The Effect Of The Inside And Outside The Circle Strategy On The Achievement Of First-Year Intermediate Female Students In The Subject Of Biology And Deductive Thinking

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ABSTRACT

The purpose of the study is to determine how first-year intermediate school biology students' deductive reasoning is impacted by the inside and outside the circle strategies. The research sample of first-intermediate female students at Al-Rifaa Girls' Secondary School was comprised of two sections (C and D) that were selected at random from nine middle and secondary schools in Babylon that are affiliated with the General Directorate of Education for the academic year 2023–2024. In terms of the factors (chronological age expressed in months, IQ exam, past accomplishment test, and deductive reasoning test), the researcher balanced the two groups in the present study. Seventy-one female students made up the research sample. They were split into two groups: thirty-four students in the experimental group, who will study using a strategy both inside and outside the circle, and thirty-six students in the control group, who will follow standard protocol. The first three units from the biology textbook were among the scientific materials that the researcher recommended should be taught. Following the establishment of parity between the two groups, the researcher created the application criteria for each group for the first intermediate grade. Following the experiment's completion, the researcher used her study instruments on the two groups to collect data and analyze it using a t-test. The results demonstrated the experimental group's advantage over the control group, which was examined using the inside-and-outside-the-circle deductive reasoning technique.

1. Introduction

First: the research problem

We live in a time of scientific advancement and renaissance, with new discoveries and innovations being made every day. This has led to rapid advancements in all spheres of life, including education, particularly in the scientific domain. In order to raise a generation that is capable of coping with this evolution, it is imperative that we pay attention to the growth and development of educational institutions. scientific and technology to ensure he and his community have access to the greatest resources possible. It is the duty of educators to prepare the next generation to cope with these situations and acquire the necessary information and abilities to invest in and use the scientific approach of thinking. Many educators still use traditional approaches that focus only on the cognitive side of teaching—memorizing content and imparting it to students—while ignoring the emotional and skillful aspects of learning. As a result, pupils' thinking will start to pose its own issues. It centers on many factors, some personal to the learner and others having to do with the instructional strategies used. In order to solve this issue, contemporary approaches that stay up with scientific advancements across all disciplines must be used. Additionally, students must take use of cutting-edge technology and new teaching strategies, as they have a beneficial influence on raising the standard of instruction and learning. Thus, learning becomes active in the educational process when traditional teaching methods are abandoned in favor of more effective modern ones. This is supported by several local studies (Al-Lahibi, 2020), a study by Abboud (2021), and a study by Al-Kaabi (2023) that highlight the importance of implementing modern teaching strategies in order to improve students' academic performance and critical thinking abilities.

In order to corroborate this, the researcher used a survey questionnaire with four open-ended questions that were sent to a sample of randomly selected female biology instructors teaching first-year intermediate biology.

Given the above, the following query may be used to define the research problem::

What effect does the inside- and outside-the-circle technique have on the deductive reasoning and biology accomplishment of female first-year intermediate students?

Secondly: researchimportance**:** Educational institutions are among the institutions that contribute most to the development and development of society, and these institutions have the mission of preparing and qualifying generations and refining the personal aspects of humanity to keep pace with the development of countries, as well as increasing the personal capabilities of individuals in order to face challenges (Al-Titi,2013:23).

Education seeks to achieve its goals by paying attention to teaching and providing learners with information and functional concepts to develop their basic skills, scientific attitudes, and ways of thinking so that they can understand the environment around them and confront the problems they suffer from in accordance with the correct scientific method (Al-Abayji,2002:111).

The purpose of education is to support students in developing their critical thinking skills and to concentrate on their personal growth and development. This is because education is a series of activities designed to effect the necessary changes, as well as interactions between students and teachers in the classroom and across scientific disciplines, including life sciences (Attiya, 2011: 29). The life sciences have advanced quickly across the globe, and because of their close relationship to human health, existence, and environment, these disciplines are now more significant and play a greater role in society. Because of this, academic institutions are now focused on creating biology teaching methodologies that provide a more encouraging learning environment for students.

