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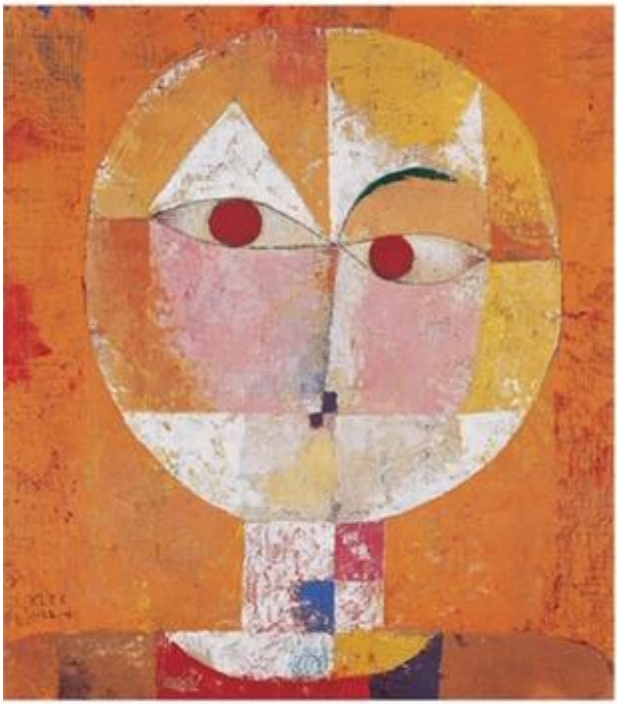

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Development Of The Spatial Intelligence Of Teenagers

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Abstract

The sample of the study consisted of (102) male and female adolescents in the ages (13,15,17). They were selected by random stratification method. To achieve the research objectives, a 5-point test was applied. 1. Adolescents (13,15,17) have spatial intelligence. 2. Spatial intelligence The ability of the fluid deteriorates with age in adolescence 3 - influenced by the intelligence of age and age (13,15) years, respectively. 4 - Spatial intelligence is not affected by sex (males, females) in ages (13,15) years. 5 - is influenced by the spatial intelligence sex at the age (13). 6 - is not affected by spatial intelligence specialization (scientific, literary). In the light of the conclusions reached, the researcher made a number of recommendations and suggestions. 1- The development of spatial intelligence in adolescents in the ages (13,15,17) years. 2 - Significance of differences in spatial intelligence according to the variable age (13,15,17) years. 3 - Significance of differences in spatial intelligence in adolescents age (13) years, depending on the sex variable (males, females). 4 - Significance of differences in spatial intelligence in adolescents (15,17) years according to variables: - Sex (males, females). - Academic specialization (scientific, literary).

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Desarrollo de la inteligencia espacial de los adolescentes.

Resumen
La muestra del estudio consistió en (102) adolescentes varones y mujeres en las edades (13,15,17). Fueron seleccionados por el método de estratificación aleatoria. Para lograr los objetivos de la investigación, se aplicó una prueba de 5 puntos. 1. Los adolescentes (13,15,17) tienen inteligencia espacial. 2. Inteligencia espacial La capacidad del fluido se deteriora con la edad en la adolescencia 3, influenciada por la inteligencia de la edad y la edad (13,15) años, respectivamente. 4 - La inteligencia espacial no se ve afectada por el sexo (hombres, mujeres) en edades (13,15) años. 5 - está influenciado por la inteligencia espacial del sexo a la edad (13). 6 - no se ve afectado por la especialización de inteligencia espacial (científica, literaria). A la luz de las conclusiones alcanzadas, el investigador hizo una serie de recomendaciones y sugerencias. 1- El desarrollo de la inteligencia espacial en adolescentes en edades (13,15,17) años. 2 - Importancia de las diferencias en la inteligencia espacial según la edad variable (13,15,17) años. 3 - Importancia de las diferencias en la inteligencia espacial en adolescentes de 13 años de edad, dependiendo de la variable de sexo (hombres, mujeres). 4 - Importancia de las diferencias en la inteligencia espacial en adolescentes (15,17) años según variables: - Sexo (hombres, mujeres). - Especialización académica (científica, literaria).

Chapter one
Definition of research
Research problem:

Spatial intelligence is one of the mental capabilities, which includes the processing of information represented by symbolic, visual or graphical formulas based on linguistic and verbal means, and this is evident through the thinking and spatial communication and the ability to recall mental representations and the ability to infer and conception, as well as includes stereotypes that include (data and graphics Maps and models) (Gardener, 1983: 2).

Spatial intelligence includes some of the most difficult types of thinking (stereotypical thinking), as individuals usually have difficulty in tasks that require this type of thinking, either to fail to accomplish those tasks or they need more guidance that helps them to do so, for example Individuals with

less space than others have difficulty coordinating furniture appropriately and may seek help from others in completing this or other tasks (Viens & Kallenbach, 2003: 102). When you go to new places this is added To a lot of tasks that require thinking spatial.

Contemporary research in the field of spatial intelligence indicated that spatial knowledge is flexible and scalable, which explains the evolution of individuals' ability to infer spatial formations (Newcombe & Frick, 2010: 102).

