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# The Effect of the S.N.I.P.S Strategy on the Development of Divergent Thinking among Students of Educational and Psychological Sciences Departments in the Subject of Comparative Education

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**Abstract:** The aim of the current research is to identify the effect of the S.N.I.P.S strategy on the development of divergent thinking among students of the Departments of Educational and Psychological Sciences in the subject of Comparative Education. The researcher adopted a quasi-experimental design and randomly selected students from the Department of Educational and Psychological Sciences at the College of Education, University of Wasit. Section (A) was chosen as the experimental group, where students were taught using the S.N.I.P.S strategy, while Section (B) was selected as the control group, where students were taught using the traditional method. The research sample consisted of 80 students. Prior to starting the experiment, the researcher ensured statistical equivalence between the two groups in several variables that might influence the validity of the experiment. The educational material selected for teaching included the first five chapters of Comparative Education. Based on the content, behavioral objectives were formulated across six levels, and 16 lesson plans were prepared for both groups. The researcher developed a divergent thinking test consisting of 30 items distributed across six areas and validated its reliability, consistency, and discrimination. The researcher herself conducted the teaching, and after completing the experiment, administered the post-test for divergent thinking to both groups. Following the collection of results, the data were analyzed using appropriate statistical methods. The results showed a statistically significant difference at the 0.05 level between the mean scores of the experimental group and the control group in the post-test of divergent thinking, favoring the experimental group. Additionally, a statistically significant difference was found at the 0.05 level in the mean differences between the pre-test and post-test scores of the experimental group, favoring the post-test. Based on these results, the researcher made a set of conclusions, recommendations, and suggestions.

**Keywords:** S.N.I.P.S Strategy, Thinking, Divergent Thinking, Comparative Education.

## Chapter One

## Introduction to the Research

### 1. Research Problem:

It is widely agreed among education experts today that science is continuously and rapidly evolving, and that economic and social changes and challenges significantly impact this

development. The researcher notes that it is unreasonable to respond to this acceleration and these changes and challenges using traditional methods; rather, they must be addressed from various perspectives, with different visions, goals, and strategies, both quantitatively and qualitatively. This approach should involve new educational ideas that deviate from the existing norms, viewing the future with a dynamic goal based on a robust, renewed, and flexible educational system. One of its key components is the human element, capable of analyzing the present, interacting immediately with changes, and developing practical solutions based on a clear vision of the future educational system.

It has become certain that education, as the system responsible for the behaviors to be learned, must define educational objectives aimed at learning and mastering these behaviors. One such goal is to develop different types of thinking and teach related skills to cultivate students who can understand the developments around them and use them for their own benefit and that of their society. Modern teaching methods, techniques, and strategies play a vital role in this process. These modern teaching strategies emphasize the centrality of the student in learning, focusing on their active participation in organized activities and ensuring interaction among the elements of the educational situation. These strategies do not only focus on cognitive aspects but also include skill-based and emotional dimensions.

The researcher believes that the poor performance of students in the subject of comparative education is not solely due to the difficulty of the subject itself or the methods used to deliver it. There is a need to develop the teaching process for this subject using the latest and most effective strategies. This belief led the researcher to choose a modern strategy from active learning strategies, one that aims at educational development and progress. This strategy is **S.N.I.P.S**, which educational literature highlights as essential in achieving fundamental and desirable goals. The central research problem then is: What is the effect of the **S.N.I.P.S** strategy on the development of divergent thinking among students in the Departments of Educational and Psychological Sciences in the subject of Comparative Education?

## 2. Importance of the Research:

Several modern strategies based on metacognitive theory have emerged, aiming to equip learners with the ability to think about their thinking, control it, and monitor it continuously to modify and improve it over time. The focus of metacognitive strategies is on how to make learners think for themselves when solving problems, rather than merely providing them with fixed answers or presenting facts and information for them to memorize. Emphasis is placed on the learner's approach to problem-solving by considering the challenges they face in understanding topics. Furthermore, the use of metacognitive strategies is crucial in moving from quantitative learning to qualitative learning, which prepares and qualifies the learner. (Badr, 2006)

The **S.N.I.P.S** strategy is one of the metacognitive strategies that emphasizes the use of questions, visual tools, and their analysis, making it suitable for promoting thinking, especially visual thinking and its skills. Historical development of science curricula since the late 1950s has seen an increased focus on understanding and thinking. (Atifah, 2011)

