



The Effectiveness of the Team Assisted Individualization Strategy in Intelligent Thinking in Physics among Sixth-Grade Scientific-Stream Students

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Abstract

The current study aims to identify the effectiveness of the Team Assisted Individualization Strategy in intelligent thinking in physics among sixth-grade scientific-stream students by verifying the null hypothesis, which states: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental-group students taught according to the Team Assisted Individualization Strategy and the mean scores of the control group taught by the conventional method on the intelligent-thinking test. The researcher randomly identified the study population from the sixth-grade scientific-stream students at Al-Nasr Central Preparatory School for Boys, affiliated with the Directorate of Education in Al-Najaf Al-Ashraf Governorate, for the academic year (2025-2026), first semester, in physics. Two sections were selected out of eight sections, with a total of (96) students distributed into two sections: (48) students in the experimental group and (48) students in the control group. The equivalence of the two research groups was established for the variables of age in months, intelligence, and prior information. A set of experimental teaching plans was prepared for the two groups, with (16) plans for the experimental group and (16) plans for the control group. An intelligent-thinking test was prepared, consisting of five skills and (20) items for the whole test; each skill included four items. The face validity, construct validity, and item discrimination power of the test were verified. The Kuder-Richardson formula was also used to calculate reliability for the multiple-choice items. The researcher assigned one of the school teachers (Mr. Bashar Mohammed Hassan) to implement the experiment during the first semester of the academic year (2024-2025), as he is one of the physics teachers at the school where the experiment was applied. This was done after the steps of the strategy were explained to him in detail, the teaching plans were presented to him, and continuous communication with him was maintained. After the experiment was completed, the study data were processed using the Statistical Package for the Social Sciences (SPSS). The results showed a significant superiority of the students of the experimental group (Team Assisted Individualization Strategy) over the students of the control group in intelligent thinking; therefore, the null hypothesis was rejected, and the study concluded with a set of proposals and recommendations.

Keywords: Team Assisted Individualization Strategy, Intelligent Thinking

Chapter One: Introduction to the Research

First: Research Problem

There is a prevailing impression that physics is a difficult and dry subject. This may be due to the methods followed by male and female teachers, which make the lesson boring and thus negatively affect the learner in terms of concentration and understanding. Therefore, it has become necessary to adopt new methods and approaches in teaching this subject (physics) that make the learner the main pillar in the classroom through individual (self) learning and cooperative (group) assistance between the learner and his classmates. Among these methods is the Team Assisted Individualization Strategy, as confirmed by the study of (Ariani, 2017) ^[13], the study of (Zamzam, 2019) ^[16], and the study of (Al-Rikabi, 2024) ^[5]. By asking a group of male and female physics teachers in Al-Najaf Al-Ashraf Governorate, it became clear that such a strategy is not used in our schools. It also became clear that intelligent thinking, which depends on important and effective skills that help the learner compare,

imagine, and expand in physics, is not used, as confirmed by the study of (Zaitoun, 2010)^[6], the study of (Al-Saeedi, 2023)^[8], and the study of (Al-Taie, 2023)^[9]. Therefore, the researcher seeks to determine the extent of the effectiveness of the Team Assisted Individualization Strategy in intelligent thinking in physics among sixth-grade scientific-stream students.

Second: Significance of the Research

First / Theoretical Significance: The theoretical significance of this research lies in the following aspects:

1. Enriching the educational and psychological literature related to modern teaching strategies, especially the Team Assisted Individualization Strategy, as one of the strategies that combines individual learning and cooperative work.
2. Expanding the cognitive framework of the concept of intelligent thinking by studying its relationship with classroom educational practices and explaining how it can be developed among secondary-stage students.
3. Providing a theoretical foundation that links constructivist and social theories of learning with applications of physics teaching, thereby enhancing understanding of the mechanisms of acquiring scientific knowledge more effectively.
4. Highlighting the importance of employing modern teaching strategies in physics, which is considered one of the subjects that requires analytical and inferential skills and high-level thinking.
5. Adding scientific results that may benefit researchers in the field of curricula and teaching methods and serve as a reference for future studies related to intelligent thinking and cooperative learning.

