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**Dr. Mohammed Suhail Najm**  
Assistant Professor, College of  
Physical Education and Sports  
Sciences, University of Mosul,  
Iraq

## Using the SWOT matrix and Stephen covey's matrix to teach chess tactics and their impact on tactical behavior and some mental abilities of outstanding first-year middle school students

**Dr. Mohammed Suhail Najm**

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### Abstract

The research aims to develop two educational programs based on the SWOT matrix and Stephen Covey's matrix to teach chess tactics and to reveal the impact of these programs on tactical behavior and the development of certain mental abilities. The researcher used the experimental method due to its suitability and the nature of the research. The research population represents outstanding first-year middle school students in the city of Mosul. By lottery, Nineveh and Umm Al-Rabyaen Secondary Schools were selected for construction procedures, with a total of (190) female students, and Zaha Hadid Secondary School for stability procedures and pilot experiments, with a total of (70) female students. Al-Hadba'a Secondary School to conduct the main experiment, with a total of (100) female students distributed into three Division: Division (A) with a total of (33) female students, Division (B) with a total of (33) female students, and Division (C) with a total of (34) female students. By lots, Division (B) was named the first experimental group, which studies according to the (SWOT) matrix. Division (C) was named the second experimental group, which studies according to the (Stephen Covey) matrix. Division (A) was named the control group, which studies according to the method followed. The researcher adopted the design of equivalent groups. While the educational lessons for the three research groups took (20) educational units, at a rate of two educational units per week, for a period of (10) weeks. The data were statistically analyzed using the arithmetic mean, standard deviation, t-test for two independent samples, t-test for two related samples, one-way analysis of variance (ANOVA), and two-way analysis of variance. The Statistical Package (SPSS) was used to conduct the statistical analysis. The results showed that the students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in the second experimental group, who were taught using Stephen Covey's matrix, and the control group, who were taught using the conventional method, in all levels of the tactical behavior test. The students in the second experimental group outperformed the students in the control group in all levels of the tactical behavior test. The researcher recommended adopting the educational content of the chess game as a core subject in the schools for outstanding female students in Nineveh as an activity of the physical education lesson. The researcher also recommended using the SWOT matrix and Stephen Covey's matrix for teaching chess tactics.

**Keywords:** SWOT matrix, Stephen Covey's matrix, chess tactics, tactical behavior, mental abilities

### Introduction

The educational process has created challenges for educational institutions, prompting them to search for tools and mechanisms that enable them to overcome these challenges and achieve an excellent advantage. Among these mechanisms is the necessity of adopting strategic thinking. This means that a strategic dimension in education has become an urgent necessity rather than an optional choice. Therefore, these institutions must recognize that the strategic mechanism is essential for ensuring continuity and excellence in the educational approach by activating its success factors, among which the institution's ability to innovate is crucial. (Targhini, 2015, p. 5) [26].

Strategic thinking contributes, through the operational level, to clarifying vision, setting and prioritizing goals, and disseminating them among learners. It also supports continuous development and updating.

**Corresponding Author:**  
**Dr. Mohammed Suhail Najm**  
Assistant Professor, College of  
Physical Education and Sports  
Sciences, University of Mosul,  
Iraq

That leads to improved performance and problem-solving while handling educational situations and making necessary decisions to ensure the success of the educational process. This is achieved through various strategic thinking patterns, which differ according to the situations that learners face and their methods of selecting strategic alternatives. (Al-Fawaz, 2008, p. 23) <sup>[2]</sup> and (Al-Shahri, 2017, pp. 2-3) <sup>[2, 12]</sup>.

Chess is one of the most intellectual sports that uses mental abilities, as it requires intelligence, focused attention, mental visualization, and making strategic decisions appropriate to the playing situation. Chess has become one of the most popular games in the world and is considered a mental game. It is one of the most popular games. As the player needs to develop strategies and plans that help him protect his pieces and win this game. (Qadour, 18, 2018) <sup>[24]</sup>.

Thus, the importance of strategic thinking for athletes in general and chess players in particular emerges. A high level of strategic thinking helps achieve greater goals and better performance. Digital achievement is a major goal of contemporary sports. It depends largely on the extent of the chess player's commitment to the training curriculum prepared according to the correct scientific foundations and following a properly structured lifestyle. As well as the greater effort the player exerts to achieve the highest athletic levels and break records in the game of chess. (Hussein, 2013, p 2-3) <sup>[18]</sup>.