Several studies indicated that there is a weakness in spatial intelligence such as Mohammed (2008) and Farhan (2013), while Al-Taee (2014) confirmed the high level of spatial intelligence.

With regard to the sex variable, the Quaiser & Lehmann (2002) study found differences in the level of spatial intelligence attributable to the gender variable. Space cognitive tests. (Boque & marre, 2003: 9).

From the above, it turns out that spatial intelligence is a cognitive structure and efficient in the representation of information spatially evolving as a result of the interaction between factors of maturity and experience.

Based on the above, the researcher presents important questions that need answers: Do adolescents have spontaneous intelligence? What is his level? Does spatial intelligence take an evolutionary path in adolescence? What is its nature? Does sex have a role in this evolutionary path?
research importance:

Kardner (1983) presented his theory of intelligence, later called the theory of multiple intelligence, in which he objected to the unilateral concept of intelligence, or expressed (by the general mental factor), taking into account the different forms of human activity and the contradiction of methods in the behaviors of the human mind (Sternberg, 1996). : 38).

Spatial intelligence is an important problem-solving intelligence in many scientific fields. It is of great practical importance in the field of science, technology and mathematics (Newcombe & Frick, 2010: 102-103). Spatial intelligence is important in many areas of life, since prehistoric human ability to provide food and the ability to fish and predict natural events based on the movement of planets, as most people at the time had a high efficiency in those tasks and they develop that efficiency in adulthood Carmel & James, 2000: 1), uses spatial intelligence to solve some puzzles or plan some change in our homes, engineers think spatially when designing homes and economic analysts think spatially when choosing charts for the rise and fall of different stock prices, pharmacy workers and scientists Animals and those who map the evolutionary pathways of

animals to predict their behavior (Canham, 2007: 266). When the hiker or tourist stands at the map or compass, his spatial intelligence will determine his path (Sarno, 2012: 166). Contemporary research in the field of spatial intelligence indicated that spatial knowledge is characterized by being flexible and scalable. This explains the development and progress of achievements in different fields, which is related to the development of individuals' ability to infer spatial formations. Studies show that children and adolescents with high spatial intelligence will be creative at university level and beyond in tasks requiring spatial skills (Newcombe & Frick, 2010: 102), and spatial knowledge is important in helping an individual to think, gather information, and solve problems that cannot be verbally solved. (Cardner, 2004: 350-351). The importance of spatial intelligence translates from Cardner's argument that he deserves to be a category independent of other intelligences. Cardner can be counted as an extension of Piaget's work in 1981, and both Dayman and Waters (2000) have confirmed this by the assumption that there is a relationship between spatial intelligence and achievement in mathematics (Sarno, 2012: 166). Students who respond or learn through images, whether they are visual or animated visuals or films, are evidence of their spatial intelligence (Nawfal and Abu Odeh, 2011: 257-258).

Several contemporary scientific studies have also pointed to the assumption (individuals can develop their spatial intelligence through training and experience) and in a series of experiments shows that children and adolescents after a short period of training have developed their spatial intelligence (Surtees, 2013: 426).

Thus, spatial intelligence is of evolutionary and adaptive importance, as each individual in order to ensure survival in this world has to move in the form of environments around them, and the ability of individuals to make tools that help adapt to that world is only evidence of their spatial intelligence In order for an individual to devise a machine, he must first imagine or imagine its shape, which is related to the function to be performed, such as cutting, and secondly, to modify that imagined form into different, broader formats.

In the same analytical course of the evolutionary requirements, many researchers in psychology, especially in the field of intelligence and cognitive processes, pointed out that the spatial intelligence and the contents of the vacuum thinking is the basis for verbal thinking as the individual collapses imaginative images that bring the word.

The results of scientific research confirmed that spatial perception is

one of the components that fall within all types of intelligence in general in adult individuals and that the factor of spatial calculation is common in children in pre-school.

Spatial intelligence is of great importance in the inference process, as it contributes to areas that are not visible on the surface or with features that are not clearly blurred. They are intended as tools of thinking that help us to know the distribution of several variables such as population distribution or natural or economic sources, as both (charts and maps) is a form of spatial intelligence.

Psychologists, researchers in the field of education and teachers who have focused on the basic skills related to literacy and science must work to develop the skills of spatial intelligence represented by the thinking space of the learners. (Newcombe & Frick, 2010: 102-103).

With the continuation of scientific development in various areas of life, including careful studies of the evolution of man through different periods of development, psychologists have concluded that adolescence is one of the most important developmental periods in human life (Abu Jadu, 2007: 405). Mental abilities become more expressive and accurate than before, and adolescent abilities begin to differentiate, with increased ability to attain and acquire skills and information. What distinguishes education at this stage is that it is built on a logical basis, unlike the previous stages, where education is automatic. The adolescent's ability to pay attention for longer periods of time is also evident (Ghabari and Abu Shaira, 2009: 238). The secondary school is the most organized educational institution in the lives of adolescents, offering opportunities to learn and master new experiences and skills and to refine previously acquired experiences (Abu Jadu, 2007: 437).