Second / Applied Significance: The applied significance of the research is represented in the following:

1. Providing physics teachers with an effective teaching strategy that helps them improve students' learning and raise their level of classroom interaction.
2. Contributing to the development of intelligent thinking among sixth-grade scientific-stream students, which positively reflects on their ability to solve physical problems and make appropriate scientific decisions.
3. Improving academic achievement in physics by adopting teaching methods that consider individual differences while supporting group work at the same time.
4. Presenting a practical model applicable in secondary schools that can be used to develop methods of teaching other scientific subjects.

Third: Research Aim

The current research aims to identify the effectiveness of the Team Assisted Individualization Strategy in intelligent thinking in physics among sixth-grade scientific-stream students.

Fourth: Research Hypothesis

There is no statistically significant difference at the (0.05) level between the mean scores of the experimental group (Team Assisted Individualization Strategy) and the mean scores of the control group (conventional method) in intelligent thinking.

Fifth: Research Limits

1. **Human limits:** sixth-grade scientific-stream students.
2. **Spatial limits:** Al-Nasr Central Preparatory School, affiliated with the Directorate of Education of Al-Najaf Al-Ashraf.
3. **Temporal limits:** the first semester of the academic year 2025-2026.

Sixth: Definition of Terms

Effectiveness: It is a positive action that has an impact on the teaching and learning process. (Al-Nabhan, 2008: 35)^[12]

Team Assisted Individualization Strategy: Adopting a method for managing the team to achieve the lesson objectives as a result of the convergence of the ideas of individualized learning and cooperative learning. (Al-Rubaie and Mazen, 2018: 102)^[3]

The researcher operationally defines the Team Assisted Individualization Strategy as: a set of steps that combines self (individual) learning and cooperative (group) learning, beginning with diagnosis and the distribution of tasks according to individual differences among learners, along with a set of tests to achieve the desired outcomes in the classroom.

Intelligent Thinking: It is the process of developing the learner so that he is enabled to acquire experience and skill in a certain field in his daily life through the use of intelligent behavior and more flexible thinking. (Razuqi, 2019: 68)^[4]

The researcher operationally defines intelligent thinking as: a set of mental skills used by the learner, including comparison, imagination, analysis, problem solving, and decision making, which the learner performs during the study of physics; it is measured through the scores obtained by the learner on the intelligent-thinking test prepared by the researcher.

Chapter Two: Theoretical Framework and Previous Studies

Theoretical Framework

Team Assisted Individualization Strategy

This strategy was developed by Robert Slavin at Johns Hopkins University with Nancy Madden in (1985). It depends on mutual and effective motivation among learners through participation in cooperative work with other learners via teams (groups), in which the learner is primarily responsible for acquiring new skills and experiences among the team members within the group. (Istrani, 2017: 66)^[14]

Advantages of the Team Assisted Individualization Strategy:

1. Empowering the members of one team, increasing interaction among them, and developing useful relationships.
2. It achieves learning among the members of one team by listening to ideas through discussion, accepting constructive criticism, and helping one another in order to master the subject matter.
3. The Team Assisted Individualization Strategy works to form an effective and active team to ensure that each member of the team understands the material studied and to evaluate the rest of the members in the other groups. (Zamzam, 2010: 33)^[16]

Steps of the Strategy

1. **First diagnosis:** The teacher prepares a set of questions about the topic in order to diagnose each student and place him in the appropriate group so that he can learn

- what suits him from the subject matter.
2. Dividing students into small groups (teams), with each team consisting of (4-6) students, so that the groups are heterogeneous in terms of diagnostic levels.
 3. The teams are evaluated by distributing different tasks and units related to the lesson topic in the form of questions and activities presented individually according to a printed form given to each student in the team, in order to obtain cognitive conclusions for learning individually.
 4. **Second diagnosis:** Conducting diagnostic tests to ensure understanding and mastery of the material and the units assigned to them.
 5. **Exchange:** The groups (teams) are allowed to meet and cooperate with each other, exchange information, acquire experiences, and provide assistance so that all team members reach the required level of competence.
 6. Tests, monitoring scores, and providing appropriate reinforcement for them.

