

# The Effect of the DSLM-Based Learning Model on the Convergent Thinking of Third-Grade Intermediate Students in the Subject of Chemistry<sup>1</sup>

**Dr. Ahmed Laibi Hussein Al-Tamimi**

*Al-Riyadh High School for Outstanding Students*

DOI:10.37648/ijrssh.v13i01.009

Received: 04 December 2022; Accepted: 17 January 2023; Published: 23 January 2023

---

## ABSTRACT

The purpose of the study was to determine how the Dual-Situated Learning Model (DSLM) affected the chemistry convergent thinking of third-grade intermediate students. The experimental plan with a limited amount of control was chosen (experimental group and control group) and the sample included: (70) participants from the third stage, divided into two groups, the first being the experimental and the control group, and each of them (35) students from the same stage in Al-Riyadah Secondary School for Outstanding Students of the General Directorate of Education in Baghdad Al-Karkh/3rd Grade Students during the academic year (2021-2022), the study sample was rewarded with the following : (Intelligence, achievement for chemistry, previous information, and convergent thinking), and the research relied on the convergent thinking test tool, and its validity and reliability were found. The emergence of the results was interpreted by the researcher, after which several recommendations were put forward, as well as some suggestions by him.

## RESEARCH PROBLEM

The goals and objectives of education are constantly evolving due to the requirements of the characteristics of the society culturally, politically and socially. Therefore, the situation differed with education and its primitive methods that were adopted at the time, using models and strategies for teaching with the purpose of raising the level of education in this regard.

Teaching is no longer a process of reproducing information, on the contrary, teaching students and developing their skills in thinking, building knowledge and using it within a sound mind, and then treating it in a way of investigation and making maximum use of it by using it for its need at the present time, for the same person or for his large community alike, and because the researcher is one Teachers specializing in chemistry have noticed that there is a clear weakness in the students regarding the process of thinking and investigation, and according to the differences that

distinguished them, which seemed clear as a result of the old methods and methods that were used and inherited through the educational generations that existed at the time, as well as the school situation and the obsolescence of buildings, laboratories and tools all combined. And it worked to weaken this kind of thinking for them, and this was confirmed by the researcher through his questionnaire, which he worked to complete and find its results statistically, as the percentage of teachers was about (95%) of those who did not care about developing this thinking among their students, so it became preferable to use a modern teaching model that works The problem can be summarized as follows: How does the Dual Situation-Based Learning Model (DSLM) influence the convergent thinking of intermediate third-grade chemistry students?

---

<sup>1</sup> How to cite the article: Al-Tamimi A.L.H., The Effect of the DSLM-Based Learning Model on the Convergent Thinking of Third-grade Intermediate Students in the Subject of Chemistry, IJRSSH, Jan-Mar 2023, Vol 13, Issue 1, 101-111, DOI: <http://doi.org/10.37648/ijrssh.v13i01.009>

### Research Importance

Chemistry is an auxiliary element for understanding facts, concepts and scientific terminology and achieving what students want, which can only be accessed by methods, methods and procedures through specialized models that fit with the study material. To the objectives of the lesson in the best possible scientific ways. The idea of teaching models is related to the method of presenting content in the educational environment, which includes the nature and the extent of understanding of situations that increase cognitive experience, including all procedures and techniques used by students of knowledge at various levels of the educational system, aiming to achieve the desired goals to achieve them to the fullest. Possible (Al-Khazaleh and Muhammad, 2012: 19).