In addition to the above, the importance of theoretical and applied research has been shown in the following points:

- The absence of an evolutionary study on the evolution of this variable in Iraq, according to the researcher.
- The importance of adolescence and the importance of detecting the development of this ability at this stage.
- Spatial intelligence is one of the important abilities in education, as individuals use it in many of their daily activities, starting from the arrangement of their bedroom to the end of their driving.
- Can benefit from the current test ((5-Point in the Iraqi environment in the process of accepting and guiding students towards disciplines that correspond to their capabilities.

research goals :
This research aims to identify:
1- The development of spatial intelligence in adolescents in the ages (13,15,17) years.
2 - Significance of differences in spatial intelligence according to the variable age (13,15,17) years.
3 - Significance of differences in spatial intelligence in adolescents age (13) years, depending on the sex variable (males, females).
4 - Significance of differences in spatial intelligence in adolescents (15,17) years according to variables: - Sex (males, females). - Academic specialization (scientific, literary).
search limits:

This research was limited to adolescents in ages (13,15,17) and both sexes (males, females), for the morning study and for the academic year (2016-2017) in the city of Kut / center of Wasit province.
Define terms:
First: Development (Arafa):
- Katami et al. (1990): Formative and functional changes associated with chronological age. These changes are in the form of improvement or progress, such as the transition from childhood to adolescence. It may be in the form of retreat or deterioration, such as the transition from adulthood to old age (Katami et al., 1991: 111).
Abu-Ghazal (2006): A series of successive changes that follow a coherent and integrated method and system that appear in both the formative and functional aspects of the organism (Abu-Ghazal, 2006: 29).
Theoretical definition: Through the presentation of definitions the researcher adopted the definition of Katami et al. (1990)
As a theoretical definition of evolution.
Second: Spatial Intelligence:
1. Gardener (1993): It is the ability or programmed human ability, which includes the mental skill to solve space problems and visualize things at different angles, and see the final details of things (Gardener, 1993).
2 - Selim (2004): "The ability to add visual representations of the world in place and adapt them in a tangible mental way.
3. Shen (2006): The ability to visually shape mental models of the world, as well as the ability to maneuver in the use of these models. .
3. Krakowski et al. (2006): includes space treatments such as remodeling objects, identifying the movement of objects in space and events that take place in a vacuum, and thinking about the spatial representations of non-

voidal activities, such as our use of structured tables to think about the structure of a company. Of mental abilities that include adaptive stereotyping (Krakowski & et.al, 2006: 266)

Armstrong (2006): The ability to perceive the spatial world accurately This type of intelligence involves sensitivity to colors, lines, shape, space and relationships between elements and includes the ability to depict, spatially represent visual or spatial ideas, and the ability to properly orientate oneself in a spatial template. optical. (Armstrong, 2: 2006).

5 - Bedair (2010): "The ability to imagine mentally in three dimensions. The expression of this shadow or perspective or maps or movements of chess or interior design, and owners of this intelligence have the ability to imagine the dimensions of the place where they are located and planned before arranging furniture, and they are pictures A good mindset for what they understand through their readings to him (Bedair, 2010: 275-276).

Theoretical definition of spatial intelligence: The researcher has developed a theoretical definition of spatial intelligence based on Cardner's theory is the ability of the individual to visualize objects in different dimensions, and the realization of spatial information and manipulate and remodel objects by adding new details, and this ability is evolving as a result of the interaction between the factors of genetics and the environment.

Procedural Definition of Spatial Intelligence: The total score obtained by the respondent by answering the paragraphs of the spatial intelligence test.

Chapter two

Theoretical framework

In this chapter, the theoretical aspects related to spatial intelligence will be presented.

First: the concept of spatial intelligence (Spatial Intelligence):

The owners of this type of intelligence have a high mental ability to imagine, especially in terms of images and structures, they are good at drawing and note details in paintings, and appreciate the beauty and art in the pictures and have a photographic memory of the events, and prefer to work as photographers, designers, painters, architects, and all jobs that require the ability On imagery with regard to images and empty spaces (Crams, 7: 2011).

Second: the historical development of the concept of space intelligence

Piaget's work in 1971 is a good example of the evolution of children's spatial intelligence. Piaget has developed several tests in this field that are still in use today. (2008: 22, James), he saw through his studies that spatial intelligence is an indicator of the logical growth of the individual, and

explained that the individual from childhood shows indicators of spatial intelligence as an example of the ability of a young child to form imagined mental imagery, and the ability of a teenager to form spatial relationships from During the rationale (Cardner, 326: 2004).

Piaget and Anhilder noted that the spatial ability develops through four stages similar to the child's maturity:

A - Topographic space: At this stage children acquire two-dimensional skills and are aware of the relationships between things.

B - projective vacuum stage: where children learn to deal with three dimensions of things.

C - retention and guidance skills phase: This stage is the growth of skills that help children to recognize what things look when they are rotated.

D - Recycling skills stage: In this stage individuals learn to turn back between (two and three dimensions) or in other words the transition from the projective space to the real vacuum, as some concepts such as balance and partial and area and size and dimensions are acquired in these stages (Piaget & Inhelder, 1971: 98).