The Role of the Teacher in the Team Assisted Individualization Strategy

The roles performed by the teacher in this strategy are as follows:

1. The teacher identifies the learning objectives and carries out systematic planning before and after cooperation and planning.
2. Determining the members of the group (cooperative team) according to ages, experiences, time, and the nature of the tasks assigned to them.
3. Choosing the simplest methods for arranging the seating places of the members (team) so that they can sit in their places easily without wasting time, and organizing them at regular distances to avoid noise (overlapping voices).
4. The teacher gives each learner in his group (his own team) a role in providing cooperative assistance to weaker students or those with lower achievement.
5. The teacher observes, intervenes, and listens to learners' dialogues and opinions to ensure that they achieve the objectives.
6. Stimulating the learners' behaviors and feelings to motivate them regarding the importance of their work, while acting as their guide and facilitator.
7. The teacher evaluates the teams (groups) to determine the extent to which the objectives have been achieved through feedback. (Qura and Wajih, 2013: 173) ^[11]

The Role of the Student in the Team Assisted Individualization Strategy

The researcher summarizes the student's role in this strategy as follows:

1. Individual (self) learning through studying tasks individually and identifying appropriate questions and activities in order to organize them clearly so that he can make decisions.
2. Good (effective) communication with the rest of the team members through dialogue and the effective exchange of information and ideas.
3. Active and effective participation so that he discovers and learns skills and abilities that enable him to provide assistance to achieve the team's objectives.
4. Providing assistance, encouragement, and motivation when his team members face some difficulties and challenges, and offering advice to solve any problem.

5. Showing the spirit of cooperative work with his classmates in order to reach analyses and conclusions for different educational situations.
6. Showing concern and respect for the rest of the group members when there is variation among learners' abilities, including intelligent learners, average-intelligence learners, and providing assistance to those below that level.
7. Dividing responsibilities among the members of one group to achieve common objectives and increase productivity, enabling learners to make many important and decisive decisions and work effectively and independently while maintaining the spirit of cooperation and communication and increasing self-efficacy.

Intelligent Thinking

The current era is witnessing rapid scientific prosperity, and the need has increased to train the learner in various intelligent-thinking skills so that he will possess skills that enable him to keep pace with progress and help him generate diverse, new, and different solutions. These skills qualify him to delve into different depths of the topics raised when thinking about matters of his life through comparison, imagination, analysis, and linking continuous and complex stimuli in order to find appropriate solutions to many problems.

(Al-Huwaiti, 2018: 53)

Benefits of Intelligent Thinking

There are many benefits of intelligent thinking, including the following:

1. Intelligent thinking gives learners comprehensiveness in concepts, things, and topics.
2. It supports their creative thinking (learners) to reach knowledge, creativity, and discovery.
3. Learners' thinking becomes more active and effective (mental activation) for participation and work.
4. Moving away from the routine pattern, as the learner feels comfort, vitality, and enjoyment.
5. It helps the learner correct his misconceptions, which enhances his development, growth, and progress (knowledge economy).

(Al-Sabab, 2018: 133) ^[7]

Intelligent-Thinking Skills

After reviewing many previous studies, including the study of (Al-Zuhairi, 2021), the study of (Al-Saeedi, 2023) ^[8], the study of (Al-Taie, 2023) ^[9], and the study of (Al-Rikabi, 2024) ^[5], the current study arrived at the following set of skills:

Comparison Skill: It is one of the basic thinking skills that organizes information and develops knowledge in order to identify similarities and differences between two concepts or two things by examining the relationships between them and searching and investigating any points of difference or agreement to find what is new in one concept and missing in the other.

