



The Degree to Which Social Studies Teachers in Irbid Governorate have Spatial Thinking Skills

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Abstract

The aim of the study was to reveal the degree to which social studies teachers in Irbid governorate possess spatial thinking skills, and to find out whether there are differences in their degree of spatial thinking skills due to gender, scientific specialization, teaching experience and the level of education, which was set at (75%). The study sample consisted of (57) social studies teachers selected by random class method distributed in three regions in Irbid governorate. A test was prepared to measure the degree to which teachers have spatial thinking skills, it consists of (22) paragraphs distributed among the three dimensions of thinking: knowledge of spatial space concepts, (9) paragraphs, use of representation tools, (7) paragraphs, spatial thinking processes and (6) paragraphs. It has the significance of acceptable honesty and stability.

The results showed that social studies teachers had spatial thinking skills that were below the educationally acceptable level (75%) in its three dimensions and each dimension separately. There are no statistically significant differences due to both sex and experience, and differences that are statistically indicative of specialization and interest in geography.

The study recommended: including courses in the training programs of social studies teachers in the colleges concerned with their preparation related to spatial thinking skills and teaching skills. And to run workshops for social studies teachers to provide them with spatial thinking skills. (250)

Keywords: social studies, spatial thinking skills, social studies teachers.

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1. Introduction:

Educators interested in social studies agree that teachers should have many of the competencies and skills necessary to teach social studies as the main field in the curriculum concerned with studying the place. The place in social studies includes all phenomena taught to students, in which all events related to the curriculum's content take place. Therefore, the teacher must have a set of competencies and skills that help students learn from a spatial perspective and contribute to raising their level of spatial culture and spatial thinking.

Al-Ziadat and Qatawi (2014) believe that a social studies teacher should have certain skills that help him/her perform his/her work efficiently and efficiently. Any lack of skills means a failure or lack of skills in the teacher him/herself and in the work he/she does. A social and national studies teacher needs to be able to perform his/her work and carry out his/her responsibilities to succeed in helping students achieve educational goals. In this context, Abdul Aziz (2009) points out that the teacher of social studies is required to have special competencies imposed by the nature of the studies subjects, social studies are more relevant and related to the reality, changes, and challenges of society. Therefore, the teacher is concerned with the changes and permanent changes in this society. He/she must also develop his/her interest, deepen his/her awareness, and direct his/her attention towards developing spatial thinking among his/her students. Hinde (2014) states that learning social studies provides learners with a clear advantage that is not available in other school curricula, namely understanding the world from a spatial perspective. Al-Saleh (2004) asserts that a social studies teacher must play a clear role in helping students understand the world from a spatial perspective by using spatial concepts and employing them to develop students' knowledge in the local and global dimensions, leading to the development of their spatial thinking skills.

Spatial thinking is the key to success in a variety of contexts in an individual's life. Therefore, it is important to integrate spatial thinking into the education system, including curricula, teaching methods, and evaluation. As for social studies as a subject of study, it can be a valuable means of teaching spatial thinking not only to create a generation of citizens with a spatial culture, but also because spatial thinking is one of the main goals that social studies in general and geography should focus on (National Research Council, 2006).

According to Tversky (2005), the need to develop spatial thinking among students is not widely understood. It has not yet become part of the methodology and system of formal education, even in developed countries. However, Newcombe (2010) emphasizes the importance of students learning spatial thinking skills by saying: "Spatial thinking skills are not innate but can and should be taught." Melson (2011) found scientific evidence supporting the possibility of teaching spatial thinking skills. He found that the brain contains many areas that lead to certain types of spatial thinking, in which the human brain tries to make spatial connections.

Understanding the world from a spatial perspective provides learners in social studies with a clear advantage that is not available in other school curricula. Hinde (2014) states that the spatial advantage achieved by social studies curricula is as follows:

- Understanding the relationships between people and the environment.
- Understanding the importance of spatial variation.
- Understanding the multiple and interrelated processes in geographical areas.
- Integrating spatial and temporal analysis, spatial perspective adds another vital dimension to time change. We can learn how phenomena and places change over time.

- The importance of social studies in preparing citizens for life in a global society.

