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The Effect of Teaching With The Differentiated Education Strategy On The Achievement of Physics And The Development Of Reflective Thinking Among Third Grade Intermediate Students

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Abstract

The study aimed to learn the impact of teaching with differentiated education strategy in physics acquisition and meditative thinking development among third-grade middle students. The researcher selected the Mediocre Boys in Baghdad as an intentional sample of the experiment, and the research sample reached (58) Students in the third grade average (29) students for each of the two research groups rewarded the researcher between the two research groups in time-age variables with months, intelligence, previous information and a measure of contemplative thinking, The researcher prepared a multi-choice collection test and applied it to the two research groups and adopted a special measure of meditative thinking, after ascertaining its sincerity and consistency, the researcher used the T-test (T-test) to learn the results, and found that the differentiated education strategy had an effective impact on physics attainment and meditative thinking development for the experimental group compared with the control group. The researcher suggested a number of recommendations and proposals.

Keywords: *Differentiated Education Strategy, Teaching , The Achievement , Reflective Thinking , Physics.*

Introduction

For several decades, our schools have relied on a particular pattern of teaching based on conservation, indoctrination and dumping. The reason for this is due to traditional schools' perception of science in general and to the curriculum in particular, From many of us, science is a set of laws and theories. and the school curriculum is only the subjects prescribed in the textbook, This narrow view of science and curriculum has contributed significantly to the low learning methods of many of our students. Learning is limited to educational achievement at the lowest levels. We also need to disseminate modern teaching strategies and methods by integrating teaching thinking skills.

Through the scholar's experience in teaching for many years, he noted the extent of the struggles of students in understanding the subjects of study as a result of their use of traditional teaching methods based on indoctrination without taking into account the ability of students to learn creativity and come up with modern ideas. Therefore, the researcher has adopted an educational strategy capable of activating the actual and intellectual abilities of students. *Does the differentiated education strategy affect physics attainment and meditative thinking development among third-grade middle students?*

In most countries, the main concern for those concerned with education has been the comprehensive and meaningful development of all aspects of the educational process. in terms of curriculum development, management and teaching methods consistent with modern-day requirements, This means paying attention to all branches of knowledge. The need has become urgent and urgent for education aimed at developing the student and preparing him for scientific life by providing him with knowledge and skills commensurate with his scientific competence, abilities, preparations, trends and tendencies (Darwazeh, 2000:12).

Basic scientific subjects taught in high schools include physics, which serves the general objectives of teaching science, such as developing thinking in general and reflective thinking in particular. Physics helps students understand natural and cosmic phenomena and study scientific laws.

Educational achievement is the fundamental criterion by which a learner's progress in his or her studies is measured and is the basis for educational decision-making.

The way to improve the level of students in the learning process is to develop their abilities to draw appropriate strategies for learning, how to activate their past knowledge, employ them in current learning situations, and focus their attention on points and salient elements of content, practise critical evaluation methods for ideas and meanings, and monitor the intellectual and linguistic activities used to verify understanding and strategies that help to stimulate students' mental abilities. And it has been noticed that Attention has increased to the subject of thinking and its development in the educational community in various Arab and Muslim countries in recent times, so that it has become one of the main objectives of the various curricula, in view of the importance of this in improving students' level of learning.(Ryan, 2000:102)

Like other different stereotypes of thinking, meditative thinking is a mental activity that the teacher seeks to motivate learners to achieve certain goals wholly aimed at taking advantage of his/her characteristics. Some educators consider that the practice of meditative thinking makes the individual possess a number of characteristics that appear in his/her subsequent behaviour. (Razuqi and Abdul Karim, 2013:195)

The importance of research can be determined as follows: This research is consistent with modern educational trends that seek to experiment with modern methods and strategies in the teaching of science; The importance of choosing physics material is the subject of experimentation because of the importance of this scientific material in interpreting many natural phenomena. And the importance of developing meditative thinking that helps students achieve one educational outcomes with different procedures, processes and tools and takes into account the learner's characteristics and past experience and imposes on him the enhancement of his efficiency and abilities. The impact of teaching with differentiated education strategy on physics achievement and the development of meditative thinking among third-grade middle students.

There are no statistically significant differences at (0.05) level between the average attainment grades in physics in experimental group students studying using a

differentiated education strategy and the average attainment grades in physics in control group students studying using the usual method. There is no statistically significant difference at 0.05 between the average grades of experimental group students studying physics using a differentiated learning strategy and the average grades of control group students studying physics using the usual method of tribal and postgraduate reflection.