Third: Brain and Brain Intelligence

Most of our spatial visual capabilities are usually defined in the right hemisphere, especially in the lobes (frontal and parietal) of the brain, and this area is most effective in recognizing dimensions, distances and time estimation (Gardener, 1994). Damage, man lost his ability to recognize the features of his way somewhere or careful observation of the details (Baroudi, 546: 2011).

The results of laboratory studies revealed difficulties such as those of Milner and Kimura (1957 & Kimura) that patients who had undergone excision in the right temporal lobe had a lack of recognition of irrelevant regular patterns and forms. The right lobes exhibit particular difficulties in drawing as the fees of these patients tend to include details in separate locations and lack general boundaries. (Cardener, 43: 2004) There are several evidences in the field of neuropsychology, which also highlighted this type of intelligence, including Luria (1973: 89) attempts to establish relationships between brain structures and information processing. The parietal-frontal area (weakening of the spatial synthesis of information occurs as synchronous processing occurs when spatial sensory data is processed sequentially and systematically, and this associated ability to process information is closely related to the ability to accomplish while solving mathematical problems and reading comprehension) : 4).

Fourth: Elements of Intelligence

Spatial perception: It is the ability of the individual to determine the horizontal or vertical position despite the derivative information.
B - visualization: The ability to visualize the arrangement of parts that have been displaced and moved randomly.
Mental rotat: means the ability to quickly and accurately rotate a two- or three-dimensional shape.
Spatial relation means the ability to understand the arrangement or spatial composition of objects or parts in those objects and their relationship with each other.
E - retention or orientation of the spatial: It is the ability of the individual to retain personal part of any vacuum situations. This is what the vacuum retention test requires. (Aszalos & Bako, 2004: 3)
Fifth: Cardner's Multiple Intelligence Theory and Spatial Intelligence
1. Historical roots of the theory of multiple intelligence

The theory emerged from recent cognitive research that showed that students differ in their minds and that they learn, remember and understand in different ways. His experimental research led him to find multiple foundations to detect multiple patterns of intelligence ranging from seven to ten patterns and ended up adopting eight intelligences. On the development and refinement of his intelligences (Obeidan and Abul-Semid, 2013: 253).

Cardner emphasized the influence of individual culture in helping an individual shape his intelligence. (Cardner, 145: 1983), he mentioned in his famous book Frames of Mind (published in 1983) in which he mentioned the existence of seven types of intelligence. (Abunsar, 37: 2004), and these intelligences are (linguistic intelligence, musical intelligence, mathematical intelligence, motor intelligence, spatial intelligence, personal intelligence, natural intelligence), and Cardner stressed that the list of these intelligence is not final (Baroudi, 543: 2011).

Cardner collaborated with a group of researchers to expand the list of multiple intelligence, as the number of types of intelligence in this list of twenty types of intelligence and the theory of multiple intelligence provided a wonderful and distinct picture of the capabilities and capabilities of the individual compared to other theories
2 - assumptions and principles of the theory of multiple intelligences

Kardner stressed that individuals differ in their mental abilities and need to understand these differences, and this depends on two main assumptions are:
A - Not all individuals can learn in the same way because of differences in tendencies and mental abilities and differences in what they care about.

B. Not sure that everything is possible to learn from it we can learn from it.
(The Pleasure, 338: 1998)

The principles of multiple intelligence theory are:

1. There is no single intelligence among individuals, but several intelligences.

2 - The multiple types of intelligence in individuals is evidence of excellence.

3. Every type of intelligence, including spatial intelligence, can be developed.

4 - can distinguish between types of intelligence owned by individuals and identify each type separately.

5. Each type of intelligence has a different path in its developmental level and in its ability to evolve (Afaneh and Khazindar, 2014: 75).

3 - the development of the capabilities of intelligence through life

The evolutionary path of intelligence developed by Cardner (1993) in which he developed four stages of the evolution of space intelligence through life, and these stages serve as a guide to identify individuals with high vacuum capabilities, and these stages are:.

A - random stereotypical ability: It is evident in early childhood when the child tries to understand the information represented by space formulas such as the child's attempt to scribble, drawing and enjoy solving puzzles.

B - Understanding the symbolic system: It is almost evident in the sixth year of the child's life, as the child begins to cleverly spatially reflect his spatial intelligence through the drawing of the house, for example, as it reflects through his drawing to understand how the movement of the lines of the stairs are linked to different levels, or identify The relationship between the number of stairs and the number of house roles.

C - the use of the codification system: It is evident at the age of eight, and through the child's ability to coding space using the drawings of complex lines between the forms.

D - professional practice: It is evident in adolescence and adulthood, and manifestations of this stage of professional interests include the practice of space such as representations of two-dimensional or three-dimensional, and these stereotypes are more evident through the elimination of adolescent with high stereotyped intelligence most of the time in creating dynamic patterns using computer . (Gardener, 1993: 79).

The child's ability to perceive the spatial relationships that exist between forms varies depending on the different stages of development and age of his life.

