TechHub Journal Vol. 7, pp.183-198 (2024)
ISSN: 2810-280(
www.techhubresearch.com

The effect of Dorman's strategy on the clever thinking of first-year intermediate students in chemistry

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Abstract. The research was distinguished by demonstrating the impact of the Distinguished Education Strategy (Dorman Strategy) and its impact on the clever thinking of first-year intermediate students in chemistry for the academic year (2023-2024). The research sample consisted of students from Future Leaders Secondary School for Outstanding Students, which It is affiliated with the General Directorate of Education of Baghdad, Al-Karkh III, and the two research groups were equal in age. Time, intelligence, and previous grade in science. This sample consisted of (56) students, (28) students for each grade, and the intelligent thinking scale prepared by (Bakhati, 2023) was relied upon, which consisted of 14 fields, and each field had four items. The results were discussed and presented. Suggestions and recommendations by the researcher.

Keywords. Dorman, students, chemistry

the study Problem

The investigator noticed during his educational career, especially in recent years, that there is a clear tendency on the part of students to use social media in teaching on the one hand, and on the other hand, their great desire to develop the way they study, especially scientific subjects such as chemistry, especially after changing the curricula and separating the science subject into three. The subjects are (Chemistry, Biology, and Physics) in this school year for the first intermediate grade, as there are many strategies that depend in their application on methods that rely on the computer and its programs, which affects their clever thinking and thus distinguishes them from their fellow students in the rest of the subjects. Therefore, it requires the researcher to search for a strategy that meets the needs of students in this way to be able to harmonize their way of thinking and enable them to use these tools so that they can solve the problems they face with clever and quick thinking that is compatible with the rapid pace of escalating cognitive and educational development, especially after the traditionalism that has affected the teaching processes in educational institutions. In large part, after conducting a questionnaire that the researcher conducted for a sample of 20 teachers, he found that 95% of them had no knowledge of this type of strategy. Therefore, the researcher chose Dorman's strategy and its effects on the clever thinking of first-year intermediate students. The study problem can be centered on one question: What is the effect of Dorman's strategy on the clever thinking of The first stage students in chemistry?

Research importance:

The distinguished education strategy is like hacking the brain, that is, entering the entire brain through various tools and an accelerated learning system inside the classroom. Each system contains three screens that are controlled by licensed software that manages these three screens .to ensure that the learners' energies are preserved and their information is preserved

This strategy originated and was invented by B.jDohrmann, one of the leaders of training and education

For more than twenty years of the Distinguished Education Project, accompanied by a specialized team, the Distinguished Education Strategy requires equipped classrooms with material and non-material equipment and materials. It also needs training tools and teachers who are experts in developing students and preparing them in an active and lively manner so that they manage their learning and proceed with it according to their interests and speed, with continued teacher management. And its follow-up (Al-Tamimi: 278, 2024). The idea of diversifying teaching began to take its place in the educational policies of different countries since 1989. This type of teaching was emphasized by a number of international conferences, the first of which was the Charter of the Rights of the Child in 1989, followed by the World Conference on Education, which was held in Jomitien, then the Dakar Conference in 2000, as they all recommended With education for excellence and excellence for all, the implications of the recommendations of these conferences appeared directly on the educational process, whether in terms of educational content or in terms of teaching methods. The recommendations of these conferences also focused on taking into account the differences between learners and that students study with different methods and strategies, and that it is It is necessary to diversify curricula and teaching strategies so that all students are able to receive an education that suits their characteristics, and for each of them to achieve the maximum degree of success within Shedding light on outstanding teaching (Dorman's strategy) by Carroll, who is considered one of the most prominent experts in this field, helped to formulate the term "distinguished teaching." She mentioned in her books on many sites that teachers may actually use distinguished teaching, but they may not be aware of that and the extent of its impact. Strategy in students' clever thinking. Therefore, she laid the foundations and principles for excellent teaching, citing vivid examples from male and female teachers throughout the United States in her books. According to what was mentioned on her personal website, her books have been translated into twelve languages. One of these languages was Arabic. Tomlinson is still working with teachers who aim to develop distinguished teaching in order to respond to the needs of students in heterogeneous classes, in various parts of the United States and abroad as well. Some studies, such as the study (Al-Alimat, 2022), have shown the effectiveness of distinguished teaching in creative thinking in addition to To study distinguished teaching skills, as in the study (Shuqairat, 2023), and the importance of the current research can be summarized in the following points:the limits of their potential and abilities. (Scott, P251 (1998).