Imagination Skill: In this skill, the individual is liberated from his real and actual world so that he does not need data of a real and actual nature; rather, he relies on his imagination, forming mental images and innovative ideas that are not usually present.

Analysis Skill: It is the process of identifying characteristics and components in order to distinguish between things and

concepts, to analyze the characteristics and patterns of the relationship between them, and to identify how their components are linked.

Problem-Solving Skill: Finding a solution to a problem that faces any individual or group in any situation and hinders progress in any aspect of life.

Decision-Making Skill: Using the individual's mind to choose the best appropriate and available alternatives for a specific situation related to work, society, or life situations.

Previous Studies: A Study Addressing the Individualization Strategy:

Study of (Al-Rikabi, 2024) [5]: The study was conducted in Iraq, Dhi Qar Governorate, to identify the effectiveness of the Team Assisted Individualization Strategy in the achievement of fourth-grade scientific-stream female students in biology and their intelligent thinking. The quasi-experimental method with partial control was used for two equivalent groups (experimental and control). It was applied to a random sample consisting of (36) female preparatory-school students from Sada Al-Najah School for Girls in Dhi Qar Governorate. The results showed a clear superiority of the experimental group, which used the individualization strategy, in the achievement of fourth-grade scientific-stream female students in biology and their intelligent thinking.

A Study Addressing Intelligent Thinking

Study of (Al-Saeedi, 2023) [8]: The study was conducted in Iraq, Al-Qadisiyah Governorate, to identify the degree to which fifth-grade scientific-stream female students possess intelligent-thinking skills. The study relied on the experimental method and was applied to a random sample

consisting of (123) female students from Al-Firdaws Preparatory School for Girls in Al-Qadisiyah Governorate, to determine their possession of future-thinking skills consisting of (16) items distributed over four skills. The results showed the superiority of the experimental-group students over the control-group students on the intelligent-thinking scale.

Chapter Three: Research Procedures

1. The researcher used the experimental method and adopted the design of two equivalent groups with a post-test.
2. The population of the current research consisted of sixth-grade scientific-stream students in the city center for the academic year (2025-2026) at Al-Nasr Preparatory School for Boys.
3. The researcher selected the study sample randomly from two sections: Section (A), the experimental group, with (48) students, and Section (C), the control group, with (48) students, after excluding the repeating students, whose number was (12), with (7) from the experimental group and (5) from the control group.
4. The equivalence of the study population was established in terms of chronological age in months and intelligence (Carter and Kane test). The arithmetic mean and standard deviation were calculated for the two groups (experimental and control). Prior information, consisting of (25) multiple-choice items, was also calculated, as well as the intelligent-thinking test, consisting of (20) items distributed over five skills, as shown in Table (1).

Table 1:

Significance level (0.05)	t-value		Control (35) students (C)		Experimental (35) students (A)		Group Variables
	Tabulated	Calculated	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	
Not significant	2	0.17	6.16	176	7.45	186	Chronological age
Not significant		0.23	3.22	17.6	3.39	17.6	Intelligence test (Carter and Kane test)
Not significant		0.34	2.67	11.3	2.80	14.2	Prior information

1. The researcher sought to control the extraneous variables, prevent any interruption throughout the duration of the experiment, and take into account the individual differences of the study population. The researcher was also careful to maintain the same duration of the experiment for both groups.
2. The researcher determined the subject matter for the two groups for the first semester from the physics textbook, consisting of the first four chapters.
3. The behavioral objectives were formulated according to Bloom's taxonomy in the cognitive domain with (6 levels). They were presented to specialists in the educational field, and an agreement percentage of (85%) of the opinions was obtained, so that the final form consisted of (177) behavioral objectives. A set of teaching plans was also organized, with (16) plans for the experimental group (individualization strategy) and (16) plans for the control group, after they were presented to a group of specialists.