The studies of Piaget, Inhelder and Meyer also show that a child between the ages of 2 and 3 does not realize these relationships, unless they are utilitarian and directly related to their needs and desires. And that between the third and fourth years of age is aware of self-spatial relationships, that is, its relationship with it and its relationship with him and adapts his activity and behavior according to this realization, and that after he is over four years of age is aware of the objective spatial relationships he realizes that he is an object among other beings, that is, his existence is different from the existence of living And the inanimate surroundings, and then seeks to adapt himself to this new perception, and to establish his relationship near and far with these different things.

Smith's studies have shown that the child's ability to perceive his direction and position and position for the East, West, North, South, Proximity and Dimension grows slowly until the age of six and then accelerates the growth of this perception between the sixth and eighth, and then slowly slowly until it reaches the age It is difficult for children to recognize these trends early in their school life. It is also difficult for them to estimate how high they are from the ground in high houses, and they may try to jump off the high altitude because they are unable to grasp the correct distance. And dimensions ((Smith, 1933: 191.

4 - multiple intelligence functions

1 - enable the individual to solve problems.

2 - make the individual capable of creativity.

3 - The model of multiple intelligences was employed in the educational field (Ghabari and Abu Shaira, 87: 2010).

5 - scientific postulates of the theory of multiple intelligences

This theory was based on a set of postulates:

The first postulate: Everyone has multiple intelligences but is distinguished in one or more of them.Cardener developed the theory of multiple intelligences based on his belief that the brain includes separate systems of different adaptive abilities.Cardner called it "intelligence", reaching at least a dozen types of intelligence and intelligence. Interstitial one of these intelligences, and each intelligence grows at a different rate within each of us, and each individual is born and has these intelligences, but to varying degrees from one individual to another. (Abdul Salam, 18: 2013).

The second postulate: Each intelligence of multiple intelligences lies in a separate part of the brain, Kardener stressed that each intelligence lies in a separate part of the brain, and is a relatively independent unit and has a biological basis within the brain, and works according to its own functions

and systems. (Muhammad, 2002: 34-35).
The third postulate: Multiple intelligences usually work in complex ways, Cardner explained that multiple intelligences are related to each other and always interact with each other.
The fourth postulate: Everyone has the ability to develop his intelligence to an appropriate level of competence, Kardner hypothesizes that each individual has many basic intelligence, and believes that the individual levels of competence in each of these intelligence depends on both the natural biological capacity, and the culture of the society in which they live The individual and his methods of education (Abdul Salam, 19: 2013).
General indications of the theoretical background of spatial intelligence:
After looking at the theoretical frameworks explaining the spatial intelligence, I was able to come up with some indicators as follows:
1. Spatial intelligence is an evolving capacity as a result of the interaction between maturity and experience.
2 - that the capabilities of spatial intelligence have evolutionary stages starting from childhood and continues to post-adolescence.
3 - The development of spatial intelligence according to Cardner goes through successive stages.
Chapter three
Research Methodology and Procedures
First: - Research Methodology: - Method of Research
This research aims at investigating the development of spatial intelligence in adolescents. To achieve this, the researcher adopted the cross-sectional studies that fall under the descriptive approach of evolutionary studies. The same time to reflect the evolution in the property of interest over time, this is what happens in developmental studies in growth psychology "(Albatsh, Abu Zeina, 2007: 225).
This chapter includes identifying the methodology and procedures used in the current research in terms of the community, the selection of the sample and the research tool, as well as the statistical methods used in the analysis of the data as follows:
Second: - Research Society: - Population of Research
The current research community consists of adolescents (males and females) who are in secondary schools who are (13,15,17) years old in the city of Kut / Wasit governorate center for the academic year (2016-2017). (17493) and (5751) female students.
Third: - Sample of Research: - Sample of Research
The researcher selected a random sample of (102) of adolescents in the

ages (13,15,17) years. Adolescents were selected by random stratification method to represent the age and sex variables by (34) adolescents and adolescents at each age of the research covered equally between males and females.

Search Tool 5-Point Test

To measure spatial intelligence, the researcher used a 5-point test by Catalan Road Wilde, Mathis Weisbrod, and Steve Ashnbrenner, 2013. Schuhfried, 2007-2008: 11 (Schuhfried, 2009 \ 2010: 65 et.at.2009: 3) Schuhfried, et.at . (Schuhfried, 2011: 74.

As for the calculation of the scores, the main variables of the test give us the total number of forms produced or generated, the number of correct forms and the expected errors.

The results of the test are usually interpreted under the term "percentage", which refers to the percentage of individuals in the group who received the same score during the test. The average range used in the 5-Point test for average individuals is 25-75, so the percentage can be interpreted as follows:

Table (1)

Table of the approved ranges in the application field

percentage	Range
Below average	0-24
within the) median (average	75-25
Above average	100-76

Thus, individuals who receive less than 24 have a low rate of intelligence or weak intelligence, and those with a score of 25-75 are described as being within the general average, ie, their spatial intelligence is good, and those who receive more than (75) are described as above. The average of their spatial intelligence is excellent (Rodewald & et.al, 2013: 15).