1. It is considered a pioneering study in chemistry for the first intermediate stage, to the best of the investigator's knowledge.
2. The research is consistent with cognitive development and new methods in education.
3. The research is a new type of e-learning that has an interactive effect on students.
4. The research came to solve the problem of monotony in education and classics in terms of presenting the strategies used
5. The research came to solve the problem of monotony in education and classics in terms of presenting the strategies used.

Research objective: This research aims to:

Knowing the effect of Dorman's strategy on the clever thinking of first-year intermediate chemistry students.

Research hypothesis:

To verify the goal of the research, the researcher formulated the following null hypothesis:

- There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who study chemistry according to Dorman's strategy and the average scores of the control group students who will study the same subject in the other way on the clever thinking scale for chemistry..

Research limitations: Here what is included in the research is specified :

1. Humanity: first-year middle school students.
2. Location: Future Leaders High School for Outstanding Students at All middle schools in the General Directorate of Education of Baghdad, Al-Karkh III.
3. Research time: The time allocated for teaching students for a full period (2023-2024) AD.
4. Methodology: All chapters of the Chemistry book for the first intermediate grade, prescribed by the Iraqi Ministry of Education, written by Prof. Dr. Ammar Hani and others, 6th edition of the year (2023), approved for teaching for the academic year (2023-2024).

Definition of terms: Define it:

Effect:1- (Amer, 2006) that:

"Every negative or positive change that affects a project as a result of any development activity." (Amer, 2006: 9)

Operational definition: It is the change expected to occur among first-year intermediate students in terms of clever thinking in chemistry.

Dohrmann Strategy: Define it:

(Al-Tamimi, 2024) that: "Distinguished Education is one way of interaction between the student and the teacher multiple approaches that Paying attention to all students' needs within the classroom to unleash the highest possible Students' skills and tendencies." . (Al-Tamimi, 2023: 282).

Operational definition: It is technological education with multiple effects, as it includes three screens with variable width in terms of content and presentation style, through which chemistry is presented to first-year intermediate students.

Clever thinking: Define it:

Markman (2012), "The individual's ability to solve new problems using his existing knowledge is a skill that can be developed." (Markman, 2012, 272)

Procedural thinking: It is the student's ability to find smart and quick solutions to problems through Dorman's three-screen strategy (distinguished education).

Theoretical background:

Distinguished Education Strategy: (Dohrmann Strategy)

Learners tend to show their inclinations to learn, either through right-brain or side-brain modes, with many whole-brain learners. It is known that finding materials that occupy the entire brain requires understanding. The brain works completely towards any information, so the teacher is expected to learn to use both parts of his brain and make the appropriate and necessary effort for that. The brain in this type of practice requires experience and examination, and learners who know that they are learning in a certain aspect of the brain more than others are generally better than those who do not know that they have readiness. Which necessarily leads to the level of learning being greater, knowing that students practice learning without knowing the geography of the brain and its destination, and it requires skills

and strategies in order to achieve this. The failure of technology to raise the efficiency of learners is due in large part to the fact that technology's inputs and outputs in the classroom have a specific composition. Unable to deal with both sides of the brain effectively, especially since long-term education is devoted to serving and meeting the requirements of the left side. Because it prevails among the largest percentage of learners, therefore, the materials and tools were designed to meet the thinking requirements of these students. He ignored the students' interruption from right-wing thinking, and their understanding of that was difficult, and all their efforts went into adapting themselves to content that was not designed for them, since, as is known, the human brain is what its basic function is. Employing and classifying learning and its different styles through brain models that depend on the type of inputs, as the inputs in the brain contain place, sound, movement, emotions, feelings, and non-verbal communication. (Al-Tamimi, 2024, 279)

When education is distinguished by the student?