Managing the educational situation using the SWOT strategy requires direct guidance from the teacher. This involves taking time to teach learners how to identify the strengths and weaknesses in a competitive educational situation. As well as the potential opportunities and threats from the competitor in the educational situation. The formulation of an alternative strategy involves creating a strategic balance between the learner's strengths and seizing opportunities, while also identifying potential risks from competitors. As well as between the strengths and weaknesses factors that characterize the internal situation. The learner's success in a strategic situation largely depends on their ability to maximize strengths and minimize weaknesses in any educational situation. (Al-Qatamin, 2002, p. 57) <sup>[9]</sup>.

SWOT letters are known as (S) and (W) refer to the strategic elements within the internal environment of educational institutions or organizations. (S) Represents strengths, while (W) represents weaknesses. The (O) and (T) represent the strategic elements in the external environment of the educational institution or situation. (O) stands for opportunities, while (T) stands for threats that work against the efforts of the educational situation. (Al-Qatamin, 2002, p. 59) <sup>[9]</sup>.

By implementing the SWOT matrix in any educational or competitive situation, the learner or competitor has a number of strategies that require him to adopt one of these strategies as a primary strategy, while the rest of the strategies are strategic alternatives. These alternative strategies are employed if the primary strategy fails due to competitive circumstances. In this case, the alternative strategy becomes the primary strategy, and the remaining strategies become alternatives. (Hiba and Al-Sayed, 2016, pp. 132-133) <sup>[17]</sup>.

Many studies have been conducted that used the (SWOT) matrix, most of which were in the field of institutional management and industrial management, including the study, the study, the study (Al-Rubaie, 2016) <sup>[10]</sup>, the study

(Marai, 2010) <sup>[20]</sup>, the study, the study (Al-Hashemi, 2014), the study (Sael, 2016), the study. The study (Ali *et al.*, 2018) <sup>[3]</sup> in the field of university performance evaluation. One study in the field of education.

Among the strategies that prioritize tasks is the Stephen Covey Matrix, also known as the Eisenhower Matrix, named after the former American president. This matrix allows us to determine priorities in any aspect of life by ranking them from most important to least important without getting bogged down in identifying the most important tasks. Here, Carnegie (2010) <sup>[14]</sup> notes that Stephen Covey identified four squares in this matrix: proactive tasks that require scheduling, urgent tasks that need immediate completion, tasks to be avoided, and non-important but urgent tasks that need quick handling. (Mustafa, 2022, p. 194) <sup>[22]</sup>. A limited number of studies have been conducted using this strategy, including the study of, the study of (Carnegie, 2010) <sup>[14]</sup>, and the study of (Mustafa, 2022) <sup>[22]</sup>.

Mental activity is considered the ultimate outcome of various thinking patterns. Thinking is the highest mental process that humans engage in, encompassing memory, perception, sensation, and more. In fact, cognitive mental processes are a form of organized thinking. (Al-Khalidi, 2008, p. 49) <sup>[5]</sup>.

This means that mental processes are fundamental for preparing and processing sensory stimuli within the internal mental representations of symbols, objects, meanings, forms, and situations. Therefore, attention is no longer focused solely on the responses issued by the individual, nor on whether those responses are correct or incorrect, but attention is also paid to the mental skills, the style of thinking, and the processing strategies followed in dealing with the sensory experiences presented in each item of any mental ability test. By monitoring the strategies followed in receiving stimuli, paying attention to them, and perceiving them auditory, visually, and tactilely, and monitoring the strategy followed in entering them into memory, thinking about them and how to link them together, and monitoring the strategies followed in developing solutions to the problems presented, and in verifying their effectiveness and whether they are useful or not, (Georges, M., & Brown, S. C., 2010, pp7-20) <sup>[16]</sup>.

### Research problem

Through a survey conducted by the researcher targeting high schools for outstanding and distinguished female students in the city of Mosul, several questions were directed to them: about their priorities and organization, and the problems and difficulties they face in academic and daily life. The result of the questionnaire was that practicing activities randomly constituted (76%), while practicing activities according to priority constituted (24%). In another questionnaire directed to the teachers of these schools, several questions were directed to them: Do your students have the ability to determine the priorities of their tasks? Do your students have the ability to make organized decisions? Can your students solve more than one problem at the same time in a logical order? When you are asked a question that requires multiple answers, do your students have the ability to organize their answers? The result was (25%) have the ability to determine priorities and (75%) have the ability to deal with tasks randomly. To identify the students' interests in the games they prefer to play, a questionnaire was conducted in which they were asked about their favorite

games, and the options included (educational games, mental games such as chess, and physical games). The results of the questionnaire showed that 15% prefer educational games, 15% prefer mental games, 60% prefer physical games (with an emphasis on volleyball), and 10% have no interest in playing any game. From the above, despite the high academic achievements of these students, which may result from their memorization skills, they lack the ability to control their abilities. They may not have the ability to organize, plan, and take initiative. In addition, they may not be able to analyze the educational situation into strengths, weaknesses, and available opportunities, which helps them logically prioritize their tasks and solve their problems. This deficiency may negatively affect their qualitative academic performance. Therefore, the researcher proposed an educational program based on the SWOT matrix and Stephen Covey's matrix to teach chess tactics and their impact on tactical behavior and some mental abilities.