Research Tool

The researcher prepared the test tool (intelligent thinking) after reviewing many previous studies, including the study of (Al-Zuhairi, 2021), the study of (Al-Saeedi, 2023) [8], the study of (Al-Taie, 2023) [9], and the study of (Al-Rikabi, 2024) [5]. It consisted of five skills: comparison skill, imagination skill, analysis skill, problem-solving skill, and decision-making skill. It contained (20) items, with four items for each skill, in multiple-choice format. The highest score for each skill of the intelligent-thinking test was (4), and the lowest score was (0). Thus, the highest score for the whole test was (20), and the lowest score was (0).

Test Validity

1. The researcher used face validity after presenting the test items to a group of experts and physics teachers, and a percentage of (86%) was adopted.
2. The researcher piloted the test on a sample consisting of (125) students from Ibn Sina Intermediate School for Boys. The average time for answering the test was (34)

minutes.

- The discrimination coefficient ranged between (8.26-2.20), which indicates that the test items are acceptable.
- The item difficulty coefficient was calculated and ranged between (0.60-0.32), indicating that the items are acceptable.

Test Reliability

The reliability of the test was calculated using the Kuder-Richardson formula for multiple-choice test items. The reliability coefficient reached (87%), which indicates that the reliability coefficient is high.

Statistical Methods

The researcher relied on the Statistical Package for the Social Sciences (SPSS), as required by the research.

Chapter Four: Presentation and Interpretation of Results

Presentation of Results: To verify the null hypothesis, which states that there is no statistically significant difference at the (0.05) level between the mean scores of the students of the experimental group (Team Assisted Individualization Strategy) and the mean scores of the control group (conventional method) in intelligent thinking, the researcher extracted the arithmetic mean and standard deviation for the students of the two research groups. The calculated t-value was (4.45), which is greater than the tabulated value (2) at the (0.05) level of significance and with (52) degrees of freedom. This indicates the existence of a clear and statistically significant difference in favor of the experimental group (Team Assisted Individualization Strategy) over the control group (conventional method), as shown in Table (2):

Table 2:

Statistical significance at (0.05)	t-value		Standard deviation	Arithmetic mean	No. of students	Groups
	Tabulated	Calculated				
Significant	2	4.45	12.4	122.9	48	Experimental
			18.8	115.4	48	Control

Effect Size: The effect size reached (0.86). The effect is considered large when it ranges from (0.50 and above), as indicated by (Al-Yasiri *et al.*, 2011: 212). This indicates that the effect size of the Team Assisted Individualization Strategy on intelligent thinking is large. (Al-Yasiri *et al.*, 2011: 212).

Interpretation of Results

- The Team Assisted Individualization Strategy enabled students who had a high level within the team to provide assistance to students with a weak level in understanding the study topics effectively, which increased the activation of their intelligent thinking.
- The Team Assisted Individualization Strategy helped create a classroom environment for free expression, asking questions, and encouraging participation, which reduces the factor of introversion and strengthens students' behavior toward active participation.
- Its teaching also included linking any prior information with new information, conducting comparisons, imaginations, analyses, problem solving, and making the resulting decisions, which develops intelligent-thinking skills.

Conclusions: The high keenness of sixth-grade scientific-stream students in physics led to increasing the effectiveness of the Team Assisted Individualization Strategy in intelligent thinking.

Recommendations

In the current study, the researcher recommends the following:

- The necessity of applying it by male and female physics teachers in the preparatory stage.
- Applying it in other subjects and topics.
- Preparing a study program and a training course for teachers on how to apply the steps of the strategy.

Proposals

- Using the Team Assisted Individualization Strategy in various educational stages.

- The effectiveness of this strategy in learning and the desire to enhance physical concepts among second-grade intermediate students.
- Its effectiveness when used with various other variables.

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