Theoretical Framework

Differentiated Education Strategy

Differentiated education on constructive theory, whose philosophy is based on research by psychologist Jean Piaget in the growth and development of knowledge in man. And It has been noted by (Tomlinson, 2001) that differentiated education is based largely on the studies of intelligence conducted by a group of educators and psychologists, which concluded a range of important results, including that intelligence is multifaceted and not something And we think, we learn, we create in different ways and the development of our preparations is influenced by the compatibility of what we learn, Among our own intelligence and the other important result of intelligence is that it is flexible, not in a position of stability and stability.(Tonlinson , 2001: p. 3)

(Kotak et al., 2008,) stated that Bloom's thinking levels (Bloom) promoted the idea of differentiated education or the diversification of teaching to align with the levels of cognitive learners by setting up six levels of knowledge that graded from simple to more complex processes, from studies that reinforced the concept of differentiated education, brain studies and knowledge of how the brain works, where Gardner was able to (Gardner) defines a set of intelligences for mankind that exist in all individuals, but to an uneven degree. The fact is that the theory of intelligence is perfectly in line with the concept of differentiated education. The teacher tries to present the same subject to the pupils in more than one way so that these methods fit into the different intelligence of the pupils (Kojak et al., 2008: 32-33).

Steps of differentiated education

1. Pre- calendar: -
    a. Identifying past knowledge.
    b. Identifying abilities and talents.
    c. Identify personal tendencies and characteristics.
    d. Determine the appropriate learning method.
    e. Identification of cultural backgrounds.
2. Classify students in groups in the light of the results of the tribal calendar according to the members of each group of common denominators.
3. Set learning goals.
4. Selection of teaching materials, activities, learning sources and teaching tools.
5. Organize the educational environment in a way that responds to all groups.
6. Choosing appropriate teaching strategies for students or groups.

7. Determine the activities to which each group is charged.
8. Conduct a post-implementation calendar process to measure learning outputs.(Attiya, 2009: 328-329)

***Studies On Differentiated Education*: -**

The aim of the study was to learn (use the differentiated education strategy and its impact on the athlete's thinking in the fifth grade primary pupils) The research sample consisted of 35 students divided into two experimental groups. The two researchers adopted a partial adjustment design for two equal groups with a dimensional test. The experiment was applied in the second semester of the academic year. (2015-2016) Two groups were rewarded with research in variables (intelligence, time age by months, previous math achievement, previous information test, parents' academic achievement) The two researchers used a T-test for two independent samples to process data, the results showed a statistically significant difference at an indicative level (0.05) for the benefit of the experimental group in the mathematical thinking test as a whole and in the fields of mathematical thinking (Mohammed and Dari, 2016).

The study aimed to learn (the impact of Ronpsen's strategy and reciprocal teaching on physics achievement and the development of critical thinking among middle first graders). The research sample consisted of 91 students (31) representing the pilot group studied in accordance with the Robins Strategy and 30 students representing the second experimental group studied in accordance with the Exchange Teaching Strategy and 30 students representing the control group studied in the usual manner. The groups were rewarded in variables (time age months, intelligence, previous achievement, critical thinking). The researcher built an attainment test where he verified the veracity and consistency as well as a critical thinking test that applied the experiment in the first and second semester of the academic year (2011-2012).

Used statistical means (ANOVA, Cronbach-Alpha coefficient), Pearson's coefficient of association and equation (Kyoder-Richardison-20) The results outperformed the two experimental groups over the control group in the attainment and critical thinking variables and the researcher suggested a number of proposals and recommendations. (Hassan, 2012).