The researcher chose the **S.N.I.P.S** strategy because it is a modern strategy that has not yet been applied to the subject of Comparative Education locally, to the best of the researcher's knowledge. This strategy provides students with the opportunity to apply their thinking and skills through methods that move away from rote memorization and repetition, which can detract from the true goal of learning—understanding and absorbing scientific concepts and information. (Atiya, 2009)

Through an extensive discussion of the importance of metacognition and its teaching strategies, along with its positive effects, particularly on student thinking, the researcher concludes that the importance of these strategies lies in their role in developing thinking among learners. This development has a direct positive impact on one of the variables in the current study: **divergent thinking**. It can be argued that thinking is a divine gift, given by Allah exclusively to humans,

distinguishing them from other creatures. This distinction is particularly evident in the most important function of the mind: thinking. (Al-Rahou, 2005)

The Quran explicitly calls for rational thought—meaning reflection, consideration, and examination of matters to understand and comprehend them. Many Quranic verses advocate for using one's mind, with 49 verses encouraging rational thinking, 129 verses urging mental contemplation, and 148 verses promoting insight. (Jrouwan, 2002)

Since divergent thinking is a higher-level form of thinking, playing a crucial role in examining issues and finding multiple solutions, many educational and psychological scholars have focused on this field since the mid-20th century. In 1950, American psychologist **J.P. Guilford** delivered a famous address on divergent thinking at the American Psychological Association's conference, marking the first step toward the study of this concept. This speech spurred widespread interest in researching divergent thinking, leading to a focus on various aspects, including its outcomes, processes, and the characteristics of individuals distinguished by divergent thinking. (Abu Zaid, 1985)

**Clarke** defined divergent thinking as a type of thinking that involves innovation, contemplation, invention, creativity, and finding solutions that suit a given problem or situation. (Clark, 1985)

One of the key areas of research in cognitive abilities is divergent thinking, as this process still requires more investigation, especially since various groups, including scholars, inventors, and artists, have been involved in this field. (Danawi, 2008)

In conducting her research, the researcher applied one of the metacognitive strategies, **S.N.I.P.S**, which, to the best of her knowledge, is the first study to use this strategy experimentally to develop divergent thinking among university students.

## 3. Research Aim

The aim of the current research is to identify the effect of the **S.N.I.P.S** strategy on the development of divergent thinking among students in the Departments of Educational and Psychological Sciences in the subject of Comparative Education.

## 4. Research Hypotheses

### 1. First Null Hypothesis:

There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group, which studies Comparative Education using the **S.N.I.P.S** strategy, and the mean scores of the control group, which studies the same subject using traditional methods, based on the divergent thinking test.

### 2. Second Null Hypothesis:

There is no statistically significant difference between the mean scores of the experimental group before and after the experiment on the divergent thinking test.

## 5. Research Delimitations

The current research is delimited by the following:

1. Students of the Department of Educational and Psychological Sciences at the College of Education for Humanities, University of Wasit, for the academic year 2024-2025.
2. The first semester of the academic year 2024-2025.
3. The first five chapters of Comparative Education, as part of the curriculum taught to third-year students in the Departments of Educational and Psychological Sciences.

## 6. Research Terminology

### 1. S.N.I.P.S Strategy:

According to **Atiya (2010)**, the **S.N.I.P.S** strategy is one of the strategies that emphasizes the visual representations contained in a reading text and benefits from them in understanding and absorbing the content. These representations include maps, images, shapes, and timelines included in the text. This indicates that the **S.N.I.P.S** strategy relies on interpreting visual aids and using them to facilitate the immediate comprehension of the reading text. (Atiya, 2010, pp. 165-166)

**Operational Definition:** The **S.N.I.P.S** strategy is used as an independent variable in teaching the experimental group, consisting of five steps.

### 2. Divergent Thinking:

**Al-Ayasa (2013)** defines divergent thinking as thinking characterized by originality and focusing on the types and qualities of outcomes. It involves producing new information from given data and generating additional information from it. (Al-Ayasa, 2013, p. 36)

**Operational Definition for Developing Divergent Thinking:**

The ability of the student to respond correctly to the activities included in the test developed by the researcher specifically for this study, which consists of fluency in its various types (associative, intellectual, verbal fluency, and fluency in shapes), and flexibility in its types (spontaneity and adaptive flexibility for meanings). These are reflected in the score differences between the pre-test and post-test scores on the divergent thinking test.

