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the impact of the intermediate teaching strategy (MIT) on the achievement of first intermediate grade students in mathematics

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Abstract

The current research aims at identifying the impact of the intermediate teaching strategy (MIT) on the achievement of first intermediate grade students in mathematics, the Empirical research was adopted, as the experimental design was used for two independent and equal groups with a post-test, the experiment was applied to a sample consisting of first intermediate stage (60) students in the intermediate (Zaytoun for boys) School affiliated to the General Directorate in Anbar Governorate - Anbar Education For the academic year (2022-2023), The research sample was distributed equally on the two research groups, and Division (A) was chosen randomly to be the experimental group, while Division (B) was chosen to be the control group, the distribution was made according to the data of the following variables (previous achievement, previous knowledge, intelligence), The achievement test was constructed, which consisted of (36) objective items of the multiple choice type with four alternatives, Where its validity and stability were verified and found acceptable, and after the experiment completion, the achievement test was applied using the statistical Package (SPSS-23), and the Levin test and the t-test were adopted for two independent samples. The results showed experimental group students superiority who studied based on the intermediate teaching strategy (MIT) on the control group students who studied based on the traditional method in the two achievement tests.

Keywords

intermediate teaching - MIT - mathematics.

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introduction

First: research problem

The common teaching methods used in the educational fields pay attention to memorization and indoctrination by using linguistic-verbal education, where most of our school lives are expressions and words, Students rarely show interest in practicing mental operations, and this was reflected in their achievement level in general, and this was confirmed by the study (Hamad & Basim,2018 ,p1219) as well as their achievement level in in particular, the students numerical sense of t this stage must be developed, as confirmed by the study (Al-Aqabi, 2007), because mathematics is one of the most difficult subjects, due to its concepts abstraction, logical sequence, and mathematical relations, Students face difficulties in identifying its components and choosing the appropriate method to solve its problems, and this weakness in the mathematics achievement was confirmed by the previous studies and research results in mathematics, as in the study of (Alwan, 2015), (Muhammad, 2017) and (Ahmed, 2020), (Jawad and other, 2021), (Hassan and Rasen, 2022), and (Majeed, 2023). Therefore, learners need effective strategies that increase their achievement using modern methods and techniques. In order to achieve this, those interested in teaching should move away from traditional indoctrination methods and start from the fact that the learner is the educational process basis in light of modernity and development, as it leads to a deeper, better and longer understanding of the cognitive content.

In the light of the foregoing, the research problem can be determined by answering the following question:

What is the impact of the intermediate teaching strategy (MIT) on the achievement of first intermediate grade students in mathematics?

Second: Research Importance:

1. The importance of mathematics in all fields, and teaching importance in the different educational stages, as it requires more attention as well as intensive care in choosing strategies that make the student an effective and essential focus of the educational process.
2. The current research targets intermediate grade students, which represents a transitional stage between childhood and maturity, and between the physical and the abstract, and the accompanying physical and psychological changes on the students, therefore, this stage requires more complete care to overcome the problems of this stage.
3. The research may lead to a deeper, better, and longer-lasting understanding of the cognitive content by moving from verbal teaching to intermediate teaching, making the student active and engaged in the educational process.
4. The absence of a previous study, based on the researcher's knowledge, that dealt with the intermediate teaching strategy (MIT) in mathematics at the local and global levels.

Third: Research objective:

The current research aims at identifying the intermediate teaching strategy (MIT) and its impact on the first intermediate grade students achievement in mathematics.

Fourth: Research Hypothesis:

There are no statistically significant differences at the level (0.05) between the average scores of the experimental group students who will study according to the intermediate teaching strategy (MIT) and the

students average who will study based on the usual method in the achievement test.

Fifth: Research Limitations:

1. Intermediate first grade students in the day intermediate and secondary schools of the General Directorate in Anbar Governorate - Ramadi district.
2. Mathematics book topics, the first part, to be taught to th first intermediate grade = students in the academic year (2021-2022), Ministry of Education, 5th Edition, for the year 2021, authored by Jassem, Amir Abdul Majeed, and others.
3. The first semester (first course) of the academic year (2022-2023).

Sixth: Terms Definition:

1. Intermediate Teaching (MIT):

(Atiyah, 2010) “The interventions and procedures that the teacher performs before, during and after reading for the purpose of guiding and directing students on how to perform a specific task, these interactions may be in the form of a balance between the students’ knowledge backgrounds and the content of the text, or directing students to investigate the meanings contained in the text, or urging students to use the new parameters in a variety of ways.” (Atiyah, 2010, p. 239).