- Psychometric characteristics of the 5-point test

A) Test validity

There is a lot of field evidence to support the validity of the test system

used in the (test of the five points) and the relationship between this test and its version of paper and pen gives us proof of the validity of construction, for this test was also calculated the building validity by finding the relationship between this test and other neurological tests such as attention test WAFA / S2 TMT.L and A, B

B- Reliability of the test

The stability of the test was calculated by calculating the alpha Kronbach coefficient as well as other types of stability were measured using the stability of the standard sample. For the spatial intelligence variable, the coefficient of alpha Kronbach (0,86) and thus can be considered a high stability of the test (Rodweld, et.al. 10).

Objectivity

- Objective app

Objectivity is achieved when the result is free from the subjective bias of the test, or free from the effects of the test situation. The objectivity of the application in the (5 point) test is achieved through the fact that the test is of a computerized type, which has a high standard.

- Objective class

The objectivity of the score in this test is that it is independent of the subjective assessment of the test-based in terms of recording the answers of the examiner or calculating the scores of variables or comparison, all through the computer, as the probability of the existence of computer errors is low, which makes the score obtained for the exam Objectivity.

- Objective interpretation

This type of objectivity is achieved when the results obtained from the test are not different in their interpretation of two persons. Whenever the test questions are correctly placed, this makes them unclear in terms of interpretation. The unambiguous normative value can repeat the position of the respondent relative to Members of the community in the measured feature, accordingly, the 5-Point test has a high objectivity in interpretation (Rodewald & et.al, 2013: 9).

Application Procedures of the 5-Point Test:

After the completion of the research procedures, the researcher started applying the tool to the current sample of (102) adolescents. Before the examiner started applying the test, the researcher took the information of each examiner (name, age, sex) and inserted this information in English to the computer which was installed. In the program of the test and after the emergence of the icon entitled (Start test) (researcher left the researcher alone to perform the test. Appendix 4.

The test includes instructions and a brief training clip, and then the actual test phase begins immediately after the prompts start on the computer screen, and at this stage of the test begins the formation of shapes and in the case of repeating one of the forms appears a stop (indication) that the last figure has been repeated Once again, the examiner begins to modify the shape to be another new shape, and so on until the end of the test time, which takes 5 minutes to complete, including the initial instructions and explanation of the test. After testing the test and the end of the test period, the result is shown on the screen of the system or device and the appendix (1) displays the report of the results of one of the examiners. The researcher printed the reports and determined the report pertaining to each examiner. This report contains the result of the examiner and all the information related to the examiner.

The results were then analyzed statistically by using the statistical programs of the psychological and social sciences. The results of these procedures will be explained in chapter four as these results are presented and discussed.

Statistical Means

The research data were processed using the following statistical methods: -.

1 - T test for one sample: - To measure the level of spatial intelligence in the three age groups.

2 - Analysis of the variance mono: to identify the significance of differences in the three ages.

T-test for two independent samples to identify the significance of gender differences at the age of (13) years

4 - Triple Variance Analysis: - To identify the differences between sex and age variables and specialization in the test of spatial intelligence.

The fourth chapter

View and discuss results

This chapter includes a presentation of the researcher's findings and their interpretation in the light of the previous literature as follows:

Objective 1: To identify the development of spatial intelligence in adolescents in the ages (13,15,17) years.

To identify the development of spatial intelligence in adolescents in the ages (13,15,17) years, the researcher used the T-test for one sample. For the age of (15) years, the calculated T value was (27.253), which is a function of the value of p) (0.000). 0.000) and Table 3 illustrates this.

Table (3)

The results of the T-test for one sample to identify the spatial intelligence according to the age variable

Significance	P – Value	T -Value	Standard mean Error	Standard deviation	Mean	age
function	0.000	28.632	1.800	10.500	51.558	13
function	0.000	27.253	1.889	11.018	51.500	15
function	0.000	34.416	1.337	7.798	46.029	17

It is clear from the table above that adolescents in the ages (13,15,17) possess a spatial intelligence according to the criterion set for the test () and the value of (p) () This result can be explained according to Cardner's view that this ability is formed in the individual before adolescence, specifically In early childhood, indicators of spatial intelligence begin to emerge, for example, his ability to scribble and draw the house and know the relationship between the number of stairs and the number of roles of the house and draw complex lines (Ling, 1911: 2) and its ability to form imagined mental images, and to recognize the direction, and determine Its position and position relative to the four directions and near and wa After gradually grows until it reaches the age of twelve to the level of awareness of Al-Rashed. In adolescence, spatial practices are evident and the adolescent's ability to form spatial relationships develops through rational descriptions (Cardner, 326: 2004).

Second Objective: To identify the significance of differences in spatial intelligence according to age variable (13,15,17) years.

To identify the significance of differences in spatial intelligence according to ages (13,15,17), the results of the analysis of the variance of monotonism showed that there is a statistically significant difference between the mean of the three phases, and the value of p) (probability is less than the level of significance (0.05) and the degree of freedom (99 , 2), suggesting a difference between the three ages in spatial intelligence as shown in Table (4).