The study aimed to learn ((the effect of the use of the Altshuller model in students' intermediate second acquisition of physical concepts and their meditative thinking)). The research sample was made up of 60 students from the Middle Gulf students for boys. (30) students for the pilot group and (30) students for the control group and the two groups were rewarded with variables (Previous collection, previous information, IQ test and meditative thinking test) In the second semester of the academic year, the researcher built a physical conceptualization test and meditative thinking test and then verified the veracity and consistency of the experiment. (2017-2018), statistical methods including T-test and equivalent The results outweighed the pilot group's control in testing the acquisition of

physical concepts and meditative thinking. The researcher suggested a number of proposals and recommendations. (Dakhil, 2018)

Result and Discussion

Demo patch: - Experimental Design

When a researcher chooses the type of design to accomplish his research, he must be aware of the adequacy of his chosen experimental design (Abdul Rahman Waznanha, 2007:484). The researcher selected the experimental partial adjustment design consisting of two sets, one experimental and the other control (Figure 1). This type of design was selected because it is suitable for the nature and conditions of the current research as well as the availability of accuracy in the results (Dawod &anor, 1990:276)

Figure (1) The experimental design adopted in the research

Dependant variable	Independent variable	Parity	Group
Achivements Reflective thinking	Differentiated education strategy The.usual method	• Chronological age in months • Reflective thinking scale • Previous achievement in physic • intelligence	Experimental differentiated education strategy Control in the usual method

Research community

The research community is a middle third grader in the middle and high day schools of the General Directorate of Baghdad Education/First Pavement for the academic year (2019-2020).

Research Sample

The researcher selected the Medium Wreka Boys as the intended sample for the application of the experiment and for the following reasons: -

1. The school administration is ready to cooperate with the researcher being a teacher on the school's staff.
2. Provide the necessary means and requirements to carry out the experiment.

The researcher selected two of the four divisions at random to represent the current research sample and selected a division c Represents the pilot group examined in a differentiated education strategy and division (a) The control group shall be considered

in the usual manner by 33 students in a division (c) and (32) students in Division (a) after the exclusion of the 4 students in the Division (c) and (3) students in Division (a) the number of final sample personnel (58) students and reality (29) students per division.

Research Group Equivalence

Chronological age in months

The researcher obtained the date of birth of each student in the research sample from the records of the teacher's administration and calculating the chronological age in months for each student until the start of the experiment on 13/10/2019 using the (T-test) test for two independent samples that did not show statistically significant differences between the members of the research sample as shown in Table (1).

Table (1) shows the arithmetic mean, standard deviation, calculated and tabular T-value of the chronological age variable in months.

Statistical significance (0.05)	T. Value		Standard deviation	SMA	N.O	Group
	Tabular	Calculated				
Non significant on level 0.05	2.00	1.473	5.405	175.31	29	Experimental Differentiated Education Strategy
			5.086	177.34	29	Control in the usual method

Previous academic achievement

Science scores for the second intermediate grade for the academic year (2018-2019) were obtained from the records of the school administration for the members of the research sample and using the T-test for two independent samples, no statistically significant differences appeared between the members of the research sample as in Table (2).

Table (2) shows the arithmetic mean, standard deviation, calculated and tabular T value for previous academic achievement

Statistical significance (0.05)	T. Value		Standard deviation	SMA	N.O	Group
	Tabular	Calculated				
Non significant on level 0.05	2.00	0.219	14.517	67.31	29	Experimental Differentiated Education Strategy
			13.897	68.13	29	Control in the usual method

Intelligence

The researcher used the Raven test for sequential matrices codified on the Iraqi environment prepared by psychologists as a good test to examine the general intelligence of its benefits in knowledge and the individual's susceptibility to clear observation, understanding, development, learning and balancing ties and relationships between things with each other and to think based on analysis and experience (Aldablagh, others, 1983:31). The researcher conducted the IQ test on both sets of experiments simultaneously and calculated the calculation of the calculation average and standard deviation of the scores of each of the two groups and by applying the T-test equation for two independent and equal samples, the results were obtained as in the following table: Table (3) shows average arithmetic, standard deviation and calculated and tabular T value of intelligence

Table (3) shows average arithmetic, standard deviation and calculated and tabular T value of intelligence

Statistical significance (0.05)	T value		Standard deviation	SMA	N.O	Group
	Tabular	Calculated				
Non significant on level 0.05	2.00	0.712	4.956	38.2	29	Experimental Differentiated Education Strategy
			5.715	36.51	29	Control in the usual method

Reflective Thinking Scale

The researcher adopted a scale (Dakhil, 2018) a pre-scale for reflective thinking that the researcher applied to third grade students on 14/10/2019 before starting the actual teaching, in order to measure what the students of the research sample possess and using the T-test for two independent samples, it was found that there is no statistically

significant difference at the level of (0.05), which indicates the equivalence of two groups in this variable as shown in Table (4).