Constructivism considers that understanding is the outcome of the learning process. Learning in this concept requires constantly rebuilding the learner's cognitive structure so that it maintains a wide range of experiences and ideas, which requires viewing the learner as an effective participant and maker of his learning through a process of balance and integration between the cognitive structure and new experiences (Khairy,2018: 49-50).

Teaching strategies have made great progress. Science and knowledge have advanced, and it is necessary to rely on teaching strategies, which has brought about a change in their contribution to increasing the means of understanding between the teacher and the students. Teaching strategies play their role in achieving the desired goals in the best possible way (Abu Sharikh2008:8).

(A strategy inside and outside the circle) seeks to achieve its desired goal, which is to help students acquire the skills of asking questions, making predictions, speaking calmly, and moving towards the goal (Ambou Saidi,2016: p. 443).

The importance of thinking, as the researcher sees it, is an integral part of the pillars of biology as it is a purely scientific subject and needs to develop students' thinking and achieve the desired goal (74:1988, Brandt).

The following highlights the significance of the research:

1. The value of education in preparing a person for their society.

2. The strategy's significance both within and beyond the circle, given that it's a contemporary approach to active learnin.

3- The importance of biology as it is the science that distinguishes itself from other sciences.

4- The importance of the middle stage as it is the practical transitional stage for students.

5- The importance of deductive thinking as a high type of thinking.

Third: Research objective: The purpose of the present study is to determine how an inside-and outside-the-circle method affects first-year female intermediate school students' performance in the subjects of biology and deductive reasoning..

Fourth: The two research hypotheses: In order to confirm the study goal, the investigator developed the following null hypothesis:

1. When comparing the average grades of female students in the experimental group studying biology using an inside-outside-the-circle strategy versus those of the control group studying the same subject using the (normal method) in the deductive thinking test, there are no statistically significant differences at the significance level (05.0)..

Fifth: Limits of research: The present study is restricted to the following areas: • Time limits: the first semester of the academic year 2023–2024; • Spatial boundaries: government middle and secondary day schools for girls associated with the General Directorate of Education in Babil Governorate/Al-Mahawil District;.

- The Frontiers of Humanity: Female students in the first middle school year2023/2024.
- Cognitive boundaries: These include:
- The first three units: from the biology book material Tabled to be taught to female students in the first intermediate year, sixth edition, during the academic year2023-2024.

Sixth: Defination terms

Impact:(Arafa Al-Quraishi) as “the amount of change caused by the teaching method, which is represented in the students’ cognitive learning outcomes and is measured by identifying the increase or decrease in their grade point averages” (Al-Quraishi:2004,17)

The researcher defines “impact” operationally as: The degree to which teaching biology with an inside-and outside-the-circle strategy affects first-year intermediate school students' achievement and grades is determined by calculating the difference between the average test scores and the deductive thinking scale that will be used. (Saadoun, Al-2012).

Third - a strategy (inside and outside the circle) known to everyone:

1- (Ambou Saidi, 2016):

"A seamless exercise that enables students to engage in a group discussion in a short amount of time with the goal of having a fruitful dialogue that permits the exchange of views on a subject for a certain objective. According to Ambousaidi (2016), "it is a mechanism appropriate for use in the primary and middle stages."

The researcher knows the definition of procedural:

"A collection of protocols and strategies devised by the investigator in accordance with the tactical measures both inside and outside the circle to enable the experimental group to utilize the resources available in the school to accomplish the lesson's objectives by equipping the students with the requisite skills for that."

Chapter Two: The theoretical framework and previous studies

The first axis: theoretical background

In this chapter, the researcher will present the theoretical aspects addressed in the current research, which represent its main components.

