

The Effect Of The Infographic Strategy On The Achievement And Development Of Visual Thinking Among The Second-Year Intermediate Students In The Social Subject

Hanaa Ibrahim Mohamed

University of Diyala, College of Basic Education, Baqubah, 32001, Iraq.

basichist16te@uodiyala.edu.iq

ABSTRACT

The current research aims to find out the impact of the infographic strategy in the achievement and development of visual thinking among second-grade intermediate students in the subject of social science by verifying the validity of the following null hypotheses. There is no statistically significant difference at the level of significance (0.05) between the average scores of the students of the experimental group who study the social subject according to the infographic strategy and the average scores of the students of the control group who study the same subject in the usual way in the post-achievement test. There is no statistically significant difference at the level of significance (0.05) between the average scores of the students of the experimental group who study social studies according to the infographic strategy and the average scores of the students of the control group who study the same subject according to the usual method of the dimensional visual thinking test. There is no statistically significant difference at the level of significance (0.05) between the average grades of the experimental group students who study the social subject according to the infographic strategy in the pre- and post-visual thinking scale. There is no statistically significant difference at the level of significance (0.05) between the average scores of the control group students who study the subject of social studies according to the usual method in the pre- and post-visual thinking scale. To verify this, the researcher used an experimental design with partial control with the experimental and control groups, and the pre- and post-tests. According to the infographic strategy and Division (E), the control group is represented, which is taught in the usual way. The number of female students in the two groups was (56), of which (26) were students in Division (D) and (30) were students in Division (E). The researcher did not find female students who had failed in the same phase year. The researcher used the same conditions for the two groups of research in the following variables: academic achievement of fathers, academic achievement of mothers, chronological age calculated in months, scores for the pre-visual thinking scale, IQ test scores, degrees of social science from the 2016/2017 academic year.

Keywords

Infographic; Infographic strategy; Visual thinking.

Article Received: 16th October, 2020; Article Revised: 30th December, 2020; Article Accepted: 08th January, 2021

Introduction

There are challenges facing the educational process in the twenty-first century, the matter that requires these challenges, most notably what middle and high schools suffer today from a teaching process that takes place in the manner of direct indoctrination of female learners, especially in teaching social subjects. That they have a role other than listening and listening most of the time, which generated educated women who do not go out of the circle of memory and do not possess higher skills, which calls for a

comprehensive review of the teaching patterns practiced with the educated women that resulted in these disappointing results and ambitions, and this is exemplified by the emergence of traditional learning (Abdullah, 2011).

In addition to what was revealed by the results of educational research and studies that there are difficulties facing the teaching process, especially teaching history, and I attributed this to the weak interest of female teachers in this subject with modern methods and strategies and their reliance on traditional methods, which in turn leads to a decrease in the

level of achievement for the learners instead of focusing on activating their impact and their participation. In the teaching process. (Khazraji, 2016: 7).

This is confirmed by the study (Al-Jubouri and Al-Jarrah, 2016), because the goal of teaching social subjects does not depend on providing students with a large amount of information, concepts and terminology only, but also developing skills that enable them to research, investigate facts, verify their validity and make decisions about them, and this requires an effort from the teachers of these materials to constantly renew. (Al-Masoud and Al-Lami, 2014: 22)

In addition to the exploratory questionnaire that was distributed to a group of sociology teachers, as it confirmed that there is a weakness in the achievement of second-grade intermediate students in history, as well as continuing to use the traditional methods.

Based on this, the researcher believes that it is necessary to keep pace with recent developments in teaching to ensure positive outcomes that enjoy originality and creativity and reduce the gap between us and the countries of the developed world that have witnessed qualitative and quantitative leaps in various areas of life by developing the teaching methods prevailing in our schools and this is what was recommended by many conferences that held in Iraqi universities, which emphasized the necessity of using modern strategies in teaching and reducing the use of traditional methods.

In this study, the researcher used four chapters (the third, fourth, fifth, and sixth grade) of the textbook of the subject of sociology, which is taught to students of the second intermediate grade by the Ministry of Education for the academic year (2017-2018). Then the researcher formulated (164) behavioural goals and prepared daily instructional plans for each group (experimental and control).

