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MULTIPLE-INTELLIGENCE-BASED LEARNING INFLUENCE ON DEVELOPING CREATIVE THINKING IN SOCIAL STUDIES AMONG NINTH-GRADE STUDENTS IN ABU DHABI, UNITED ARAB EMIRATES

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Abstract:
This study aimed to examine the influence of multiple intelligence-based learning on the development of creative thinking for ninth-grade students in Abu Dhabi private schools. This study used a quasi-experimental design. Also, this study used a control group (30 students) and an experimental group (30 students) of ninth grade students from private schools in Abu Dhabi. The two groups were selected randomly. The instruments used were pre and post-tests in creative thinking skills. Data was analysed using descriptive statistics, ANCOVA and t-test. The findings revealed a significant difference in the creative thinking post-test mean score after controlling for the effect of pre-test between both groups. The experimental group (M = 82.97, SD = 9.98) exceeded the control group (M = 61.20, SD = 15.85) after controlling the effect of the pre-test of creative thinking on both groups, F (1, 57) = 38.31, p = .000. The t-test revealed that there was a significant effect for gender in the elaboration skill (post-test), t (28) = -2.12, p = .043, with females (M = 22.50, SD = 1.95) receiving higher scores than males (M = 20.25, SD = 3.53). In conclusion, the findings reveal the influence of multiple intelligence-based learning on the students' creative thinking skills.

Keywords: multiple intelligence, flipbook, critical thinking skills, social studies

1. Introduction

Since the beginning of the last century, many different patterns of teaching have prevailed, which depend on the method of indoctrination and retrieval. The teacher is central to the educational process that restricts the role of the student to copying and memorizing information to receive high marks. Teachers also direct students to depend

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on seeking knowledge from the textbook. In this teaching style, the student does not discover their abilities, which have led to lower levels of skills and creativity.

Thinking is one of the most important characteristics that distinguishes humans from other creatures. Allah (SWT) says: "*Those who remember Allah while standing, sitting or (reclining) on their backs, and reflect in the creation of the heavens and the earth, 'Our Lord! You have not created this in vain. Glory to You! Save us, then, from the chastisement of the Fire*" (Qur'an 3:191, 2013). The need for a person to think is a matter of life that accompanies him in all life's stages. The world has become more complex because of contemporary challenges imposed by information technology. That is why success in facing these challenges does not depend on the amount of knowledge as much as it depends on how to use and apply that knowledge (Ahmed, 2018).

Teaching thinking has become a necessity as the best solution to face challenges such as, problem solving, innovation, and critical thinking. This has given students the ability to make decisions and promote values of citizenship and to keep pace with the contemporary issues that arise. It has become the most important goal of contemporary education in the educational institutions to help students look at different issues from a multiple point of view and modify their negative attitudes towards the specialization, subject material, school, teacher, management, and classmates. It also enhances the positive attitudes they have, which gives students the opportunity to learn different ways and methods for solving one problem, evaluate them for the opinions of others in many situations and judge them objectively. This will help in the development of students' self-learning and create a healthy environment, so that the study becomes more interesting and engaging. Therefore, students will recognize the importance of teamwork, stimulate their thinking, achieve self-reliance, and make them more capable of accepting new experiences, increasing self-confidence, preparing them for working life and facing school and life problems. This demonstrates the ability of students to be active members of society who are capable of change, and innovate new things (Humaid & Mohamed, 2019).

The goals of teaching social studies in the UAE came in line with this trend as it seeks to provide students with the ability to think forward, make connections between causes and results, as well as collect and analyze data. It seeks to provide them with creative thinking skills. It also provides explanations for phenomena and events, and stipulates the goals of the educational policy of the UAE to develop learners' abilities to creativity, innovation, methodological thinking and its practical applications (UAE Ministry of Education, 2013).

The multiple-intelligence theory presents a new method in support of student thinking and achievement of its future goals. It supports teachers in flexible methods that help them sense the strengths and weaknesses of their students and provides them with the basic mechanisms for this through various types of intelligence. School applications have contributed much to the principles of the multiple-intelligence theory in improving important educational areas. It also opens the door to innovation and creativity in the

fields of education. It provides a richer picture of the child's abilities and potential for success (Jarwan, 2013).

2. The Multiple-Intelligence Theory

Gardner's theory states that intelligence has eight types and has identified two characteristics common to all eight types of intelligence:

1) It is not only hereditary; it can also be acquired and developed.
2) It can be learned and trained on.