There are several procedures that the learner uses to make the learning clearly distinct, the most important of which are: the learner's ability to:

1) He invests all his energies.
2) He understands the information provided to him.
3) It contributes to organizing his learning and himself.
4) He has the tools to accomplish learning.
5) He is independent in his learning and relies on himself.
6) He takes the initiative to change his cognitive structure to achieve his own understanding processes.
7) He plans his independent self-learning.
8) Organizes experiences, tools, and materials to fit together into a system that helps achieve achievement.
9) He sees and distinguishes what he did not see before entering constructive and modern learning situations.
10) He has a clear goal and strives to achieve it with perseverance and determination. (Qatami et al.: 2013, 2018)

Definition of the distinguished education strategy:

Distinctive Education is the set of plans and activities provided to the student within the classroom multiple approaches that Preparing everything the student needs in the classroom regarding the lesson needs to work to unleash the highest possible potential of individuals.

Traditional education	**distinguished education**
Students are treated in one way and at one level	The basis is to meet the different and diverse needs of the student
Evaluation at the end of the unit, week, year, etc.	Evaluation is an interactive and continuous process that occurs at all times and forms through memorizing and retrieving information

Students' interests and learning style are rarely taken into account	Diverse learning styles and students' interests are taken into consideration.
Students are assigned one assignment for the whole class	Diverse learning styles and students' interests are taken into consideration
There is one curriculum, one educational materials, and one textbook	The experiences provided to the student are many and varied and prevent distraction and mental wandering Basic educational standards are adopted that depend on both sides of the school and according to the type of input

Chart No. (1) The difference between traditional learning and distinguished learning (Al-Tamimi, 2024: 283)

Steps of the distinguished education strategy:

Since this strategy depends on dealing skillfully with modern electronic means and devices and means of wireless communication, it is therefore preferable to train teachers well before starting this experiment. The steps of this strategy consist of materials, devices, and the content of the educational material, which are: First: The teacher prepares his scientific material and proves it in a proper manner. Audio, image, video and presentation on a personal computer.

Second: Three cameras are placed in the hall designated for the lesson. The first is in front of the teacher, the second is for the students, and the third is directed randomly to each student who shows an emotion, and the emotions and movements that result from their integration into the education process are studied.

Third: The teacher displays the pictures continuously, asking the students to pay attention and focus on them so that they can be asked later.

Fourth: A video clip is presented on one of the three screens.

Fifth: Words with a distinctive voice are added to the subject being studied and sent via wireless to each student's private headphone. For the purpose of attracting their attention and preventing them from mental distraction.

Sixth: Displaying a picture of the teacher teaching on one of the screens, as well as a picture of the students, to monitor their movements and interests in the lesson.

Seventh: The teacher provides quick questions via wireless to the students for the purpose of evaluation after completing the lesson.

The success of this strategy depends on the teacher's skill in using the tools, explaining them correctly, and adopting specific and appropriate times in order to achieve the necessary goal, which is to introduce this information to both sides of the brain for all learners, despite their individual differences (Zayer et al.: 2017, 160-161).

What is the benefit of Dorman's strategy?

The distinguished education strategy is based on the principle of education for all. It takes into account all different types of learners and reinforces the phrase (that education is a right for all) and the phrase (that one size does not fit all). At the same time, it takes into account different styles of learning.