Interest in spatial thinking has recently increased among researchers in social studies due to the rapid expansion of geographical techniques, including GPS and GIS. Kerski, (2008) emphasizes the importance of spatial thinking skills becoming part of the curriculum. In addition to being an imperative to keep pace with the tremendous progress in geographical techniques and their applications in daily life, it encourages the use of problem-solving skills. In the same context, Al-Kilani (2006) believes that spatial thinking is essential in learning social studies. It qualifies students to adopt an active investigative approach about the world around them and to ask about what, where when and why about people, places, and environments. Spatial thinking also qualifies students to formulate answers to critical questions about patterns of spatial organization in the past, present and future, predict the consequences of events in separate locations, and predict what may happen in certain circumstances.

On the ground, learning spatial thinking means learning processes through an individual acquiring knowledge of spatial concepts and having the necessary ability to use representation tools to understand, analyze and communicate information, in addition to having mental skills such as the ability to solve problems and make decisions using knowledge and skills related to spatial concepts (Bednarz, Jo & Metoyer, 2008). Spatial thinking has been defined in many ways, but the definition issued by the US National Research Council (National Research Council, 2006) is one of the most comprehensive definitions. Spatial thinking has been defined as: a set of interrelated skills that include knowledge of spatial concepts (Space), use of tools of representation (Tools of Representation) and "logical" thinking processes (Reasoning Processes). Hegarty (2010) believes that spatial thinking can be defined through an individual's ability to use gestures, build mental images, using analogies

to give meaning to a place, and that an individual's ability to combine spatial concepts, spatial representations and thought processes distinguishes it from a spatially illiterate person. According to the US National Science Foundation (National Science Foundation, 2009), spatial thinking can be defined as thinking that helps to find meaning through: shape, size, orientation, location, or through objects, processes, spatial phenomena, or through the relative positions of several objects in space.

Due to the importance of learning spatial thinking for students, the second edition of the American Geographic Society standards (National Geographic Society, 2010) mentioned a field called "The world from a spatial perspective". This field included four main criteria related to spatial thinking: the "first standard" mentioned how to use maps and geographical and technical tools to acquire, process and edit information from a spatial perspective. It includes three skills: how to use geographical presentations and explanations to solve demographic problems, and how to use technology to explain and link the Earth to human and natural systems from Through geographical charts and maps, and how to use geographical presentations and tools to analyze, explain and solve geographical problems, and in the "third standard" analyzing the patterns of spatial organization of humans and different places and environments above the Earth's surface, the importance of focusing on: describing and explaining spatial interaction, patterns that describe forms of spatial organization, spatial behavior of populations, and how to apply concepts and spatial organization patterns in decision-making. In the "Eleventh Standard," the distribution of patterns of global economic activities, the need to focus on: the features and classifications of the spatial distribution of economic systems, the different workload of economic activity centers in various places, and the study of increasing economic dependence among the countries of the world.

Hegarty (2010) emphasizes that teaching spatial thinking requires the teacher to have spatial thinking skills. He/she is concerned with developing his/her abilities and

making a clear effort through educational practices to facilitate students' acquisition of spatial concepts. Therefore, Bani Khalid (2009) warns that although social and national studies curricula are among the best curricula related to spatial thinking, students should not only know these phenomena, without deciding their location within the general framework and in their proper place. So social studies, especially geography, do not become an unrealistic or practical science. This is reinforced by Al-Khalidi (2007) that social studies curricula are subject to a lot of misunderstanding, especially by teachers who often teach them as a subject concerned only with describing locations and places. Therefore, learners do not have sufficient understanding of their applications and knowledge of the essence of their knowledge and their contributions to analyzing and explaining natural and human phenomena and understanding spatial relationships. In other words, learners do not acquire spatial thinking skills. Through theoretical literature, we find justification for these concerns. Bednarz, et al., (2008) mention the increasing interest in teaching spatial thinking skills in recent years. However, there is a lack of clarity on what teachers should do to prove their ability to teach spatial thinking skills and include aspects of spatial thinking in lesson plans or test items more clearly.

The roles required of a social studies teacher in developing his students' spatial thinking skills and competencies in this field are still beginning in educational research. Educational research efforts in integrating spatial thinking in classrooms and the educational process in recent years have mostly focused on school curricula, in a broad sense, including formal courses, classroom activities for students, and implementation techniques to support spatial thinking (Doppen, (2007). However, few research efforts have been directed towards evaluating the skills and competencies of spatial thinking among teachers, revealing thinking skills The location of teachers is essential as a first step in preparing teacher training programs aimed at developing their teaching skills. In the same context, Doppen (2007 and

Golightly, Nieuwoudt, & Richter, 2006) believe that providing students with spatial thinking skills depends on the availability of teachers who can integrate educational activities or materials in their classrooms with clear goals to support spatial thinking among students. Revealing teachers' abilities and skills about spatial thinking is the logical basis for knowing if they can employ it in their classrooms.