First: Constructivist theory

Secondly, active learning strategies (strategy inside and outside the circle)

1: Constructivist theory as an idea:

One of the newest developments in education is constructivist theory. The focus of educational research has shifted significantly over the past three decades, particularly in relation to prior knowledge and

understanding of the concepts being studied. This has meant that learners are now more interested in what goes on inside their minds when they are exposed to a variety of educational situations (Al-Adwan, Ahmed, 2016: 36).

Second: The concept of a strategy inside and outside the circle:

It is regarded as one of the most significant strategies employed in the educational process because its application mechanism incorporates a novel form for the lesson output, increasing learner involvement and enhancing the learning environment through the strategy's concept of encouraging students to share ideas and compete in them through creative pair work (Al-Ali2006: 157).

A: Strategic components inside and outside the department:

1. Circle: Students are divided into small groups and form circles.
2. Topic: A specific topic is selected for discussion.

3- Cards: Questions or information are written on cards.

4- Time: A specific time is set for each round of discussion (Melhem 2001: 72).

B: Strategic steps inside and outside the department:she:

1. The instructor teaches the lesson according to his previous plan.

2. The instructor splits the class up into two groups. Every team is split up into two equal groups. To ensure that the students meet face-to-face, one group forms an outside circle and the other an inner circle.

3. The instructor assigns multiple-choice or completion problems to the students in their inner groups, along with their solutions. Students in the outer circle go clockwise to stand with each student in the inner circle when each student in the inner circle asks a question of the student in the outer circle and receives a response. After he poses a question, they walk to the student who provided the response. They stay in this position for the duration of the course, at which point the instructor supervises the swap of roles between the two groups (Ambo Saidi, 2016: 443).

secondly": Deductive reasoning:

A - The concept of deductive thinking:

It is a procedure that permits a person to derive new knowledge or a conclusion from observations pertaining to the subject matter or circumstance being studied that does not directly exist (Abu Jado, and Al-Najri, 2007: 271).

B- Deductive thinking skills:

1- Interpretation skill

2- Analysis skill

3- Reasoning skill

4- Deduction skill

5- The skill of explanation (FACION, 1998: 82).

Second: The second axis: previous studies:

For her research, the investigator will examine a few earlier studies in chronological order that either directly or indirectly support her findings and that demonstrate the scientific methods that the present study's processes and methodology are founded on..

The first axis: studies related to the independent variable:

- **Study by Buthaina Al-Sharifi (2021):**The purpose of the research was to determine (the impact of information gaps and strategies used both within and outside of the circle on middle school female students' performance in the Arabic grammar subject).
- **Study of Hagar Al-Daoudi (2019 (**The influence of strategy both within and outside the circle on students' mental alertness and their acquisition of the abilities necessary to prepare and receive serves in volleyball for female students).

The second axis: Studies related to (deductive thinking)

1. Nassif (2022) The association between students' accomplishment in the topic of thermodynamics and their deductive reasoning abilities in physics departments at colleges of education.

2. (2014) Al-Harishawi The use of tales in physics instruction and their effects on first-year intermediate students' success and logical reasoning

Chapter III:

First: Research methodology: In order to accomplish the study goals, the investigator used the experimental research strategy, since it is a suitable method for validating hypotheses that facilitate truth-finding and can surmount any obstacle. It is one of the most accurate methods for researching educational phenomena since it allows for the control of all factors that might affect the variables. Underdog (Atwi, 2009:221)

Second: Experimental design:

Selecting an experimental design with partial control for two experimental and control groups as well as a post-test was appropriate for the research goal and to achieve the validity of the two hypotheses, as shown in the diagram (1) below. The researcher adopted one of these designs that was compatible with her research.