Distinctive education takes into account, satisfies and develops the different inclinations and trends of students, which enhances the level of motivation and raises their level of challenge for learning. It helps students develop innovation and reveals learners' creativity. What increases the importance of distinguished education is that it is based on integration between the methods presented in education in terms of the diversity of sensory inputs that work to introduce knowledge to both sides of the brain and thus process it in a way that facilitates the understanding process for students and thus increases their cognitive structure. Therefore, this strategy is somewhat similar The strategy for processing academic information in terms of the diversity of means of entering information for the student, as well as the diversity of means used for this purpose, in addition to its focus on both sides of the brain. This means taking into account the diversity and individual differences of the students, their level of thinking, maturity, and the nature of their understanding, as well as in remembering academic information and storing it until the time of the exam through storage and encryption procedures. For every piece of information and inserting it into long-term memory (Al-Tamimi: 2024, 287-288).

Clever thinking:

One of the characteristics of a clever thinker is thinking at different levels, starting from the simple to the complex, and here the meaning of this reminder appears, which is characterized by its speed and smoothness, that is, it does not require complexity or being slow in using his skills (Al-Hijazi: 2012: 173).

Characteristics of students who have clever thinking:

1) Firstly, it inspires students to think accurately and with high precision in dealing with the problems that they may encounter in their practical lives, which affects changing their behavior for the better with regard to making decisions and dealing with some intractable problems.
2) Choosing and identifying appropriate opportunities and means to treat problems using appropriate patterns.
3) They prefer to choose productive thinking or rational behavior that is more productive than others.
4) It enhances the cognitive storage of behavioral patterns that will be used in the future in new situations.
5) It helps students to think deeply, carefully study aspects of the problem, and learn new skills. (Nofal and Muhammad, 2008: 83)

The process of integrating chemistry content with good thinking can generate new skills for students in processing their scientific subjects, or what is known as cognitive load. This is because clever thinking is closely linked to the cognitive content, which is the subject of thinking. Therefore, this type of learning requires appropriate and specific mental procedures at the same time. It is appropriate for the type of thinking used because it is an interaction between thinking and content, so depth is an important feature that distinguishes clever recall.

So real thinking is the advanced processes of processing, analysis, and discrimination that occur to achieve learning in content areas (Swart, et al, 2008).

Skillful thinking is how to work accurately and translate the main ideas and develop a plan for communication between each student and the ideas to facilitate the process of understanding them clearly. It is also the process of verifying the effectiveness of the ideas used to cover all parts of the task or problem for the purpose of completing its treatment. It is the process of creating a coordinated framework or structure to arrange the basic facts and evidence in a

logical manner. In the process of dealing with problems, clever thinking provides an opportunity to link ideas in order to reach a state of logical persuasion for the student's conclusion. It is worth noting that writing down thinking and linking it to information and the process of communication in writing or verbally will help clever thinking in many matters, including:

First: the method of searching and the time of searching for the information the student needs.

Second: Distinguishing and analyzing this information and the extent of its relationship to what the student wants.

Third: Determine the information closest to the required content.

Fourth: Determine the extent to which the student needs more information or not (Allen, 2004:1-2)

Components of clever thinking:

Arthur & Bena (2009) were able to identify (14) characteristics of a skilled thinker with intelligent behavior, which are:

1) Perseverance: It is represented by individuals who cling and persevere in the task until completion, focus, and search for ways to reach goals when they face obstacles and do not give up easily.
2) Controlling recklessness: taking time to think and think carefully before doing something, remaining calm, thoughtful, and deliberative.
3) Listening with understanding and empathy: understanding others and devoting mental energy to their latest thoughts and ideas, and the person's idea is to make an effort to understand others' point of view and emotions.
4) Reciprocal thinking: Working together: Individuals are able to work together, learn from others in cases of reciprocity, and work in teams.
5) Thinking flexibly: looking at things in another way. Individuals have the ability to change points of view, generate alternatives, and consider multiple options.
6) Thinking about thinking: Individuals who possess this trait know knowledge, realize their own thoughts, use strategies, feelings, and procedures and their effects on others.
7) Strive for accuracy: Individuals who possess this trait investigate the task again, always do their best, set high-precision standards, constantly check and find ways to improve.
8) Finding a sense of humor: Individuals have the ability to create humor, laugh a little, find loopholes, make similarities, and are able to laugh at situations and themselves.
9) Previous experience and its application in a new situation: Skilled individuals use what they have previously learned, transfer the knowledge that has been learned, and apply it to new situations.
10) Constant readiness for continuous learning: Skilled individuals have a lot to learn, humility and pride when they admit that experience is not knowledge of everything, but knowledge of the most complex works, resistance to complacency.
11) Visualization, innovation, and innovation: He tries in a different way to generate new ideas that include fluency and flexibility.
12) Questioning and posing problems: The intelligent individual knows how he knew this? The questioning position has the knowledge of what data is needed and develops questioning strategies to produce this data and find solutions to it.
13) Collecting data using all the senses: The clever individual uses his natural paths and pays attention to the world around him and collects data through the five senses.
14) Taking responsible risks: going out for adventure, taking risks, and constantly trying new situations. (Arthur & Bena, 2009:8-13)