As a research tools, the researcher prepared an achievement test consisting of (50) objective test items of multiple-choice type distributed according to the six levels of the BLOOM classification, namely (knowledge, understanding, application, analysis, synthesis, evaluation) and (10) essay paragraphs. Then the researcher verified the validity of the apparent test and the validity of the content by presenting it to a group of specialists as well as extracting the psychometric properties of the test (difficulty factor, strength of distinction, effectiveness of false alternatives). The researcher applied the test to the two research groups (experimental and control) at the end of the experiment. Dependence on the half-segmentation equation using the Pearson correlation coefficient and after correcting it using the Seperman-Brown equation, then the researcher relied on the visual thinking scale, which consists of (36) test items. The test was applied before the start of the experiment and after its completion. The statistical package (SPSS), including the T-test for two independent samples, the Spearman-Brown equation, the Cronbach's Alpha equation, and the stability equation. After correcting the answer, the data were processed statistically. The results viewed in a statistically significant difference between the mean achievement and the visual thinking scale between the students of the two research groups (experimental and control) at a significance level of (0.05) in favour of the experimental group that studied the social subject according to the infographic strategy. Thus, the researcher rejects the hypotheses and accepts the alternative hypotheses for the current research.

In light of the foregoing, the researcher decided to use a modern strategy in teaching, which is an infographic strategy. Perhaps it may contribute to solving part of the problem or mitigate its severity, and based on the above, the current research

problem can be formulated by answering the following questions:

Does the infographic strategy have no effect on the achievement and development of visual thinking among the second grade intermediate students in the subject of social science?

Literature Review

Al-Jarawi study (2014) aimed at knowing the effectiveness of using a proposed training program in developing the skills of designing electronic mind maps through infographic technology and visual culture skills of pre-service teachers, and the study used the semi-experimental approach, and the sample consisted of (15) students One of the students of the College of Education, Teacher Classroom Division from the Curriculum Department, the results indicated that the proposed program has contributed to improving the level of knowledge of visual culture skills and technical skills of infographic designs in designing electronic mental maps for learning lessons in the study sample. (Al-Jarawi: 2014).

Al-Samarrai study (2014) was conducted in the province of Baghdad / Iraq Al-Mustansiriya University / College of Education. This study aimed to know the effectiveness of the strategy of the circular house shape in the collection of history for second-year intermediate students and their attitudes towards them. The researcher randomly selected a sample consisting of (60) female students of

middle Sharia for girls, and the sample was divided into two research groups (experimental and control) by (30) students for each group. Partial, and the induction tool was an achievement test that consisted of (50) multiple choice test items distributed on the first three levels of Bloom levels. The researcher used the T-test for two independent samples of equal number and square ki and the equation of the difficulty of the test items and the effectiveness of the wrong alternatives. Experimental on female students of the control group in the achievement test (Al-Samarrai: 2014).

Darwish and Al-Dakhni Study (2015) aimed to identify the effect of static and moving infographic presentation patterns via the web on developing visual thinking skills of autistic children and their attitudes towards it. The study used the experimental approach and the sample consisted of (30) children of autism whose ages ranged from (7) – (10) years were divided equally into two groups: the first experimental group studied using static infographics, and the second experimental group studied using moving infographics. It included tools to test visual thinking skills and attitudes test. The results showed a statistically significant difference between the mean scores of the first experimental group and the second experimental group in Post application to test visual thinking skills and attitudes test for the benefit of the first experimental group

Table 1.Experimental Design of Research

The Group	Pre-test	Independent variable	Dependent variable	Research Tools
<i>Experimental</i>	visual thinking	infographic strategy	achievement + visual thinking	Achievement test + visual reasoning test
<i>Control</i>	visual thinking	-----		Achievement test + visual reasoning test

Research Methodology

The researcher used the experimental method in this research to achieve its goals because it is based on experience and there are several attempts to define the meaning and meaning of the experimental method of thought and rules, the most prominent of which is that which seeks to know the experimental method. It is also hidden in it, as in the case of introspection, in order to describe and explain the phenomenon outside of the mind (MathyLimban, 1998).

First) Experimental Design

The research design means the road map or the study the strategic plan drawn up by Al-Baha in order to be able to reach the answer to its research problem and adjust the variance in the degrees of the dependent variable so that it is due to the independent variable (Muhammad al-Tayyib, 2005: 132). The researcher adopted one of the types of experimental designs The partial control with two experimental and control groups appropriate to the research conditions (Al-Zobaie et al., 1981: 94) as in Table (1).

1) Research community

The research community means that it is a group of individuals, books, or school buildings according to the subject area of the research problem, to which the researcher can generalize the results of his research (Ghobari and Abu Shairah, 2015: 95), and that the description of the research community is intended to define its characteristics that affect the research results in terms of the number of members of the community, the nature of their distribution and their characteristics. The current research community consists of female students of the second intermediate grade in the governmental middle and high school daytime schools for girls affiliated

to the General Directorate of Education in Diyala Governorate in the Baquba District Center for the academic year (2017/2018), of which there are (23) schools where middle schools are (17) and secondary schools are (6).