## Chapter Two

## Theoretical Aspects and Previous Studies

### 1. The S.N.I.P.S Strategy

Most modern strategies focus on the comprehension of the reading text to derive meaning and emphasize the importance of activities that monitor text comprehension. Experts agree that such activities are fundamental for achieving an acceptable level of comprehension of the text. (Ahmad, 2001, p. 54)

The S.N.I.P.S strategy is one of the metacognitive strategies. These strategies are learning techniques based on a teaching model that allows the learner to use their own skills to develop independent learning, enabling them to take responsibility for their own learning. These strategies involve actions that the learner takes to engage in activities and mental processes and learning methods, including self-regulation, which are employed before, during, and after learning to aid in remembering, understanding, planning, managing, and solving problems. (Khattab, 2007, p. 89)

Atiya notes that it is "an effective strategy for achieving reading comprehension, emphasizing the use of visual aids to present the reading text, with a focus on using concept maps, images, and shapes that the text may include." (Atiya, 2009, p. 190)

Al-Dulaimi explains that it is a strategy that interprets visual aids and enhances reading, used as a five-step reading approach to facilitate the immediate processing of the text. (Al-Dulaimi, 2009, p. 22)

The **S.N.I.P.S** strategy consists of five steps:

1. **Starting with Questions**
2. **Noting What Can Be Learned from the Instructions**
3. **Identifying What is Important in the Text**
4. **Connecting the Visual Aid to the Text**

5. **Explaining the Visual Aid to Another Person**

This strategy is highly effective in achieving reading comprehension for visual learners who tend to prefer educational methods requiring high observation skills, the ability to distinguish and compare, and supporting the text with visual aids. These visual indicators enable learners to link ideas in the visual aid with ideas in the reading text. (Atiya, 2009, p. 197)

The strategy is used as a five-step reading approach to facilitate the immediate processing of the text through interpreting the visual aids. It relies on images, diagrams, and maps, and can be used either with the teacher's assistance or independently by the learner. It is also suitable for group activities under the teacher's supervision. (Al-Hashimi & Al-Dulaimi, 2008, p. 187)

The steps of this strategy are, in fact, a set of principles that guide the reader toward understanding the reading text well, helping learners overcome many academic challenges. (Habib Allah, 2000, p. 3)

2. **Steps of the S.N.I.P.S Strategy**

The S.N.I.P.S strategy can be applied according to the following steps:

**1. Start with Questions:**

The learner asks themselves what kind of information they are looking for through the visual aid:

- ✓ Why am I looking at the visual aid?
- ✓ What does the visual aid represent?
- ✓ What is important in the visual aid?
- ✓ How can I use the visual aid to understand the reading text?

**2. Noting What Can Be Learned from the Instructions:**

In this step, the learner looks for guidance and directions by examining the title of the visual aid and activating their prior knowledge, without relying solely on preconceived ideas.

**3. Identifying What is Important in the Text:**

In this step, the learner identifies the main ideas and important information in the reading text.

**4. Connecting the Visual Aid to the Text:**

In this step, the learner connects the visual aid to the text by identifying the main ideas in the text and the meanings conveyed by the visual aid.

**5. Explaining the Visual Aid to Another Person:**

In this step, the learner explains the visual aid to another person or to themselves aloud, interpreting and clarifying what it contains in relation to the reading text. (Atiya, 2009, pp. 199-197)

**3. Divergent Thinking**

Divergent thinking, sometimes referred to as "free-flowing thinking," is characterized by focusing on the diversity of outcomes and their qualities. According to Guilford, divergent thinking involves generating new information and producing new ideas from given information. Furthermore, the constraints in this type of thinking are reduced, leading to a broader exploration, with ideas and information being generated abundantly. (Qatami, 2003, p. 22)

It is a type of thinking that requires generating as many responses as possible to a single problem, distinguishing it from convergent thinking, which follows a traditional path where the individual uses available information to arrive at a single correct conclusion, similar to conclusions others might reach in similar situations. (Al-Fakhri, 1981, p. 174)