This theory sees that the multiple intelligence of each individual works independently, as you also see that everyone specializes in a single or combination of these types of intelligences that some call an intelligent imprint. A person uses this in his dealings, and in his confrontation of the various situations and problems that he is exposed to in life. Everyone can develop their multiple-intelligence or take it to a higher level if they have the motivation and the appropriate encouragement and training (Al-Maloul, 2016).

The multiple-intelligence theory presents a new method in support of student thinking and achievement of its future goals. It supports teachers in flexible methods that help them sense the strengths and weaknesses of their students and provides them with the basic mechanisms for this through various types of intelligence. School applications have contributed much to the principles of the multiple-intelligence theory in improving important educational areas. It also opens the door to innovation and creativity in the fields of education. It provides a richer picture of the child's abilities and potential for success (Jarwan, 2013). Hussein (2012) stated that the classification of intelligences expresses certain characteristics, but it does not mean that individuals can be classified on the basis that they have certain traits and no other traits. Each individual has all the intelligences, but they vary in different levels from one person to another. For example, a weakness in the ability to speak or write in an individual does not necessarily mean he has a weakness of linguistic intelligence, but he may have another intelligence that is used as an input to develop his linguistic intelligence.

The theory of multiple intelligences assumes that there is no educational method or strategy that can be offered to all students at all times due to the different levels of multiple intelligences each one of them has. Using specific strategies may be highly successful with a group of students or less successful with other groups. In order to address the individual differences among students, it is recommended that a wide range of instructional strategies be used to match students' intelligences to make learning effective and to deepen understanding. The teacher can identify students' intelligences and use appropriate activities accordingly as instructional interventions that fit those intelligences (Al-Hashemi, 2013). Table 1 below presents a Summary of the Multiple Intelligences Theory.

Table 1: A Summary of the Multiple Intelligences Theory[ii]

Intelligences	Basic components	Symbolic signs	Future career (Known characters)
1. Linguistic	Sensitivity to sounds, language, structure, meanings and functions	Linguistic studies and the sound of letters in pronunciation, such as English and Arabic.	Writer and orator, such as: Martin Luther King, Abbas Mahmoud Akkad and Charles Dickens.
2. Logical/ Mathematical	Sensitivity to arithmetic and logical operations with numerical indications and long indicative chains	Computer programming and languages (e.g. Pascal language)	A mathematician and software scientist, such as Al-Khawarizmi, John Dewey and Einstein
3. Spatial	Visual perception of the world and the ability to correctly and accurately visualize spatial	Imagination and Accuracy	Architect: Reem Colhas
4. Bodily-Kinesthetic	Express of thoughts using consistent and skilled body moves	Symbolic languages, such as sign language and gestures	Actor, athlete, storyteller, dancer like: Michael Jordan
5. Musical	The ability of the person to taste musical melody, rhythm and verbal harmony	Musical tunes and rhythm of musical instruments.	Composer, Musical Instrument Maker, Lyrics Writer (Michael Jackson)
6. Interpersonal (Social)	Capability of understanding personalities and moods	Body language such as: facial expression and insinuations	Political analyst, military leader and social reformer, such as Mother Teresa
7. Intrapersonal (Self)	Able to understand himself and his emotions and his strengths and weaknesses	Self-programming	Psychologist and therapist, religious reformer, (Freud, men of religion)

2.1 Linguistic Intelligence

People with this intelligence love to read, write, tell stories, and memorize facts. We can read topics or write letters to older people or to people with disabilities, or provide used books to libraries, homeless shelters, or school classrooms.

2.2 Bodily-Kinesthetic Intelligence

People with this intelligence are proficient in fine motor tasks and they deal very easily with their moves and bodies. Through the following activities, our students can understand moral intelligence, such as helping young people to practice some of their favorite sports and exercise moves, as well as volunteering in sport, social and cultural

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activities, repairing and delivering clothes to shelter and homeless persons and providing assistance to persons with disabilities and special challenges.

2.3 Interpersonal/Social Intelligence

The ability to self-knowledge and knowing others is an inseparable part of man, and it is the ability to know things or to distinguish sounds and evidences. The social scientist Ross Honey believes that social intelligence is a collective measure of social and self-awareness, the development of social beliefs and attitudes, the ability to manage complex social change, and these people are characterized by leading others and having many friends. Moreover, others seek their help in decision-making and mediation in disagreements. They also enjoy joining groups and clubs, for example, to provide meals for needy children, as well as gifts and donations to charity centers, and the provision of clothing for the needy and orphans on holidays and various events (Abdul Majeed & Naji, 2013).

