses were derived from it:

There is no statistically significant difference at the level of significance (0.05) between the average real and hypothetical performance of students of the Mathematics Department in the College of Education in the strategic intelligence scale.

The T-test was used to measure the difference between the average real and hypothetical performance of the students of the research sample for the dimensions of strategic intelligence

From the table, we note that the arithmetic averages of the students for the scale as a whole are higher than the hypothetical average, and to know the significance of the difference, a t-test was adopted for one sample. The calculated T value for the scale as a whole is greater than the tabular value of (1.96) and with a degree of freedom (129), and this means that the null hypothesis was rejected and the alternative hypothesis accepted, meaning that there is a statistically significant difference in that at a significant level (0.05) between the average real performance and the hypothesis (120) among the students.

This result can be explained by the fact that some of the fourth stage students 'practices are based on research and what it entails in terms of developing and testing hypotheses to reach a solution to the research problem. They see the university's vision and mission, so they have future plans. Strategic intelligence is nothing but a set of processes aimed at searching for and processing information. Then publish it and protect it so that it is accessible to the right person, enabling him to take the appropriate decision, and this agrees with Ray (Clar, 2008).

The third question: What is the direction and strength of the correlation between mathematical correlations and strategic intelligence among students of the Mathematics Department in the College of Education?

The following sub-null hypothesis was derived from it:

There is no statistically significant correlation relationship at (0.05) level between the fields of mathematical correlations and the dimensions of strategic intelligence among students of the Mathematics Department in the College of Education.

As this hypothesis was verified by calculating the correlation coefficient between mathematical correlation skills and the dimensions of strategic intelligence among students, as shown in the following table:

T-values denote correlation				Values of the correlation coefficients				Domains
Interconnections	Life	The athlete	dim	Interconnections	Life	The athlete	dim	
4.68	3.59	4.68	4.40	0.380	0.300	0.380	0.360	strategic

As it is evident from the table that there are correlations between all areas of mathematical correlations and strategic intelligence as a whole, and it can be confirmed that we note that the T-values of the significance of the correlation are greater than the tabular amount (1.96), which indicates the existence of a good correlation between the areas of mathematical correlations and the dimensions of strategic intelligence among students, i.e. The more they possess mathematical connectedness, the more they possess strategic intelligence, and vice versa.

CONCLUSIONS
1. Students of the Mathematics Department in the College of Education have a low level of mathematical correlations.
2. Fourth-year students, Department of Mathematics, College of Education, have strategic intelligence.
3. There is a good positive correlation for students of the Mathematics Department in the College of Education between mathematical correlations and strategic intelligence.

RECOMMENDATIONS
1. Benefiting from the scientific materials prescribed for fourth-stage students by presenting applications of mathematics to ensure the development of low mathematical correlations among fourth-stage students.
2. Designing training programs for fourth-stage students in the mathematics departments of the Faculties of Education to train to possess the weak in mathematical correlation skills, to develop the ability to think about things in depth and the ability to analyze to face the problems and challenges facing the teacher and the learner, and to conform to future changes in the educational process.
3. Work to enhance students' strategic intelligence, to include teaching objectives and methods, and to evaluate the dimensions of strategic intelligence in order to continue this possession of students.

The proposals
1. Conducting a study to reveal the growth of mathematical correlations among students of the Mathematics Department.
2. Building a training program for teaching cadres according to the skills of mathematical correlations and the dimensions of strategic intelligence.
3. Building a training program for fourth stage students according to the fields of mathematical interdependencies and studying their effectiveness in some variables.
4. Conducting a descriptive study to find out the level of strategic intelligence of mathematics teachers and their students.

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