The unique feature of divergent thinking is the variety of responses that emerge, which are not confined to the provided data. This does not mean that it does not play a role in reaching a unique result, as it is present whenever trial and error thinking occurs. (Wiseman, 1973, p. 148)

Divergent thinking also involves generating old ideas in new relationships. It is flexible thinking that takes multiple directions rather than a single one. It goes beyond obvious and apparent things, seeking distant, indirect possibilities and multiple solutions for a single problem. It is expressed in situations that allow for multiple correct answers. (Al-Ajili, 2009, p. 77)

### 4. Principles of Divergent Thinking

Divergent thinking differs from other types of thinking in that it is used for creative problem-solving and relies on several principles:

**1. Postponing Judgment:**

This principle suggests postponing judgment and evaluation until a large number of possibilities and alternatives around the educational situation or problem are provided.

**2. Seeking a Greater Quantity of Ideas:**

Unique ideas emerge from a large number of ideas, meaning the greater the quantity of ideas, the higher the chance of finding original and distinctive ideas.

**3. Initiation**:

This principle emphasizes recording all incoming ideas without worrying about whether they are useful or not. Often, unconventional ideas are the key to finding new alternatives. Establishing new relationships between ideas may result from ideas that initially seem illogical or unhelpful. Initiation encourages letting imagination flow freely, surpassing the conventional. (Khalil, 2007, p. 22)

**4. Take a Break for Ideas to "Brew":**

This principle means setting the problem aside for a while and engaging in an activity or hobby unrelated to the issue. This reflects the concept of "incubation" as a stage in the creative process. During this period, original ideas may arise, and it is helpful to carry a pocket notebook to record these ideas.

**5. Try to Integrate Ideas:**

This principle means that the individual should always be alert to the ideas others present during the "creative problem-solving" process. The person may come up with an original idea by linking diverse ideas from different sources. There are no restrictions on this. (Jrawn, 2002, pp. 284-285)

### Commentary on These Principles

Divergent thinking is not a traditional, direct form of problem-solving or facing life situations. Instead, it is reflective thinking that requires higher-level cognitive skills, such as analysis, synthesis, and evaluation, according to Bloom's taxonomy. This is where divergent thinking differs from convergent thinking, which provides a single solution based on available information. Divergent thinking, however, leads to a range of possible solutions that are not necessarily restricted to the available information in the situation but often includes creative solutions. (Khalil, 2007, p. 23)

## Chapter Three

## Research Methodology and Procedures

### 1. Research Methodology and Experimental Design

Due to the nature of the current research, which aims to understand the impact of the S.N.I.P.S strategy on enhancing divergent thinking among students in the departments of educational and

psychological sciences in the subject of comparative education, the researcher adopted an experimental methodology. This methodology is defined as "the intentional modification of the conditions of a phenomenon and explaining it by observing the changes that occur and interpreting them."

The researcher used a partial control experimental design with an experimental group and a control group, both undergoing a post-test for achievement and divergent thinking, as shown in the following diagram (1).

***Diagram (1)*** *Experimental Design for the Research Groups*

| Group | Pre-Test | Independent Variable | Dependent Variable | Post-Test |
|---|---|---|---|---|
| **Experimental** | Divergent Thinking | S.N.I.P.S Strategy | Divergent Thinking | Divergent Thinking Test |
| **Control** | | Traditional Method | | |

## 2. Defining the Research Population and Sample

### 1. Research Population:

The research population consists of third-year students in the departments of educational and psychological sciences at the faculties of education in Iraqi universities for the academic year (2024-2025).

### 2. Research Sample:

The researcher selected the department of educational and psychological sciences at the College of Education, Wasit University, as the sample for her study, as she is a faculty member at this university. The researcher used simple random sampling, choosing Section (A) to represent the experimental group, which will be taught using the S.N.I.P.S strategy, and Section (B) for the control group, which will be taught using the traditional method. The total number of students in both sections was (80), with 40 students in the experimental group and 40 students in the control group, as shown in Table (1).

***Table (1)*** *Number of Students in the Research Groups Before and After Exclusion*

| Group | Number of Students Before Exclusion | Number of Excluded Students | Number of Students After Exclusion |
|---|---|---|---|
| **Experimental** | 40 | - | 40 |
| **Control** | 40 | - | 40 |
| **Total** | 80 | - | 80 |

## 3. Equivalence of the Research Groups

### 1. Age in Months:

Using the independent t-test (T-test), the results showed no statistically significant differences, as the calculated t-value (0.24) was smaller than the critical t-value (1.98) at a significance level of (0.05) and degrees of freedom (78). This indicates the equivalence of the two groups in terms of age. Table (2) demonstrates this.