2. Achievement:

(Al-Laqani, 1999) defined it as “the extent to which students absorb

what they have learned from specific experiences through academic courses, and it is measured by the degree that students obtain in the achievement tests prepared for this purpose" (Al-Laqani, 1999, p. 58)

Chapter Two: References Review

First: theoretical background

The first axis / intermediate teaching strategy (MIT):

Since the intermediate teaching strategy (MIT) is one of metacognition strategies, the researcher discussed metacognition and metacognitive strategies before getting into the intermediate teaching strategy details.

- **Metacognition**

Flavell 1979, is the first researcher who use the term metacognition in the educational aspect and in his research, and he gave a comprehensive description of knowledge beyond knowledge, since the beginning his research interests had focused on psychological development, especially children's thinking and their thinking processes, his studies were influenced by Piaget literatures, as he noticed that children monitor their own understanding and other cognitive activities, in leading students to choose, directing cognitive tasks, strategies and goals that are able to organize their learning, despite this, students make mistakes during the learning process, and therefore students should benefit from this process in choosing goals. (Al-Atoum, 2004, p. 207)

- **Metacognitive Strategies:**

Despite several studies that dealt with metacognitive variable and several variable components, the two researchers agree with the study (Al-Husseini and Al-Dulaimi, 2011) that metacognitive is strategies and skills in controlling knowledge so that the learner can translate it on the ground, this concept has many definitions, including:

(Ibrahim, 2005) defined it as "higher control processes whose guest is skipping, monitoring, and evaluating the learner's performance in solving problems, as they are executive skills that are interested in directing and managing different general thinking skills in solving the problem, and it is one of the smart performance or parameter processing components." (Ibrahim, 2005, p. 89)

The importance of the metacognitive strategy is it makes students unable to face difficulties during learning and reconsider the methods and mental activities that they use and helps the learner to play a positive role during his participation in the education process as it develops his human capabilities, and the learner moves to the qualitative learning level that confirms the importance of mental upbringing and thinking development. (Al-Hashimi and Al-Dulaimi, 2008, pp. 52-53)

Intermediate Teaching Strategy (MIT)

It is one of the metacognitive strategies that make the teacher lead his students successfully and in increasing the reading comprehension skills, intermediate Teaching Strategy (MIT) was developed by Neil and Langer

to be general enough to be applicable to any subject. (Neal & Langer, 1992, p. 230)

Intermediate teaching means all the teacher's procedures to guide students before, during and after the reading process, to guide and direct students on how to perform a specific task, and all of these interactions are in a way that balances the read text content and the students' knowledge storage, and encourages and pushes them to use what they read in various new methods.

This strategy works on activating the students' role in an educational situation and raising their interaction level between them and what is included in the read text to make the reading process a success by strengthening students' understanding of what they read by anticipating the meanings and contents between the lines. (Atiyah, 2010, p. 239)

Intermediate teaching strategy (MIT) phases are:

1. The post-reading stage: It aims at students' preparation and readiness for reading, as for the comprehension processes in this stage, they are the previous knowledge mobilization using learning media, including brainstorming, raising a problem and presenting it, or self-questioning, the teacher role in this process is to explore the students' feelings and their knowledge backgrounds on the subject or issue, predict the substance content by clarifying and reviewing ideas, presenting a complex general theory, formulating purposeful

questions or experimenting, and the teacher's role is to lead the students in this process.

2. **Reading stage**: **Achieving understanding** and the process here is building meaning through the validating predictions process, answering purposeful questions, talking about ideas, taking notes, summarizing or writing down responses, the teacher role is guidance and direction at this stage, remembering or memorizing, which is processing ideas using experiments, projects, or creative work. At this stage, the role of the teacher is to advise using a specific formula that motivates students to retain ideas.
3. **The post-reading stage**: the process here applies the knowledge that has been reached in new situations, and the aim is to consolidate knowledge, and the role of the teacher is to direct the application process, make observations, and participate in the students, based on the results (Atiyah, 2010, p. 240)

Obeidat and Suhaila (2014) mention: "Mathematics, whether it is geometry or arithmetic, is forms, relationships and links, and there is no mathematical issue that cannot be drawn or expressed in a shape or form, for all words can be translated into symbols, these are some mathematical symbols (=, +, -, <, >,....)" (Obeidat and Suhaila, 2014, p. 223).

The researcher believes that when implementing the intermediate teaching

strategy, it is possible to achieve important goals, including:

1- Crystallized scientific concepts and the interdependence of ideas
2- Identify the main or central ideas and sub-ideas in the read text.
3- Statement of the causal relationship, which is one of the most important types of relationships.
4- Using mathematical and quantitative relations and understanding the sequence of phenomena and events for operations.
5- Read more effectively for shapes, pictures and illustrations.
6- Developing some mental skills, including reasoning, deduction, and predicting the existence of relationships between ideas in the read text.
7- Working on retrieving and reviving prior knowledge among students.
8- Increasing students' confidence in their abilities and encourage them to learn on their own.