And the emergence of these various teaching models that specialists have identified for their application and to ensure their validity, illusion and impact on the level of students, that the factor that determines the use of a model is what it is used for, the nature and level of learners and what is included in this science and its content that the learners hope to achieve (Al-Drej, 2004: 33-34 This model raises the pre-existing concepts of learners and facilitates the correct understanding of scientific concepts by making a modification in the retained concept in order to introduce a model of dual learning to teach in a modern way. about these ideas to figure out which mental structures are more scientific for the concepts and the double meaning is that the conceptual modification is according to the quality of the scientific concepts and the faith of the learners about those concepts. As a result, it may lead to the modification of the existing model and the creation of a completely new one through the method of creating a weakness or creating a difference to Each of motivating learners, raising students' achievement scores, and challenging their beliefs about concepts (Al-Rabat B, 2015: 740), and the learner seeks to achieve his goals through thinking and then reaching facts that he could not reach previously, as the mental process joins together with each other in order to reach Those goals that by having a set of mechanisms such as awareness, accurate memory and fruitful thinking, and this leads to the empowerment of the individual in his society (Al-Afoun and Muntaha, 2012: 11-12). Just as the process of the learner's understanding of any subject or making a decision is carried out through his understanding of the scientific methods of thinking, so scientific thinking is necessary for thought, and we need to encourage learners of its importance and role in solving contemporary problems with correct decisions (Abdul Salam, 2001: 277).

Because it is important to develop education and make it effective, as it is the product of advanced human thought, because It is a systematic procedure that results in the development of new advanced-level concepts and knowledge (Mahmoud, 2006:140).

As a result, the following evidence demonstrates the significance of the research:

- 1.The DSLM educational model aids in the creation of education that places the learner's well-being at the center of the educational process.
- 2.The significance of this model due to the freedom it affords the individual to share their thoughts, alter their understanding, and learn new things.
- 3.The significance of chemistry, which has evolved into a fundamental and significant focus in numerous fields, has made it a fertile ground for scientific endeavors..

### Research Objectives

Statement of the effect of DSLM-based learning on convergent thinking for third-grade intermediate students in chemistry.

### Research Hypothesis

The following hypothesis is presented by the researcher in order to achieve the research objective:

At the level of significance (0.05), there is no significant difference between the mean scores of students in the control group (the second) who were taught using the DSLM model and those in the experimental group (the second). were taught according to the usual methods of convergent thinking.

### Research Limits

1. Human Limits: Students of the third intermediate grade in one of the excellent morning schools in Baghdad.
2. Spatial Limits: The General Directorate of Education, Baghdad, Karkh III.
3. Time Limits: the academic year (2021-2022).
4. Cognitive Limits: the chemistry book for the third intermediate grade (for the curriculum adapted for the academic year in question). Written by: Al-Dujaili, Ammar Hani and others (2016), 4th edition, General Directorate of Curricula, Ministry of Education, Republic of Iraq, Baghdad.

### Terminologies

1) Impact: It was defined by:

A) (Saleh, 2014): “The ability of the factor of the study title to obtain a useful increase, but if it fails negatively, the factor may lead to unhelpful results” (Saleh, 2014: 14).

b) (Mahdad, 2016): “It is the extent to which the ability to reach good results is affected by that ability to pass the test and use a good set of inputs and results” (Mahdad, 2016: 93).

The researcher adopted the definition of (Mahdad, 2016) as a theoretical definition.

The researcher provides the following procedural definition: It is the amount of change that results or occurs from teaching using the Dual Situation-Based Learning Model (DSLML) in the convergent thinking of third-grade intermediate students.

2- Dual Situation-Based Learning Model (DSLML) he defined:

A) (She 2004): “An educational model based on the nature of the concepts and the learners’ beliefs about these concepts and it needs to design sufficient teaching events to destabilize and balance through creating a gap or defect in the learners’ prior knowledge, which leads them to a state of cognitive confusion to overcome the previous knowledge and from Then the conceptual change occurred” (She, 2004: 146).

b) (Rabat, A 2015): “An educational model based on dual situations and focuses on the conceptual learning of students through building tribal concepts according to (6) stages arranged one after another used in education. This model is based on studies of the characteristics of the scientific concept, the detection of learners' misconceptions, the analysis of learners' mental structures, the design and teaching of educational events based on predictions and interpretations, and the application of what students have learned in new situations that confirm the conceptual change process.” (Al Rabat A, 281: 2015).

The researcher adopted the definition of (Rabat, A 2015) as a theoretical definition.