***Table (2)*** *Results of the t-Test for the Significance of the Differences Between the Experimental and Control Groups in Chronological Age Calculated in Months.*

| Group | Sample Size | Mean | Standard Deviation | Degrees of Freedom | t-Statistic | Critical Value (0.05) | Significance Level |
|---|---|---|---|---|---|---|---|
| **Experimental** | 40 | 260.76 | 4.26 | 78 | 0.34 | 1.98 | Not Statistically |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | Significant |
| **Control** | 40 | 261.02 | 4.23 | | | | |

**2. Last Year's Average:**

The mean and standard deviation were calculated for both research groups (experimental and control). Using the independent t-test, the results showed no statistically significant differences. The calculated t-value was 0.35, which was smaller than the tabulated t-value of 1.98 at a significance level of 0.05 and degrees of freedom (78). This indicates the equivalence of the groups in last year's grades. Table (3) illustrates this:

***Table (3)*** *Mean, Standard Deviation, and T-test Results for the Research Groups' Last Year's Achievement in the Second Year*

| Group | Sample Size | Mean | Standard Deviation | Degrees of Freedom | t-Statistic | Critical Value (0.05) | Significance Level |
|---|---|---|---|---|---|---|---|
| **Experimental** | **40** | 61.83 | 7.79 | 78 | 0.35 | 1.98 | Not Statistically Significant |
| **Control** | **40** | 62.56 | 8.67 | | | | |

**3. Intelligence:**

The researcher chose the Raven Intelligence Test (1983), one of the most widely used and common intelligence measures, to assess mental ability. The mean and standard deviation for both groups (experimental and control) were calculated. Using the independent t-test, the results showed no statistically significant differences, as the calculated t-value (0.26) was smaller than the tabulated t-value (1.98) at a significance level of 0.05 and degrees of freedom (78). This indicates the equivalence of the groups in intelligence scores. Table (4) illustrates this:

**Table (4)** T-test Results for the Research Groups' Intelligence Test Scores

| Group | Sample Size | Mean | Standard Deviation | Degrees of Freedom | t-Statistic | Critical Value (0.05) | Significance Level |
|---|---|---|---|---|---|---|---|
| Experimental | 40 | 30.77 | 3.40 | 78 | 0.26 | 1.98 | Not Statistically Significant |
| Control | 40 | 31.00 | 3.55 | | | | |

**4. Divergent Thinking:**

Before beginning the experiment, the researcher administered a pre-test for divergent thinking to students in both groups (experimental and control). The responses of the students were collected, and the mean and standard deviation for both groups were calculated. Using the independent t-test, the results showed no statistically significant differences. The calculated t-value was 0.38, which was smaller than the tabulated t-value of 1.98 at a significance level of 0.05 and degrees of freedom (78). This indicates the equivalence of the groups in the pre-test for divergent thinking. Table (5) demonstrates this:

**Table (5)** *Mean, Standard Deviation, and T-test Values for the Pre-test of Divergent Thinking*

| Group | Sample Size | Mean | Standard Deviation | Degrees of Freedom | t-Statistic | Critical Value (0.05) | Significance Level |
|---|---|---|---|---|---|---|---|
| **Experimental** | 40 | 22.23 | 1.59 | 78 | 0.38 | 1.98 | Not Statistically |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | Significant |
| **Control** | 40 | 22.45 | 2.65 | | | | |

**4. Controlling Extraneous Variables (Internal and External Validity):**

**A. Internal Validity:**

In order to ensure the internal validity of the research, the researcher controlled the following variables:

1. **Sample Selection:** To eliminate the effect of individual differences between students in both the experimental and control groups, the researcher randomly selected both groups using the random method and ensured equivalence between the groups.
2. **Maturation:** This refers to any biological, cognitive, or psychological changes in individuals during the experiment, such as fatigue and growth, which may have a positive or negative effect on the research results.
3. **Associated Factors:** The duration of the experiment could allow external factors to influence the dependent variable. In this study, the teaching took place under conditions free from any significant incidents, and the duration of the experiment was equal for both groups, lasting for a full academic semester.
4. **Tools Used:** The researcher utilized the "Divergent Thinking Test" as part of the research procedures.
5. **Course Instructor:** The researcher herself taught both the experimental and control groups throughout the entire duration of the experiment.
6. **Experimental Attrition:** This refers to the loss of participants during the experiment. In this study, no students dropped out during the experiment.
7. **Testing Situation:** The researcher minimized this variable by having a time gap between the pre-test and post-test applications. Students were not informed in advance that they would be retested.
8. **Curriculum Content:** The material taught to both research groups in both schools was the same, specifically the first five chapters of the Comparative Education course. The researcher ensured that the content provided in each lesson was identical for both groups.
9. **Distribution of Sessions:** The weekly schedule was organized in agreement with the department administration so that the Comparative Education course was taught to both the experimental and control groups on Wednesdays and Thursdays.

**B. External Validity:**

External validity refers to the researcher's ability to generalize the results of the study to the larger population. To ensure external validity, the researcher addressed the following factors:

1. **Selection-Relation to the Experiment:** The effect of this variable was minimized by randomly selecting both the experimental and control groups.
2. **Interaction Between Pre-testing and Experiment:** The researcher applied the pre-test for divergent thinking, which might lead the students to become aware of the nature of the experiment. To mitigate this, the course instructor informed the students that the pre-test was for research purposes.
3. **Effect of Experimental Procedures:** The researcher herself taught both groups while maintaining the confidentiality of the experiment.

**5. Research Requirements:**

**1. Defining the Curriculum Content:**

The curriculum content for the study was defined as the first five chapters of the Comparative Education course.

**2. Formulating Behavioral Objectives:**

The researcher formulated 69 behavioral objectives based on Bloom's Taxonomy across six cognitive levels (Remembering, Understanding, Applying, Analyzing, Synthesizing, and Evaluating). These objectives were presented to a group of experts and evaluators in the fields of teaching methods, measurement, evaluation, and statistics to assess their accuracy, relevance to the course content, and the cognitive level they measured. Based on the experts' feedback, which included a consensus of 80% or higher, the objectives were revised linguistically and in terms of cognitive levels, retaining 69 behavioral objectives that aligned with Bloom's levels and course content.

**3. Preparation of Daily Teaching Plans:**

The researcher developed daily teaching plans for the Comparative Education course, preparing 16 plans for the experimental group and the same number for the control group. These plans were reviewed by experts for feedback and suggestions. After incorporating minor revisions based on their input, the final plans were approved, having received 80% or more agreement from the experts.

**6. Research Tool:**

**1. Divergent Thinking Test:**

The researcher designed a Divergent Thinking Test specifically for the current research. After reviewing several previous studies, none of the available tests were suitable for the study's objectives and sample. As a result, the researcher proceeded to construct a new test based on the following steps:

**1. Defining Divergent Thinking Skills:**

The researcher reviewed several studies and literature on divergent thinking skills and identified six key skills. After presenting these skills and their theoretical definitions to a group of experts, the most appropriate skills for the age group of the sample were selected. The experts agreed on the following six skills, as shown in Table (6):

**Table (6)** Divergent Thinking Skills

| No. | Skill |
|---|---|
| 1 | Associative Fluency |
| 2 | Intellectual Fluency |
| 3 | Fluency of Shapes |
| 4 | Verbal Fluency |
| 5 | Spontaneous Flexibility |
| 6 | Adaptive Flexibility of Meaning |

**2. Formulating Test Items:**

After agreeing on the six divergent thinking skills, the researcher reviewed available divergent thinking tests and created her own test consisting of six items. These items incorporated behavioral situations and varied types of questions, including both essay-type and objective questions, based on the nature of each primary and secondary skill definition.

**3. Test Validity:**

To ensure content validity, the researcher presented the test, its skills, definitions, and question distribution to a panel of experts and specialists in curriculum and teaching methods. They were asked to evaluate the relevance of the test items, their clarity, accuracy of wording, and provide suggestions for improvement. The researcher accepted items that received 80% or more agreement from the experts. Based on their feedback, some questions were reworded and adjusted to better suit the sample's level, thus ensuring the test's content validity.