While several people interested in teaching issues believe that a teacher's spatial thinking skills grow with teaching experience, Mohan (2009) doubts that knowledge and skills, as key components of spatial thinking, grow with classroom teaching experience. Mohan, (2009) believes that teachers teach as they learned in universities and teacher training centers, so they often have not undergone specialized courses in spatial thinking.

Younis (2011) believes that teaching the geography course within the social studies curriculum requires exceptional skills and competencies for the teacher, reflecting his possession of spatial thinking skills. These skills and competencies are shown in his ability to:

- Show that phenomena are based on natural and human factors in their existence and spread.
- Show the extent to which the countries of the world depend on each other.
- Guide students towards tolerance and international understanding.
- Explain the impact of natural and human variation within a country on lifestyles and human activities.
- Show the shape and distribution of the phenomenon in place.
- Help students deduce the significant impact of location and location on human adaptation to the environment.
- Show the patterns of physical geography and human geography and their characteristics in the world.

- Classify geographical environments naturally and humanly according to similarities and differences between them.
- Explain some of the spatial relationships of different geographical phenomena.

Bednarz et al., (2000) suggest classifying the spatial thinking skills that a teacher should have into the three components suggested by the U.S. National Research Council: spatial concepts, representation, and thought processes. These three components supply a practical tool that can help teachers employ spatial thinking during teaching practices in more clear and systematic ways.

Despite the importance of a social studies teacher having spatial thinking skills, there are few studies that have dealt with this subject directly.

The study of Al-Dayri and Al-Rabani (2022) was concerned with revealing the effectiveness of using educational infographics in developing spatial thinking skills among tenth grade students in the Sultanate of Oman. The study sample consisted of (406) female students, divided into two groups: (194) experimental students and (212) female students. To achieve the goal of Dr. Rasa, the researchers prepared a multi-choice spatial thinking skills test and short essay questions. The results of Dr. Rasa indicated that there is a statistically significant difference between the average grades of female students in the experimental and control groups in Testing spatial thinking skills for the experimental group. Considering these results, the study recommended the use of educational infographics in the educational process to develop spatial thinking skills.

Barida and Barnawi's study (2022) aimed to identify the impact of using an electronic educational platform based on interactive images in developing spatial thinking skills among fourth grade students in Makkah. The two researchers used the semi-experimental method to achieve the aims of the study. The study sample consisted of (60) fourth grade students divided into two control groups, with (30)

female and experimental students and (30) students. The researchers prepared a guide to teaching the geography unit using an electronic educational platform based on interactive images applied to the experimental group and applied a test to both groups for spatial thinking skills, the results showed statistically significant differences in the development of spatial thinking skills among the students of the experimental group due to the electronic educational platform.

Attia (2019) conducted a study aimed at finding the effectiveness of a proposed program based on (Google, Earth) in geography to develop some visuospatial thinking skills among high school students in Egypt. The experimental method was used, and the preparation of a visuospatial thinking skills test was applied to a sample of (80) students divided into two experimental groups of (40) students. The study showed statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the average score of the experimental group on the visual spatial thinking skills test and for the benefit of the group Empiricism.

The Al-Harbi study (2018) aimed to find out the effectiveness of using computerized thinking maps in developing spatial thinking skills among second-level secondary students in Mecca. The spatial thinking skills scale was prepared and applied to a sample of (60) second-level secondary students divided into two control groups with (30) experimental students and (30) students. The study showed statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the average scores of the two groups in the spatial thinking skills scale in favor of the experimental group.