Table (4) shows the arithmetic mean, standard deviation, T-value, and tabular variable pre (reflective thinking)

Statistical significance (0.05)	T. Value		Standard deviation	SMA	N.o	Group
	Tabular	Calculated				
Non significant on level 0.05	2.00	0.976	2.552	10.03	29	Experimental Differentiated Education Strategy
			2.604	9,37	29	Control in the usual method

Adjusting extraneous variables

1. The researcher was keen to set some variables to believe that they affect the safety of the trial procedures
2. The researcher taught the experimental group and the control group himself.
3. The course was one for the experimental group and control group
4. The number of weekly quotas (4) per week in physics was two portions per group
5. The duration of teaching of the two research groups was uniform and lasted (8) weeks.
6. The researcher applied the experiment in one school
7. Maturity did not affect the results of the experiment because the duration of the experiment is short and specific.

Research requirements

1. Determination of the scientific material: The researcher identified the study subject that is studied during the experiment in Chapter I (static electrical), Chapter II (magnetic), Chapter III (electric power), Chapter IV (battery and electric driving force) and Chapter V (power and electrical power).from Physics Book and Third Grade Intermediate for the Academic Year (2019-2020).
2. Formulation of behavioral purposes: 40 behavioral purposes in the field of knowledge and levels (remembrance, assimilation, application and analysis) of Bloom's classification of the field of knowledge were formulated and presented to a group of specialists in physics teaching, measurement and evaluation methods for the purpose of judging the accuracy, formulation and clarity of behavioral purposes (Annex 1).

Preparation of teaching plans

Planning is defined as "a scientific method to which human beings have recourse to deal with something or a problem that they can face in their lifetime, whether it be a real or future problem aimed at ensuring that they succeed in confronting it" (Exclusive, 2000:219).

The teaching plan has been prepared according to the strategy of differentiated education for the experimental group and according to the usual method of the control group. A model of each type of plan has been presented to a number of specialists in the teaching methods of physics (annex 1) to ascertain its validity and modify what they deem appropriate.

The tow research tools

Test achievement: One of the research requirements is to build an attainment test where the researcher has prepared an achievement test that is appropriate to the content of the subject and based on Bloom's levels of knowledge (remembrance, assimilation, application and analysis), where (40) multiple selection paragraph has been identified in the light of the content of the subject and behavioural purposes after being presented to a number of specialists, experts and methods of physics teaching (Annex 1).

Test sincerity

The veracity of the test is defined as: "The extent to which the test performs the purpose it must achieve"(Abu Lubda, 1979:234)In order to be honest and verified for the purposes for which it was designed, the following have been confirmed:

Face Validity

The test is ostensibly honest if its title and appearance indicates that it measures the trait for which it was developed (Anani, 2002:255). The researcher presented the test to a group of experts and specialists in physics teaching methods to judge the correctness of the test paragraphs in terms of clarity of their paragraphs and based on the opinions of experts and arbitrators.

Content Validity

(Stunly 1972) considers that the test increases the sincerity of its content whenever it represents the subjects of the course (Stanly, 1972:102). The researcher presented the test to a group of experts and arbitrators supplement (1) and based on their opinions and observations, the validity of the test was agreed upon by arbitrators and specialists on more than 80%.

Application of the test to the first reconnaissance sample

To ascertain the clarity of the paragraphs, the clarity of the test instructions and the time taken to answer the test, and then modify the test paragraphs in the light of the exploratory experience (Ahsan and Adnan, 2008:38). The researcher applied the test to a survey sample of 35 students from Mediterranean Abd al-Karim Kassem. After calculating the duration of the test, the time required for the test was 45 minutes.

Application of the test to the second reconnaissance sample

For the purpose of statistical analysis of the test paragraphs and determination of the level of difficulty and strength characterizing each paragraph and the effectiveness of its alternatives and the stabilization factor of the test, the researcher applied the test to a second survey sample of 100 students of the basil average soldier after the researcher ascertained their completion of the substance.

Statistical Analysis of Test Paragraphs

Analysis of test paragraphs is a way to improve its quality by knowing the strength of difficulty Paragraphs and their ability to discriminate and exclude invalid paragraphs (Scannell, 1975: p.211)

Difficulty coefficient of paragraphs

(It is the proportion of those who answered the paragraph or question the wrong answer to the total number of students) (Murad, 2002:211) The level of difficulty of the test paragraphs was calculated after the researcher calculated the factor of difficulty of each test paragraph found to be between (39%) and (67%). Blum considers that the test paragraphs are acceptable if the rate of difficulty is between (20%) and (80%) (Bloom, 1971:66).