2.4 Musical Intelligence

It is associated with love of music. These people enjoy a higher sense of music and rhythm than others, regardless of their experience or learning of music. They appreciate tunes, respond to music, remember melodies and love to sing. They are inclined to training young and needy people with musical instruments, providing free musical performances at various places and events, homeless shelters, elderly shelters and for refugees.

2.5 Logical-Mathematical Intelligence

It consists of the ability to perform mathematical calculations, logically analyze problems, and investigate issues scientifically. As Howard Gardner suggests, it involves the ability to detect patterns, deductive reasoning, and logical thinking. This intelligence is often associated with scientific and athletic thinking, where the person uses numbers, mathematics, and logic to understand the number patterns, visual patterns, and thinking patterns that we deal with in our daily lives. Furthermore, they have an understanding of numbers, set questions and conduct experiments. We teach math, science and logic to children and young people, play chess, play mazes and other games in shelters, hospitals and orphanages and ask for aid and donations and send them to those who deserve them (Al-Dulaimi, 2009).

2.6 Visual-spatial Intelligence

The ability to accurately perceive the visual world, re-create, manipulate, and modify aspects of one's perceptions (even in the absence of relevant visual stimuli). Spatial visual intelligences deal with shapes, patterns, designs, color spectra, and their relation to objects within a given space, including distance and direction. It includes our ability to visualize dreams and fantasies. They also love drawing, designing, inventing, reading maps and paintings. Moreover, they are good at dealing with colors and pictures through beautifying places on street walls, old buildings, and public places, hanging pictures,

making event cards, and sending them to their recipients. They are characterized by attention to visual detail, visual imagination, and spatial perception, subtle, conscious and purposeful observation to images and graphics and getting drawing ideas through them.

2.7 Naturalistic Intelligence

They love beautiful landscapes and life forms, such as collecting flowers and roses and sending them to patients, on social occasions or birthdays. They also enjoy planting vegetables, making healthy meals, and delivering them to orphans, the needy, and homeless people. They also volunteer and donate in cleaning parks and squares to make them safe and clean.

2.8 Personal/ Intrapersonal Intelligence

It is a process that enables individuals to distinguish between their feelings and form a mental image of them, which is the center of other intelligences. Personal intelligence involves thinking about personality and information related to personality. Every individual has an independent personality and personality traits that allow us to recognize the mental image of the individual either from ourselves or from the other person. For example, when we observe a person who appears to be good at solving problems or is gentle, we issue our personal judgment according to our personal intelligence to describe that person and we often predict their behavior in the future. In addition, they can work on their own to follow their interests and goals and have a strong sense of right and wrong. They may also adopt an old man to communicate with them periodically. Moreover, they may teach needy children. Their personal hobbies are art, beating drums, and making food invitations for a home or community.

3. Creative Thinking

Al-Rashidi and Al-Khaldi (2015) referred to (Al-Qatami et al., 1996) in his definition of creativity as a cognitive process with successive stages of production, which is to produce multiple solutions characterized by diversity and novelty in a supportive and harmonious environment. Creative thinking has a deep connection with creativity, where creativity describes the outcome while creative thinking describes the processes and mental skills for creativity, which is used by the individual to produce as many ideas as possible about the problem that he or she is facing, or the situation he or she is interacting with, these ideas are characterized by diversity, difference and non-repetition. Jarwan (2002) interpreted creative thinking as a complex and purposeful mental activity directed by a strong desire to seek solutions or to get original results that were not previously known. Creative thinking characterized by comprehensiveness and complexity as it is of the highest complex level of thinking, because it involves interconnected cognitive, emotional and ethical dimensions that constitute a unique state of mind (Jarwan, 2002). Then, Bahmam (2007) defined creative thinking as to look at things in a different way and

think out of the box to reach new, innovative and creative solutions. Then, he classified creative thinking skills into four levels: fluency skill, flexibility, originality and elaboration.

One of the most important foundations of the theories that studied creativity was established by Torrance, who defined creativity as a process similar to scientific research and sensitivity to problems and gaps as well as the formation of ideas or hypotheses, and then test these hypotheses and modify them until the results are reached (Bahmam, 2007). Al-Mutairi (2014) mentioned the definition of creativity by (Anderson and King, 1993) as a multi-stage mental intellectual process that produces a new idea or work that is characterized by the most fluency, flexibility, originality, sensitivity to problems, maintaining and sustaining direction, and the ability to focus on the area of interest for a long time and the discovery and formation of new relationships. Creative thinking is explained through three axes intellectual fluency, which is to find the largest number of solutions to problems, then, flexibility which is diversity and difference and finally, non-repetition or non-communism, which is described as originality (Al-Mutairi, 2014).