**Research objectives**

1. Preparing a program according to the (SWOT) matrix to teach chess tactics.
2. Preparing a program according to Stephen Covey's matrix to teach chess tactics.
3. Revealing the impact of the two programs on developing tactical behavior in chess among outstanding first-year middle school female students.
4. Revealing the impact of the two programs on enhancing certain aspects of attention (concentration, distribution, and shifting) among outstanding first-year middle school female students.
5. Revealing the impact of the two programs on developing spatial ability (spatial perception, spatial visualization, and spatial orientation) among outstanding first-year middle school female students.

**Research hypotheses**

1. There are no statistically significant differences between the average scores of the three research groups on the tactical behavior scale in the game of chess among outstanding first-year middle school female students.
2. There are no statistically significant differences between the average scores of the three research groups in developing some aspects of attention (concentration, distribution, and transformation) among outstanding first-year middle school female students.
3. There are no statistically significant differences between the average scores of the three research groups in developing spatial ability (spatial perception, spatial

visualization, and spatial orientation) among outstanding first-year middle school female students.

**Research Fields**

1. **1-Human Field:** First-year middle school students at Mosul High School for Outstanding Female Students.
2. **2- Temporal Field:** The research was conducted from November 1, 2022, to May 17, 2023.
3. **3- Spatial Field:** Classrooms at Mosul High School for Outstanding Students.

**Research procedures**

**Research methodology**

The researcher used the experimental method due to its suitability and the nature of the research.

**Research Population**

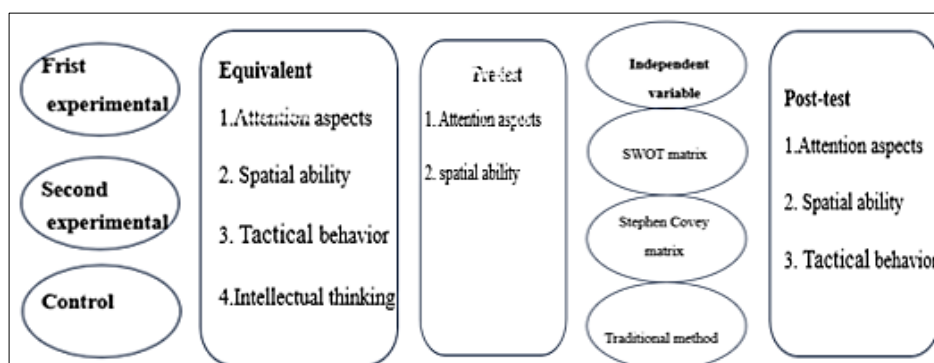
The research population consisted of 360 academically gifted first-grade middle school female students in the city of Mosul, distributed across four schools. The researcher obtained the population statistics by contacting the General Directorate of Education in Nineveh and the Educational Planning Department's Statistics Division.

**Research sample**

Nineveh and Umm Al-Rabi'een secondary schools were randomly selected for construction procedures, with a total of (190) students. Zaha Hadid Secondary School for stability procedures and exploratory experiments, with a total of (70) students. Al-Hadbaa Secondary School for the main experiment, with a total of (100) students distributed into three sections: Section (A) with a total of (33) students, Section (B) with a total of (33) students, and Section (C) with a total of (34) students. By lot, Section (B) was named the first experimental group that studies according to the (SWOT) matrix. Section (C) was named the second experimental group that studies according to the (Stephen Covey) matrix. Section (A) was named the control group that studies according to the traditional method. (3) Students from Section (A), (3) students from Section (B), and (4) students from Section (C) were excluded, so that the total sample students became (90) students, with (30) students for each group.

**Experimental design**

The researcher relied on the equivalent groups design, which includes three groups: two experimental groups and a control group. Figure (1) shows the adopted experimental design.



**Fig 1:** Experimental design for equivalent groups

## Research tools

The research tools consisted of (tactical behavior, attention aspects, and spatial ability).