2. Study problem and questions:

Spatial thinking is a powerful tool for interpreting global phenomena, at all levels, from local to global. Attention should be paid to developing spatial thinking and providing students with spatial vocabulary that gives them the ability to describe and analyze the spatial organization of people, places, and environments on Earth. Therefore, attention to spatial thinking is central to student learning. For social

studies as a subject of study, it can be a valuable means of teaching spatial thinking, because spatial thinking is one of the main goals that social studies should focus on (National Research Council), 2006). A social studies teacher has the primary responsibility for developing spatial thinking among students. He/she must pay attention to developing spatial thinking among his students. This can only be done if he has specific skills in teaching spatial thinking imposed by the nature of social studies subjects. As Mohan (Mohan, 2009) stated, teachers teach as they learned in universities and teacher training centers, so they often have not undergone specialized courses in spatial thinking. This makes it difficult to judge the spatial thinking skills of social studies teachers. It is a type of thinking that requires the teacher to have special competencies and develop his spatial thinking skills. It is required to use various concepts, spatial representation tools, and thinking processes. By reviewing previous studies, the researchers noted that some indicated a weakness in the spatial thinking skills of social studies teachers, including Walshe, 2007); Hammadi and Masoudi, 2009; Weakley, 2010; Sweilem, 2014. The researchers did not find any previous study that dealt with this the subject is in the Jordanian environment. Therefore, he decided to carry out the current study to identify the extent to which social studies teachers in Irbid governorate have spatial thinking skills. The study problem is reflected in answering the following questions:

Question 1: Is the degree of spatial thinking skills of social studies teachers in Irbid governorate different?

Question 2: Are there statistically significant differences at the level of ($\alpha \leq 0.05$) in the degree to which social studies teachers in Irbid governorate possess spatial thinking skills due to the variable of experience?

3.The aim of the study:

The current study looks to achieve the following main goal:

To identify the extent to which social studies teachers in Irbid governorate have spatial thinking skills, and to find out if there are statistically significant differences in their degree of spatial thinking skills due to teaching experience.

4.The importance of the study:

The importance of studying stems from the importance of the responsibility of social studies teachers, and that their success depends on their possession of specialized skills in teaching spatial thinking, thus contributing to building a new generation characterized by innovation and innovation and bringing them to the level that society needs. The importance of this study can be decided by the following points:

- 1.The study takes its importance from the importance of spatial thinking at present, due to the rapid expansion of geographical techniques and the resulting need to integrate spatial thinking into the educational process to keep pace with the tremendous progress in geographical techniques and their applications in daily life.
- 2.The study derives its importance from focusing on spatial thinking skills, which is one of the most prominent features of teaching and learning social studies. Therefore, revealing that social studies teachers have spatial thinking skills leads to providing a vision of the ability of teachers to provide their students with spatial thinking skills.
- 3.The current study provides feedback to the faculties of education in Jordanian universities on the effectiveness of their curricula and courses in dealing with the most important educational issues that arise in the educational field.
- 4.The study benefits officials in the Ministry of Education because it reveals the degree to which social studies teachers have spatial thinking skills, which may contribute to drawing the attention of those responsible for in-service teacher training programs in the Ministry to the importance of teachers having spatial thinking skills.

5.The study helps social studies teachers by raising their awareness of the importance of having spatial thinking skills.

5.Study limits:

When generalizing the results of this study, the following limits should be taken into consideration:

- Human and spatial limits: the study was limited to a sample of social studies teachers in Irbid governorate.
- Time Frame: The study was implemented during the first semester of the academic year 2022-2023.
- Objective limits: It consists of revealing the degree to which social studies teachers have skills

The three spatial thinking concepts: knowledge of spatial space concepts, use of representation tools, and thought processes.

Procedural definitions:

The degree of possession: In this study, it means the score that reflects the arithmetic mean of the answers of social studies teachers to the spatial thinking skills test prepared for this purpose.

Social studies teachers: In the current study, they are the teachers officially assigned by the Jordanian Ministry of Education to teach social studies in schools in Irbid governorate during the academic year 2022-2023.

Skills: These are behavioral phrases that include a set of measurable mental skills and abilities that enable the teacher to perform activities with a satisfactory level of effectiveness to achieve educational goals (Al-Huwaidi, 2002:36).

Spatial thinking skills: These are all the skills and mental abilities used to give students the ability to think spatially. They include knowledge of spatial concepts (Space), use of representation tools (Tools of Representation) and thinking processes

(Reasoning Processes) and enabling the teacher to teach spatial thinking skills to ensure the achievement of educational goals.

6.Method and procedures:

Study methodology:

Since the study revealed the degree to which social studies teachers in Irbid governorate have the competencies of spatial thinking, the method followed by the study is the descriptive survey method.

