



Successful intelligence and its relationship to lateral thinking among fifth-graders in mathematics

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Summary:

The research aims to measure successful intelligence in its three areas of intelligence (analytical, practical and creative) and recognize lateral thinking with its skills (generating new realizations, generating new methods and methods, generating new ideas, generating new alternatives, generating new creations) and knowing the direction and strength of the correlation between successful intelligence and lateral thinking in fifth-graders in mathematics.

The correlative descriptive research curriculum has been used. In order to achieve these objectives, the following three hypotheses have been formulated:

- 1- There is no statistically significant difference at the indicative level (0.5) between the hypothetical and computational averages of students' grades (research sample) in the successful IQ test in mathematics.
- 2- There is no statistically significant difference at the indicative level (0.5) between the hypothetical and computational averages of the scores (research sample) in the lateral thinking test in mathematics.
- 3- There is no statistically significant correlation at the indicative level (0.5) between successful intelligence and lateral thinking in fifth-grade scientific students.

The research community may consist of 1656 students in the fifth grade of science who are divided into 16 preparatory high schools of the General Directorate of Karbala Holy Governorate. 310 students from the research community have been selected to represent the required sample.

In order to achieve the research objectives, the researchers built a successful intelligence test consisting of 18 paragraphs that were distributed to the three areas of successful intelligence (analytical, practical and creative) by 6 per field of measurement of successful intelligence. The researchers also adopted a test (Al Khafaji, 2015) for lateral thinking, to measure the lateral thinking in the scientific V students in mathematics, where this test is from 17 paragraphs.

The search tools were then applied to the basic sample, where:

- 1- Research sample students have successful intelligence.
- 2- Research sample students have side thinking.
- 3- There is a peculiar correlation between successful intelligence and lateral thinking in research sample students.



The introduction:

The theory of successful intelligence is considered one of the modern psychological theories of intelligence, as it contains very important implications in the teaching and learning process, whether in teaching methods and strategies or in evaluation methods. The importance of the theory comes from its inclusion of three interacting components: analytical, creative, and practical.

The teacher is supposed to learn what the students actually understand during their education, in addition to guiding them to analyze the information appropriately, laying the procedural foundations for its practical application, and teaching them methods for producing and creating knowledge and the process of reproducing or remembering it. This process requires more effort, planning, and high motivation on the part of the teacher.

The concept of successful intelligence also indicates that it is an individual's ability to achieve a specific life goal, within a specific social and cultural field, by taking advantage of his strengths and addressing his weaknesses in order to adapt and build, and choosing appropriate environments, by combining his analytical, creative, and practical abilities. Successful intelligence also refers to an individual's ability to achieve success within his own standards, in addition to the cultural and social contexts to which he belongs.

(Sternberg, 2015; Sternberg 2003,)

Education has also increased its interest in thinking in general and lateral thinking in particular, as one of the main goals it seeks to develop among learners. The reason for this is due to the many problems and challenges facing societies due to the rapid changes and developments that have affected all aspects of contemporary life. (Al-Qisas, 2007)

Mathematics can be viewed as a process of building concepts, principles, generalizations, skills, issues, and advanced ideas. It is a form of mental inquiry that influences and is affected by this structure in terms of development and growth. It is an interconnected relational fabric for the formation of principles, ideas, rules, laws, and theories. Therefore, the teacher and teaching methods must take into account this construction in a coherent manner, which is generally found in most scientific grammar books. (Afana, 2007: p. 34)

Since the nature of mathematics represents an innovative activity for the human mind, in addition to the fact that it possesses special features in developing thinking, lateral thinking can be improved with mathematics, especially if it is taught well through modern teaching methods and methods that ensure that the student is an effective focus in the teaching process. Since lateral thinking focuses on mental activities as it represents one of the important patterns of thinking in a student's life, and it also plays an effective role in acquiring knowledge and solving problems for students, the process of developing lateral thinking has become a must, as it helps its users in verifying presuppositions and not adhering to them. Adherence to the traditional limits of thinking, as it makes the student open-minded, flexible, and creative in his questions, and the process of linking ideas and arriving at a possible solution to the problem, and thinking continues to develop and refine this solution and perhaps replace it with a better solution (DeBono, 2015: p. 7)

Keywords: successful intelligence, lateral thinking, math subject

First: Research Problem:



Mathematics is one of the most challenging subjects for pupils' intelligence and thinking in the curriculum which relies heavily on their mental abilities, and one of the most important theories dealing with these abilities is the theory of successful intelligence, which is considered to be one of the modern intelligence theories that focused on the quality of intelligence and not the highest quantity in individuals. In addition, it has become the safest practical orientation of learning and schooling, as observance of the principles of this theory and the best education process graduates it from the traditional pattern that focuses on the development of accredited knowledge above recollection to integrative education that focuses on the development of students' experiences. By integrating their creative and practical skills, along with their professional skills to analyze and remember capabilities in an integrated form exploited the security of his strengths and corrected his parents' weaknesses.