## Tactical behavior

Through the analysis of the literature and sources, the researcher did not reach a test that measures tactical behavior in the game of chess, so it was necessary to build a test that measures tactical behavior through the following steps:

1. Determining the goal of the test: Measuring the ability of the research sample to act strategically in chess game situations.
2. Analysis of the content of the literature: The researcher was able to identify the most famous chess books.
  - Fischer teaches you chess by Bobby Fischer and Stuart Margulis.
  - How to re-evaluate your chess by Jeremy Silman.
  - My system book by Aaron Nimzowitsch.
  - Zurich International Championship book by David Bronstein.
  - Games book by Bobby Fischer.
  - Think like a grandmaster by Alexander Kotov.
  - My Great Ancestors series by Garry Kasparov.
3. Determining playing positions.
4. Presenting tactical positions in the form of a booklet to experienced chess referees, with the aim of showing their suitability for the research sample, as well as determining the degree of difficulty of each position.
5. After excluding inappropriate situations, the situations were organized into six categories of varying difficulty, and the number of situations was (162) situations, then

instructions were given to answer the situations, and a practical example was provided to clarify the answer.

6. Applying the tactical behavior test to the students of the survey sample on (11/1/2022).
7. Applying the test to the construction sample, numbering (190) students, on (11/3-10/2022), and after correcting their answers, they were arranged in descending order, then (57) answers were taken in the highest rank and (57) in the lowest rank, then a (t) test was conducted between the two groups, and the test showed significant differences in favor of the higher group in (138) situations, while no statistical differences appeared in (24) situations, and therefore they were excluded, noting that the (t) values ranged between (13.25-0.201).
8. The test was applied with (138) topics on a stable sample of (50) female students, on the date (13-20/11/2022 AD), and after (30) days the test was reapplied to the same sample, then the correlation coefficient between the first and second applications was calculated, and good correlation coefficients appeared between the two applications (0.83-0.81-0.79-0.79-0.77-0.77), meaning that the test is stable.
9. The test time was determined by dividing the test into three sessions so that two categories of the six categories are tested in each session to avoid mental stress, and the test was applied to a survey sample of (20) female students in the period (22-23-24/11/2022), where the first session took (15-25) minutes with an average of (20) minutes, while the second session took (25-35) minutes with an average of (30) minutes. Finally, the third session lasted (30-40) minutes with an average of (35) minutes. Figure (2) shows a model for testing the tactical behavior of the chess game.



Fig 2: A model for testing the tactical behavior of the chess game

**Attention aspects**

The tachystoscope test was used, which is a Russian test used by (Mustafa, 2014) [23]. After obtaining the test, it was employed electronically.

**Pilot study**

The modified Tachistoscope test for aspects of attention (concentration, distribution, and shifting) was administered to a pilot sample of 20 female students from Zaha Hadid High School on November 20-21, 2022, to ensure its suitability for the research sample. The students responded to the Tachistoscope test for its three aspects.

**Scientific criteria for the modified tachystoscope test**

Facial validity: The test was presented to a group of expert judges specialized in measurement, evaluation, and teaching methods. The researcher obtained 100% agreement between the judges regarding the test performance and correction methods.

**Reliability**

To determine the reliability coefficient for the attention aspects using the retest method, after applying the test to a reliable sample of 50 female students in the period from November 27 to 30, 2022, then the test was reapplied to the same sample after (20) days from the first application, and using Pearson's correlation coefficient, high correlations were found between the first and second application, as the reliability coefficients ranged between (0.84 - 0.87), indicating that the test parts have high reliability coefficients.

**Spatial ability**

A sample of tests consisting of (72) tests designed by the Educational Testing Services Center to measure (23) factors of mental abilities was reached under the name (the Factor Reference Cognitive Test Set). This set was approved by (Ekstrom *et al.*, 1987). Among these tests is the spatial ability test, which consists of: (spatial perception, spatial visualization, and spatial orientation).

**Test specifications**

The spatial ability test consists of three components (spatial perception, spatial visualization, and spatial orientation) and seven subtests (number comparison, matching pictures, hidden shapes, paper folding, surface development, card rotation, and cube comparison). The following are the three components of spatial ability and their respective domains:

**Pilot Study**

The spatial ability test was applied to a sample of 20 female students from Zaha Hadid High School on December 12, 2022. The application revealed the suitability of the test instructions and paragraphs for the research sample.