Table (4)

Results of mono-variance analysis of the research samples

p –Value	f –Value	squares Mean	Degrees of freedom	Sum of square	Source of variance
0.033	3.517	342.863	2	685.725	among-groups
		97.493	99	9651.853	Within- groups
			101	10337.578	Total

To find out the direction of the statistical difference, the researcher used the Shivet method, and Table (5).

Table (5)

Scheff'e test comparison among the three ages in spatial intelligence

p –Value	Standard Error	Mean difference	(J) age	age (I)
1.000	2.39477	0.05882	15	13
0.035	2.39477	5.52941	17	
1.000	2.39477	0.05882-	13	15
0.039	2.39477	5.47059	17	
0.035	2.39477	5.52941-	13	17
0.039	2.39477	5.47059-	15	

Table (6) shows the following:

1 - Comparison between the two phases of age (13,15): - When testing the significance of the difference between the average scores of the two phases using the method of Chevy, it appeared that the difference is not statistically significant at the level of significance (0.05).

2 - Comparison between the two phases (13,17): - When testing the significance of the difference between the average scores of the two phases using the method of Chevy, it appeared that the difference D statistically at the level of significance (0.05) and for adolescents at the age of (13) years.

3 - Comparison between the two phases (15,17): - When testing the significance of the difference between the average grades of the two phases using the method of Chevy, it appeared that the difference D statistically at the level of significance (0.05) and for adolescents at the age of (15) years.

- Table (6) shows that there are no statistically significant differences be-

tween the ages (13,15) years, and the researcher attributes this result to the similarity in the skills and abilities used by members of these two age groups represented by (mental rotation, visual perception, perception) , Imagination).

- There are statistically significant differences between ages (13,17), and ages (15,17), and in favor of age (13) and age (15), the researcher attributes this result to that each type of intelligence included in the theory of Cardner, including spatial intelligence It has a different path in its developmental level and its ability to evolve (Afaneh and Khazindar, 75: 2014) and the spatial intelligence of the liquid capabilities that deteriorate with age. (Al-Zayyat, 100: 2006) This deterioration is evident in the late adulthood of adolescence in the resolution of spatial problems and spatial perception. ((James, 2008: 22

Third Objective: To identify the significance of differences in the spatial intelligence in adolescents age (13) years according to the sex variable (males, females).

To achieve this goal, T-test was used for two independent samples. The calculated T value (2.689), which is a function of the value of p () of (0.011).

Table (5)

Scheff'e test comparison among the three ages in spatial intelligence

p –Value	Standard Error	Mean difference	(J) age	age (I)
1.000	2.39477	0.05882	15	13
0.035	2.39477	5.52941	17	
1.000	2.39477	0.05882-	13	15
0.039	2.39477	5.47059	17	
0.035	2.39477	5.52941-	13	17
0.039	2.39477	5.47059-	15	

Table (8) shows the superiority of males to females in spatial intelligence. This result can be explained by the assumption of some researchers that the differences between males and females may be attributed to the recessive properties of chromosome (x), as these differences are related to male sex hormones and proved empirical evidence Environmental factors have an impact on spatial intelligence (Boque & marre, 2003). The environment

has special roles, strategies and pre-prepared tendencies for each sex. N to different directions (Zarzis, 7: 2007).

Fourth Objective: Significance of differences in spatial intelligence among adolescents aged (15,17) years according to sex variables (males and females) and academic specialization (scientific, literary).

To identify the significance of differences in spatial intelligence according to variables (age, sex, specialization) the researcher used triple variance analysis and the researcher will present statistical indicators for spatial intelligence test as shown in Table (7).

Table (7)

The descriptive characteristic + cs of adolescents aged (15,17) in spatial intelligence

sample	Standard deviation	Mean	Specialization	Sex	Age
8	16.903	52.00	Scientific	Males	15
9	10.105	45.89	Literary		
17	13.636	48.76	Total		
9	4.770	51.00	Scientific	Female	
8	7.511	57.88	Literary		
17	6.969	54.24	Total		
17	11.689	51.47	Scientific	Total	
17	10.666	51.53	Literary		
34	11.019	51.50	Total		
9	9.619	47.44	Scientific	Males	17
8	7.717	45.88	Literary		
17	8.542	46.71	Total		
8	5.292	47.50	Scientific	Female	
9	8.353	43.44	Literary		
17	7.176	45.35	Total		
17	7.649	47.47	Scientific	Total	
17	7.906	44.59	Literary		
34	7.799	46.03	Total		
17	13.295	49.59	Scientific	Males	Total
17	8.781	45.88	Literary		
34	11.253	47.74	Total		

17	5.183	49.35	Scientific	Female	
17	10.709	50.24	Literary		
34	8.297	49.79	Total		
34	9.937	49.47	Scientific	Total	
34	9.893	48.06	Literary		
68	9.866	48.76	Total		

To identify the significance of differences in spatial intelligence, the results of the analysis of variance showed the following:

Table (8)

Analysis of the triple variance to identify the differences in spatial intelligence according to age variables (15, 17), sex (males, females), specialization (scientific, literary) and interaction among them