Study population:

The study population consists of social studies teachers from Irbid governorate, distributed in three regions: The Directorate of Education of the Northern Mazar, the Directorate of Education of the Bani Obeid, and the Directorate of Education of the Taiba. They number (143) teachers, including (60) male and (83) female teachers, according to statistics from the Jordanian Ministry of Education for the academic year 2022-2023.

Study sample:

The study sample consisted of (57) teachers of social studies, accounting for (40%) of the size of the study population, including (24) male and (33) female teachers, selected by random stratigraphic method among members of the original research community. It is one of the statistically and scientifically acceptable probability samples to consider the teacher's gender variable (male, female) in selecting study sample members. Table (1) shows the distribution of study sample members according to its variables.

Table (1) Distribution of study sample members according to its variables

Study variables	Variable levels	The count	percentage
experience	less than 5 years	11	19.3%
	5 to less than 10 years	26	45.6%
	10 years and over	20	35.1%
	Total	57	100%

Study tool (test):

To achieve the goal of the study, which is to detect the degree to which social studies teachers in Irbid governorate possess spatial thinking skills, the researchers designed a test that included a set of questions that measure spatial thinking skills in its three dimensions: knowledge of spatial concepts, use of representation tools, and thinking processes, by reviewing educational literature and previous studies related to the subject of the current study. The study tool had two parts: the first had the first data of the study sample members, the instructions for answering the test, and the second included the test paragraphs. The first test consists of (25) A multiple choice section measures spatial thinking skills in its three dimensions: knowledge of spatial space concepts, use of representation tools, and thinking processes. Each question has four alternatives, one of which is correct.

Test Validity:

The validity of the test was confirmed in its first form by presenting it to (9) expert judges specialized in the field of social studies in Jordanian universities and educational supervisors. They were asked to judge the test as said in the arbitration letter addressed to them in terms of the appropriateness of the wording, clarity, and suitability of the test paragraphs. Considering the suggestions of the arbitrators, the number of final test paragraphs became (22) paragraphs, after (3) paragraphs were deleted, as follows:

- The first part measures the degree to which social studies teachers have the skills to know the concepts of spatial space, and the number of paragraphs (9) paragraphs.
- The second part measures the degree to which social studies teachers have the skills to use acting tools, and the number of (7) paragraphs.
- The third part measures the degree to which social studies teachers have the skills of thinking processes, and the number of paragraphs (6) paragraphs.

To decide the educationally acceptable level of spatial thinking skills for social studies teachers in Irbid governorate, the jury was asked to decide the smallest acceptable score for this test of (100%). The average ratings of the arbitrators were (75%). This percentage is equivalent to (16.5) marks from the overall test score of (22). For each of the three skills, the minimum acceptable arithmetic average (75%) was as follows:

- The skill of knowing the concepts of spatial space (6.75) is a score of the total skill score of (9) degrees.
- The skill of using acting tools (5.25) is a score from the overall skill score of (7) grades.
- The skill of knowing thinking processes (6.5) is a score of the overall skill score of (6) grades.

Indications of the validity and statistical stability of the test:

The indications of the validity and stability of the test were extracted before applying it to the original study sample as follows:

1. Believe the consistency of the test paragraphs

To ensure the consistency of the test's paragraphs after the completion of the arbitration procedures, it was applied to a survey sample from the study population and outside its sample. It included (20) teachers of the social studies subject, and then extracted the consistency factors of the test paragraphs by calculating the Pearson Correlation coefficient using the Statistical Packages Program (SPSS) between each paragraph with the overall skill score contained in it, to show the consistency of the paragraphs in measuring the skill contained in the test. The results were as shown in Table (2).

Table (2) Reviewed correlation coefficients to measure the internal consistency of paragraphs of each dimension of spatial thinking skills in the test

Skills to know the concepts of spatial field		Skills of using acting tools		Thinking process skills	
Paragraph number	coefficient engagement	Paragraph number	Correlation coefficient	Paragraph number	Correlation coefficient
1	0.753	10	0.851	17	0.716
2	0.567	11	0.617	18	0.747
3	0.742	12	0.755	19	0.792
4	0.603	13	0.709	20	0.730
5	0.589	14	0.820	21	0.827
6	0.585	15	0.775	22	0.764
7	0.710	16	0.582		
8	0.648				
9	0.712				

* The correlation coefficient is statistically at the level of ($\alpha \leq 0.05$)

The results in table (2) show that the values of the correlation factors for each test paragraph with the overall score of the dimension contained in it are positive and statistically significant. They ranged from (0.567) to (0.851), showing the suitability of these paragraphs to measure the possession of the three spatial thinking skills of social studies teachers in Irbid governorate. Considering the results of internal consistency, no paragraph was removed from the test paragraphs.