**Scientific criteria for the spatial ability test****Jurists' validity**

The spatial ability test was presented to a group of judges specialized in the field of measurement, evaluation, teaching methods, and psychology, and there was 100% agreement on the suitability of the test.

**Reliability:** The test was administered to a sample of 40

female students on December 14, 2022. The test was then re-administered to the same sample after 20 days. Pearson's correlation coefficient was calculated between the first and second applications. The results showed that the correlation coefficient for spatial perception was 0.85, for spatial visualization it was 0.87, and for spatial orientation it was 0.88. The overall correlation coefficient for the entire test was 0.84, indicating high reliability of the test.

**Equivalence of research groups**

The equivalence of the research groups was reached in the variables (mental ability, spatial ability, aspects of attention, and reflective thinking), and the (F) test was used for comparison.

**Mental abilities**

The researcher used the (Otis-Lennon) test of mental ability, intermediate level, form (C), prepared by (Al-Ghamdi, 2001). The test was applied to the research sample on (12/15/2022). Using the one-way analysis of variance (f) (ANOVA) test to compare the research groups, it was found that there were no statistically significant differences between the research groups in the mental ability test, as the value of (f) reached (0.084), and thus the research groups were equivalent in the mental ability variable.

**Reflective thinking**

The modified reflective thinking scale of Al-Mashrawi (2009) was applied to the research groups on (12/18/2022), and the responses were corrected. Using the (f) test (ANOVA) to compare the research groups, it was found that there were no statistically significant differences between the research groups on the reflective thinking scale, as the value of (f) reached (0.148), and thus the research groups were equivalent in the reflective thinking variable.

**Aspects of attention**

The modified attention aspects test (Tachystoscope) was applied to the research groups in the period from (15-16/2/2023 AD) and the responses were corrected. Using the (F) test (ANOVA) to compare the research groups, it was found that there were no statistically significant differences between the research groups on the test, as the (f) values ranged between (0.034-0.267), and therefore the research groups are equivalent in the attention aspects variable.

**Spatial abilities**

The researcher applied the spatial ability test of Ekstrom, French, and Harman (1987) to the female students of the research groups in the period (19-20/2/2023) and the responses were corrected and using the (f) test (ANOVA) to compare the research groups, it was found that there were no statistically significant differences between the groups in the components of the spatial ability test, as the values of (f) ranged (0.192-0.307), and thus the research groups are equivalent in the spatial abilities variable.

**Game teacher**

The physical education teacher taught the research groups, at a rate of two educational units per week, for a total of (20) units over a period of (10) weeks, with a time of (45) minutes for each unit, and thus the factor of teaching experience was modified.

**Educational content of chess**

Due to the absence of educational material for chess in Iraqi schools and the lack of textbooks on the subject, the researcher prepared educational content specific to the game according to the scientific foundations of educational content.

**SWOT Matrix Steps****Analysis and Prioritization Unit****This unit consists of the following steps**

1. Mental preparation (mental exercises) (3 minutes)
2. Analysis of internal and external situations for new game situations (10 minutes)
3. Prioritization (7) minutes: Using the SWOT Matrix
4. Determine main and alternative strategies (7 minutes)
5. Apply strategies (15 minutes)
6. Conclusion (3 minutes): At this stage, the teacher concludes the lesson by summarizing what was covered in the analysis and priorities unit.

**Applications Unit**

This unit includes the following steps:

1. Mental preparation (mental exercises) (3 minutes)
2. Reminding the priority lists (3 minutes)
3. Reminding the strategies (3 minutes)
4. Applications (30 minutes)
5. Closure (3 minutes): At this stage, the teacher concludes the lesson by summarizing what was covered in the applications unit.

The two program units are applied alternately, meaning that the analysis and prioritization unit is applied in one lesson, followed by the applications unit in the next lesson, and so on.

**Stephen Covey Matrix**

**Priority Setting and Testing Unit:** The following are the steps of this unit:

1. Mental preparation (mental exercises) (3 minutes)
2. Reading the game situation (10 minutes)
3. Setting and arranging priorities (7 minutes)
4. Determining the strategies needed for the solution (7 minutes)
5. Testing priorities using strategies (15 minutes)
6. Closure (3 minutes): At this stage, the teacher concludes the lesson by summarizing what was covered in the analysis and prioritization unit.

**Prioritization and Strategies Activation Unit****This unit includes the following steps**

1. Mental preparation (mental exercises) (3 minutes)
2. Review of priority lists (3 minutes)
3. Review of strategies (3 minutes)
4. Reminder of practical examples (3) minutes
5. Applications (30 minutes)
6. Closure (3 minutes): At this stage, the teacher concludes the lesson by summarizing what was covered in the applications unit.