Successful Intelligence is one of the core knowledge processes that outperforms information and knowledge to help adapt and control individual resources within a learner's context in different life situations. Resources, whether in the form of information and experience of the learner or tools available in the life situation, The need for successful intelligence today is evident in the abundance of information-rich sources and the enormous amount of knowledge that the human mind is unable to carry (Sternberg, 1998a:71).

One of the most important challenges facing mathematics education is the constant reliance on traditional orientation, which depends on direct thinking or so-called (Vertical or vertical thinking) It is thinking that moves individuals to move forward with logical and incremental steps in an innovative way. This thinking excludes unfamiliar alternatives (Oftentimes and Allah, 2006:26), vertical thinking is effective and excellent, but often incomplete, but not enough. Because such a method does not have enough interest in productive, creative and generative areas of thinking, This need to emphasize the way of thinking, its value and its importance when used in the right place. The gravity lies in considering such methods alone sufficient and allowing them to control all one's intellectual attempts (Debono, 2010:14) Hence the problem of current research was crystallized by the question: Does successful intelligence relate to lateral thinking in fifth-graders in mathematics

Second: The importance of research

1- Theoretical significance:

- 1- The present study contributes to strengthening the theoretical structure of the variables in question.
- 2- The results of this study provide a good theoretical basis on the importance of these changes in educational attitudes and the importance of teachers' and educators' attention to them based on the educational process.
- 3- This study provides a new research tool that can be used in subsequent studies on successful intelligence.

2- Practical (procedural) significance:

The potential of the study's findings to be used in:

- 1- Knowledge of the possession of successful intelligence by fifth graders (research sample).
- 2- Knowledge of the possession of lateral thinking by fifth graders (research sample).



3-Recognize the nature and direction of the correlation between successful intelligence and lateral thinking.

4- Provide a test of successful intelligence and lateral thinking suitable for scientific phase V.

5- Draw the attention of the supervisors of the educational and educational process to attention to successful intelligence and lateral thinking.

Third: Research Objectives:

The current research aims to identify:

1-Successful level of intelligence among fifth-grade scientific students (research sample) in mathematics.

2-Lateral thinking in fifth-grade scientific students (research sample) in the subject of mathematics.

3-The direction and strength of the correlation between successful intelligence in its three fields and lateral thinking among students

Fifth grade in mathematics.

Fourth: Research hypotheses:

The research hypotheses are formulated in the light of the goals set by researchers agencies:

1- There is no statistically significant difference at the indicative level (0.5) between the hypothetical and computational averages of student scores (research sample) in the successful IQ test in mathematics.

2- There is no statistically significant difference at the indicative level (0.5) between the hypothetical and computational averages of the scores (research sample) in the lateral thinking test in mathematics.

3- There is no statistically significant correlation at the indicative level (0, 05) between successful intelligence and lateral thinking in fifth-graders in mathematics.

Fifth: limits of research:

The research was limited to:

1-Spatial boundaries: Boys' Secondary and Day Preparatory Schools of the Directorate General of Karbala Holy Education/Indian District.

2-Time limits: Academic year (2023-2024) First semester of the year.

3-Human Frontiers: Fifth Grade Scientific Students

4-Cognitive boundaries: Mathematics Book for Fifth Grade Science *

Sixth: Definition of terms:

1-Successful Intelligence: Known by both:

-Sternberg (1998), Sternberg: "As a set of capabilities used to achieve the individual's goals in life in the cultural and social context through the choice, formation and adaptation of the environment, three capabilities include analytical, creative and practical capabilities". (Sternberg,1998b: p.15)

-(Abu Hamdan 2008): "It is the ability of the individual to achieve goals according to certain criteria or in particular within the social context in which the individual is present, i.e. the individual sets his or her goals and works to achieve them in line with the social and cultural context in which he or



she is present. Successful intelligence consists of analytical intelligence, practical intelligence and creative intelligence." (Abu Hamdan, 2008:9).

-Procedural definition of successful intelligence: The overall degree of the respondent (student) to his answers to the successful intelligence test prepared by the researchers in his three areas that measure the analytical, practical and creative capabilities individually.

2-Lateral Thinking was known by:

(De Bono,1998) -Bah: "That kind of thinking that requires problem-solving in non-traditional ways, or seems illogical." (De Bono,1998:3)

-(Mahmoud, 2006): "A pattern of thinking based on the creation of as many solutions and alternatives as possible. It is possible to look at the problem or attitude on more than one side and jump steps to solve the problem "(Mahmoud: 2006:189).

Procedural definition: Researchers know a procedural definition for current research as the outcome of the responses of fifth-grade scientific students and measured by the overall degree of students in the lateral thinking test prepared for this purpose.