**4. Pilot Testing of Divergent Thinking Skills Test:**

The researcher administered the test to a pilot sample of 25 students in the third year to assess the clarity of the test items, instructions, and timing. The results indicated that both the items and instructions were clear, and the average test duration was 35 minutes.

**5. Statistical Analysis of Test Items:**

To analyze the test items and evaluate their difficulty level and discriminative power, the researcher administered the test to a statistical analysis sample of 100 students from the Department of Educational and Psychological Sciences at Maysan University.

- **Item Discrimination Power:**

The researcher calculated the discrimination index for each test item. The values ranged from 0.37 to 0.62, which are considered good and indicate that the items are effectively distinguishing between different levels of student performance.

**6. Test Reliability:**

The researcher tested the reliability of the Divergent Thinking Skills Test by administering it to a pilot sample of 30 students. Using the Kuder-Richardson formula 21, the reliability coefficient was found to be 0.85, which is considered high and acceptable, indicating that the test has good reliability.

**7. Scorer Reliability:**

For the scoring process, the answers of the pilot sample were corrected by a colleague based on the model answers. Using the Kuder formula, the agreement rate between the two scorers was 0.93, showing excellent reliability in scoring. This confirmed that the test was ready for full implementation.

**8. Scoring the Test:**

The test items were scored on a binary scale (0 or 1), awarding one point for each correct answer. If the answer was incorrect or left blank, it received a score of zero. Each skill had a maximum of six correct answers, making the total possible score for the test 36 points. This method finalized the test in its final form.

**7. Procedure for Conducting the Experiment:**

To implement the experiment correctly, the researcher followed these steps:

1. The experiment was conducted at the beginning of the first semester of the 2024-2025 academic year, involving the two groups (experimental and control), with a total of 16 lectures for both groups.
2. The pre-test for divergent thinking skills was administered to both groups to ensure equivalence between them.
3. The experimental group was taught using the S.N.I.P.S strategy according to the prepared teaching plans for this strategy.
4. The control group was taught using the traditional method according to the prepared teaching plans.

5. At the end of the first semester, the divergent thinking test was administered to both groups, and the students' answers were scored according to the established correction method.

**8. Statistical Methods:**

The researcher used the Statistical Package for Social Sciences (SPSS) to analyze the research data.

## Chapter Four

## Presentation and Interpretation of Results

### 1. Presentation of Results

The first hypothesis is: (There are no statistically significant differences at the 0.05 significance level between the mean scores of the experimental group students who studied using the S.N.P.I.S strategy and the mean scores of the control group students who studied using the traditional method on the post-test of divergent thinking skills).

To achieve the second objective, the researcher corrected the students' answers. The results showed that the mean score for the experimental group was (26.36) with a standard deviation of (3.24), while the mean score for the control group was (23.03) with a standard deviation of (3.46). Using the t-test for independent samples to compare these two means, the calculated t-value was (3.82), which is greater than the critical value of (1.98) at the 0.05 significance level and 78 degrees of freedom, as shown in Table (7).

***Table (7)*** *Results of the t-test for the post-test of divergent thinking for the experimental and control groups*

| Group | Sample Size | Mean | Standard Deviation | Degrees of Freedom | Calculated t-value | Critical t-value at 0.05 level | Significance Level |
|---|---|---|---|---|---|---|---|
| **Experimental** | 40 | 26.37 | 3.24 | 78 | 3.82 | 1.98 | Significant |
| **Control** | 40 | 23.03 | 3.45 | | | | |

This indicates a statistically significant difference between the mean scores of the two groups on the divergent thinking post-test in favor of the experimental group, which was taught using the S.N.P.I.S strategy compared to the control group, which was taught using the traditional method. Therefore, the first null hypothesis is rejected.

The second hypothesis is: *(There are no statistically significant differences at the 0.05 significance level between the mean scores of the experimental group students who studied using the S.N.P.I.S strategy before and after the experiment on the divergent thinking test).* This hypothesis was posed to verify the second objective of the research, which is to identify the effect of the S.N.P.I.S strategy on developing divergent thinking.

To verify this hypothesis, the researcher compared the pre-test and post-test results of the experimental group on divergent thinking. The results showed that the mean score for the pre-test was (22.27) with a standard deviation of (3.17), and the mean score for the post-test was (26.37) with a standard deviation of (3.24). Using the t-test for paired samples to compare these two means, the calculated t-value was (16.06), which is greater than the critical t-value of (2.02) at the 0.05 significance level and 39 degrees of freedom, as shown in Table (8).