2) Research samples

The selection of the research by the researcher is one of the important steps in the research stages that reveal the extent of consistency and correlation between the research problem, its objectives and its tools on the one hand, and the extent of the researcher's skill on the other hand. The research sample can be defined as a model that includes a part or part of the determinants of the original community concerned with the research that are representative of it as it bears its common characteristics and this model enriches the researcher from studying all units and vocabulary in the original community, especially in the case of the impossibility or difficulty of studying all these units. Intentionally from among the schools to be the research sample for the purpose of applying the experiment in it for the following reasons:

- 1- The school administration showed willingness to cooperate with the researcher.
- 2- Its proximity to the researcher's residence.
- 3- It contains two sections for the fifth literary class.

Using the simple random drawing method, section (D) became the experimental group that is taught according to the infographic strategy, and section (E) represent the control group that taught in the usual way. The number of students is divided into two groups (56) students by (27) students in section (D) and (30) students in section (E), as in Table (2).

Table 2.Number of female students in the experimental and control groups

The Group	Section	Number of students
<i>Experimental</i>	D	26
<i>Control</i>	E	30
<i>Total</i>		56

3) Equivalence of the research group

The researcher was keen on the statistical equivalence of the two research groups in several variables that she believes may affect the safety of the experiment before starting it, and the variables are:

1. Parents' Academic Achievement.
2. Mothers' Academic Achievement.
3. Chronological age calculated in months.
4. Scores of the visual thinking scale.
5. IQ test scores.
6. History course scores in the final exam for the second semester of the previous year (2016/2017).

4) Research requirements

A) Identifying the scientific subject: The researcher specified the scientific material that the students of (the research sample) will study, which included the chapters (the third, fourth, fifth, and sixth) of the book of sociology to be taught to students of the second intermediate grade for the academic year 2017/2018.

B) Formulation of behavioural goals: These are goals that are characterized by a high degree of specialization and specificity and are capable of evaluation and measurement, and show the students' responses, whether mental, emotional or kinetic for one class (Zaidan and Shaker , 2017: 26). The researcher prepared behavioural goals according to Bloom's levels in the cognitive domain by (164) behavioural goals in the six levels, and they were presented to a group of specialists, to find out their validity and coverage of the content of the course.

C) Preparing teaching plans: planning for teaching represents an approach to plan the way of working, as it is an organized and purposeful mental process that leads to achieving the goals planned effectively and

competently. The educational process - learning and the interdependent and interrelated relationships that exist between these elements and the organization of these elements with each other leads to the achievement of the desired goals of this process represented in the desire to learn intellectually, emotionally, and physically (Al-Khazaleh and others, 2011: 75). The researcher prepared a set of teaching plans for the subjects of history which will be studied to the students of the two research groups according to the infographic strategy of the experimental group and according to the usual method of the control group.

Research Objectives and Hypothesis

The objective of the current research is to identify the impact of the infographic strategy in the achievement and development of visual thinking among second-grade intermediate students in the subject of social studies.

To achieve the goal of the research, the researcher formulated the following null hypotheses:

- 1- There is no statistically significant difference at the level of significance (0.05) between the average scores of the students of the experimental group who study the social subject according to the infographic strategy and the average scores of the students of the control group who study the same subject in the usual way in the post-achievement test.
- 2- There is no statistically significant difference at the level of significance (0.05) between the average scores of the students of the experimental group who study social studies according to the infographic strategy and the average scores of the students of the control group who

study the same subject according to the usual method of the dimensional visual thinking scale.

3- There is no statistically significant difference at a significance level (0.05) between the average grades of the experimental group students who study the subject of social studies according to the infographic strategy in the pre- and post-test of the visual thinking scale.

4- There is no statistically significant difference at the level of significance (0.05) between the average scores of the control group students who study the subject of social studies according to the usual method in the pre- and post-test of the visual thinking scale.

The research is concerned with the following parts:

A- Human:female intermediate and secondary school students affiliated to the city of Baqubah, the Baqubah district center.

B- Spatial: one of the governmental middle school for girls affiliated to the General Directorate of Education in Diyala Governorate.

C- Temporal: the second course of the 2017/2018 academic year.

D- Scientific: chapters (third, fourth, fifth and sixth) of the book on sociology to be taught for the second intermediate grade for the academic year 2017/2018.