Theoretical framework:

Successful Intelligence

Despite the multiple definitions of intelligence, they all emphasize that intelligence is a person's ability to fit new and differentiated attitudes, and to change his behaviour in proportion to the environment and external conditions to which he is exposed (Rauf, 1992, p. 187).

In the last three decades of the last century, Sternberg's theory of intelligence has evolved, with Sternberg,1985 stating that his tripartite theory is not the only triple theory of intelligence, since Guilford suggested that intelligence can be understood in three ways: Processes, contents and findings, Cattell suggested another triple theory in 1971 general intelligence depending on three types of capabilities: General mental ability, special mental abilities and primary factors forming culture and science. (Wars, 1999, Sternberg & Davidson, 1986)

Chan, 2007 describes successful intelligence as a set of analytical, creative and practical capabilities interacting with each other, used in an integrated and interdependent manner to achieve the individual's real-life goals of successfully learning skills, within his or her social and cultural range, in the light of choosing, shaping and adapting to the appropriate environment. (Chan, 2007, p23)

Successful intelligence is defined as an individual's intended ability to adapt to the environment that surrounds him or her in order to achieve his or her goals and those of culture and society. Thus, individuals must find a balance between three dimensions:

- 1) Change their environment when it does not fit them (choice)
- 2) Modify the environment to fit them (forming).
- 3) Modify in themselves to adapt to their environment (adapt). So balancing these aspects is the key to the triple intelligence that Sternberg called successful intelligence. s strengths and weaknesses, thereby exploiting one's strengths And he tries to make up for his weaknesses, so successful intelligence is not that intelligence that can be measured by traditional intelligence tests, Successful intelligence is how to leverage one's strengths and compensate for one's weaknesses. ((Janet & Samuel, 2001, p 361



Al-Fa 'aouri (2011) considers that he is the individual necessary to achieve successful achievements in daily life, and to achieve the goal within ideal personal criteria that fall into the individual's social and cultural contexts (Al-Fa' aouri, 2011, p. 49). Abderrahman et al., 2017, describes successful intelligence as students' use of their analytical, practical and creative abilities in academic life. By mastering skills and achieving educational goals, and interacting with educational activities to apply skills in study, Forming an effective hub in education and achievement, linking evaluation and teaching processes, Using the calendar and enhancing students' strengths and addressing their weaknesses, the extent of their success or failure to achieve the goals is determined (Abdul Rahman et al., 2017, p. 344).

Ingredients for successful intelligence

1- Analytical intelligence ("analytical intelligence") is defined as: the intelligence used to analyze the situation of its components, make comparisons between contradictions, judgement, and evaluation, which helps the learner to know the characteristics of the situation, according to what the situation is right.

2- Practical intelligence is defined as: "The intelligence through which the learner can shape and adapt to the environment in which he or she is present, helps him or her choose the right one of the things in his or her daily life, acquires experience to achieve his or her compatibility with the environment, shapes his or her behaviour in proportion to the situations in which he or she is experiencing, and generates the ability to solve problems."

3- creative intelligence: intelligence that enables the learner to find unfamiliar objects, encompasses invention, discovery and imagination, and through creative intelligence the learner can override the information provided to him from the situation and generate new high-quality ideas (Waqf, 1998, 525-526)

Educational Employment of Successful Intelligence Theory

This theory attempts to address old problems affecting the educational system including a group of people with high academic degrees, but unable to adapt to the requirements and nature of working life or that they are unable to achieve the excellence expected of them, as reflected in their testimonies and their scientific documents, as well as the general inability of graduates to adapt to labour market requirements and the actual need to qualify them, so this theory follows in its application a set of pedagogical foundations for teaching and evaluation methods as follows:

1- Provide learners with various options for the evaluation process, such as written functions and daily reports. It is important that evaluation be part of the learner's interests, challenging the student's abilities, giving the student the opportunity to choose, and incorporating diverse skills such as analysis, comparison and application of new subjects affecting life.

2- Education should focus on poor learners rather than strong learners, and use varied teaching methods that attract students' tendencies to study.

3- A learner's understanding of his strengths through a way of thinking compatible with his or her analytical, creative or practical abilities is related to raising the level of attainment and self-



competence of the learner. The learner's sense of achievement motivates him or her to continue working, as well as his or her ability to continue his or her career in the future.

4- Enabling the learner to identify his or her weaknesses, and working to correct them gives the learner the opportunity to raise his or her educational achievement; A learner's assimilation of knowledge is one of the objectives of the educational process, which is required not to diminish the learner's abilities in the event of a weakness in his or her abilities. The main task of the learning process is to help him understand everything about his weakness. and then build upon it to give it the opportunity to learn about the three ways of thinking that will make it successful in its future life.