2. Test stability:

The stability of the test was verified using the Coderrichardson-20 equation (K, R - 20) to calculate stability, after applying the test to the survey sample consisting of (20) teachers of the social studies subject. The stability factor for the overall test in this way was (0.874). This value is proper and shows that the test has a high stability.

Determine the time of the test:

After applying the test to the survey sample consisting of (20) teachers for social studies, the test time was decided by applying the following equation:

The average completion of the first three test respondents+ the average completion of the last three test respondents

2 Therefore, the proper time for the test is 30 minutes. (Al Bahi, 2010:562)

Test correction

The test consists of (22) paragraphs. Each teacher is given one score for each correct answer, while the score is zero for each wrong answer. Since the number of paragraphs in this test is (22) paragraphs, the range of scores that can be obtained is limited to (0) to (22) scores.

7.Study variables:

First: independent (taxonomic) variables: including:

-Experience, which has three levels: (less than 5 years, 5 to less than 10 years, 10 years and more).

Second: the dependent variable:

The degree to which social studies teachers in Irbid governorate own spatial thinking skills.

Statistical treatment:

To answer the first question, arithmetic averages, standard deviations, and percentages were extracted. The "T" test was used for one sample. To answer the second question, a unilateral variance analysis (One Way ANOVA) was used. If the results showed differences, the dimensional comparisons were used using the "Scheffe" method to name the source of the differences.

The results of the study and their discussion

Results related to the answer to the first question: "Is the degree of spatial thinking skills of social studies teachers in Irbid governorate different from the educationally acceptable score (75%)?"

To answer this question, the arithmetic mean, standard deviation, and percentage of the degree to which social studies teachers in Irbid governorate have spatial thinking skills were extracted. The arithmetic mean of the educationally acceptable score (75%) was calculated, to confirm the difference in arithmetic mean between the degree to which social studies teachers in Irbid governorate have spatial thinking skills and the educationally acceptable score. The two researchers used the "T" test for one sample. The results were as shown in Table (3).

Table (3) The results of the One Sample T-test ", to reveal the difference between the degree to which social studies teachers in Irbid governorate have spatial thinking skills and the degree that is educationally acceptable.

Competencies	The degree	Arithmetic mean	percentage	Standard deviation	The calculated value of (t)	Level of significance
The skill of knowing the concepts of spatial field	The degree of ownership	5.93	65.9%	1.60	-3.865	0.000*
	Educationally acceptable grade	6.75	75%			
The skill of using acting tools	The degree of ownership	4.56	65.2%	1.30	-4.012	0.000*
	Educationally acceptable grade	5.25	75%			
The skill of thought processes	The degree of ownership	3.61	60.2%	1.24	-5.413	0.000*
	Educationally acceptable grade	4.50	75%			
Spatial (total) thinking skills	The degree of ownership	14.11	64.1%	3.09	-5.847	0.000*
	Educationally acceptable grade	16.50	75%			

* A statistically significant function at the level of ($\alpha \leq 0.05$)

The arithmetic averages in table (3) show that the arithmetic average of the degree to which teachers of social studies in Irbid governorate have (total) spatial thinking skills is (14.11) compared to the arithmetic average score of (16.50). This means that there is a clear difference in the arithmetic average of the degree to which teachers have spatial thinking skills (total) and the educationally acceptable score of (2.39) in favor of the educationally acceptable grade. The arithmetic average of the degree to which teachers have the skill to know the concepts of spatial space (5.93) compared to the arithmetic average score of (6.75), meaning that there is a difference. Ostensibly Between the two averages is (0.82) in favor of the educationally acceptable score. The arithmetic average of the degree to which teachers have the skill of using acting tools was (4.56) compared to the arithmetic average score of (5.25), meaning that there is a clear difference between the two averages of (0.69) and in favor of the educationally acceptable score. The arithmetic average of the degree to which teachers have the skill of thinking processes is (3.61) compared to the arithmetic average score of (4.50), meaning that there is a clear difference between the two averages of (0.89) in favor of the educationally acceptable score.