Terflinger (2002) definition is the ability to imagine or invent new things by synthesizing ideas and modifying or changing them. Also, Phuket (2007) argued that creativity is a mental process in which new ideas are generated and ideas are modified in prior knowledge to create new solutions to problems. Moreover, Guilford defined it as thinking in an open format whose output has a unique feature, which is the variety of produced answers that are not determined by the information provided to the individual. Bahmam (2007) noted that creativity is a comprehensive and complex mental process aimed at finding original solutions to problems in human life. Furthermore, Jarwan (2008) interpreted creativity as a multi-faceted mental activity involving new and original output of value from individuals or groups. While Obaidat and Abu Al-Sumaid (2013) see it as a thinking that does not follow familiar or common methods, rules and patterns. Attiyya (2015) explained that creative thinking has levels that vary in terms of depth among people. First is the expressive creativity level. It is a foundation on which the other levels are based and it is necessary for their emergence. Also, it appears independently without the need for skill, originality or output quality and perhaps the best example of this level is the expression of spontaneous drawings of children expressing their thoughts. Second is the productive creativity level, which is a level that, if reached by the individual, shows a tendency to improve the method of performance according to specific rules leading to the emergence of integrated products. Third is the inventive creativity level. This is represented in the individual's ability to invent and discover, this level is deeper than the previous two levels, and invention is considered the most apparent quality of the individual. It is the work of the inventors and discoverers who show their genius using innovative materials and methods and the realization of new relationships between things or parts that were separated before. Fourth is the regenerative creativity level. It is a level that requires an amendment to the general principles governing a field in science, literature or arts. When a person reaches this level, he would be able to renew and modify the general principles governing the field of the

thinking subject, which leads to improve previous existing things and methods using skills relevant and suitable to them. Fifth is the imaginative or emergent creativity level, which is the level that requires an original creative thought to appear among available ideas. This level is achieved by the creative person when he/she is able to show a principle or generate a new rule that was previously unknown (Attiyya, 2015).

4. Factors Contributing to The Development of Creative Thinking

Abdullah (2017) explained that there are a number of factors that can help in the development of creative thinking and abilities of learners, which are:

1) Qualified teachers who are able to take care of creativity and creative minds and follow-up their students in and out of school, and communicate with their families to follow the development of their creativity.
2) Provide an educational environment that encourages creativity, which contains all the supplies of libraries, laboratories, computers, technologies and means of presentation.
3) Provide curricula with modern contents that are flexible and work on a comprehensive development of the personality of the learner, and is able to develop his/her imagination and enable him/her to develop hypotheses and discovery methods, so as to stimulate the mind and encourage research and experimentation.
4) Relying on assessment methods that emphasizes measuring creative abilities for learners and these measures are characterized by stability, objectivity, comprehensiveness and discrimination, that is, measuring the higher thinking levels of the students to whom creative thinking skills belong.
5) Conducting workshops and training courses for creativity which are equipped with all the means and techniques required for the processes of creativity.
6) Engaging creative students in activities and events that are characterized by depth and diversity and are under the supervision of those who have sufficient experience in creativity and care of creative minds.
7) Providing optional courses that respond to the students' creative tendencies and guide their path of choosing future career.
8) Providing programs enrichment in support of the content of the subjects that enrich the learning material in a way that contributes to the formation and development of creative abilities among learners.
9) Issue a special magazine or newspapers that include creative students' activities and achievements. (Abdullah, 2017).

Assaf (2013) demonstrated that psychologists and researchers of creative thinking perceive that the practice of creativity has sentimental tendencies as well as mental skills. Emotional orientations should be available along with cognitive skills and creative thinking, and it has components and skills that distinguish it from other types of thinking. The researchers almost unanimously agreed of the classification and components of

creativity, some call them creativity skills, which include four fundamental skills of creative thinking (fluency, flexibility, originality and elaboration). Where Feldhusen in 1984 and Torrance in 1965 determined them by five skills, which are: (fluency, flexibility, originality, elaboration sensitivity to problems).

There are many theories that explain creativity and creative thinking. Such as, Geschtal theory of Creative thinking (Figure 1).