The researcher defined it procedurally: It is the model used in the third intermediate grade teaching the experimental group's students, and it has six stages. (examination of the characteristics of the scientific concept, questioning students’ understanding of the concept, processing information among students who

have a misunderstanding of it, designing learning events based on dual situations, and teaching with existing learning events). on dual situations and provoke challenge for situational learning events).

3- Convergent thinking: defined:

A- (Amer, 2007): It is an attempt to obtain or reach accurate answers by collecting the ideas presented (diverse), which he sorts and evaluates, and then takes what is most acceptable” (Amer, 13: 2007).

B - (Al-Ashqar, 2011): “It is that style that is able to summarize and extract from the sum of the ideas presented to come up with one idea that is more appropriate to the answer depending on the laws and plans that are the basis for the selection” (Al-Ashqar, 2011: 39).

The definition of (Al-Ashqar, 2011) was adopted as a theoretical definition.

Procedural definition of convergent thinking: It is the process of arriving at the adoption of one specific answer to a question or problem, and it is measured by the level of education that the third-grade intermediate student through the results obtained at the end of the experiment.

### Theoretical Framework:

Any learning according to the constructivist perspective can only take place by balancing the knowledge structures and information acquired and available to the individual, thus producing renewable ideas through the individual’s adaptation to those around him. They have made a great contribution to this field. He is considered to be the one who laid the first foundations for it. He showed that knowledge is built on its subjects, and that what skills an individual acquires are received through the knowledge found in the processes of representation and matching, which are two components of the process of self-organization. Piaget derived it from the biological sciences, as he was interested in the study of living things, (Zaytoun and Zeitoun, 2003: 87).

### Dual Situated Learning Model (DSLML)

Rabat (2015) defined it as an educational model implemented according to (6) steps that follow each other used in the classroom, and is consistent with Piaget's theory of imbalance events to help learners abandon their misconceptions and accept scientific concepts, and is based on examining the properties of the concept, identifying misconceptions, preparing mental structures that individuals were unable to contain, designing teaching events based on

predictions and interpretations, and putting what individuals have learned into new situations that emphasize the occurrence of conceptual comprehension" (Al-Rabat B, 2015: 740).

Characteristics of the dual situational learning model:

(She, 2004) defines the characteristics of a dual-situations-based learning model in the points below:

a) The dual situation-based learning model requires clarification of the defect in prior knowledge or the existence of a difference that produces students' curiosity and interest, as well as challenges their beliefs regarding scientific concepts.

b) The model emphasizes the need to identify the learner's misconceptions about the ideas that were shown and which were acquired by the learner from several sources.

c) Providing the new mental model is the appropriate time in which the rebuilding of knowledge occurs. The learner must see the new mental structure more convincing in order to contribute to the replacement of the previous concept. This is done through many activities, including (inquiry, modeling, similarity and contrasting events) that give the learner More understanding and analysis to form a new cognitive structure or to complete the learner's existing cognitive structures.

d) Giving the student newer opportunities to understand whether he can actually put the altered mental structures to use in different situations, which helps conceptual change succeed. Before beginning any type of interference, the design of learning events based on challenging situations needs to take into account all of the unique mental structures that students lack. (She, 2004: 146)

Steps of the Dual Situation-Based Learning Model (D.S.L.M):

(Al-Rabat) defined the lesson process according to the dual situation-based learning model through (6) successive stages that are interconnected and my agencies:

First: Examination of the attributes of the scientific idea : All pertinent information regarding significant mental conditions is provided at this stage. and through which the scientific view of the concept is built.

Second: Detecting incorrect perceptions of the student that pertain to the idea that needs to be understood in science: Its goal is to make sure that the student doesn't

understand the new ideas well because they didn't know the basics before.

Third : Fragmentation of mental problems that the student does not have: In order to reconstruct a more scientific perspective on the scientific concept, you must accurately identify the number of mental structures that the student lacks..

Fourth: Utilizing a dual-situation design :If there is more than one mental topic that the learner needs to help them form a more scientific view concept, this design for the occurrence of learning based on dual situations is based on the results of the first step. It is somewhat important for the design of two learning events based on paired situations.