Eh. The process of learning and evaluation requires a balance between analytical, creative and practical thinking Students need to balance the thinking skills used, by including them in the curriculum or in the evaluation process by choosing what fits with the content and this process aims to help the student think in ways commensurate with the knowledge analysis required by the content, or creativity in producing new ideas through knowledge, or applying them in life situations. (Sternberg,1998b,28)

Second Research: Lateral Thinking:

First: Thinking:

The beginning of the world's interest in the topic of visibility increases, especially in the 1980s of the second half of the twentieth century. This concern is reflected in the numerous models of thinking, research, studies and training programmes, and the consensus between the perspectives for the development and advancement of this vital field, in accordance with the principles of targeted education, to organize thinking among learners, thereby helping them to invest their maximum capabilities and creative energies. (Abu Jada and Mohammed, 2007:25)

Second: Lateral Thinking:

Vertical anchor thinking has always been the only kind of thinking. And it represents the final form and the higher goal that the mind seeks to achieve, and perhaps the computer devices are the best application of this method The programmer must know the problem, and determine the way in which this problem is discovered. The computer uses unparalleled logic and efficiency to solve the problem, and this streamlined step-by-step progress towards the solution is quite different from the lateral thinking method. De. Bono,1997:9) (

Side thinking is a new vision of creativity without limitations on the presentation of ideas by both creative skills and skills strategies, an integrated and unified creative method that helps individuals to produce new ways, in terms of thinking or decision-making tools, and whose learning will affect the way these daily tasks are performed, as they will be characterized by accuracy, speed and high quality.

(De. Bono,1997:17)

Professor Debono is the creator of the term lateral thinking, who entered the Oxford Dictionary in his latest release, specializing in (Debono) in Ph.D. and psychology, received a doctorate in medicine and then a doctorate in psychology from the British University of Camburg, and published (Debono) More than 67 books, mostly on the subject of thinking and creativity and teaching their skills, some of which have been translated into 38 languages, including Arabic. (Abdelnur, 2005, p. 7.8).



In Sloane's view, lateral thinking is to move away from the ordinary thinking, and to look for unusual ways to find a solution. (Sloane, 2006:98)

And de Bono called this kind of thinking. (Serious creativity) to distinguish between creativity based on understanding self-regulated information systems, and creativity based on inspiration and research, with no purpose in hoping for something to happen, as he called De Bono is interested in changing perceptions, ideas, methods, skills and concepts by seeking to change and generate new concepts, skills and perceptions, rather than working hard with the ideas, concepts and perceptions themselves. (debono, 2007:4)

Debono is the leading reference in creative thinking and teaching thinking as a skill. He has developed the main creative tools for lateral thinking, and is also the discoverer of the Six Hats Strategy for Thinking. (De bono, 2008, P 125)

Third: Principles of lateral thinking:

1- Finding a variety of ways to look at things: in what circumstance is lateral thinking used, and under what circumstance can vertical thinking be acceptable? The use of lateral thinking is essential in problem situations, when anchored thinking is unable to give the answer, The problem is not solvable, except by experimenting with unusual ways of looking at it, Other problems can be solved through vertical thinking, but the process becomes dull and long in such cases, Side thinking may be the most helpful in finding the best solution by defining the problem as a situation that needs to be answered, and hinting that the answer is unclear and sometimes the situation is just a problem, viewed in a certain way, and viewed differently may demonstrate the right course of action.

2- Reducing vertical thinking control: vertical thinking is not useful in generating new ideas And as it strongly prevents it, there is an extreme human nature that overwhelmingly searches for total control of what is going on in the brain. Everything has to be analyzed and installed logically, and there is a vigorous quest for judgement and intense scrutiny that may be false. film, like a film bar that segments motion into a series of still images, This form of mind is very extreme, there are a large number of minds that show this tendency to a lesser extent.

3- Using coincidence: Using coincidence is the third fundamental principle of lateral thinking, to generate new ideas, shows that there is a contradiction when we suggest that Shina may happen through coincidence, because in defining coincidence things cannot happen by planning, and that is precisely their value in that they lead to new ideas. (De Bono,1967:106)

Fourth: Lateral Thinking Skills:

1- Building new realizations:

Perception symbolizes consciousness or understanding, that is, a learner becomes aware of things while thinking about them. In other words, perception is hypothetical conscious thinking that aims to capture a learner's mental processes, In order to understand, make decisions, solve problems, or judge things, Or do something, realizing one of the kinds of inner understanding, leads the learner towards the idea with a view to understanding it, and de Bono asserts that thinking and perception are one thing. According to De Bono, thinking is to investigate expertise for a purpose, this goal may be to achieve understanding, make a decision, solve problems, or do a job. (Abu Jadau and Mohammed 2007: 467-468)



2- Generate new methods and methods: De Bono stresses that there are general methods and methods of doing things that are sometimes expressed unclear, so an effort must be made to draw these methods. There are three types:

-Intentional or purpose-oriented methods and methods: they relate to what the learner is trying to achieve.

-Mechanical methods and methods: these describe the amount of impact of an act.