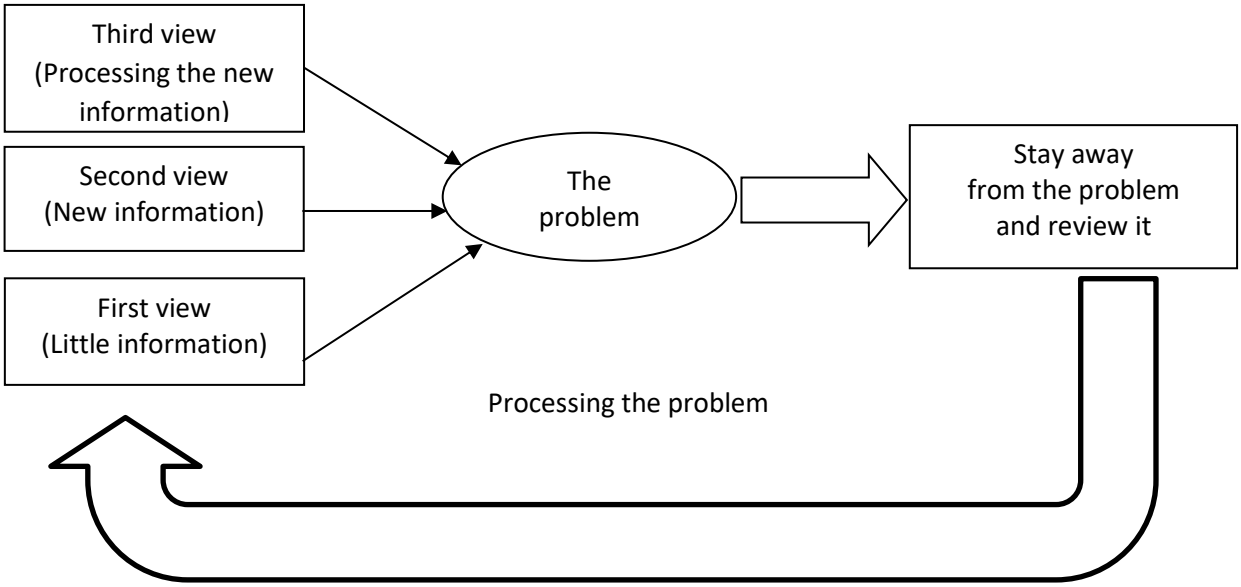

Figure 1: Addressing the problem from the Geschtal theory of creativity point of view[iii]

Ruzzuqi & Abdul-karim (2015) explained that the authors of this theory say that creative thinking begins with a problem that the individual faces that is incomplete or deficient, and when thinking about solving it, everything is considered, examined within the overall framework, they see that it is insightful thinking, where the individual reaches the solution suddenly, and then, moves away from the problem and reaching the so-called flash insight. Looking at the problem for the first time will be different from the other times, the more we look at the problem, the more we will receive new information from reordering factors and components, which makes us change our opinion and see things we did not notice before. In the final stage, rebuilding the field is done to restore consistency to it (Ruzzuqi & Abdul-karim, 2015). Assaf (2013) showed that the solution suddenly appears on the basis of intuition and understanding of the situation, not on the basis of logic, and that some solutions come by coincidence and others by creativity. Creativity is the ability to look at the components of the field, and the realization of relationships. Then, vision happens that comes suddenly as a solution to the problems, creative solutions require intuition and understanding of the problem, as well as fertile interaction between imagination and spontaneity (intuitive knowledge) and between mental processes (i.e. abstraction and analysis (mental knowledge) and creative processes occur through this interaction (Assaf, 2013).

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Another theory of creative thinking is the Psychoanalysis Theory. Jarwan (2013) demonstrated that Freud, the founder of this theory, believes that creativity is the expression of defensive tricks called (transcendence or sublimation), and through these defensive tricks, the individual expresses his potentials in a form that is accepted by society. Creativity arises as a result of psychological conflict at the beginning of the person's life (as a defensive trick) to counteract the libido energy which society does not accept to express. According to Freud, creativity is the creative person moving away from the familiar reality to an imaginary life, and he has linked creativity and other behaviors with the set of motives driven by the unconscious. If the person cannot express his/her desires and tendencies freely, those desires must proceed in other ways or be compensated (Jarwan, 2013).

Attiyya (2015) said that Chris provided another explanation for the creative process from the psychoanalysis point of view. He believes that the basic psychological process of creativity is a recoil process in the service of ego. Creative work emanates primarily from unconscious content, including memories, delusions and instinctive stimuli. Ego plays the role of directing these contents towards the problem that the creative person tries to find a solution for, even if these contents try to direct themselves, and thus, the unconscious or ego do not try to overcome it. Moreover, Younk sees that the creative node of the individual develops unconsciously at first, and continues to evolve until it comes to the consciousness at a certain moment, while Adler sees that creativity occurs by a feeling of deficiency because when the individual feels an organic shortage that rush towards confronting it bravely to make up for that shortfall (Attiyya, 2015).