Fifth: Teaching through dual-situation-based learning events :This focuses on giving the learner chances to make predictions, providing clarifications and explanations, and addressing dissonance in order to give the learner a more complete and in-depth understanding of the new concept..

Sixth: Teaching with learning events based on contradictory situations: This provides learners with opportunities to apply the mental topics that the learners have acquired in new situations to ensure that a successful conceptual change has occurred (Al Rabat A, 2015: 284).

Convergent thinking: She defined it (Al-Afoon, 2012) as an activity towards choosing only one solution or one decision that is specific to a problem. (Al-Afoon and Hussein, 2012: 109).

### **The Nature of Convergent Thinking:**

The educational literature clarified that convergent thinking is (thinking that requires the individual to choose one of the available answers to solve the problem or situation), and this requires changing his abilities to collect and organize information, which leads to the achievement of a specific and effective solution to the problem, as "Gilford" proved that convergent thinking includes several skills. It is "a mental activity directed to a specific situation, and the new position of the individual is a test of response, or a specific inevitable result in order to reach incorrect answers. The origin of convergent thinking is due to creative thinking that has been divided into parts using factor analysis to analyze data." (Al-Afoun, Hussein, 2012: 111

### **Convergence of Thought Abilities:**

It refers to the way of thinking in which a collection of ideas is broken down into one or two that are the best,

most accurate, and most appropriate responses to a particular question or to find a solution to one of the problems that are under study. This type is governed by a set of determinants that represent standards and laws that determine the decision taken. The thinking abilities amounted to fifteen convergent thinking abilities (Al-Ashqar, 2011: 39).

### RESEARCH METHODOLOGY AND PROCEDURES:

Since the current research has an independent variable (DSLML model) and a dependent variable (convergent thinking), the quasi-experimental design was chosen for two equal groups (the experimental group that studied with the DSLML model and the control group that studied in the usual way) with the post-test of convergent thinking and the chart (1) below illustrates this.

**Chart (1) Experimental design of the research**

| Group        | Parity  | Independent Variable | Dependent Variables |
|--------------|---|----------------------|---------------------|
| Experimental | Intelligence                                    | DSLML Model          | Convergent Thinking |
| Controlled   | Previous information test                       | Traditional Method   |                     |
|              | Previous collection<br>Convergent thinking test |                      |                     |

#### Identification of the community and the sample:

##### Research Community:

The study consisted of a community representing all third-grade intermediate students in government secondary schools within the Baghdad Directorate of Education, Karkh/3rd Year Students for the academic year (2021-2022).

##### Research Sample:

The researcher chose (Al-Riyadah High School for Outstanding Students) by the intentional way to apply the current research experience.

Validation of the experimental design's internal integrity:

The following are some of the extraneous factors that the researcher worked on controlling or locating that could influence the experiment's outcomes:

#### Equivalence for the two groups:

##### 1- Previous achievement in chemistry:

In order to determine the degrees of academic achievement, the members of the first and second groups' arithmetic mean and standard deviation were calculated. The t-test was used to determine the difference between the two independent samples, and it was discovered that the calculated t-value (0.391), which is less than the standard t-value (2,000), and degrees of freedom (68) indicate that the two groups are equivalent in terms of academic achievement. It appeared that the arithmetic mean of the members of the experimental group was (74,514) with a value ((s) (15.071), and the arithmetic mean of the members of the chart (2) shows this.

**Chart (2) Arithmetic mean, standard deviation and T-value of the students of the study sample in the previous achievement**

| variable            | the group    | Sample No. | Arithmetic mean × | Standard Deviation (s) | T Value    |         | Significance Degree | Degree of Freedom | Significance                |
|---------------------|--------------|------------|-------------------|------------------------|------------|---------|---------------------|-------------------|-----------------------------|
|                     |              |            |                   |                        | Calculated | Tabular |                     |                   |                             |
| previous collection | Experimental | 35         | 74.514            | 15.071                 | 0.391      | 2       | 0.05                | 68                | Statistically Insignificant |
|                     | Control      | 35         | 73.142            | 14.225                 |            |         |                     |                   |                             |

2- IQ test:

In choosing intelligence for Raven, which had 60 questions, the arithmetic mean and standard deviation of the first and second groups were calculated. The experimental group's average score was 39.542, with a standard deviation of 7.558, and the control group's average score was 37.77, with a standard deviation of 7.352. For two independent groups, the significance

difference of the t-test was used. The value (t-test) (0.994) was found to be lower than the tabular t-value (2,000) at the level of significance (0.05) and degrees of freedom (68), indicating that the two groups are comparable in IQ scores. As in Diagram (3) shows this.