The two units of the program are implemented alternately, i.e. the priority setting unit is applied and tested in one lesson, followed by the priority setting and strategies activation unit in the next lesson, and so on.

**Teacher's Guide:** The researcher prepared a special guide for the teacher.

**Educational tools****Several educational tools were used to implement the educational units, including**

1. Data projector
2. Magnetic chessboard
3. Magnetic memory board
4. SWOT matrix record and Stephen Covey
5. Chess game: It includes (20) boards

**Work map description**

The researcher prepared a work map that includes the locations of the educational tools used in the research and the seating areas for the students, ensuring the teacher can easily manage the educational situation.

**Exploratory study**

The educational plans (SWOT) and (Stephen Covey) were applied to a sample of 20 students, who were divided into two groups, each consisting of 10 students. The first group was exposed to the steps of the SWOT matrix, while the second group followed the steps of the Stephen Covey matrix. The study was conducted from December 4, 2022 to December 18, 2022, over a period of two weeks.

**Application of pre-tests:** Modified Tachystoscope Test for Attention Aspects:

The test was applied to the students of the three research groups from (2/15/2023) until (2/16/2023) in the halls of Mosul High School for Outstanding Female Students in the city of Mosul.

**Spatial Ability Test**

The test was applied to students of the three research groups from (2/19/2023) until (2/20/2023) in the halls of Mosul High School for Outstanding Female Students in the city of Mosul.

**Application of the main experiment**

The educational content of chess was taught using the (SWOT) and (Stephen Covey) matrices, while the control group was taught in the traditional way. Starting from February 21, 2023, to May 4, 2023, for 10 weeks, with two educational units per week, with a total of 20 units for each of the three research groups. Each unit lasted 45 minutes. The days of the main experiment were distributed as follows: the first (SWOT) experiment on Sunday and Thursday, the second (Stephen Covey) experiment on Monday and Tuesday, and the control group (traditional method) on Tuesday and Wednesday.

**Application of post-tests**

Tactical behavior: The test prepared by the researcher was applied to the students of the three research groups for the period from (5/7/2023) to (5/11/2023), in the halls of Mosul High School for Outstanding Female Students in the city of Mosul.

**Modified tachystoscope test for attention aspects**

The test was applied to the students of the three research groups from (5/14/2023) to (5/15/2023), in the halls of

Mosul High School for Outstanding Female Students in the city of Mosul.

### Spatial Ability Test

The test was applied to students of the three research groups from (5/16/2023) until (5/17/2023), in the halls of Mosul High School for Outstanding Female Students in the city of Mosul.

### Statistical methods

1. Percentage to determine the agreement rate of experts.
2. Pearson correlation coefficient.
3. Arithmetic mean.
4. Standard deviation.
5. T-test for two independent samples.
6. T-test for two related samples.
7. One-way ANOVA.

8. Two-way ANOVA.
9. Scheffe's test.

The statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS).

### Results and Discussion

#### Results for the first hypothesis

The results of the (f) test showed that the F values for the difficulty levels in the planned behavior test were statistically significant at an error rate of  $\leq 0.05$  with degrees of freedom (2-87-89) as the (f) values were (582.192 /1610.633 /7855.951/4137.374/2871.274/4265.162/6040.956). This indicates that we reject the null hypothesis and accept the alternative hypothesis. The Scheffe test was used to test the alternative hypothesis.

**Table 1:** Scheffe's test (LSD) for levels of tactical behavior test and overall total among the three research groups

Group Tactical behavior test	First experimental (SWOT)	Second experimental (Stephen Covey)	Control (Traditional method)
First level	243.7	219.9	180.6
	A	B	C
Second level	239.6	218.3	179
	A	B	C
Third level	239.1	218	175.3
	A	B	C
Fourth level	236.8	216.2	174.3
	A	B	C
Fifth level	233.8	213.5	172.4
	A	B	C
Sixth level	229	210.7	166.5
	A	B	C
Overall total	1422	1296.6	1048.1
	A	B	C

Table (1) shows that there is a difference in letters for each level of difficulty in the tactical behaviour test and the overall total among the three research groups, favouring the highest arithmetic mean.