The theory of psychoanalysis has concentrated on the emotional and motivational aspects for creativity, but its focus was less on the cognitive and learning aspects. The concept of creativity in light of this theory emphasizes the role played by the contents and motives that lie outside the area of individual awareness in the creativity process, and this is an exaggerated explanation far from logic.

5. The Influence of Multiple-Intelligence-Based Learning on Developing Creative Thinking

Theories and previous studies have proved a significant relationship between multiple-intelligence-based learning and the development of creative thinking among students, and that the former influences the latter. For example, the study conducted by Yi, Sulaiman and Baki (2015) about the role of multiple intelligences and creativity in students' learning style to examine the relationship between creativity and intelligence. The study findings showed that students from both genders possessed high intelligence in common domains, namely interpersonal, followed by intrapersonal and musical. This study concluded that it is important to identify students' intelligence profile as well as their creativity level according to domains. This is to aid students learning, providing

them with the optimum learning environment through their preferred learning medium and help them to achieve their fullest potential in their respective talented areas.

Also, Abdi and Rostami (2012) have studied the effect of multiple intelligences-based instruction on Students' creative thinking ability at 5th grade in a primary school. The purpose of this study was to examine the effect of multiple intelligences- based instruction on students' creative thinking ability at 5th grade in primary school. The researchers have used Torrance's Creative Thinking Test as pre-tests and posttests. Results which were analyzed by covariance indicated that multiple intelligences- based instruction significantly stimulated students' creative thinking ability. Hence, it was concluded that strategies founded on MI theory were more effective in improving students' creative thinking ability than traditional teaching. Moreover, Widiana and Jampel (2016) have conducted a study about improving students' creative thinking and achievement through the implementation of multiple intelligence approaches with mind mapping. This classroom action research aimed to improve the students' creative thinking and achievement in learning science. It was conducted through the implementation of multiple intelligences with a mind mapping approach and describing the students' responses. The findings showed positive results, where students felt happy in learning science through the implementation of multiple-intelligences with mind mapping and this method has improved students' creative thinking.

Teaching based on multiple-intelligence has a great effect on students' learning and creative skills. Also, it helps to increase students' motivation to learn different subjects. However, there is a lack of studies investigating the effect in the social studies and national education subject. Hence, the current study aimed to investigate and prove that teaching based on the multiple-intelligence theory is more effective in improving students' creative thinking ability than traditional teaching in the subject of social studies and national education.

6. Purpose of The Study

This study has two main objectives as follows:

1) This study aims to determine a statistically significant difference between the experimental and control groups in creative thinking skills (post-test).
2) This study aims to determine a statistically significant difference between the experiment-group members in creative thinking skills (post-test) based on gender variable

7. Research Design

This part explains the research design used in this study.

7.1 Experimental Research Design

It is based on a deliberate change or manipulation in certain conditions in the factors that can affect the phenomenon of the study. And observe the effects of this change and interpret it and get to know the relationship between the causes and the results. It is a method based on experiment and observation, in which the researcher intentionally controls all the variables that can affect the phenomenon of the study.

It is defined as the research conducted under intentionally controlled and regulated conditions by variables of the situation that would affect the phenomenon or the variable investigated through the use of two groups, first is the experimental group and it is subject to the influence of an independent variable, and the other is control group and it is not subject to the influence of the independent variable, so that the variance between the two groups can be attributed to the independent variable (Omar, 2009).

7.2 Characteristics of the Experimental Research

There are three main characteristics of experimental research as follows:

1) Achieving equivalence between members of the controlling and experimental group in all the variables, excluding the independent variable, which can affect the dependent variable, so that the differences between the two groups do not get attributed to differences within them.
2) The researcher can make a manipulation by a systematic change in a particular variable (i.e. the independent variable) to see how it affects another variable (the dependent variable) and control all internal variables that can affect the dependent variable.
3) The possibility of repeating the experiments in different situations or under the same conditions (Atiyya, 2009).

7.3 Experimental Research Difficulties

There are three experimental research difficulties as follows:

1) Some of the designs in experimental research in the educational field may conflict with the administrative and organizational regulations used in schools, such as the design requires that the experimental sample should be from one school and the control sample from another school which does not satisfy the school administrations and students' parents.
2) Difficulty of having two equal classroom grades in all variables (gender, age, marital status, level of achievement, level of care received by the student from the family, health characteristics, cultural and economic level of the family, tendencies, attitudes, physical and mental abilities, and the environment from which the individual descends (rural or urban), which makes it difficult to generalize the results of the experiment because the sample of the study does not represent the research population and this prevents generalizing the results.
3) Difficulty in controlling the variables and similarity between the members of the control and experimental groups because the researcher in the human sciences

deals with many changing and unstable variables and some of these variables may not be apparent but still can affect the results.