**Chart (3) Arithmetic mean, standard deviation and value (t-test) for students of the study sample in intelligence**

| variable     | the group    | Sample No. | Arithmetic mean × | Standard Deviation (s) | T Value    |         | Significance Degree | Degree of Freedom | Significance                |
|--------------|--------------|------------|-------------------|------------------------|------------|---------|---------------------|-------------------|-----------------------------|
|              |              |            |                   |                        | Calculated | Tabular |                     |                   |                             |
| Intelligence | Experimental | 35         | 39.245            | 7.558                  | 0.994      | 2       | 0.05                | 68                | Statistically Insignificant |
|              | Control      | 35         | 37.771            | 7.352                  |            |         |                     |                   |                             |

3- Equalization of past information test:

The t-test was used (T-test) for two independent samples to determine the significance of the difference and demonstrates that the calculated value (t-test) is (0.540), which is less than the tabular values (t-test) (2), at the level of significance (0.05) and degrees of freedom (68), indicating that the two groups are

equivalent. The arithmetic mean and standard deviation of the members of the first and second groups were calculated in the degrees of the previous information. It was shown that the information scores in the previous, chart (4) is in between.

**Chart (4) the arithmetic mean, standard deviation and value (t-test) of the study sample in the previous information**

| variable            | the group    | Sample No. | Arithmetic mean $\bar{x}$ | Standard Deviation (s) | T Value      |          | Significance Degree | Degree of Freedom | Significance                |
|---------------------|--------------|------------|---------------------------|------------------------|--------------|----------|---------------------|-------------------|-----------------------------|
|                     |              |            |                           |                        | Calculated   | Tabular  |                     |                   |                             |
| <b>Intelligence</b> | Experimental | <b>35</b>  | <b>11.114</b>             | <b>1.890</b>           | <b>5400.</b> | <b>2</b> | <b>0.05</b>         | <b>68</b>         | Statistically Insignificant |
|                     | Control      | <b>35</b>  | <b>10.857</b>             | <b>2.088</b>           |              |          |                     |                   |                             |

**4- Convergent thinking test:**

The (Al-Maliki 2013) test for convergent thinking was adopted and its validity and reliability were confirmed, and the average scores and variance of the study sample were found using (t-Test) for two independent

samples. , There is no statistically significant difference in the convergent thinking of the students in the research sample at the level of significance (0, 05) or the degree of freedom (68). and thus the experimental and control groups are equivalent in convergent thinking. as in chart (5)

**Chart (5) The results of the t-test in the convergent thinking variable**

| variable                   | the group    | Sample No. | Arithmetic mean $\bar{x}$ | Standard Deviation (s) | T Value      |          | Significance Degree | Degree of Freedom | Significance                |
|----------------------------|--------------|------------|---------------------------|------------------------|--------------|----------|---------------------|-------------------|-----------------------------|
|                            |              |            |                           |                        | Calculated   | Tabular  |                     |                   |                             |
| <b>Convergent Thinking</b> | Experimental | <b>35</b>  | <b>11.114</b>             | <b>3.91</b>            | <b>0,416</b> | <b>2</b> | <b>0.05</b>         | <b>68</b>         | Statistically Insignificant |

**Controlling extraneous variables (internal safety)**

2- Duration: The experiment took a full academic year, the first semester and the second semester during the school year (2021-2022), and the experiment lasted for (20) weeks, and the number of classes was four classes per week for both research groups (T and T). Z), an average of two lessons per week for the two groups (T and Z), and the researcher was keen that the study

material given in each lesson is equal for the two research groups.