Infographic Strategy

It is a technique that works on extracting ideas and information from the abstract theoretical space to the photographic space, so that the presentation attracts the visual and audio receptors of the recipient in a way that facilitates their access, understanding, and assimilation, and realization of theoretical information (Abeer Arabian, 2016: 19).

The following should be considered for infographic design:

- Choose one topic for each infographic.
- Choose the information that can be represented visually.

- Ensure that the displayed information is correct.
- Choose a special title for the infographic topic.
- Merging pictures and drawings, simplifying information, and avoiding long sentences.
- Choose attractive colors that suit the information presented.
- The cohesion of the basic components through highlighting the relationships and gathering related information and linking it together.
- List and attach a list of information sources (Isa, 2014: 33).

To reach a successful and persuasive infographic design, it is necessary to follow important steps that will facilitate the designer to produce it in a coordinated and integrated manner:

- A) The idea: It is all that comes to the human mind in terms of new things, solutions and suggestions, so the idea is the product of thinking, and thinking is one of the characteristics of the human kind, so every work, whether pictorial, written or otherwise, is the result of an idea, and perhaps the largest and most difficult part for the designer is to find the idea.
- B) Research: After arriving at the idea, the research stage comes, and many details are branched out from it that help in better access to your unique infographic.
 - Determining the purpose of the infographic.
 - Defining infographic goals.
 - Analysis of the target group.
- C) Create a chart and structure for the infographic: This step is considered as a translation of the research stage from collecting and analyzing information and data into a structure and a chart that consists of the title, main parts, sub-parts and choosing colors.

- D) Tools: The tools used in infographic design are:
- Static infographic design programs.
 - Animated infographic design programs.
- E) Design revision: the stage of reviewing and making sure of all infographic aspects by reviewing the following:
- Ensure that the content is complete and sequential.
 - Ensure that the fees used are correct.
 - Coordination.
- F) Directing: At this stage, the final design (an infographic product) comes out to be published and circulated, whether it is printed or animated.
- G) Marketing and publishing: When the infographic is produced in its final form, the time comes for a publication, as it can be published through multiple means (Shaltout, 2016: 118)

Infographic is employed for educational purposes through the following uses:

- 1- Developing some moral and social values of the learners by presenting them in the lesson, thus contributing to the development of the learners' personality.
- 2- Breaking the monotony of learners from the large number of verbal presentations, as it works to attract attention through attractive visual design elements, which increases their positive attitudes towards the learning content.
- 3- Raising the learners' recall rates by actively participating in the learning process, which results in learning that lasts for long periods.
- 4- Rapid information delivery, as it allows learners to understand the information in an organized manner and to lay the foundation for the schemes that need to be placed in the minds of learners in an orderly manner.
- 5- An effective visual communication tool that attracts learners' attention, makes them interested in the content, and helps to

communicate a large amount of data in an easy-to-understand format when applying the elements of visual interest (Afifi, 2018: 258-339).

Academic Achievement

Academic achievement is one of the goals of education by being one of the most important learning outcomes that learners seek, as well as being the primary criterion by which learners progress in their studies. Today, it has become a basic measure relied upon to know his intelligence and superiority ratios as well as being a benchmark for success in school and social life, especially the ability to interact and coexist with others (Nasrallah, 2010: 14). There are several factors that affect achievement, the most important of which are:

- 1- The family: the cultural status and the economic condition of the family and its availability to fulfil the needs of the learner satisfaction of his desires, and interests as well as the diversity of stimuli that helped him in physical, mental, and social development play a major role in his ability to achieve positive educational achievement (Nasrallah, 2010: 63).
- 2- The school: It is the institution in which the learner is provided with knowledge and has a direct influence on his level of achievement.
- 3- Intelligence: There is a relationship between intelligence and academic achievement, as the level of intelligence varies from one learner to another, so there are individual differences between them.
- 4- Motivation: the potential of the learner should be directed and mobilized (Zayer and Dakhil, 2013: 154).
- 5- Emotional factors: The manifestations of emotional factors are numerous, but the most prominent is the anxiety factor. The learner who is emotionally disturbed due to anxiety or some other emotional factor can focus or comprehend, whether while receiving lessons in class or by studying at home (Al-Sarhan, 2004: 35).

Visual Thinking

Islam pays close attention to reason and thinking, and whenever we searched the Holy Qur'an, we found that it contains many verses related to thinking. Thinking is the finest cognitive process for the individual that distinguishes him from others. It is a cognitive process that is considered an essential element in the mental and cognitive construction of learners.