Manfra and Bolick (2017) showed that the appropriate research design in social studies is quasi-experimental research. This is confirmed by Atiyya (2009) in the difficulty of applying the experimental design and preferring it by applying the quasi-experimental design in the research of human sciences. Therefore, the researcher chose to apply the quasi-experimental design in the study to what fits with the research methodology.

Quasi-experimental research is a method which is based on the study of human phenomena as they are without change. Another definition is studying the relationship between two variables as they are in reality without controlling the variables. Also, it is a study that resembles experimental research, but it is not a real experimental research, and that is because the independent variable is not chosen randomly, because there are some obstacles that may affect the experiment and it is evident in the social sciences, psychology, education and medical research (Omar, 2009).

7.4 Sampling Method

Random sample method is used in the case of homogeneity of the original population, using systematic mechanic methods to prevent the researcher from intervention or bias; through tables of random numbers in a horizontal, vertical or diagonal, negative or positive ways, after the sample is distributed on the list randomly, representing the original population to the study sample. However, it is necessary to obtain a sample by chance and away from subjectivity because the chances of selecting the study population (the schools) had equal chances of selection, which distinguishes the random sample method (Al-Qawasmeh, Abu Al-Roz, Abu Musa, & Abu Talib, 2012).

Simple random sample method was used in selecting the research population to select the school that the study would be applied to. Then, the names of the schools were written down on small pieces of paper and put inside a box. Then, (15) schools were drawn from the box. After that, the researcher communicated with the managers to get approval to conduct the study. However, some managers refrained from giving approval to conduct the study at their schools, due to some of the schools being stricter in their educational policies, which resulted in the researcher conducting another random draw. After conducting the second random withdrawal of schools, (R.D) private school was selected to apply the study on it as an exploratory sample and (A.D) school to apply the study on it as controlling and experimental samples. The researcher reviewed that there are many studies conducted on a similar number of samples like the current study. For example, Mahmoud and Mujawar (2016) conducted a study which aimed to determine the effectiveness of educational activities based on multiple intelligences to develop thinking skills among students of Qaseem University in Saudi Arabia, where they selected a sample of 25 students for the experimental group and 26 students for the control sample. Moreover, the study conducted by Al-Kassab (2017) addressed two samples that included 35 and 28 members for the experimental and control samples respectively, which is close to the number of sample members whom the researcher had

dealt with in the current study. This was confirmed by Hussein (2007) who stated that the sample should not be less than (30) male and female students.

In this study, 20 Male and female students were selected as a pilot study from the (R.D) school and Table 2 below shows the distribution of the exploratory sample members according to gender with percentages. Regarding the control and experimental groups, a total of 30 male and female students were the members of the experimental group and similarly in the control sample. There were exactly 11 female students, representing (37%), and 19 male students, which constitute (63%), in the control sample, while the numbers of the experimental sample members were 30 students in total, including 16 male students, representing (53%), and 14 female students, which constitute (47%) of the experimental sample.

Table 2: The Distribution and Percentage of the Pilot Study, Control and Experimental Samples According to Gender[iv]

Samples / Gender	Experimental sample	Percentage	Control sample	Percentage	Pilot study sample	Percentage
Male	16	53%	19	37%	9	45%
Female	14	47%	11	63%	11	55%
Total	30	100%	30	100%	20	100%

7.4 Research Instruments

The researcher has reviewed the educational literature and previous studies and it was found that the best and most suitable scale to be used for this study is the Torrance Scale to measure the ability to think creatively, which was expressed by Sayyed Khairullah in 1974, and also the intelligence scale of Howard Gardner in 1993, which was developed later by Shearer in 1996. It includes eight types of intelligence (i.e. linguistic intelligence, intrapersonal intelligence, interpersonal intelligence, logical intelligence, bodily-kinesthetic intelligence, spatial intelligence, musical intelligence, and naturalistic intelligence) (DeBono Center for Teaching Thinking, 2017). It is one of the best instruments for achieving study objectives and its suitability to the study sample. The researcher has prepared the pre-test first to measure the equality of the control and experimental groups before applying the multiple intelligences program and post-test application.

The researcher then applied the first version test to the pilot study sample which is not the experimental sample (the actual sample). The study includes two variables the independent variable is the teaching method based on multiple intelligences) and the dependent variable is the development of creative thinking skills. So, each variable must have a scale to be measured, and since the study sample is applied to ninth-grade students, the items and questions of the measures should be reduced and decreased in fear of boring the students and the need for a long time from the students' classes and thus, affecting the curriculum and lesson plans for teachers negatively and harming the

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validity of objective response when answering the measurements and tests applied to the study sample.