As for the lessons, it was two lessons for each group, from the beginning of the experiment on (3/11/2021) AD, until its end on (12/4/2022) AD.

3- The teacher: the students of the research sample were taught by the researcher personally to ensure that

the experiment is protected from students' involvement. by different teachers.

4- Study subject: The two research groups studied the third intermediate chemistry book (conditional material), 4th edition, for the year 2016.

5- Experimental extinction: the phenomenon of student absenteeism or interruption of work (experiment), and while the researcher was carrying out the experiment, no case of interruption, leaving or transfer of any student of the research sample occurred during the experiment period.

3- Preparing the study materials:

The current research requires the preparation of a set of requirements for the purpose of implementing the research procedures, and these requirements include:

a. Selection of the scientific subject:

The scientific material for both the first and second graders research groups was determined over the period of conducting the research (for two full semesters) of the academic year (2021-2022), and it included the adapted material for the chemistry book for the third intermediate grade, how to distribute classes on the academic content and the number of pages for each chapter.

B. Formulating Behavioral Objectives:

The researcher formulated (320) behavioral objectives in the light of the scientific material specified in the adapted material for the chemistry book for the third intermediate grade. analysis, synthesis level, evaluation level), and the researcher prepared (42) behavioral objectives in the cognitive aspect, and the researcher presented the behavioral objectives to the specialized experts

T. Creating lesson plans :

Considering the content of the chemistry curriculum for the third intermediate stage, (40) study plans for the DSLM model were prepared for the first group and (40) plans in the previous method for the second group.

These plans were presented to a panel of experts in the methods of teaching chemistry to express their opinions about the suitability of the plan to the teaching method used for both the control and two experimental groups , as well as its suitability to the curriculum content and performance purposes.

4- Preparing the study tool: the convergent thinking test:

The researcher adopted the test that was prepared by Al-Maliki (2013), which consists of seventy-two test items. After studying it and presenting it to experts and arbitrators to address the appropriate paragraphs for the age group, academic level, and comprehension level of the research sample, twenty-five test items were adopted and applied to a sample of third- and fourth-grade students because the researcher found that it was a suitable tool for his research.

1) Openness to others: A copy of the test was shown to a group of experts in science teaching methods and other educational fields. They all agreed that it was safe to write the paragraphs and give their opinions on them. Some of the paragraphs were removed, and the arbitrators' opinions and instructions were taken into account.

2) This is the initial exploratory use of the convergent thinking test:

On 3/11/2021 AD, a sample of thirty students in the third intermediate grade took the convergent thinking test. The students' questions and observations regarding the instructions and answer paragraphs were recorded during this procedure, and the time required to answer each test item was calculated.

3) The convergent thinking test's second exploratory application:

On 4/11/2021, the test was administered to another survey form containing one hundred third-grade students under the supervision of the same researcher. This was done after the test was applied to the first exploratory sample and the time taken to answer its paragraphs as well as the clarity of the instructions and the way to answer them were evaluated .Its application to the second exploratory sample's purpose was to achieve stability by using the electronic statistical program through the alpha-Cronbach equation, the result of the stability appeared within eighty-six percent, and thus the test was successful. Therefore, the convergent thinking test in the last form became complete for application to the two study groups.

#### **Experimental application procedures:**

The experiment was applied to the students of the first and second research groups using the following procedures:

A - The experiment began by applying (intelligence test, convergent thinking test, past subject test and achievement for chemistry) on the two groups (experimental and control) on 8-12/11/2021.



B - The experiment began on 6/11/2021 for the two groups: the experimental group and the control group. The experimental group studied using the DSLM model-based teaching plans developed by the researcher, while the control group studied in the usual way and also in light of the teaching plans prepared by the researcher for this purpose.

T- The post-convergent thinking test was applied on 10/4/2022 AD corresponding to (Sunday) on the research sample at one time, and the results of the study sample (T and Z) were found.