Square Etta partial	p - Value	f - Value	Mean square	Degrees of freedom	Sum of square	Source of variance
0.092	0.017	6.062	536.029	1	536.029	Age
	0.350	0.888	78.513	1	78.513	Sex
	0.597	0.283	25.020	1	25.020	Specialization
	0.149	2.138	189.020	1	189.020	sex * age
	0.487	0.489	43.219	1	43.219	* age specialization
	0.255	1.320	116.735	1	116.735	* sex specialization
	0.096	2.867	253.471	1	253.471	* sex * age specialization
			88.418	60	5305.083	Error
				68	168226.000	Total

The results indicate the following:

1. Age

The results showed that there is a statistically significant difference in the spatial intelligence according to the age variable. The calculated value was (6.062) which is statistically significant for the benefit of age (15)

years because the value of (p) is less than (0.05) degree of freedom (60.1). The arithmetic mean for the age of (15) years was (51.500) and the arithmetic mean for the age (17) years was (46.029). The researcher calculated the size of the effect () through the partial square equation of ETA as it was (0.092) .This effect is very small for the age variable according The Cohen Standard (Cohen, 1988) (Muhammad, 290: 2010).

2. Sex

The results showed that there is no statistically significant difference in the spatial intelligence according to the sex variable. The computed mean value was (0.888) which is not statistically significant because the value of (p) is greater than (0.05) with freedom degree (60.1). At the age of (15) years for males was (48.76) and for females (54.24) and at the age of (17) years the mean for males (46.71) and for females (45.35).

3. Specialization

The results showed that there is no statistically significant difference in the spatial intelligence according to the variable of specialization. The computed mean value was (0.283) which is not statistically significant because the value of (p) is greater than (0.05) with freedom degree (60.1). At the age of (15) years of scientific specialization (51.47) and literary (51.53), at the age of (17) years, the arithmetic mean of scientific specialization (47.47) and literary (44.59).

4 - Interactions between (age and sex, age and jurisdiction, sex and jurisdiction, age and sex and jurisdiction).

A - There is no interaction between the variables (age, sex), where the calculated value of the value (2.138), which is not significant because the value of (p) is greater than (0.05) and the degree of freedom (60.1).

B - There is no interaction between the variables (age, jurisdiction), where the calculated value of the value (0.489), which is not indicative of the value of (p) greater than (0.05) and the degree of freedom (60.1).

T - There is no interaction between the variables (sex, jurisdiction), where the calculated value of the value (1.320), which is not indicative of the value of (p) greater than (0.05) and the degree of freedom (60.1).

D - There is no interaction between the variables (age, sex, jurisdiction) as the calculated Alfai value (2.867), which is not significant because the value of (p) is greater than (0.05) and the degree of freedom (60.1).

- It is clear from table (9) that there is a statistically significant difference according to the age variable and for the benefit of age (15) years, the researcher attributes this result to the fact that the intelligence of Sial intelligence decreases and deteriorates with the individual's age, and educational

experiences have a lesser role in its development. (Anani, 93: 2008)
- There are no statistically significant differences according to the sex variable, which means that both males and females do not differ in the degree of their spatial intelligence. The researcher attributes this result to the exposure of individuals of both sexes to similar cognitive experiences in quantity and gender in the social environment in which they live (Inad, 150: 2012).
- There are no statistically significant differences according to the specialization variable, which means there is no difference in the spatial intelligence between disciplines (scientific, literary). The researcher attributes this result to the fact that spatial intelligence is linked to the individual's ability to visual perception and visualize ideas of a visual or spatial nature which can We find them in the disciplines (scientific, literary), which are formed through what is offered by the curricula of both disciplines or through the acquisition of knowledge in the academic stages (Gardner, 1991: 122-123).
As for the interactions between (stage, sex), (stage, specialty), (sex, specialty), (stage, sex, specialty) there are no statistically significant differences.
Conclusions
1. Adolescents (13,15,17) have spatial intelligence.
2. Spatial intelligence The ability of the fluid deteriorates with age in adolescence
3 - influenced by the intelligence of age and age (13,15) years, respectively.
4 - Spatial intelligence is not affected by sex (males, females) in ages (13,15) years.
5 - is influenced by the spatial intelligence of sex at the age (13).
6 - is not affected by spatial intelligence specialization (scientific, literary).
Recommendations
1 - interest in the development of spatial intelligence through the use of charts, tables and mental maps in education.
2. Include curricula in special subjects for the development of spatial intelligence as well as the adoption of appropriate teaching methods.
3 - interest in the development of space intelligence among students through the use of appropriate computer applications for the development of space intelligence.
4 - Encourage students to draw paintings of the material they are learning and draw visual representations of concepts.
Proposals

Conducting correlative studies between spatial intelligence and other variables such as critical thinking, logical thinking, cognitive competence, visual memory, and executive function.
2. Conducting a comparative study between kindergarten and primary school children to determine their degree of spatial intelligence.
3- Conducting an evolutionary study to know the development of the spatial intelligence in children.
5 - Conducting a study to know the development of spatial intelligence in other groups such as children with autism, orphans, and blind children.
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