-Valuable methods and methods: refers to how the work acquires value. (Al-Daibani, 2013:52)

3- Forming new ideas: the idea is the thing he imagines Mind, ideas are material ways of implementing concepts, the idea must be specific and put into practice, and in order to generate new ideas, warn Debono's quick rejection of ideas, asserts that rapid rejection of ideas comes from the constraints of reason. If the idea is not in line with these restrictions, it tends to reject, And this is the initial use of pessimistic thinking, but it takes thinking about this situation, This shows optimism, and even thinking about such situations may require creativity in order to reach more creative ideas. (Al-Kubaisi, 2013:131)

4- Generate new alternatives: We mean a way of thinking about solutions from a possible or available group. Lateral thinking is interested in discovering or formulating new ways of rearranging available information, and generating new solutions rather than going one way, which then develops a single pattern of looking for ways. Alternative behavior is normal for individuals who feel they do. (Janabi, 2013:40)

This is true to some extent, since research through lateral thinking goes beyond the phase of natural research, where lateral thinking allows individuals to generate many alternatives according to their capability. In natural research, a learner cares about logical alternatives while in lateral thinking alternatives are not required to be logical and one alternative may be a useful starting point. (Novel, 2010:138)

5- Making new creations: De Bono indicates that creativity is working to generate something new, not analyzing old things, creations or innovations are a picture of lateral thinking. (Abu Rayash, 2007: 326-330)

Fifth: Uses of lateral thinking:

1- Generate new ideas: There are functions that force man to generate new ideas, such as research process, architectural design, media, teaching process... Etc, it is not easy to generate new ideas, and often vertical thinking is useless, when generating new ideas is better and easier, where a person waits for opportunity, inspiration or a gift of creativity. (Debono, 1995:57).

2- Solving problems:The problem is not something that has to be formally presented. At the same time, it is not something that requires a solution to the pen and paper. It represents the difference between what a person wants and owns. Perhaps it is something that is taken to go beyond something, or to get rid of something, or any difficult situation to get rid of. According to De Bono, 2006, the types of problems are:

A-The problem that needs to be rearranged prior information, i.e., rearranged more deeply, and this type of problem can be solved through lateral thinking.

B-The problem of no problem, the person may be committed to the current order and cannot go out, discuss what is better, and to have a relationship that indicates which one of them will focus on, the



problem is to realize the existence of the problem, i.e. realize that there are things that can be improved, so the realization knows that it is a problem, and of this kind many problems can be solved by side thinking. (De Bono, 2006: 31-33)

3- Periodic reassessment: Revisiting means things that cannot be questioned and that is to say, challenging all hypotheses that suggest that this process is useless when assessing something, Because there is an urgent need for reassessment, it is only useful when the reassessment-evaluation is re-evaluated if it has not been done for a long time, It is a deliberate attempt to examine things in a new way that differs from its predecessor.

4- Reducing polarization and resolute assessment: Perhaps the most important use of lateral thinking is its use in a way that is totally unthinkable, but it is a skill possessed by man. The emergence of these problems that can only create those divisions and polarize thinking, which the mind imposes on what is discussed, studied and discussed. (De Bono, 1990:60)

5- Lateral Thinking for Decision Making: We Can Use Lateral Thinking in Decision Making decision ", where the rejection of the alternative opinion is a strong point of the decision, since each decision has a certain degree of distrust and trust in a resolution that does not offer specific alternatives, is a weak confidence that can be the result of a weakness in imagination. And the trust that comes from seeing several alternatives and then rejecting them all is true trust, There is a connection between decision-making and thinking, since one of the definitions of lateral thinking and creativity is a decision-maker's unique ability to gather ideas and information. In order to reach new decisions, that is, he uses his creative abilities to see aspects of the problem, Others may not be able to see it, because decision-making is the process of choosing the best alternatives available to solve a particular problem, or confronting situations that require it. (Shehab, 1998:17)

Previous studies:

First: Studies on successful intelligence:

1-Study Esra Al-Sari (2015) aimed to learn "the impact of a training programme in mathematics based on the theory of successful intelligence in developing the problem-solving skill of talented students in kindergartens", conducted in Jordan, University of Balqa Applied.

2- The study of Abdul Wahid Mahmoud Mohamed Makki Al-Kanani (2016): aimed at learning about "a proposed teaching model in light of the theory of successful intelligence and its impact on the achievement of fourth-grade scientific students from mathematics and the development of their creative thinking", conducted in Iraq, Basra University.

3-Rasha Mr. Sabri's study (2018) aimed to learn "a programme in mathematics based on the theory of successful intelligence using modern teaching entrances to develop mathematical knowledge, critical thinking and national identity among middle school students", conducted in Egypt, Ain Al-Shams University.

4- The study of Ibzam Ezzedine Mohamed Abdel Fattah (2021) aimed to learn "a program based on the successful theory of intelligence to develop pedagogical knowledge of the content of mathematics and meditative practices of the student teachers of the Faculty of Education", conducted in Egypt, University of Zagaziq.