***Table (8)*** *Results of the t-test for the pre-test and post-test of divergent thinking for the experimental group*

| Test | Mean | Standard Deviation | Mean Difference | Standard Deviation of Differences | Degrees of Freedom | Calculated t-value | Critical t-value at 0.05 level | Significance Level |
|---|---|---|---|---|---|---|---|---|
| **Pre-test** | 22.27 | 3.17 | 4.10 | 1.40 | 39 | 16.06 | 2.02 | Significant |
| **Post-test** | 26.36 | 3.24 | | | | | | |

This indicates a statistically significant difference between the pre-test and post-test scores on divergent thinking for the experimental group, in favor of the post-test. This shows that the S.N.P.I.S strategy has an effect on developing divergent thinking in the experimental group. Therefore, the null hypothesis is rejected.

The researcher attributes the result to the fact that the S.N.P.I.S strategy helps in developing divergent thinking and addressing scientific situations in the subject of comparative education through the use of divergent thinking skills. During the implementation of the model's steps, students are encouraged to actively engage in divergent thinking by participating in diverse educational activities, which promotes them to apply what they learned in the subject.

Divergent thinking, as seen by Guilford, is the production of new information and generating ideas from given information, with fewer restrictions and a broader search process. It leads to the production of ideas and information abundantly, which aligns with deep learning styles. This type of thinking requires producing as many responses as possible to a single problem by looking at it from multiple perspectives, indicating deep understanding. A unique feature of divergent thinking is the variety of responses it generates, not limited to the given data, which aligns with the philosophy of the strategy. This does not mean it cannot lead to a unique solution but exists where trial-and-error thinking occurs.

Divergent thinking is not traditional, direct thinking in searching for solutions and facing life situations. Instead, it is reflective, deep thinking that requires the use of higher-order thinking skills in Bloom's taxonomy such as analysis, synthesis, and evaluation. Thus, divergent thinking differs from other thinking styles by offering multiple potential answers or solutions that are not necessarily confined to available information, embracing creative solutions that compete for higher scores.

**2. Effect Size Calculation:**

The effect size for the S.N.P.I.S strategy in developing divergent thinking was calculated using the independent group effect size measure, which involves calculating eta squared ($N^2$):

**1. Effect size for the post-test of divergent thinking:**

n2=(t2)(t2+df)=(3.82)2(3.82)2+57=0.20n² = \frac{(t²)}{(t² + df)} = \frac{(3.82)²}{(3.82)² + 57} = 0.20n2=(t2+df)(t2)=(3.82)2+57(3.82)2=0.20

According to Table (9), the effect size value of (0.20) is large.

**Table (9)** Reference for determining effect size levels in psychological and educational sciences

| Effect Size | Small | Medium | Large |
|---|---|---|---|
| **Effect Value** | 0.01 | 0.06 | 0.14 |

**2. Conclusions**

Based on the results obtained, the researcher can conclude the following:

1. The S.N.P.I.S strategy can be applied to students in the Department of Educational and Psychological Sciences.

2. Teaching using the S.N.P.I.S strategy encouraged students to feel that they were the source of information, which increased their self-confidence through active participation in class by asking questions, clarifying, predicting, and summarizing.
3. The effectiveness of the S.N.P.I.S strategy in developing divergent thinking in students of the Department of Educational and Psychological Sciences.

4. **Recommendations**

In light of the results of this study, the researcher recommends the following:

1. Teachers of the subject of comparative education should be directed not to rely solely on traditional methods of teaching, but rather focus on modern models, methods, and strategies, including the S.N.P.I.S strategy.
2. The S.N.P.I.S strategy should be adopted in teaching comparative education to students in the Department of Educational and Psychological Sciences.

5. **Suggestions**

To complement this study, the researcher suggests conducting further studies as follows:

1. Conducting a similar study to investigate the effect of the S.N.P.I.S strategy on the academic achievement of students in the Department of Educational and Psychological Sciences in the subject of teaching methods and developing their critical thinking.
2. Conducting a study to examine the effect of the S.N.P.I.S strategy on acquiring concepts in other educational stages, such as middle school or high school.

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