When the test was used for a single sample, the results showed that the differences in the arithmetic averages were statistically significant. The computerized (t) value of differences between (-5.847) (-3.865). These values are statistically significant at the level of ($\alpha \leq 0.05$). This result means that the degree to which social studies teachers in Irbid governorate have spatial thinking skills in general and in the three sub-skills (the skill of knowing spatial concepts, the skill of using acting tools, the skill of thinking processes) is lower than the educationally acceptable level (75%). This result may be because teacher training programs in the faculties of education in Jordanian universities may be devoid of topics related to training teachers to have spatial thinking skills. Geography and history courses taught in the various departments of the College of Humanities and Social Sciences, despite dealing with spatial concepts, are provided to teachers with knowledge without training them in

the skills and competencies that enable them to use or employ them in teaching. Therefore, acquiring and knowing the concept does not mean acquiring the skill of employing and using it. This indicates that teacher training programs in the faculties of education in Jordanian universities did not do what was required of them in providing teachers with spatial thinking competencies and skills. The result was a low degree of teachers' possession of thinking skills in general. In the three sub-skills, the skill of knowing the concepts of spatial space, the skill of using acting tools, and the skill of thinking processes. This result was consistent with the results of several previous studies that showed that there was a weakness in the possession of spatial thinking skills by social studies teachers, either during the service because of Abdul Aziz's study (2009), where the degree of possession of social studies teachers was lower than the educationally acceptable level (80%). Or pre-service teachers. Several studies have shown that pre-service social studies teachers have poor spatial thinking skills, such as a study (Walshe, 2007) such as a study (Hammadi and Masoudi, 2009), a study (Weakley, 2010) and a study (Sweilem, 2014).

Results related to the answer to the second question: "Are there statistically significant differences at the level of ($\alpha \leq 0.05$) in the degree to which social studies teachers in Irbid governorate have spatial thinking skills due to the variable of experience?"

To answer this question and to reveal the significance of differences in the degree of spatial thinking skills of social studies teachers in Irbid governorate, arithmetic averages, and standard deviations of teachers' scores on the spatial thinking skills test were extracted depending on the experience variable (less than 5 years, from 5 years to less than 10 years, from 10 years and over). The results were as shown in Table 4.

Table (4) Arithmetic means and standard deviations of teachers' scores on the spatial thinking skills test, depending on the specialization variable

Competencies	statics prescriptive	Experience variable		
		less than 5 years	5 to less than 10 years	10 years and over
The skill of knowing the concepts of spatial field	Arithmetic mean	5.82	6.00	5.90
	Standard deviation	1.47	1.30	2.05
The skill of using acting tools	Arithmetic mean	4.45	4.62	4.55
	Standard deviation	1.44	1.36	1.19
The skill of thought processes	Arithmetic mean	3.45	3.69	3.60
	Standard deviation	1.51	1.09	1.31
Spatial (total) thinking skills	Arithmetic mean	13.73	14.31	14.05
	Standard deviation	3.80	2.65	3.35

The arithmetic averages in Table (4) indicate that there are clear differences between the degrees of spatial thinking skills of social studies teachers in Irbid governorate, in general, and in the three sub-skills, depending on the experience variable. To find out the level of statistical significance of differences in arithmetic averages depending on the experience variable (less than 5 years, 5 to less than 10 years, 10 years and more), the results were as shown in Table (5).

Table (5) Results of the One-Way ANOVA analysis to reveal the significance of differences in the degree to which social studies teachers in Irbid governorate possess spatial thinking skills, depending on the variable of experience

Competencies	The source of the contrast	The sum of squares	Degrees of freedom	The average of squares	The calculated value of "f"	Level of significance	trend signifying
The skill of knowing the concepts of spatial field	between groups	0.283	2	0.141	0.053	0.948	Non-functional
	Within groups	143.436	54	2.656			
	Total	143.719	56				
The skill of using acting tools	between groups	0.204	2	0.102	0.059	0.943	Non-functional
	Within groups	93.831	54	1.738			
	Total	94.035	56				
The skill of thought processes	between groups	0.443	2	0.222	0.141	0.869	Non-functional
	Within groups	85.066	54	1.575			
	Total	85.509	56				
Spatial (total) thinking skills	between groups	2.698	2	1.349	0.137	0.872	Non-functional
	Within groups	532.670	54	9.864			
	Total	535.368	56				