## DISCUSSION AND PRESENTATION OF THE FINDINGS

Presentation of the results: For the purpose of verifying the hypothesis, the researcher calculated the results of the T-test for the group's students' individual scores (T and Z) in convergent thinking, as shown in Chart (6)

**Chart (6) T-test results to see the significance of the difference between the mean of the study sample in the post-convergent thinking test**

| GROUP            | SAMP<br>LE NO. | ARITHME<br>TIC MEAN | STANDA<br>RD<br>DEVIATI<br>ON | التباين<br>ن | DEGRE<br>E OF<br>FREED<br>OM | CALCULA<br>TED<br>T<br>VALUE | TABUL<br>AR<br>T<br>VALUE | SIGNIFICA<br>NCE AT 0.05     |
|------------------|----------------|---------------------|-------------------------------|--------------|------------------------------|------------------------------|---------------------------|------------------------------|
| Experime<br>ntal | 35             | 21.27               | 2.37                          | 5.61         | 68                           | 5.21                         | 2                         | Statistically<br>Significant |
| Control          | 35             | 17.23               | 3.53                          | 12.46        |                              |                              |                           |                              |

Despite the progress made by the first group over the second group, a difference was found between the average scores of the two groups to test the validity of the preceding hypothesis. The average scores of the students in the experimental group were (21.27), with a difference of 5.61, and the average scores of the students in the control group were (17.23), with a difference of 12.46. The calculated T-test value was (5.21), which is greater than the standard T-test value (2.00) with a degree of freedom (68), making it clear that the difference between the two independent samples was statistically significant at the significance level (0, 05). Therefore, the alternative hypothesis is accepted and the null hypothesis is rejected, indicating that there was a difference between the two study groups.

### Discussion and Interpretation of the Findings:

According to the statistics, there is a statistically significant difference in favor of the students in the experimental group in the convergent thinking variable between the average scores of the students in the first group who studied using the Dual Attitude-Based Learning Model (DSLML) and the students in the second group who studied using the traditional method. and the reason can be attributed to:

A) The steps of teaching according to the DSLM model helped students collect and analyze solutions and choose the appropriate and best solution to the problem after relying on the criteria set for selection in a scientific manner based on research and experimentation.

B) The use of the Dual Attitude-Based Learning Model (DSLML) in the course of teaching gave an incentive and a sense of competition among students in a high spirit by putting forward ideas and arranging them in lists that led to an increase in the field of important beliefs towards the future, and the continuous reinforcement by the teacher with motivating and strong phrases has facilitated Students face the problems that come their way in new situations in the application phase, which may help to increase their convergent thinking.

C) The distinction of the students of the experimental group is due to the use of the Dual Situation-Based Learning Model (DSLML), which made the students more effective and interactive in the lesson than the students of the second group, as the role of the students was transformed into a learner and a keeper of knowledge into a productive and important one with

the lesson material, which is an important sign in the development of their convergent thinking.

D) Teaching according to the Dual Situation-Based Learning Model (DSLML) helped students exchange ideas using evidence and proofs by reorganizing and expanding the information structure and enabling them to understand the information and facts gained.

### CONCLUSIONS:

Through the research experience and in light of the results, the researcher reached the following:

1. The good effect of the (DSLML) model as a model of education, on the dependent variable, if compared with the old methods of teaching.
2. The use of the (DSLML) model worked on developing convergent thinking among third-grade intermediate students in chemistry.
3. Teaching according to the Dual Attitude-Based Learning Model (DSLML) gives equal opportunities to students through their positive participation in the lesson activities and takes into account individual differences.

### Recommendations:

There are several recommendations proposed by the researcher, depending on the results he reached, which are:

- 1 - The DSLML model has proven that it is one of the models that can be adopted as a method of teaching for its good effect on the dependent variable, which is convergent thinking.
- 2 The attention of middle school chemistry teachers to the (DSLML) model so that they can leave the old methods that they used to follow in the previous period as a method of teaching.

### Suggestions:

There are two Suggestions:

1. Conducting research and studies to ensure the validity and suitability of this model for different grades.
2. Activating this model by experimenting with other researches with new influences and variables not mentioned in this study, including reflective thinking, scientific sense, divergent thinking, .... etc.