Thinking is defined as the process by which the mind organizes its experiences in a new way to solve a problem, so that this process includes the perception of new relationships between the topics and the elements in a given problem. In other way, It is the perception of the relationship between the introductions and the results, the perception of the relationship between cause and effect, between the general and the specific, and between something known and another unknown (Mustafa, 2002: 27).

Therefore, visual thinking is a system of processes that translates the individual's ability to read the visual figure and convert the visual language carried by that form into a verbal language written or spoken in order to extract information from it (Mahdi, 2006: 8). Visual thinking can also be defined by the ability of the individual to deal with perceptible materials and distinguish them visually so that he can perceive spatial relationships, interpret information, analyze it, and explain ambiguity (Al-Shobaki, 2010: 35).

Visual thinking requires a set of necessary skills that must be developed among the learners using different activities, and most literature agrees that visual thinking skills are a set of processes under which several skills are included that encourage the learner to think and meditate by merging visual perceptions with cognitive experiences to translate these images into an understandable written or spoken language. Thus, there are many skills of the visual thinking skills as follows:

1- The skill of visual distinction: the student's ability to recognize the visual image and distinguish it from other forms by invoking her previous experience.

2- Shape analysis skill: the student's ability to see and interpret the relationships within the visual stimulus.

3- The skill of interpreting visual information: the student's ability to clarify and interpret visual meanings.

4- The skill of linking visual relationships: the student's ability to relate visual stimuli and their components, and discover serious relationships with shapes, images and visual stimuli (Ismail, 2016: 19).

Visual thinking depends on visual language and thinking at the same time. The visual thinking environment requires tools and methods that are schematically linked to mental connections to produce an innovative pattern of information. The tools of visual thinking include the following:

1- Images: It is considered one of the most important features of this element, as it dominated all areas of knowledge, culture and media. It is an accurate recording of the phenomena and forms that are difficult to communicate with, such as volcanoes, earthquakes, waterfalls, and others.

2- Symbols: it means the expression and connotation of meanings and ideas with signs, drawings and colours.

3- Maps: It is considered one of the most important tools that can be used as a visual tool, as it has an important role in the visual-spatial processing of information, and it is a simplified linear representation of the nature of a place, surface or direction with the use of an appropriate scale.

4- Graphic illustrations: it is a representation of lines and geometric shapes of a figure to clarify what it is of information, and it means the arrangement and the relations between the whole and its parts (Masoud, 2014: 253-254).

Research Tools

The researcher used two research tools. One is the achievement test and the other is the visual thinking scale. The test aims to measure the achievement of the students of the two research groups (experimental and control) in the sociology textbook curriculum to be taught for the second intermediate grade of semesters (third, fourth, fifth and sixth) for the academic year 2017/2018. Thirty-nine items of the objective test have been considered. These items are among the most accurate achievement tests that prove the validity of the judgments, the coverage of the educational curriculum, and the shortening of time. In correcting the answers, the researcher relied on giving one score for the correct answer and zero for the wrong answer, and the passages left without an answer, as well as those that include two answers, treated the wrong answer by giving a zero score for it, and thus the final score of the test became between zero as a minimum and 39 as a maximum.

On the other hand, visual thinking scale can be viewed as mental ability that can be measured and developed by focusing on the visual input in teaching and providing visual shapes and drawings, as the student is able to convert the visual message presented to him into a meaningful verbal language that is easy to store in the students' mind (The Sheikh, 2013: 179). The visual thinking scale aims to measure the impact of the independent variable infographic strategy on developing dependent variable visual thinking compared to the traditional method and measure its impact on the development of visual thinking among the students of the research sample. To ensure the validity of the test, it was presented to a group of referees to express their views on the extent to which the test phrases are appropriate for each dimension of the test and how appropriate it is to the level of the students. Eventually, (36) item have been chosen. The researcher started applying the experiment at the beginning of the

second course of the academic year 2017/2018 on Sunday 25/2/2018 and ended on Thursday 3/5/2018. The researcher used the statistical methods via the statistical package (SPSS), including the T-test for two independent samples of equal number, the difficulty factor for the objective items, the strength of distinction coefficient for the objective items, the effectiveness of the wrong alternatives, the Pearson correlation coefficient, and the Spearman - Brown equation.

Research Results

1) There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who study the social subject according to the infographic strategy and the average scores of the control group students who study the same subject in the traditional way in the post-achievement test.