Second: previous studies

To the extent of the researcher's knowledge, there are no previous studies that have dealt with the Intermediate Teaching (MIT) strategy in mathematics, but he found a study related to this variable in scientific subjects, which are:

1- A study (Al-Issawi, 2017), the study was conducted in Iraq, aimed at identifying the effectiveness of the intermediate teaching strategy

(MIT) in the achievement and probing thinking in the subject of biology among the second intermediate grade students.

Chapter Three / Research Procedures

First: Research Methodology: In this research, the experimental method was adopted, in order to achieve the research objectives.

Second: The research experimental design: The researcher adopted one of the experimental designs with partial control for two independent, equal groups with a post-test, due to its suitability to the current research problem, Table (1):

Table (1), the research experimental design

group	two groups equivalence	independent variable	dependent variable	test type
Experimental	– IQ test – previous achievement grades	intermediate Teaching Strategy (MIT)	Achievement	– Achievement test in mathematics
Control	– Previous knowledge test	Traditional method		

Third: research community:

The first intermediate grade students were selected in the secondary and intermediate day schools of the Ramadi district - the General Directorate of Anbar Governorate, for the academic year (2023-2022), where the total number of the intermediate first grade students reached (5196)

students distributed to (83) schools.

Fourth: Research Sample: The research sample, which reached (60) students, was distributed equally to the two broadcast groups based on the following variables data (previous achievement, previous knowledge, intelligence), and group (B) was chosen randomly to be the control group and group (A) was chosen to be the experimental group.

Fifth: control procedures:

1. **The experimental design internal safety:** the researchers aimed to verify the equivalence over the arithmetic mean and standard deviation of the data that represent these variables, and the researchers also used Levene's test for two independent samples to calculate the difference significance between the variance of each of these variables data for the two research groups, it was found to be homogeneous in all male variables because the significance level for these variables is greater than the level of (0.05) and a (t-test) was used for two independent samples to find out the difference significance between the averages of each of these variables for the two research groups, it was found that there were no statistically significant differences because the significance level of these variables was greater than the approved (0.05) level.
2. **Experimental design external safety:**

A. **Experiment duration:** The duration of the experiment is unified for the two research groups, as it began on Sunday 23/10/2022 and ended on Thursday 26/1/2023.
B. **Subject teacher:** The two researchers aimed to teach the two research groups (experimental and control) by them, to avoid the difference that might occur as a result of the difference between teachers in their style, abilities and skills.
C. School subject: The School subject is represented by the mathematics book, the first part of the two research groups (experimental and control), the first intermediate grade to be taught for the academic year (2022-2023), 5th edition, 2021 AD.
D. **The number of scheduled classes and their distribution on the week days**: The two research groups (experimental and control) were taught based on the classes number prescribed for mathematics for the first intermediate grade in Iraq, which are (5) attendance classes per week for each section, for the academic year (2023-2022).
E. **Experimental extinction**: No student left or was dismissed from the two research groups (experimental and control).
F. Sample individuals' maturity factors: These variables did not have an effect on the experiment because the duration is

relatively medium. These changes are equal for the two research groups' students, as they are in a similar age group.

Sixth: Research Tool (Achievement Test):

The two researchers prepared a test to measure the experimental group and the control group students' achievement after the end of the experiment, this test, which consists of (36) multiple-choice objective items, was built according to the following steps:

1. **Identify the purpose of the test.**
2. **Identify the material.**
3. **Content analysis and formulation of behavioral goals.**
4. **Preparing the test map (specification table).**
5. **Prepare test instructions.**
6. **Test validity.**

A. **Face validity:** The two researchers presented the test that they prepared to the group of mathematics arbitrators and its teaching methods and intermediate school mathematics teachers to take their opinions about its items validity in measuring the mathematics content in the light of behavioral goals, the researcher aimed at taking into account the suggested observations, and some items were amended and reformulated in the light of the observations proposed by the

arbitrators, and the items on which they agreed for more than (80%) were remained.