**Financial support and sponsorship:** Nil

**Conflict of Interest:** None

### REFERENCES

1. Al-Ashqar, Faris Ratib (2011): Philosophy of Thinking and Theories in Learning and Teaching, 1st Edition, Zahran Publishing House, Amman, Jordan.
2. Al-Bayati, Alia Hamid Nassif (2005): The effectiveness of two proposed treatment methods for learning chemical symbols in the ability of second-grade students to write chemical equations (unpublished master's thesis), Diyala University, College of Basic Education.
3. Gerges, Rasha Ramzy (2016): The effectiveness of a learning model based on dual situations in science in developing some science process skills among fifth graders, Fayoum University, Saudi Arabia. A magister message that is not published
4. Al-Khaza'leh, Muhammad Salman and Zaki bin Abdulaziz Yudi (2012): Teaching Strategies, 1st Edition, Al-Khwarizmi for Publishing and Distribution, Amman, Jordan.
5. Al-Drej, Muhammad (2004): Purposeful Teaching (From the Teaching Model by Objectives to the Teaching Model with Competencies), 1st Edition, Al Ain, United Arab Emirates, Dar Al-Kitab University.
6. Rabat, Bahira Shafiq Ibrahim (2015a): Modern Strategies in Teaching, 1st Edition, Dar Al-Fikr Al-Arabi, Egypt.
7. Rabat, Bahira Shafiq Ibrahim (2015b): Modern Directives in Curricula and Teaching Methods, 1st Edition, Dar Al-Fikr Al-Arabi, Egypt.
8. Rabat, Bahira Shafiq Ibrahim (2015b): Modern Directives in Curricula and Teaching Methods, 1st Edition, Dar Al-Fikr Al-Arabi, Egypt.
9. Al-Zahrani, Muhammad bin Issa Shanan (2018): The effectiveness of a strategy based on the dual-situation learning model (DSLML) in developing the understanding of engineering concepts among fifth-grade students, College of Education, Umm Al-Qura University, Saudi Arabia. Published PhD thesis
10. Zeitoun, Hassan and Zeitoun, Kamal (2003): Teaching and Teaching from the Perspective of Constructivist Theory, Cairo, World of Books.
11. Saleh, Ali Abdel Rahim (2014): The Arabic Dictionary for Defining Psychological Terms, 1st Edition, Dar Al-Hamid for Publishing and Distribution, Amman, Jordan.
12. Amer, Ayman, (2007): Analytical thinking, ability, skill and style, Faculty of Arts, Cairo University.
13. Abdel Salam, Mustafa Abdel Salam (2001): Modern trends in science teaching, Dar Al-Fikr Al-Arabi, Cairo.
14. Al-Afoun, Nadia Hussein, and Hussein Salem Makawon, (2012 AD): Training a science teacher according to the constructivist theory, 1st Edition, Dar Safaa for Publishing and Distribution, Amman.
15. Al-Afoun, Nadia Hussein and Muntaha Mutashar Abdel-Saheb (2012): Thinking, its patterns, theories,

and methods of teaching and learning, Dar Al-Safa Publishing and Distribution, Amman, Jordan.

16. Al-Maliki, Alaa Rahim (2013): Building a test of the ability to convergent thinking among university students according to the theory of latent traits using the Rush model, (unpublished master's thesis), University of Baghdad, College of Education Ibn Rushd.
17. Mahmoud, Muhammad Ghanem (2006): Introduction to Teaching Thinking, 1st Edition, House of Culture for Publishing and Distribution, Amman, Jordan.
18. Mahdad, Al-Zubair (2016): A Dictionary of Educational Terms and Terminology in the Arab Heritage, 1st Edition, King Abdullah bin Abdulaziz International Center for Arabic Language Service, Riyadh, Saudi Arabia.
19. She (2004) (B). Facilitating Changes in Ninth Grade Students 'Understanding of Dissolution and Diffusion through DSLM Instruction. Research in Science Education 34 (4.)