The researcher applied the post-achievement test on the students of the two research groups (experimental and control) and after correcting the test answers and establishing grades to find out the achievement of the second-grade intermediate students in the subject of socialism and treating the grades statistically, so the average scores of the experimental group students reached (42.462) degrees and standard deviation (5.255) degrees, with a variation of (27.615) degrees, while the average of the control group's scores was (36.6) degrees and a standard deviation of (7.784) degrees with a variation of (10.590) degrees. When using the T-test for two independent samples that are not equal in number (T-test), it was found that the calculated T value (3.268) is greater than the value (2.011) at a level of significance (0.05) with a degree of freedom (54). This means that the result is statistically significant for the benefit of the experimental group who were studied according to the infographic strategy on the control group students who studied according to the regular method.

Thus, the researcher rejects the first hypothesis and accepts the alternative hypothesis because the difference is statistically significant at the level of (0.05) between the average scores of the experimental group students who study the **Table 3.** The arithmetic mean, standard deviation, variance, and T-value (calculated and tabular) of the scores of the

subject of the social studies curriculum according to the infographic strategy and average grades of the control group students who study the same subject in the traditional way in the post-achievement test, as illustrated in the Table (3).

students of the two research groups (experimental and control) in the post-achievement test.

The Group	No. of Students	Arithmetic mean	Standard deviation	Variance	Degrees of Freedom	T-Test		Significance level (0.05)
						Calculated	Tabulated	
<i>Experimental</i>	26	42.462	5.255	27.615	54	3.268	2.011	statistical indication
<i>Control</i>	30	36.6	7.784	60.590				

Table 4. The arithmetic mean, standard deviation, variance, and T-value (calculated and tabular) of the scores of the students of the two research groups (experimental and control) in

The Group	No. of Students	Arithmetic mean	Standard deviation	Variance	Degrees of Freedom	T-Test		Significance level (0.05)
						Calculated	Tabulated	
<i>Experimental</i>	26	93.770	6.340	40.195	54	2.048	2.011	statistical indication
<i>Control</i>	30	88.2	12.61	159.01				

the post-visual thinking scale.

2) There is no statistically significant difference at the level of significance (0.05) between the average scores of the students of the experimental group who study social studies according to the infographic strategy and the average scores of the students of the control group who study the same subject according to the traditional method of the post-test of the visual thinking scale.

The researcher applied the visual thinking scale to the students of the two groups of research (experimental and control) and after correcting the answers of the test and setting grades to find out the extent of the development of visual thinking of the students of the middle bending class in the subject of socialism and the treatment of degrees statistically, so the number of the

average scores of the students of the experimental group reached (93,770) degrees, standard deviation (6.340) degrees, a variation of (40.195) degrees. While the mean of the control group's scores was (88.2) degrees, standard deviation (12.61) degrees, a variance of (159.01) degrees for the control group. On the other hand, using the T-test for two independent samples with equal numbers (T-test), the calculated T value (2.048) is greater than the tabular value (2.011) at a level of significance (0.05) with a degree of freedom (54). This means that the result is statistically significant in favour of the experimental group and this indicates the superiority of the training group students who studied according to the infographic strategy over

the control group students who studied according to the traditional method. Therefore, the researcher rejects the second hypothesis and accepts the alternative hypothesis since there is a difference of statistical significance at the level of significance (0.05) between the average scores of the students of the experimental group who study the subject of social studies for the second intermediate grade according to the infographic strategy and the average scores of the students of the control group who study the same subject according to the traditional method of testing post-visual thinking as illustrated in Table (4).

3) There is no statistically significant difference at the level of significance (0.05) between the average grades of the experimental group students who study the social subject according to the infographic strategy in the pre- and post-visual thinking test.

To verify the validity of the third hypothesis, the researcher extracted the arithmetic mean of the scores of the experimental group students in the pre- and post-visual thinking scale test. The social studies for the second intermediate grade according to the infographic strategy in the pre- and post-tests of visual thinking scale reached (79.15) degrees, the standard deviation (93.77) degrees, and the degree of freedom (54) as the T-value calculated was (8.33) degrees, which is greater than the tabular amount of (2.060), which

indicates that there are statistically significant differences at the level of significance (0.05) in favor of the post-test. Thus, the researcher rejects the third hypothesis and accepts the alternative hypothesis as illustrated in Table (5).

4) There is no statistically significant difference at the level of significance (0.05) between the average grades of the control group students who study the social subject according to the usual method in the pre- and post-tests of visual thinking scale.