Research method: includes the procedures followed by the researcher to verify the research hypotheses

Research structure:

1: Choosing the Experimental method:

The study was characterized by an independent variable factor, which is the (Dorman Strategy) model, , which is (skillful thinking), the researcher adopted the experimental design with partial control and post-testing by adopting the two experimental groups controlling each other. The researcher also made the two research groups, one of them a control for the other, and diagram (2) shows this.

Dependent variable	Independent variable	Equality of groups	the group
Clever thinking	Dorman strategy	Chronological age in months Previous achievement in science Intelligence Clever thinking	First experimental Second experimental Female officer

Scheme (2) Experimental research design

Research population and sample equivalence:

The research community consists of government day secondary schools affiliated with the General Directorate of Education of Baghdad, Al-Karkh/3 exclusively for the academic year (2023-2024) AD.

The research sample:

The research sample of first intermediate students at Future Leaders High School for Outstanding Students of Baghdad Al-Karkh District/3 was intentionally selected for the following reasons:

1- Its proximity to the researcher's workplace, which allows him to continue the research continuously.

2- The convergence of school students in social and economic aspects.

3- The school administration expressed its serious desire to cooperate with the researcher, as he works as a teacher in the same school.

Future Leaders High School for Outstanding Students consists of two classes for the first intermediate grade. Class A was randomly selected to represent the experimental group and Class B to represent the control group, with (27) students for each of the experimental and control groups using the mutual control method in Table (1).

Final number	Number students Failing yen	Number of sa members be exclusion	Division	the group	T
28	/	29	a	Experimental	1

28	/	28	B	Female officer	2
56		56		the total	

Table (1) Lesson presentation timings within the research sample

Third: Control procedures:

The researcher tried to isolate external stimuli from the two research groups. Therefore, before starting the experiment, the researcher took the following steps. Therefore, before starting the experiment, the researcher took the following steps:

1- Verifying the internal integrity of the experimental design:

The researcher tried to control or determine the internal factors that could affect the results of the experiment as follows:

A - Controlling test differences in experimental individuals:

The research procedures required distributing the research sample to prevent the results of the experiment from being affected by differences between the research sample, and then verifying the equality between them statistically in the following variables:

- The students' ages are similar to the specified age .
- The power of intelligence.
- Achievement in previous stages
- Intelligent thinking

The students' ages are similar to the specified age:

The researcher reviewed the school records and cards of the students of the two research groups in order to obtain information regarding their chronological age, and for each student in the research sample.

The average scores of the two research groups, the variance, and the T-value were extracted as shown in Table (2) below:

indication Statistics at Level 0.05	T value		variance	Arithmetic mean	Number of students	the group
	Tabulation *	Calculated				
Non-functional	00 . 2	14 . 1	125044	4 . 5 18	28	First experimental
			127069	5 . 6 18	28	Second experimental

Table (2)

The arithmetic mean, variance, and T-value of the chronological age variable for the research sample

It is clear from the table above that the calculated T-value is equal to (14.1), which is less than the tabulated T-value at the level of significance (0.05) and the degree of freedom (54), which is equal to 2.00. This indicates the equality of the two groups in the chronological age variable of the research sample.