Paragraph differentiation coefficient

The researcher calculated the paragraph differentiation coefficient where he found a value ranging from 0.22 to 0.56. This shows that the test paragraph differentiation coefficient is good.

Effectiveness of false alternatives:

The wrong alternative is effective when the students who have chosen it in the lower group more than the number who have chosen the same alternative from the upper group (Al-Baghdadi, 1981:229). A good and effective financier is that alternative with a significant negative gravity factor (Al-Nabhan, 2004:203). After applying the equation of the effectiveness of erroneous alternatives to test paragraphs, all alternatives were found to be adequately effective, so the wrong alternatives were kept unchanged.

Test stability

The test is intended to give the same results if it is repeated in the measurement of the same thing successively, and in similar circumstances (libada, 1999:408). The researcher chose the halfway to find the test stability, as it avoids the defects of other methods used to measure the test stability as it is faster and less effortless, The persistence coefficient was calculated using the Pearson correlation coefficient to find an correlation coefficient between individual vertebrae and displacement grades. It reaches 0.87 and is corrected using the Spearman Brown equation and reaches 0.93, a good correlation coefficient. (Duran, 1985:133)

Meditative Thinking Measure:

Current research requires the measurement of the meditative thinking of the students of the research sample and to achieve this goal The literature and metrics prior to meditative thinking, The neighbourhood of the researcher adopted a scale (intruder, 2018) for secondary study, where the scale includes a paragraph (20) for the adoption of the measurement followed the following steps

Scale sincerity:

Defined as "the extent to which the test performs the purpose it must achieve" (Abu Lubda, 1979:234)

In order to ascertain the prima facie veracity of the scale, the paragraphs of the measure of reflection were presented to a group of experts and specialists in education, psychology, measurement and evaluation (appendix 1) for their opinions and verification of the truthfulness of its content, and in the light of their observation, some paragraphs were amended.

The first exploratory application of the scale:

To reveal the clarity of the instructions in the measured paragraphs and the time of the response, the measure was applied to a random sample of 30 students from the Abd al-Karim Kassem Boys' Middle Students of the General Directorate of Baghdad Education/First Pavement, where the total average time at all paragraphs was calculated at 50 minutes.

Second exploratory application:

The researcher applied the scale to a second survey sample of average third-grade students (100 students) randomly selected from the average (basil soldier) for boys of the Directorate General of Education/First Pavement to find a constant scale.

Scale Stability:

"means that an individual maintains almost the same position for his or her group, when his or her measurement is repeated, and remains about the same to the extent that

it is a small value of the standard measurement error, and with a high stabilization factor (Abu Jadu, 2003:402).

The constant of the scale for this research was calculated by the alfa krunbakh coefficient, as the average internal correlation coefficient is the best estimate of the average persistence coefficient, and this can be achieved in a number of ways, including the alfa krunbakh equation. Where the stability reached (84%) and see (Duran, 1985) The test is consistent if it is consistent (80%) or more (Duran, 1985:133).

Implementation of the experiment:

During its implementation, the researcher followed the following experience: -

1. The researcher began conducting the experiment on 13/10/2019 with four classes per week at a rate of two classes per group and the experiment continued until 15/12/2019.
2. The researcher taught students of both groups the subject of physics based on his own teaching plans, according to the strategy of differentiated education for the experimental group and according to the usual method for the control group.
3. The achievement test was applied to students of both groups simultaneously on 19/12/2019
4. The measure of reflection was applied to students of both groups simultaneously on 17/12/2019.

Statistical means:

1. T-test of two independent and equal samples used in the parity of the research and testing groups indicates the differences between the average research sample scores in the collectible test and the final results of the meditative thinking scale (Al Bayati, Zakaria, 1977:260).
2. Difficulty factor: - To calculate the difficulty factor of the achievement test paragraphs. (Al-Zubai, 1981:77)
3. Differentiation coefficient: to calculate the identification coefficient of the vertebrae of the collectible test. (Al-Dahir et al., 1999: 79-80)
4. Equating the effectiveness of erroneous alternatives: To calculate the effectiveness of alternatives for collective testing. (Al-Dahir et al., 1999:91)
5. Pearson's correlation coefficient for calculating the quantitative test fastness coefficient in a halfway fragmentation method (Al Bayati, 1977:183).
6. Sperman Brown coefficient: to correct the coefficient of stability of the collectible test.(Oudeh, 1999:363)
7. Facronbach coefficient: used to calculate the constant of the meditative mindset (Oudeh, 1998:355).