### Discussion of the first hypothesis results

The results of the one-way analysis of variance for all difficulty levels of the strategic behaviour test and the overall total showed statistically significant differences at an error level of  $\leq (0.05)$  and degrees of freedom (2-87-89). To test the least significant difference between the three groups, the researcher used the Scheffé test. The results showed that the students in the first experimental group, who were taught using the SWOT matrix, performed better than those in the second and control groups. This result is consistent with all studies that have demonstrated the effectiveness of the SWOT matrix in the dependent variables addressed by those studies. Regarding the current study, the researcher attributes this result to the fact that teaching the students in the first experimental group chess tactics using the SWOT matrix helped them develop the ability to prioritize based on strengths, weaknesses, potential threats, and available opportunities. As a result, they developed diverse strategies that enabled them to overcome the difficulties associated with chess situations. This improvement was reflected in their ability to achieve higher scores in the difficulty levels of the chess tactical behavior test compared to the second experimental group and the control group. Regarding the superior performance of the second experimental group,

which was taught using Stephen Covey's matrix, over the control group taught with the traditional method. The researcher attributes this result to the fact that teaching the students in the second experimental group according to Covey's matrix enabled them to classify game situations into four categories: (1) important and urgent matters, (2) important but not urgent matters that need scheduling, (3) unimportant but urgent matters, and (4) matters to be avoided. Subsequently, they selected appropriate strategies for each category that considered the prioritization within each group, which made their decisions more efficient and directed. This improvement was reflected in their ability to achieve higher scores in the difficulty levels of the chess tactical behavior test compared to the control group.

### Results of the second hypothesis

The results of the two-way ANOVA showed that the values of (f) for the aspects of attention and their times represent statistically significant differences at an error rate of  $\leq (0.05)$  and degrees of freedom of (2-87-89). The values of (f) ranged between (8.250 -532.39), which indicates the rejection of the null hypothesis and the acceptance of the alternative hypothesis. However, there were no statistically significant differences in the time of attention shifting, as the values of (f) between groups and within groups reached (0.424/0.027), respectively, meaning that we accept the null hypothesis for the time of attention shifting. To test the alternative hypothesis, the (Schfee) test was used.

**Table 2:** Least significant difference test (Schfee) for attention aspects and their respective times between the three research groups

Group Attention aspects	First experimental (SWOT)	Second experimental (Stephen Covey)	Control (Traditional method)
Concentration	4.633	4.2	3
	A	B	C
Concentration time	15.33	15.5	16.51
	A	B	C
Distribution	4.333	3.717	3.15
	A	B	C
Distribution time	21.217	21.967	22.483
	A	B	C
Shifting	4.133	3.55	2.967
	A	B	C

Table (2) shows us the difference in letters for each level of difficulty for the tactical behaviour test and the overall total among the three research groups in favour of the highest arithmetic mean. However, no differences were observed between the group taught using Stephen Covey's matrix and the group taught using the traditional method in terms of attention concentration time. Likewise, no differences appeared between the three groups in the time of shifting attention.

#### Discussion of the second hypothesis results

The results of the two-way ANOVA analysis for all attention aspects and their respective times showed statistically significant differences at an error level of  $\leq$  (0.05) with degrees of freedom (2-87-89). However, no statistically significant differences were observed for the attention shift time at the group level and the interaction between group and test. To test the least significant difference among the three groups, the researcher used the Scheffe test. The test showed that the students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in both the second experimental group and the control group. The researcher attributes this result to the fact that teaching the students in the first experimental group using the content and strategies of the SWOT matrix, along with prioritization, contributed to the development of their attention skills. As a result, they became capable of focusing their attention on any movements occurring on the chessboard within standard times. In addition to distributing their attention to all the movements of the pieces in record time, they also became able to shift their attention according to the progress of the game and the strategies they have adopted. This was clearly reflected in their scores on the Tachistoscope tests (concentration, distribution, shifting) compared to the students of the second experimental and control groups.

Regarding the superiority of the students in the second experimental group, who were taught using Stephen Covey's matrix, over the students in the control group, who were taught using the traditional method. The researcher attributes this result to the fact that teaching the students in the second experimental group using Stephen Covey's matrix equipped them with the ability to prioritize according to the game situation. This enhanced their capacity to focus their attention based on the weight of these priorities and

within standard times. The varying nature of these priorities also contributed to their ability to distribute their attention within standard times. Additionally, the varying strategies gained from practicing prioritization using Stephen Covey's matrix enhanced their ability to shift attention according to the game's demands and any changes that occurred. This contributed to achieving higher scores on the Tachistoscope test compared to the students in the control group.