The students' ages are similar to the specified age:

For the purpose of ensuring the equality of the two research groups in this variable, the researcher applied the Lennon test for mental ability on 10/2/2023, Monday. This test consists of fifty items. Each item contains five alternatives, and in each of them one alternative represents the correct answer, and the highest score is (50) marks can be obtained. The answers were corrected and grades were obtained. An average score was extracted
For the two sets of research, contrast, and T-value, as shown in Table
(3) below:

Statistical significance at the 0.05 level	T value		variance	SMA	Number of students	the group
	Tabulation	Calculated				
Function	2.00	226،0	21.16	20.3	28	Experimental
			36.60	19.5	28	Female officer

Table (3)
The arithmetic mean, variance, and T-value of the intelligence variable For the research sample
It is clear from the table above that the calculated T-value is equal to (0.226), which is less than the tabulated T-value at the level of significance (0.05) and the degree of freedom (54), which is equal to 2.00. This indicates the equality of the two groups in the intelligence variable for the research sample.
Students' grades in science for the sixth grade of primary school:
Information about this variable was obtained from the students' general registration records, and the science subject grade was recorded for each student for the academic year (2022-2023). Average grades were extracted for the two groups: research, variance, and T-value, as shown in Table (4) below:
Table (4)
The arithmetic mean, variance, and t-value of a variable
Science degree for the sixth grade of primary school for the research sample:

indication Statistics at Level 0.05	T value		variance	Arithmetic mean	Number of students	the group
	Tabulation * n	Calculated				
Non-functional	2.00	0 ,65	92.16	25,72	28	Experimental
			179.56	70,66	28	The female officer

It is clear from the table above that the calculated T-value is equal to (65.0), which is less than the tabulated T-value at the level of significance (0.05) and the degree of freedom (54), which is equal to 2.00. This indicates the equality of the two groups in the achievement variable for the research sample.

Clever thinking:

For the purpose of ensuring the equality of the two research groups in this variable, the students were tested with the clever thinking scale on 10/3/2023 AD, and the average scores for the two research groups, variance, and T-value were extracted as shown in Table (5) below:

Table (5)

The arithmetic mean, variance, and T-value of the clever thinking variable for the research sample:

indication Statistics at Level 0.05	T value		variance	Arithmetic mean	Number of students	the group
	Tabulation *	Calculated				
Non-functional	2.00	0 ,89	18.49	03,16	28	Experimental
			23.09	11،10	28	The female officer

It is clear from the table above that the calculated T-value is equal to (0.89), which is less than the tabulated T-value at the level of significance (0.05) and the degree of freedom (54), which is equal to 2.00. This indicates the equality of the two groups in the skillful thinking variable for the two research samples.

Adjusting the intermediate (extraneous) variables:

Extraneous variables that may affect the results of the current research were identified, which are:

1- The teacher: The researcher taught the two research groups himself hroughout the research period to prevent any possible defect might result from the teacher's difference in his ability, personality, and the extent of his knowledge of the nature of the experimental variable when treating each group.

2- Study material: The chemistry textbook for the first intermediate grade was determined for the two research groups, and the study material was presented according to the plans prepared by the researcher and within the classes allocated in the school schedule.

3- The duration of teaching: The duration of the experiment was equal between the two groups, starting from (10/1/2023), as it was a complete academic year for the academic year 2023-2024.

4- Experimental extinction: There was no interruption among the members of the research sample.

5- Physical conditions: For this purpose, the researcher was interested in ensuring that the classrooms for the two groups were similar in terms of lighting and ventilation and far from noise.

6- Study tools: The research tool was applied to the two research groups on consecutive days, and each test was on a specific day for all students in the sample.