<table>
<tr><td>The two groups</td><td>Parity</td><td>Independent variable</td><td>Dependent variable</td><td>Search tool</td></tr>
<tr><td>Experimental</td><td rowspan="2">1- Chronological age calculated in months
2- Previous achievement in sixth grade science subject
3. Intelligence test (Raven)
4- Deductive thinking test</td><td>Strategy inside and outside the circle</td><td rowspan="2">-Collection
-Deductive thinking</td><td rowspan="2">1- Achievement test
2-Deductive thinking test</td></tr>
<tr><td>Female officer</td><td>The usual method</td><td></td><td></td></tr>
</table>

a plan1: Experimental design with two groups in the research

Third: The research community and its sample

A- Research community: These are the individuals or objects that make up the study topic, the outcomes of which the researcher aims to generalize (Abbas, 2009:217)

The study population comprises first-year middle school pupils enrolled in two or more courses in middle and secondary government day schools for females in the Al-Mahawil district of the Babil Governorate for the academic year 2023–2024.

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Fourth: The research sample: It is part of a society, possesses the characteristics of that society (Al-Manzila,2010:101)

As can be seen in the table below, the study sample (Al-Rifaa Secondary School for Girls) was selected for the academic year 2023–2024 using a straightforward random approach from the Babylonian schools under the umbrella of the General Directorate of Education..

Table2: The number of female students in the two research groups before and after exclusion

T	**the group**	**Section**	**Number of female students before expulsion**	**Number of excluded female students**	**Number of female students after exclusion**
1	Experimental (strategy inside and outside the circle)	C	36	2	34
2	Controller (normal method)	Dr	39	3	36
	the total	**2**	**75**	**5**	**70**

Fifth: Equality of the two research groups:

Although every member of the research sample comes from a similar social and economic background and is from a single geographic location, the school administration chose to distribute the participants at random. The researcher will compensate the students in the experimental and control research groups for certain variables that she believes interfere with their influence over the independent variable (Muhannad Yahya, 2019:124).

The following factors were used to equalize the two groups:

1. Age chronologically expressed in months.

2. Biology test results for the preceding school year's sixth-grade elementary students (2022-2023).

3.Intelligence test (Raven).

4.Pre-deductive reasoning test.

Seventh: Requirements for conducting the research

The researcher identified the necessary requirements to conduct the experiment as follows:

1- **Determine the academic subject (study content)**The researcher ascertained the scientific content that the two research groups would examine in the event that the subject's study units comprised the following: (The first unit comprises the first and second semesters, and the second unit comprises the first, second, and third semesters) from the biology book Tabled to be taught for the first intermediate grade, sixth edition, for the year 2023..

Eighth: Numbers of the two research tools

Research tool: It is a method used to gather information on research topics, test hypotheses, and accomplish the experiment's objective (Abu Huwaij, 2002:65).

Tools for the study were created by the researcher.

To accomplish the second aim of the present study, a deductive reasoning exam has to be constructed using the following stages: - The procedures for getting ready for a test on deductive reasoning abilities

are as follows: -

1- **Determine the purpose of the test:**The purpose of the deductive thinking exam is to assess the female research sample students' capacity to apply deductive reasoning techniques to their biology coursework.

2- **Determine the targeted deductive thinking skills:**

In order to renew deductive thinking skills, the researcher reviewed a group of studies that dealt with deductive thinking before starting to prepare the deductive thinking test in order to know the steps through which the test is constructed. After reviewing the tests, the researcher noticed that most of them relied on objective paragraphs, so the researcher consulted a group of specialist professors. In consultation with the supervising professor, the test items should be of the multiple-choice type.

2- Formulating test items for deductive thinking skills

The paragraphs have been drafted to suit the nature of deductive thinking skills and what their number indicates (25) Paragraphs divided into (5) deductive thinking skills in a multiple-choice style, with four alternatives.