Regarding the lack of statistically significant differences in attention shift time among the three research groups, the researcher attributes this result to the fact that playing chess requires a high level of attention and the ability to shift attention between squares on the chessboard according to the demands of the competition. Shifting attention and making appropriate decisions about moves require a specific time frame to assess the situation. In other words, the time required to shift attention from one move to another, assess the situation, and make decisions is an essential skill that every chess player must possess. Regardless of the method or strategy they are taught. This explains why there were no statistically significant differences in attention shift time among the three groups.

This is consistent with what was indicated by the International Chess Schools Committee of the International Chess Federation (2002). "That chess develops cognitive abilities such as attention and its aspects, memory, intelligence, perception, and analysis, all of which are essential factors for cognitive growth in a chess player. This required the organization of decision-making time when practicing these cognitive skills." (Chess Committee, 2002, p. 1).

#### Results of the third hypothesis

The results of the two-way ANOVA showed that the values of (F) for the spatial ability tests and the total score show statistically significant differences at an error rate of  $\leq$  (0.05) with degrees of freedom (2-87-89). The values of (F) ranged between (76.383- 2892.211). This means that we reject the null hypothesis and accept the alternative hypothesis. To test the alternative hypothesis, the Scheffe test was used.

Table (3) shows the difference in letters in all spatial ability tests and the overall total among the three research groups, in favor of the highest arithmetic mean.



**Table 3:** Least significant difference test (Schfee) for spatial ability tests and the overall total between the three research groups

Group spatial ability	First experimental (SWOT)	Second experimental (Stephen Covey)	Control (Traditional method)
Spatial perception	13.8 A	11.85 B	9.07 C
Spatial visualization	9.05 A	6.97 B	5.47 C
Spatial orientation	9.62 A	7.27 B	6.55 C
Total spatial ability	32.47 A	26.08 B	21.08 C

### Discussion of the third hypothesis results

The results of the two-way ANOVA for all spatial ability tests (spatial perception, spatial visualization, and spatial orientation) showed statistically significant differences at a significance level of  $\leq (0.05)$  among the three research groups. For the least significant difference test, the researcher used the Scheffé test. The results indicated that the students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in the second experimental group, who were taught using the Stephen Covey matrix, and the control group, who were taught using the traditional method.

The researcher attributes this result to the fact that teaching the students in the first experimental group using the SWOT matrix and its activities enhanced their ability to recognize weaknesses and strengths in play situations. As well as to perceive potential threats and available opportunities. This improvement in spatial perception of chess pieces and their movements led to better spatial visualizations of opponent moves and more informed decision-making. Through spatial orientation for planning moves and transitions, the ability acquired by the students in the first experimental group was reflected in their higher scores on spatial ability tests (spatial perception, spatial visualization, and spatial orientation) and overall, compared to the second experimental group and the control group.

As for the superiority of the students in the second experimental group over the students of the control group, the researcher attributes this result to the characteristics that the students of the second experimental group acquired through practicing the tasks of Stephen Covey's matrix. When situations are urgent, they perform the tasks of organization and achievement. When situations require taking the initiative in play, they perform the tasks of planning and then taking the initiative. When situations require deception, they are aware of these situations and make the necessary arrangements to avoid falling into these situations. When the purpose of the situations is to waste time, then it is required that they avoid these situations. Practicing these tasks in this order has enabled them to perceive play situations and places, build cognitive visualizations of gameplay, and finally, make critical decisions through spatial orientation. This was clearly reflected in their higher scores on spatial ability tests (spatial perception, spatial visualization, and spatial orientation) and overall, compared to the answers of the control group students.

### Conclusion

1. The students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in the second experimental group, who were

taught using the Stephen Covey matrix, as well as the students in the control group, who were taught using the traditional method, in all levels of the tactical behavior test.

- The students in the second experimental group, who were taught using the Stephen Covey matrix, outperformed the students in the control group, who were taught using the traditional method, in all levels of the tactical behavior test.
- The students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in the second experimental group, who were taught using the Stephen Covey matrix, as well as the students in the control group, who were taught using the traditional method, in all aspects of attention (except for attention shifting time).
- The students in the second experimental group, who were taught using the Stephen Covey matrix, outperformed the students in the control group, who were taught using the traditional method, in all aspects of attention (except for attention shifting time).
- The students in the first experimental group, who were taught using the SWOT matrix, outperformed the students in the second experimental group, who were taught using the Stephen Covey matrix, as well as the students in the control group, who were taught using the traditional method, in all components of spatial ability.
- The students in the second experimental group, who were taught using the Stephen Covey matrix, outperformed the students in the control group, who were taught using the traditional method, in all components of spatial ability.
- No statistically significant differences were found among the research groups in the variable of attention shift time.

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