The following instruments were used in this study:

1. Howard Gardner's Multiple-Intelligence Survey Instrument
2. Pre-test & post-test: They measure four skills in creative thinking: fluency, flexibility, originality, and elaboration.

7.6 Research Findings

The results of the study showed a significant difference in the creative thinking post-test mean score in total, where the experimental group (M = 82.97, SD = 9.98) exceeded the control group (M = 61.20, SD = 15.85) after controlling the effect of the pre-test of creative thinking on both groups, F (1, 57) = 38.31, p = .000. Also, it was revealed that the four skills of creative thinking which are fluency, flexibility, elaboration, and originality have significant differences in the creative thinking post-test mean scores after controlling for the effect of pre-test between the experimental and control groups. Moreover, the results indicated that there was not a significant difference in the creative thinking post-test (in total) mean scores for males and females in the experimental group and all creative thinking skills, except for the elaboration skill (post-test), a significant difference was found, t (28) = -2.12, p = .043, with females (M=22.50, SD=1.95) receiving higher scores than males (M=20.25, SD=3.53). The result of data analysis indicated the significant effect of the multiple intelligences-based learning on the development of creative thinking skills.

8. Discussion

This study follows the theory of multiple-intelligence by Gardner (1983) in his book 'Frames of Mind'. The theory emphasized that the traditional ways in measuring intelligence such as short answers questions or paper and pen tests do not adequately assess intelligence. Intelligence represents a certain intellectual ability that requires a set of problem-solving skills that enables it to create an effective product when it is appropriate in the cultural context in which the individual lives. Also, intelligence is a dynamic trait that is not fixed at birth. Intelligence can grow and evolve through the appropriate learning style. Gardner (1983) has identified seven types of intelligences and added another type which resulted in eight types of intelligence in total. As Gardner argues, each type of intelligence is unique, but it is linked to other coherence and it works based on the cultural backgrounds and social contexts. This theory advanced a new scientific concept that is more effective than the traditional way of measuring intelligence (Hazima & Al-Haj, 2013).

The findings of this study indicated the effectiveness of multiple intelligence-based learning on the development of creative thinking skills (fluency, flexibility, originality, and elaboration) in the Social Studies and Civics & Citizenship Education subjects for ninth-grade students. Moreover, Al-Eid (2018) has established a book titled

'intelligence and multiple-intelligence'. This book stressed the importance of building strategies for curricula based on multiple-intelligences and emphasized the need to plan lessons according to the manual of multiple-intelligence strategies to raise the quality of cognitive achievement among students that focus on quality rather than quantity.

On the other hand, Tan, Lee, Ponnusamy, Koh and Tan (2016) suggested that curriculum in schools should encourage and develop creativity and foster creative minds. In addition, Kazim (2013) stated that the concept of multiple-intelligences opens the door to creativity in various aspects, and reveals the inherent intelligence capabilities of learners, which need encouragement and motivation to be improved and developed, and is an entry point to the establishment of effective exempt relationships that enhances the self-learning, as well as collective learning to achieve specific goals. The teacher can play a prominent role in this field, especially in the application of specific teaching strategies consistent with the type of intelligence that he or she wants to develop or improve in a group of learners. The Multiple-Intelligence Theory proposes solutions in which teachers can design new curricula, and provides a framework within which teachers can address any educational content and present it in a variety of ways.

Al-Omrani and Al-Khazae' (2013) stated that the reason for the effectiveness of multiple-intelligence activities compared to the usual way, is that learning according to multiple-intelligence activities is an active learning process that allows the learner to choose the activity that suits his or her intelligence and therefore, the learning process creates a high motivation towards learning and stimulates scientific thinking. They also noted that the multiple-intelligence activities provide learners with a variety of educational experiences, which have motivated them to think scientifically.

Also, the activities of multiple-intelligences help to increase the motivation of the learner because of the positive interaction between the learner and his/her classmates on the one hand and between learners and teaching material (activities), and the teacher on the other hand. This is contrary to the usual way of teaching which is less effective in terms of enhancing the intellectual abilities of students or learners. Othman (2017) has conducted a study about the characteristics and methods of learning and teaching students according to their intelligence patterns. His study showed that the theory of multiple-intelligences eliminated the misunderstanding of intelligence, which defines the learner in two forms, either intelligent or stupid. However, this theory has opened up a broad horizon for new methods of learning and teaching.

Conflict of Interest Statement

The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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