5- The Mehdi Saleh Hamza Study (2022): aimed at knowing "the nature and direction of the correlation relationship between the depth of mathematical knowledge at its four levels



(remembrance and reproduction, application of strategic thinking concepts and skills, extended thinking) and between the successful intelligence with its three analytical capabilities, the creative process of high-achieving middle-grade students and according to the gender variable)", conducted in Iraq, University of Bagof Bag.

Second: Studies on lateral thinking:

1- Study (Al-Kubaisi, 2009): This study was conducted in Iraq. It was aimed at knowing what effect the use of brainstorming strategy in teaching mathematics on achievement and lateral thinking in middle second grade students.

2- Study (Al-Gorani, 2010): This study was conducted in Iraq, where it was aimed at knowing the relationship between lateral thinking and personality characteristics according to the model of the list of five factors of personality among university students.

3- Study (Al-Khafaji, 2015): The study aimed at "knowing the impact of the proposed educational design based on the education strategy in order to understand the achievement of mathematics and lateral thinking in fifth-graders", Wagrit in Iraq, University of Baghdad

Chapter 3: Research methodology and procedures

Research curriculum: In their current study, researchers adopted the descriptive curriculum, in pursuit of research objectives.

Research Community: Includes all 1,656 students in the schools of the Indian Education Department of the General Directorate of Karbala Holy Education for the academic year (2023-2024)

Research Sample: The sample of the research was selected in the way of the simple random sample to represent members of the original community. The members of the sample reached 310 students according to the sources in the educational statistics, including (Afana, 1997:325).

Research tools: To achieve research goals a test of successful intelligence was built, and a test is adopted to measure lateral thinking:

Successful IQ test: Researchers prepared a test to measure successful IQ, because of the lack of a ready test suited to the selected sample to achieve the research objectives. The process of building the test passed until it reached its final picture several steps followed by the researchers:

1- Setting the test target: The goal of building the test is to measure the successful intelligence in the research sample.

2- Identifying areas of successful intelligence:

After reviewing the literature and research on successful intelligence and its previous studies, which are of three dimensions: intelligence (analytical, practical, and creative).

3- Test paragraphs: The preliminary test is made up of (18) substantive (multiple selection).

4- Preparation of test instructions: in order to be clear and unambiguous the test was indicated that this test is for the purpose of scientific research, emphasis on answering all the test paragraphs, explaining the answer mechanism, and the duration of the test.

5- Application to the reconnaissance sample:

5/1- The first exploratory application of the test: To identify the clarity of the test paragraphs and determine the time needed for it, the researchers applied the test to the first survey sample of

(20) students. The test paragraphs were clear to them. The time taken was calculated by taking the first (5) students and the last (5) students and dividing the output by their number and showing the time needed to answer is (70) minutes.

5/2- Second exploratory application of the test: the test was applied to a second survey sample of (100) students from the research community to ensure that:

A- Statistical analysis of test paragraphs:

First: ease and difficulty factors: results ranged from (0.30 - 0.75) for all test paragraphs and these ratios are acceptable as indicated by the sources, as in table (1)

Second: Discriminatory force of test paragraphs: ranging from (0.33 - 0.48) for all paragraphs, as indicated by sources, these ratios are acceptable and permissible, and table (1) shows this.

Effectiveness of wrong alternatives: All wrong alternatives were effective, and alternatives were therefore kept unchanged as in table (1)

Table (1) Ease of difficulty and discernment transactions for cognitive speed test paragraphs

Discrimination factor	Difficulty factor	Ease factor	Paragraph	Discrimination factor	Difficulty factor	Ease factor	Paragraph
0.31	0.30	0.70	13	0.33	0.30	0.72	1
0.37	0.38	0.62	14	0.40	0.35	0.66	2
0.34	0.47	0.46	15	0.33	0.44	0.72	3
0.66	0.35	0.51	16	0.44	0.34	0.66	4
0.41	0.48	0.65	17	0.37	0.50	0.75	5
0.62	0.47	0.53	18	0.32	0.69	0.31	6

B. Psychometric properties:

First: Sincerity of construction: To calculate the sincerity of the construction, Pearson's correlation coefficient has been adopted between each test paragraph and the total test. Results ranged from 0.34 to 0.73. This is a good indication of the internal consistency of the test paragraphs. These results are effective at the evidentiary level (0.01) and table 2.

Table (2) Correlation factors per paragraph with the total sum of successful IQ test paragraphs

Degree of	Paragraph	Degree of	Paragraph	Degree of	Paragraph
(**)0.37	13	(**)0.41	7	(**)0.34	1
(**)0.73	14	(**)0.35	8	(**)0.45	2
(**)0.47	15	(**)0.43	9	(**)0.66	3



(**)0.44	16	(**)0.34	10	(**)0.52	4
(**)0.34	17	(**)0.44	11	(**)0.52	5
(**)0.70	18	(**)0.59	12	(**)0.39	6

Second: Stability:

To ensure the stability of the successful IQ test, the researchers applied the test to a survey sample from the research community and from outside the final sample students. The number of students (40) students, and the application was repeated again two weeks later, after which the researchers used the test method and replication (test-re-test) and calculated the Pearson correlation coefficient. The Alpha Cronbach method is also used, with a successful IQ test stabilizing factor of this method (80.0).