7- Distribution of classes: The number of classes scheduled for chemistry for the first intermediate year is (two classes per week), so the researcher agreed with the school administration that the times of the classes (second and third) should be as much as possible in a way that ensures equal time allocated to the class for the two research groups and in a (periodic) manner. reciprocal). As shown in diagram (3).

Scheme (3)

Third	the second	Period today
Control(group (B	Experimental group (A)	Sunday
Experimental group (A)	Control group (B)	Tuesday

Distribution of lessons among groups

Search requirements:

1- to choose academic subject: The academic subject that will be taught in the academic year (2023-2024) was determined, and within the annual plan for the chemistry textbook for the first intermediate grade, which included two units divided into four chapters, as the academic topics were distributed between weekly classes, at the rate of two classes per week. For each of the two research groups, the classes to be taught were distributed between classes and according to the academic year.

Preparing daily teaching plans:

In light of the educational content of the chapters of the chemistry book scheduled for the first intermediate grade, (16) teaching plans were prepared for the experimental group, which was organized according to Dorman's strategy, and (16) teaching plans were prepared for the control group, which was organized according to the other method. The researcher presented models of teaching plans of all kinds to a group of experts and arbitrators with experience and specialization in the field of science teaching methods and specialists, and to benefit from their opinions and suggestions, the validity of the tool was demonstrated based on agreement of opinions (80%) by adopting the Cooper agreement percentage equation between opinions. Some amendments to these plans to take their final form.

Search tool:

One of the requirements of this research is to prepare a tool to measure the dependent variable, which is the measure of clever thinking, and the following is an explanation of its numbers:

Clever thinking scale:

The researcher decided to adopt the clever thinking scale prepared by (Al-Bukhati, 2023), which consists of (14) domains with (4) items for each domain, as it is a new scale, and its validity and reliability were conducted by (Al-Bukhati, 2023).

Scale description:

The scale consists of (14) domains with (4) items for each domain, where the answer is with alternatives (always applies to me, often applies to me, applies to me to some extent, does not apply to me, never applies to me), and grades were given (1, 2, 3,4,5) Given that (5) for the alternative always applies to me, and the score (4) for the alternative applies to me often, (3) for the alternative applies to me to some extent, (2) for the alternative does not apply to me, (1) for the alternative does not apply to me at all, and thus The highest score that a sample member

can obtain on the scale is (280) degrees, the lowest score is (56) degrees, while the hypothetical average of the scale is (168) degrees.

Validity and reliability of the scale:

The items of the scale were presented to a group of experts to judge its validity in measuring the trait to be measured. The researcher approved a percentage of 80% or more regarding the validity of the items of the scale. The scale was approved as it is because it was built in the same academic year (2023) by (Bekhati). (2023) based on their opinions, and thus the measure is considered valid.

Stability:

The reliability of the clever thinking scale was estimated by applying the scale to a survey sample from the community itself and from outside the research sample, consisting of (90) first-year intermediate students in Al-Aflaz Middle School for Boys, which is affiliated with the General Directorate of Education in Baghdad, Al-Karkh/3, on 10/4/2023, and in a manner Cronbach's Alpha Coefficient: The reliability coefficient of the scale was found, which is called the internal consistency coefficient of the scale or what is called the homogeneity coefficient, as the value of the reliability coefficient of the scale was (0.75).

Scale correction:

The students' responses to the scale's items were corrected by the researcher, taking into account whether the items were positive or negative, as follows: (5) is given for the alternative: it always applies to me, and a score of (4) is given for the alternative: it applies to me often, (3) is given for the alternative: it applies to me to some extent, and (2) For the alternative, it does not apply to me (1) for the alternative, it does not apply to me at all. Thus, the highest score that a sample member can obtain on the scale is (280) degrees, and the lowest score is (56) degrees, while the hypothetical average of the scale is (168) degrees.

Experiment application:

A - The researcher did his research with experience For both groups in the research on Sunday, starting on 10/1/2023 AD.

B - The researcher began the actual teaching of the experiment on (10/1/2023) AD, and the researcher studied the students of the research sample according to the teaching plans for each group.