Statistical analysis of test items:

Construct validity: When applying any scale to determine the psychometric properties of its items, one of the most crucial steps is statistical analysis of the items. This process aids the researcher in selecting items with desirable qualities, which increases the scale's validity and stability. Consequently, it is believed that statistical analysis of the data is more significant than logical analysis (Anastasi & Urbina, 1997:172).

of honesty by finding the correlation between each of the following:

A- The relationship of the item score to the total score for the deductive thinking skills test:

The Pearson correlation coefficient was used by the researcher to determine the paragraph's validity.Because the deductive reasoning test's item scores are graded and continuous, there is a direct association between each item's score and the test's overall result. Following the computations, the researcher discovered that, at a significance level of (0.05), the correlation coefficient's value was between (0.55-0.27), which is higher than the crucial value of (0.19). The test is valid for assessing the phenomena for which it was intended to measure since its degree of freedom is (98)..

B- The relationship of the item's grade to the grade of the field to which it belongs:

This relationship was calculated using the Pearson correlation coefficient, and it was discovered that all correlation coefficients are statistically significant at the significance level (0.05) because their values range from 0.68 to 0.51—a value that is higher than the crucial value of (0.19) with 98 degrees of freedom.

C- The relationship of the field to the overall degree:

1-By utilizing Pearson's coefficient to derive the connection between the students' test results and the overall score, this form of validity was confirmed. The statistical analysis sample consisted of (100) female students in order to do this. Since all of the computed correlation coefficients were greater than the critical value of (0.19) at a significance level of (0.05) with a degree of freedom (98), the findings showed that the correlation between the two fields measures one thing, which is deductive reasoning. This is a reliable sign that the test construct is valid..

2- Paragraph discrimination factor:

Using the law of discriminating power, the researcher examined the deductive reasoning test items. After calculating each item's discriminating power, the researcher discovered that all of the test items could distinguish between the female students in the sample, with a discrimination coefficient ranging

from 0.33 to 0.56. Test items are deemed valid if their discriminatory power is 0.30 or higher. No test item is removed from the list because it is deemed to have an acceptable degree of discriminating power (Al-Absi, 2010:205).

1- **Reliability of the deductive reasoning test**:

A fixed tool is described as one that, when used repeatedly under similar conditions, yields outcomes that are comparable or same (Nofal and Faryal, 2010:276).

With one point awarded for a right response and zero for a bad response, this is the most used technique for determining the internal consistency of test questions (Melhem, 2000:265).

If the stability factor was 81.0, it means that the test's dependability is rather high.

The fourth chapter:

First: Display the results: The purpose of the present study is to determine how first-year intermediate school biology students' deductive reasoning is impacted by the inside and outside the circle technique. The researcher's findings will be made public..

Null hypothesis: In order to confirm the hypothesis, which reads as follows: "In the post-test of the deductive thinking test, there are no statistically significant differences at the significance level (0.05) between the average (17.26) grades of the experimental group, who studied using the inside and outside the circle strategy, and the average grades of the female students of the control group, who study the same subject in the usual way. The averages of the two groups in the post-test of deductive reasoning were compared using the t-test for two independent samples, as shown by the researcher. according to Table 3.

Table3: t-test outcomesF or two separate samples for each of the two study groups on a test of logical reasoning

T	the group	Number of female students	SMA	standard deviation	Degree of freedom	T value		Statistical significance at level0,05
						Calculated	Tabulation	
1	**Experimental**	34	17.26	4.19	68	5.736	2.000	Not statistically significant
2	**Female officer**	36	12.06	3.93				

Additionally, the researcher used an equation (to extract the size of the impact)d) to determine the magnitude of the influence that the independent variable (inside and outside the circle method) has on the dependent variable (deductive reasoning).

Table3: The independent variable's impact magnitude on the deductive reasoning abilities variable

Independent variable	Dependent variable	effect size value)d)	The amount of effect size
Strategy inside and outside the circle	Deductive reasoning	1.39	big

The effect size value (d) reached (0.29), as the above table makes evident, and as a result, both the inside and outside the circle strategies significantly increased the experimental group's degree of deductive reasoning in comparison to the control group.

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