To verify the validity of the fourth null hypothesis, the researcher applied the T-test approach for two correlated samples. It was found that the average differences between the grades of the control group who study the social subject for the second intermediate grade according to the usual method in the pre- and post-tests of visual thinking test reached (75.9) degrees, standard deviation of (88.2) degree, and the degrees of freedom was (29). The calculated T-test value was (-13.05), which is greater than the tabular amount (2.045). This indicates that there are statistically significant differences at a significant level (0.05) in favour of the post test. Therefore, this means there is a significant difference between the two (pre and post) for the visual thinking test of the control group students, thus rejecting the fourth hypothesis and accepting the alternative hypothesis as in the Table (6).

Table 5. The significance of the difference between the pre- and post-test scores of the visual thinking test of the experimental group.

	No. of Students	Arithmetic mean	Total grades	Difference between	Arithmetic mean of	Standard deviation	Degrees of freedom	T-Test		Significance level (0.05)
								Calculated	Tabulated	
Pre-test	26	79.15	2058	-380	14.62	9.27	25	8.033	2.06	statistical indication
Post-test	26	93.77	2438							

Table 6. The significance of the difference between the pre- and post-test scores of the visual thinking test of the control group.

	No. of Students	Arithmetic mean	Total grades	Difference between	Arithmetic mean of	Standard deviation	Degrees of freedom	T-Test		Significance level (0.05)
								Calculated	Tabulated	
Pre-test	30	75.9	2277	-638	21.27	8.94	29	13.05	2.045	statistical indication
Post-test	30	88.2	2646							

Discussions

It is important to emphasize that research results led to the rejection of the null hypotheses because the superiority of the students of the experimental group who studied the sociology approach according to the infographic strategy in the achievement test and the visual thinking scale over the control group students who studied the same material in the traditional way. This can be explained by the following:

- 1- The infographic allows the students to engage in group discussions between the students about the information and data they contain, and thus there was a clear impact of these discussions in understanding the shapes and pictures and what they contain.
- 2- Infographic's dependence on presenting information through pleasant designs and beautiful, harmonious colours contributed to increasing students' interest in learning social studies that was reflected in their abilities or their desire to understand messages and visual shapes.
- 3- The use of infographic in the teaching of social studies led to the availability of multiple media combining the image and the word, which led to an increase in the understanding and understanding of their content.
- 4- The diversity in the use of images and shapes allowed the students to learn in a variety of ways that suit their preferences and needs.

Conclusion

In light of the researcher's findings, the following can be concluded. Teaching social studies for the second intermediate grade with an infographic strategy can develop visual thinking for middle school students. Furthermore, adapting the infographic strategy to teach the subject of social studies to intermediate second grade students. It is important to:

- 1- prepare a guide for the school of social studies in the skills of infographic design.
- 2- prepare an infographic for the subjects of the social studies course and circulating it to female teachers in schools.

References

- [1] Al-Jubouri, Subhi Naji Abdullah and others. (2011). Strategies and Methods for Teaching Social Subjects. 1st edition, The national library, Baghdad.
- [2] Al-Khazraji, Haydar Khazal Nazzal (2016). *Applied Studies in Methods of Teaching History*, 1st Edition, Thaer Al-Essami Foundation for Printing, Publishing and Distribution, Baghdad, Iraq.
- [3] Al-Jubouri, Saad Jaweed, & Uday Idan Al-Jarrah (2016). *A field study to address the crisis of weakness in the performance of teachers of social subjects and their development according to comprehensive quality standards*,

College of Education Ibn Rushd,
University of Baghdad

Edition, University Knowledge
House, Alexandria, Egypt.