T - The researcher applied the clever thinking scale to the research sample on Monday (5/2/2023) AD.

D - The researcher studied the two experimental groups at a rate of (16 teaching sessions) for each group by himself.

Statistical methods:

With the adoption of the Statistical Portfolio for the Social Sciences (SPSS), the following statistical methods were adopted in the research procedures and analysis of its results:

T-Test for two independent samples.

First - the equality of the research sample in terms of variables (previous achievement, age, intelligence, clever thinking).

Second: Comparing the grade point averages of students in the two groups to test the null hypotheses of the research.

Pearson correlation coefficient:

To calculate the stability coefficient and the correction stability coefficient

Alpha-Cronbach coefficient equation:

To calculate the reliability coefficient of the clever thinking scale test.

Show results:

Results of the clever thinking scale:

To compare the first and second experimental groups in the clever thinking scale, according to the second null hypothesis, which states that (there is no statistically significant difference at the significance level of 0.05 between the average scores of the two research groups in the clever thinking scale), and to verify this hypothesis, the researcher verified The significance of the differences between the scale scores for the two research groups using the T-value (t-Test) in the statistical program (SPSS), as in Table (6).

Table (6)

The arithmetic mean, variance, calculated and tabulated T-value, and statistical significance of the research sample students' scores on the clever thinking scale

Statistical significance at Level 0.05	T value		variance	SMA	Number of students	the group
	Tabulation	Calculated				
Not significant	2	4.46	4.5	5.22	28	Experimental
			4.41	20.0	28	Officer

It is clear from the table above that the calculated T-value (4.46) is greater than the tabulated T-value (2.00) at a significance level of (0.05) and a degree of freedom (54). Therefore, the null hypothesis is rejected, i.e. there are individual differences.

Interpretation of the results:

The results of the current research showed the superiority of the first experimental group, which was studied using Dorman's strategy, over the second experimental group, which was studied using the other method, in the skillful thinking scale. This can be attributed to the following:

• The strategy of (Distinguished Education), which was studied in the first experimental group, which contains various stimuli, presented the academic subject in a variety of forms, including sound, images, and other things, the solution of which requires thinking on the part of the student with the help of the teacher. Thus, this strategy helped in organized thinking and following the sequential steps in Understand the topic.

• Students become accustomed to the steps contained in the strategy by understanding its steps and involving them in understanding the topic.

• The (distinguished education) strategy helped students develop clever thinking about the subject, thus enabling the student to expand understanding of the subject.

• The strategy that was studied in the first experimental group moved the students from the usual pattern in which the student is often a recipient of information to the pattern of active and effective participation with his colleagues and the teacher, by giving them answers to each step of the strategy.

• This strategy helped train students to find guidance on other topics related to the subject of study.

• By the researcher adopting the steps of this specific and regular strategy while teaching the topics, the difficulties of the students were reduced, and thus their tendency toward learning and understanding chemistry topics increased.
• The researcher assigned the students to do activities and solve problems as homework at regular times, which helped increase their desire to study chemistry.

Conclusions:

After completing the research, the results showed a positive impact of the distinguished education strategy (Dorman) for first-year intermediate students (research sample) on their clever thinking.

What the researcher recommends:

After the researcher completed his work, he suggested some recommendations:

1- Adopting a research strategy in teaching chemistry due to its positive impact on clever thinking.
2- Including the research strategy within the curricula and teaching methods curriculum in colleges of education.
3- Training chemistry teachers in secondary schools (middle and middle schools) on how to teach with this strategy.

Suggestions:

In continuation of the current research, the researcher proposes the following:

1. Conduct a similar study on other levels of study in the same subject.
2. Conducting other studies that address the relationship of this strategy with other variables such as creative thinking, scientific curiosity, and developing scientific inclinations.
3. Conduct a comparative study between the distinguished education strategy and the rest of the teaching strategies and demonstrate their impact on various variables.

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