6- Correction of the test: The test paragraphs have been corrected through the adoption of the key (0, 1) and represent b (1) for the correct answer and (0) for the wrong answer and the highest degree the student receives is (18) a degree and the lowest degree the student can receive is (0).

B- Lateral thinking test and the following steps are included:

First: Apparent honesty: The apparent truthfulness was verified by its presentation to a number of experts and specialists in mathematics and methods of teaching mathematics, measurement and evaluation. All paragraphs received the required approval.

Second: Stability: The persistence of the lateral thinking test was extracted. Researchers adopted the alpha-kronbach method and reached (0.78). This is an acceptable ratio.

Final application of the test: After conducting statistical treatments for both the successful IQ test and the lateral thinking test, the researchers applied the two tests and the appropriate conditions were taken into account during the application so that the data and information were ready for statistical analysis.

Presentation and interpretation of results:

1- Results related to successful intelligence:

To test the validity of the first hypothesis relating to the comparison of real performance and hypothetical performance of students on the successful IQ test by calculating the calculation averages and standard deviations of each of the test paragraphs obtained by the individuals of the research sample and then finding the calculation average of the successful IQ test scores in total, where the calculation average of their real performance was 10.51 degrees.

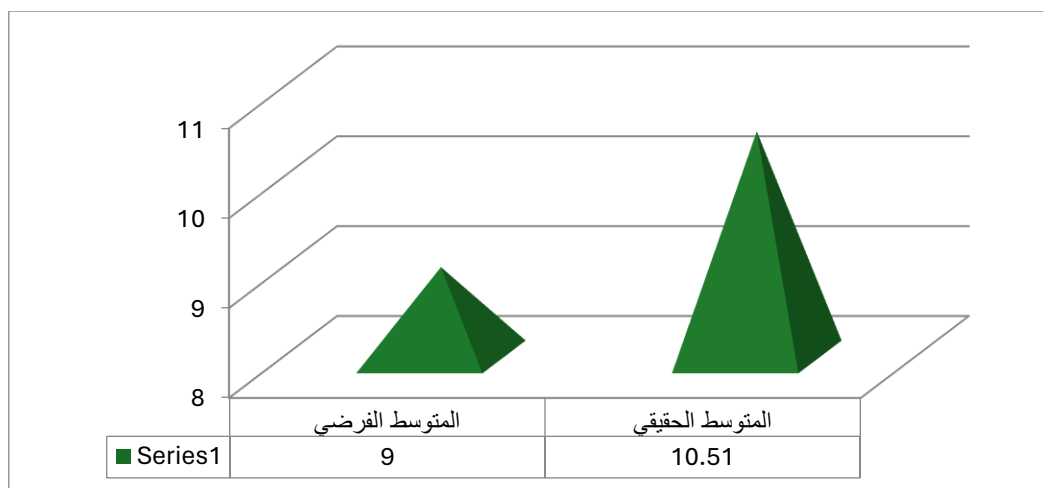
By comparing with the hypothetical average of a successful IQ test equal to (9) degrees, we note that the real performance of research sample individuals is more than hypothetical performance.

In order to ascertain the significance of the differences between the computational and hypothetical average, the T-test was used for one independent sample. The results were shown as in table (3):

table (3)

T tabular value	Calculated T value	Standard error	Standard deviation	Average grades	Group
1.98	2.023	0.175	2.762	10.51	True average
				9	Hypothetical mean

From the table above, the calculated value is higher than the tabular value. It rejects the zero hypothesis and accepts the alternative hypothesis. So the individuals of the research sample possess successful intelligence, and the researchers believe that the reason is that the individuals of the research sample have gained previous experiences by studying many different subjects of mathematics in their stage and the stages in which they have already studied. And just as the nature of mathematics is rich and rich in problems and attitudes that guide students and help them by using their highest level of intelligence, Thus, the students of the research sample were able to use previous information and experience in the test prepared, which showed their possession of successful areas of intelligence and the format (1) shows the real average and hypothesis on the successful IQ test.