- [4] Al-Masoudi, Muhammad Hamid, & Salah Khalifa Al-Lami(2014). *Methods of Teaching Social Subjects Concepts - and Applications*, 1st Edition, Safaa House for Publishing and Distribution, Amman, Jordan.
- [5] Al-Jerawi, S. (2014). *The Effectiveness of Using Comics on Academic Achievement and Visual Thinking Skills for Fifth-Grade Students in Basic Sciences in Khan Yunis Governorate*, Unpublished Master Thesis, Faculty of Education, Al-Azhar University, Gaza.
- [6] Al-Samarrai, Q. M., &Raed I. A.(2014). *Modern Trends in Teaching Methods*, 1st Edition, Dijlah House for Publishing and Distribution, Amman, Jordan.
- [7] Darwish, O. and M., &Al-Dakhni, A. A.(2015). Two types of infographic presentation (fixed and moving) via the web and their impact on developing visual thinking skills of autistic children and their attitudes towards it, learning technology.
- [8] Matthew, &Limban, (1998). *School and Thought Education* (translated by Ibrahim Yahya Al-Shehabi), Ministry of Culture in the Syrian Arab Republic, Damascus, Syria.
- [9] Al-Ghubari, Thaer Ahmad, Khaled Muhammad Abu Shairah (2015). *Educational Research Methods*, 1st Edition, Arab Society Library for Publishing and Distribution Amman, Jordan.
- [10] Muhammad A. and others (2005). *Research Methods in Educational and Psychological Sciences*, 3rd Edition, University Knowledge House, Alexandria, Egypt.
- [11] Al-Zobaie, A., and others (1981). *Research Methods in Education*, Part 1, Baghdad University Press for Publishing and Distribution, Baghdad, Iraq.
- [12] Zaidan, Abdul Razzaq Abdullah, and Anwar Farouq Shaker (2017). *Modern Trends in Teaching History*, 1st Edition, Central Press, Diyala University, Iraq.
- [13] Al-Khaza'leh, M. S. F. and others (2011). *Effective Teaching Methods*, 1st Edition, Dar Safa for Publishing and Distribution, Amman, Jordan.
- [14] Abeer Abu Arabian (2016). *The Effectiveness of Using Infographic Technique (Fixed - Mobile) in Developing Genetic Issue Solving Skills in Life Sciences among Tenth Grade Basic Girls in Gaza*, MA Thesis, Islamic University of Gaza.
- [15] Shaltout, Muhammad (2016): *Infographic from Planning to Production*, 1st Edition, Egypt, King Fahd National Library.
- [16] Afifi, Muhammad Kamal Abdel-Rahman (2018). *The interaction between the two modes of static and mobile infographic design and the two e-learning platforms, blackboard and WhatsApp, and their impact on developing visual learning design skills and perception of its components*, The Education Journal for Educational, Psychological and Social Research.
- [17] Nasrallah Omar Abdel Rahim (2010). *Low level of school attainment and achievement*, Dar Wael, Amman, Jordan.
- [18] Zayer, S. A., Dakhil S. T. (2015). *Modern Trends in Teaching the Arabic Language*, 1st Edition, Dar

- Al-Manhajiya for Publishing and Distribution, Amman, Jordan.
- [19] Al-Sarhan, A. N. (2004). *Recreation and Academic Achievement*, Arab Education Library for the Arab Gulf States, Riyadh, Saudi Arabia.
- [20] Mustafa, Fahim (2002). *Thinking skills in the stages of public education*, Cairo: Arab Thought House.
- [21] Mahdi Hassan (2006). *The Effectiveness of Using Educational Software on Visual Thinking and Achievement in Technology among Eleven Grade Students*, Master Thesis, College of Education, Islamic University, Gaza.
- [22] Al-Shoubaki, Fida (2010). *After employing the systemic approach in developing concepts and skills of visual thinking in physics among eleventh-grade female students*, Master Thesis, College of Education, Islamic University, Gaza.
- [23] Ismail, A. M. M. (2016): *The use of infographic (interactive and static) and its impact on the development of academic achievement among students of education technology and their attitudes towards it*, education technology studies and research, Egypt.
- [24] Masoud, Reda Hindi (2014). *The Effectiveness of a Program Based on Thinking Maps in Developing Visual Thinking Skills through Social Studies Curricula for Fifth Grade Primary Students*, Journal of the Educational Society for Social Studies, Issue 56.
- [25] Sheikh, M. (2013). *The Effectiveness of Thinking Maps in the Development of Visual Thinking Skills, Habits of Mind, and Academic Achievement among First Year Secondary Students*, Journal of Arab Studies in Education and Psychology, Arab Educators Union.
- [26] El-Sawy, Y. (2007). *Knowledge Management and Information Technology*, Dar Al-Sahab for Publishing and Distribution, Cairo, Egypt.
- [27] Khalil, S. A. (2013). *Contemporary Trends in Education, Glory of the University Foundation for Studies*, Publishing and Distribution, Beirut, Lebanon.
- [28] Al-Zamili, A. A. J. and others (2009). *Concepts and Applications in Educational Assessment and Measurement*, Al-Falah Library, Kuwait.
- [29] Al-Zubaidi, S. H. (2015). *Curricula for Social Subjects and Teaching Methods*, House of Curricula, for publication and distribution, Amman.
- [30] Salloum, A. H. (2001). *Thinking and Solving Problems*, Al-Naba Magazine, Issue No. 53
- [31] Shaltout, M. (2016). *Infographic from Planning to Production*, 1st Edition, Egypt, King Fahd National Library.
- [32] Aziz, M. (2005). *Thinking from an educational perspective, its definition - its nature - its skill - its development - its patterns*, Cairo, The World of Books.