Search results and interpretation

For the purpose of validating the first hypothesis of research that:

There is no statistically significant difference at the level (0.05) between the average attainment grades in physics in experimental group students studying using differentiated education strategy and the average attainment grades in physics in control group students studying the same subject using the usual method, where the researcher used the T test (T-test) with two independent samples to test the difference between the average achievement scores of the experimental and control groups showed the statistical results of the test as shown in Table No. 5

Table (5) shows the average arithmetic, standard deviation and the T value calculated for the grades obtained by the students of the experimental group and the students of the control group in the attainment test and the tabular value (theory).

Statistical significance (0.05)	T-value		Standard deviation	SMA	N.O of sample personnel	Group
	Tabular t.crt	Calculated t.obs				
Statistically significant level (0.05)	2.00	2.988	15.117	68.17	29	Experimintal
			12.227	57.41	29	Control

The above table shows:

The students of the experimental group outperformed the students of the control group, as the average attainment of students of the experimental group increased the average attainment of students of the control group by the D teams statistically (0.05) and for the benefit of the experimental group, thus rejecting the first research hypothesis. This shows that the use of differentiated education strategy has an effective effect in increasing the attainment of students of the experimental group.

For the purpose of validating the research's T hypothesis that: There is no statistically significant difference at 0.05 between the average grades of experimental group students studying physics using differentiated education strategy and the average grades of control group students studying physics using the usual method of meditative thinking scale s data, the researcher collected his data by applying a meditative thought scale to the experimental and control groups where the researcher used T-test for two independent samples. To identify the difference between the two averages of the experimental and control groups in the meditative thinking scale as shown in table 6

Table 6: Computational average, standard deviation, calculated T value of grades obtained by pilot group students and control group students in the dimensional reflection scale and tabular value (theory)

Statistical significance	T value		Degree of freedom	Standard deviation	SMA	N.O of sample personnel	Group
	Tabular t.crt	Calculated t.obs					
Significant onlevel0.) (05	2.00	2.76	56	2.5	11.48	**29**	Experimintal
				2.26	9.82	29	Control

Table No. (6) shows that the freely calculated T value (56) is equal to (2.76) and is greater than the tabular T value at (0.05) level. Therefore, the difference between the experimental and control groups is statistically significant and in favour of the experimental group and thus rejects the second zero hypothesis.

The results of this research can be attributed to the following reasons:

1. Teaching using a differentiated education strategy has provided a good learning environment for all students in the experimental group because it is based on the diversification of methods, procedures and activity that enabled students to achieve the desired goals and the way that suits them.
2. Teaching using a differentiated education strategy takes into account the learner's characteristics, past experiences, talents and tendencies and thus aims to enhance his efficiency and abilities to achieve the desired results.
3. Learning using a differentiated education strategy has made the student the focus of the educational process. The student is no longer a teleprompter of information. He has found himself thinking and reflecting on his thoughts as he mentally expresses it, helping him to understand better and increase his achievement, which develops his meditative thinking skills.
4. This strategy helped to develop new ideas and students' keenness towards modern teaching, which contributed to the development of their reflective thinking.

Conclusion

In conclusion, the implementation of a differentiated education strategy has proven to be effective in elevating the overall academic performance of the pilot group students in comparison to their counterparts in the control group. The topics explored in this research demonstrated a notable increase in achievement among students who experienced the differentiated approach. Furthermore, the utilization of differentiated education, coupled with its diverse set of activities, emerged as a catalyst for fostering a deeper understanding of scientific concepts among students. This enhanced comprehension subsequently contributed to heightened reflective thinking skills. The

variety of teaching methods embedded in the differentiated approach played a pivotal role in nurturing the students' scientific abilities. It is important to note that the adoption of a differentiated teaching approach demands a heightened level of effort, skill, and cognitive engagement from students when compared to traditional learning methods. This underscores the significance of recognizing the increased demand on students' part in order to reap the full benefits of this educational strategy. In essence, the findings of this study underscore the potential of differentiated education in not only enhancing academic achievement but also in cultivating critical thinking skills among students.

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