Form (1) Average real performance of the search sample on the resulting IQ test and average hypothetical performance of the test

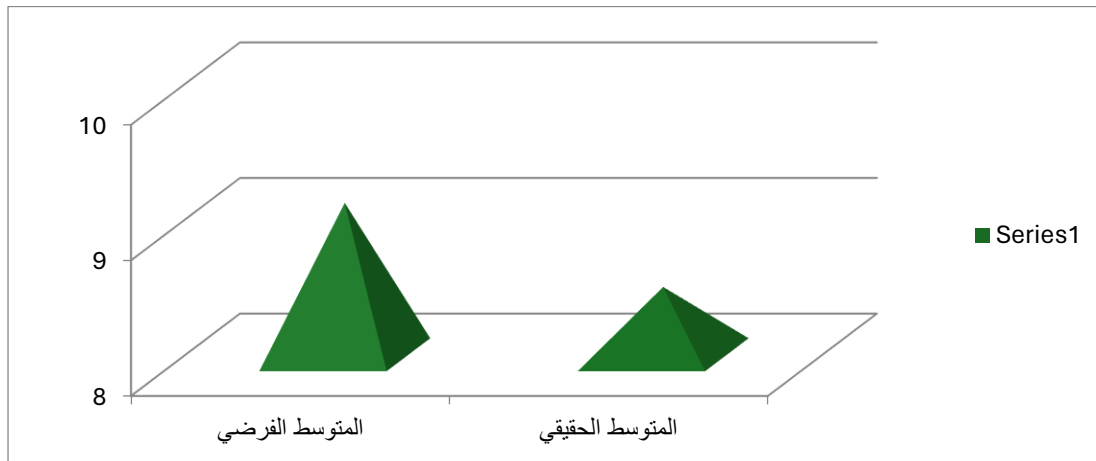
1- Results related to lateral thinking: The validity of the second hypothesis for comparing students' real performance with hypothetical performance was tested and the results were: By calculating the scores obtained by the individuals of the research sample, it was found that the average calculation of the real performance of the individuals of the sample reached (9.12) degree,

in comparison with the hypothetical average of the test which is equal to (8.5) degree, note that the real performance of the research sample students exceeds the hypothetical performance, and an increase in ascertainment and to recognize the significance of the differences between the computational average and the hypothetical average. The T-test was approved for one separate sample. The results were as in table (4)

Table (4)

Calculated T value	Calculated T value	Standard error	Standard deviation	Average grades	Group
1.98	2.463	0.485	2.024	9.12	True average
				8.5	Hypothetical mean

From the above table it is clear that the calculated value is higher than the tabular value, so we accept the alternative hypothesis and reject zero. The students of the research sample have a side thinking, because the students, and the figure (2) shows the average scores of the lateral thinking test.



Form (2) Average Lateral Thinking Test Scores

3- Results related to the correlation between successful intelligence and lateral thinking.

The Pearson Correlation Coefficient was used to identify the correlation coefficient between the grades of the research sample students on the successful IQ test and their grades on the lateral thinking test, and to identify the connectedness of the correlation coefficient. The researchers used a T test for the correlation coefficients to validate the third hypothesis. The othesis was reached as table (5):

Table (5)

T value for significance	Correlation coefficient value	Deviation standard	Average arithmetic	Number of indiv	Test type
7.238	0.450**	2.762 7.767	10.51 31.588	310	Successful Intelligence
		2.024	9.12		Lateral thinking lateral thinking

(* *) Binding coefficient at an indicative level (0.01)

Note from table (4) above that the calculated correlation coefficient between successful intelligence and lateral thinking in research sample students has reached (0.450). This is a positive and acceptable correlation coefficient.

The T value calculated for the correlation factor (7.238) was greater than the high tabular T value (1.98) At an indicative level (0.01) and a degree of freedom (308), this refers to the rejection of the zero hypothesis and acceptance of the alternative, that is, there is a correlation between successful intelligence and lateral thinking and its expulsive orientation, and the two researchers believe that the cause is the students of scientific V When they have successful intelligence, this is reflected in their increased lateral thinking in my mathematics.

Second: Conclusions

- 1- Research sample students have successful intelligence.
- 2- Research sample students have side thinking.
- 3- There is a peculiar correlation between successful intelligence and lateral thinking in research sample students.

Third: Recommendations:

- 1- Recommend to the General Directorate of Curricula to emphasize the areas of successful intelligence and lateral thinking skills of students when preparing mathematics curricula in general and the fifth-grade scientific curriculum in particular.
- 2- Math teachers need to learn about the areas of successful intelligence and lateral thinking skills by recommending the educational system to conduct the necessary training courses and programs and hold seminars for both teachers and students.
- 3-Recommend to the Directorate of Education to focus on enhancing and developing students' mental abilities, including successful intelligence and side thinking to keep pace with scientific development and to hold training courses, seminars and programs.
- 4-Building educational and mentoring programs to help develop successful intelligence and improve students' side thinking.
- 5-Recommend the use of appropriate teaching methods and methods in taking into account the relationship between successful intelligence and lateral thinking in the light of those results.



Fourth: Proposals

- 1- Build a training program for students applied to train them on successful intelligence.
- 2- Undertake a similar study for students of outstanding schools and compare results.
- 3- Conduct research to reveal the relationship between successful intelligence and lateral thinking among math teachers and teachers.

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