B. **Content Validity**: The specifications table is an evidence of the content validity.

7. **Test Validity:**

A. **The first** exploratory **experience for the achievement test:**

To identify the test time that the student takes to answer the test and to verify the clarity of the wording of its items and instructions,

B. **The second exploratory experience for the achievement test:**

The achievement test was applied to a second reconnaissance sample of (107) students, and the students who failed were excluded statistically (7), the purpose of applying this test is to find out the psychometric characteristics, and after applying the test to the second exploratory, the researchers aimed to:

- Correct students' answers.
- Collate the data in descending order from highest to lowest.
- Choose a percentage (27%) for the higher group, and (27%) for the lower group. On this basis, the test items

were analyzed to find the discrimination power, the difficulty coefficient, and the alternatives effectiveness.

8. Statistical analysis of the achievement test items: to ensure that the achievement test items observe the students individual differences, where the difficulty coefficient was calculated for the test items and it was found to range between (0.37 - 0.65), and therefore the difficulty coefficient of the items for the achievement test are all acceptable, and when calculating the coefficient of discrimination for the achievement test items, it was found to range between (0.48 - 0.78), where the test item is considered good if its discrimination power is (0.30) or more (Eble, 1972: 40), the researcher used the law of false alternatives effectiveness and found that all coefficients are negative. This indicates that the alternatives attracted more answers from the students of the lower group compared to the answers of the higher group students. (Al-Dulaimi and Al-Mahdawi, 2020, p. 117)
9. **Achievement test** stability : The researcher used the alpha-Cronbach equation to find the achievement test reliability, so the achievement test reliability was (0.92), and it is considered good reliability, as the test is considered good if the test reliability value is (0.67) or more (Al-Nabhan, 2004, p. 240).
10. **Test Application**: The two researchers applied the achievement test to the two groups on Thursday 19/1/2023.

Chapter Four: Presentation and interpretation of the results

First: Mathematics achievement test results:

Results related to the null hypothesis

(There is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who studied based on the intermediate teaching strategy (MIT) and the average scores of the control group students who studied based on the traditional way in the mathematics achievement test).

After correcting the students' answers in the achievement test, which was applied to the two research groups (experimental and control), the researchers used the statistical program (SPSS) version (23) to find out the statistical description of the experimental and control groups data in the achievement test, and the results were shown as in Table (2) below.

Table (2) Statistical description of the research groups (experimental and control) data in the achievement variable

group	number of students	arithmetic mean	standard deviation	Standard arithmetic mean error	95% confidence interval in the arithmetic mean	
					Maximum	Minimum
Experimental	30	25.5667	4.861	0.88757	6.32919	1.53748
Control	30	22.6333	4.398	0.80299	6.32970	1.53697

When applying the (Levene's Test) test for two independent samples, which shows the difference significance between the students' scores difference for the two groups (experimental and control), it was found that the value of (F) (0.709) at the significance level (0.403), and this level is greater than the approved level (0.05), this indicates that the two groups are homogeneous in the achievement variable, and when applying the (t-test) for two independent samples, which shows the difference significance between the mean scores of the two groups (experimental and control), it turns out that the calculated t-value (t) is (3.286) at the significance level (0.002), and this level is smaller than the level (0.05) adopted with a freedom degree (58), as shown in Table (3) below.

Table (3) The value of (t) and (f) for the two research groups (experimental and control) in the achievement variable

variable	freedom degree	t-test		Leven - test		Statistical significance (0.05)
		f	significance	t	Significance level on both sides	
achievement test	58	0.709	0.403	3.286	0.002	significant

This indicates that there are statistically significant differences in the two groups mean scores, which leads us to reject the null hypothesis and accept the alternative which states (there is a statistically significant

difference at the level of (0.05) between the mean scores of the experimental group students who studied with the Intermediate teaching strategy (MIT) and the mean scores of the control group students who studied in the traditional way in the mathematics achievement test) and in favor of the experimental group with the largest arithmetic mean. These results are consistent with the study of both (Hassan Warsan, 2022) (Hassan, 2023).

Second: Conclusions: The researchers reached to the following most important conclusions:

1. Teaching based on the Intermediate Teaching (MIT) strategy requires time, effort and high skill in preparing the lesson, while implementing the lesson in it is smooth and comfortable for the teacher and makes him more controlled and focused in class management.
2. The intermediate teaching strategy (MIT) has a clear effect on raising the achievement level of the experimental group students in mathematics compared to the students' level of the control group.
3. Teaching based on the intermediate teaching strategy (MIT) made the student a main focus in the education process, and provided students with an opportunity to think and express.

Third: Recommendations

1- Invite the competent authorities (preparation and training) in the Ministry of Education and its directorates to organize training courses on the application of the intermediate teaching strategy (MIT) and how to employ them in teaching mathematics.
2- Encouraging and urging male and female teachers to use the intermediate strategy (MIT) when teaching mathematics for the intermediate stage, because of its significant impact on student achievement.

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