The results in table (5) show that there are no statistically significant differences in the degree to which social studies teachers in Irbid governorate have spatial thinking skills in general and in the three sub-skills, due to the variable experience. The "f" values calculated for the differences on the overall test and its three dimensions ranged between (0.053) and (0.141). These values are not statistically significant at

the specific level of significance ($\alpha \leq 0.05$). This result means that the experience factor of social studies teachers is not considered an influential factor in their degree of spatial thinking skills in general and in the three sub-skills, meaning that the degree to which social studies teachers in Irbid governorate have spatial thinking skills is the same regardless of their teaching experience. This is an indication that all teachers are combined, regardless of their teaching experience and sex, in addition to minor differences in the degree of ownership due to specialty. They agree that their degree of possession of spatial thinking skills in general and in the three sub-skills was less than the educationally acceptable level (75%). This indicates that all teachers undergo a single preparation program that does not enable them to acquire spatial thinking skills, meaning that social studies teacher preparation programs need to add new courses to preparation programs to enable teachers to acquire spatial thinking skills as spatial thinking and acquire its skills. It is a major part of social studies and the preparation of its teachers. This result can also be attributed to Mohan's (2009) questioning that the components of spatial thinking grow with the teaching experience in classrooms. Mohan (2009) believes that teachers teach as they learned in universities and teacher training centers, so they often have not undergone specialized courses in spatial thinking. This makes teachers repeat their educational practices from year to year so that each new year of experience is often a duplicate of the previous year.

7. Recommendations:

Considering the findings of the current study, it recommends the following:

1. The Jordanian Ministry of Education recommends the need to hold in-service training courses for social studies teachers to provide them with spatial thinking skills in its three dimensions: knowledge of spatial field concepts, use of representation tools, and spatial thinking processes.

2. To recommend to Jordanian universities the importance of including courses in the training programs of social studies teachers in the colleges concerned with their preparation related to spatial thinking skills and teaching skills.
3. To recommend that researchers conduct studies like the current study to build a training program to train social studies teachers before and during the service.
4. Preparing a guide for social studies teachers showing how to use spatial thinking skills in teaching.

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مدى امتلاك معلمي الدراسات الاجتماعية في محافظة إربد لمهارات التفكير المكاني

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الملخص

هدفت الدراسة إلى الكشف عن درجة امتلاك معلمي الدراسات الاجتماعية في محافظة إربد لمهارات التفكير المكاني، ومعرفة ما إذا كانت هناك فروق في درجة امتلاكهم لمهارات التفكير المكاني تعزى لمتغيرات الجنس والتخصص العلمي والخبرة التدريسية والمستوى التعليمي، والتي بلغت (75%). تكونت عينة الدراسة من (57) معلمًا ومعلمة من معلمي الدراسات الاجتماعية تم اختيارهم بالطريقة العشوائية الطبقية موزعين على ثلاث مناطق في محافظة إربد. تم إعداد اختبار لقياس درجة امتلاك المعلمين لمهارات التفكير المكاني، يتكون من (22) فقرة موزعة على أبعاد التفكير الثلاثة: معرفة مفاهيم الفضاء المكاني، (9) فقرات، استخدام أدوات التمثيل، (7) فقرات، عمليات التفكير المكاني، و(6) فقرات. يتمتع الاختبار بدلالات الصدق والثبات المقبولين. أظهرت النتائج أن معلمي الدراسات الاجتماعية يمتلكون مهارات التفكير المكاني دون المستوى المقبول تربوياً (75%) في أبعاده الثلاثة وكل بعد على حده. لا توجد فروق ذات دلالة إحصائية تعزى لمتغيري الجنس والخبرة، كما توجد فروق دالة إحصائية للتخصص والاهتمام بالجغرافيا. وأوصت الدراسة بتضمين برامج تدريب معلمي الدراسات الاجتماعية في الكليات المعنية بإعدادهم دورات تتعلق بمهارات التفكير المكاني ومهارات التدريس، وإقامة ورش عمل لمعلمي الدراسات الاجتماعية لتزويدهم بمهارات التفكير المكاني. الكلمات المفتاحية: الدراسات الاجتماعية، مهارات التفكير المكاني، معلمو الدراسات الاجتماعية.