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## THE IMPACT OF PROBLEM SOLVING STRATEGY IN THE DEVELOPMENT OF CREATIVE THINKING AMONG THE SECOND MIDDLE SCHOOL STUDENTS IN THE CITY OF TABUK

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**ABSTRACT:** The study aimed to identify methods that can help the teacher in developing the students' creative abilities, identify the steps of the problem solving strategy, and identify the impact of the problem solving strategy in the development of creative abilities (fluency, original flexibility and expansion) among The second middle school students in the city of Tabouk To achieve the objectives of the study, the researcher followed the semi-experimental approach. The study tool was applied to a random sample of (54) female students of the second middle grade in Tabuk city, The researcher reached the following results: There were statistically significant differences at the level of (0.01) in the ability of fluency and flexibility for the benefit of the students of the experimental group who were trained in problem solving strategy, and the absence of statistically significant differences at (0.01) level of originality and addition between the experimental group and the control group.

**KEYWORDS:** problem solving, intermediate stage, creative thinking.

#### **INTRODUCTION**

Over the last two decades, there has been an interest in developing the creative abilities of the learner and the need to search for methods that contribute to the development of these capabilities. Therefore, the various approaches and methods that achieve this goal. The problem solving strategy is one of the most prominent methods through which the learner can organize his mental processes in dealing with the problematic situation, Especially the problems that he did not pass through, because it encourages the learner to discover and face the various problems in life, and it can be applied in all life situations, and the transfer of the impact of training from one position to another.

According to some researchers, interest in the problem-solving strategy began at the hands of John Dewey (1910) through his book How to Think, and then increased attention clearly in 1945, through the number of studies conducted by Wethermer (1945), and studies done by In his book "The Art of Thinking", Garaham Wallas identified the stages of problem solving. This strategy was adopted by many organizations and centers that are interested in developing creative abilities in the United States and other countries (Ching & Ruey: 2002, p35).

Today, educators see a problem-solving strategy as "a way for students to learn new scientific concepts and as a way to challenge their previous knowledge structures and challenge the usual reference frameworks by posing new problems in new situations that force students to think deeply about their thinking. Which leads to the development of creative abilities, and develop self-confidence, and develop the spirit of adventure and curiosity and seek to visit the unknown,

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"The problem-solving strategy gives students a more effective role to participate in all aspects of life in this changing world." (Britz, 1993, 12).

According to Al-Rashidi (2005, 113), "problem solving is nothing but a kind of learning that is similar in nature to other types of complex relationships and subject to the same laws as it is subject to., And learns the solution in accordance with the law of impact or reinforcement, and solve problems in the form of searching for information on a problem that is not available to solve, rearrangement and evaluation, and requires a discovery of relations between means and ends more than other forms of learning, and the difference in degree not in Type".

Gack (1986, 100) and Krelik (1977: 52) call for the early training of the learner from a young age on a problem solving strategy because it helps him to meet the challenges and enables him to achieve harmony in his life and achieve his goals.

This study comes to reveal the importance of early planning to train Female students on problem solving strategy and its impact on the development of their creative abilities, especially after the increasing recommendations in the Arab world that call for this.

#### The Study Problem:

The problem of the study is to identify the impact of the problem solving strategy on developing the creative abilities of The second middle school students in the field of family education in the city of Tabuk.

The study problem can be identified by answering the following questions:

1. Are there statistically significant differences at the level of (0.1) between the average scores of the experimental group and the Female students of the control group for fluency skill due to the implementation of the problem solving strategy?

2. Are there statistically significant differences at the level of (0.1) between the average scores of the Female students in the experimental group and those in the control group for flexibility skill due to the implementation of the problem solving strategy?

3. Are there statistically significant differences at the level of (0.1) between the average scores of the experimental group and the Female students of the control group of the originality skill due to the implementation of the problem solving strategy?

4. Are there statistically significant differences at the level of (0.1) between the average scores of the students of the experimental group and the Female students of the control group for the skill of adding or expanding due to the implementation of the problem solving strategy?

#### **Objectives of the study:**

This study seeks to achieve the following objectives:

1 - to reveal the methods that can help the teacher in the development of creative abilities of Female students.

2. Identify the steps of the problem-solving strategy.

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3- Identifying the impact of the problem solving strategy in the development of creative abilities (fluency and originality flexibility expansion) of The second middle school students in the field of family education in the city of Tabuk.

#### The Importance of the Study:

The importance of the study is as follows:

1 - The development of creative capabilities has become a general goal of the projects of the development of education in all Arab countries, and may contribute to this study to reveal the effectiveness of this strategy in the development of creative abilities of Female students.

2 - This study deals with the development of the capacity of Female students at an important age. Late childhood is considered to be the most important stage in the learner's life as it is an essential stage in shaping his mind and personality.

3 - Determine the level of creative abilities of students in The second middle school students intermediate in the city of Tabouk after training on problem solving strategy.

4 - This study is complementary to a series of studies aimed at discovering ways to help develop the creative abilities of students.

#### **Terminology of study:**

Problem Solving Strategy:

Ciltas. (2012, 112) defines it as one of the ways in which the learner takes an active and effective role as he faces a puzzling situation or new questions that challenge his thinking and requires a solution to think and use observation, hypotheses and experimentation in order to arrive at acceptable explanations and solutions supported by evidence And the facts for this problem, under the guidance and guidance of the teacher.

"This method is used to deal with all types of science so that it can be used as necessary and useful, in classroom and non-classroom situations, in everyday life" (Dagseven, 2012, 1416).

It is intended in this study that it is a strategy based on the organized mental activity of the student begins to consult the student's thinking of the problem of what deserves to think and search for the most possible solutions in accordance with scientific steps to reach the best solution to the problem, through the practice of a number of educational activities that can contribute to Developing the creative abilities of the learner.

#### **Creative Capabilities:**

The creative capabilities of this study were determined by (fluency, flexibility, originality, addition or expansion).

Fluency: This skill refers to the ability of the individual to produce as many ideas as possible about a subject in a given period of time.

Flexibility refers to the ability of the individual to change his or her thinking by changing the situation in which he or she experiences multiple responses that do not belong to one category, ie, the individual takes more than one approach to all possible ideas or responses. Authenticity: This skill refers to the ability of the individual to produce new ideas or solutions

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that are unfamiliar to the problem, that is, the individual who is characterized by this skill does not repeat the ideas of others.

Addition: This skill refers to the ability of the individual to give new additions and increases of a certain idea. The student with the ability to detail is described as a person who can deal with an idea or work and then define its details. It can also address a simple idea or simple outline of a topic and then expand it and chart its steps that lead to it being practical(Al-Atoum, 2011, 112-114).

#### Theoretical framework and previous studies:

The follower of the problem-solving strategy finds itself confronted with several models that present the steps of strategic problem solving. This may be due to different problems in form and degree of complexity. Before we review these models, we must define the conditions that must be met to achieve the creative solution to the problem.

- To think of the individual in as many solutions as possible.
- The solution is funky.
- The intellectual has a high degree of motivation.
- Be patient.
- Think about multiple directions. (Stein, 1975, 35).

Several models have emerged that present strategic steps to solve problems, including: The five steps to solve the problem identified by John Dewey (1910) in his book How do we think? These steps are:

1. Recognize that there is a problem: awareness of the difficulty of feeling a sense of failure.

2. Identify the problem: Clarify and define the design of the target to search and then define the situation that represents the problem.

3. Use of past experiences: such as appropriate information and known solutions or ideas to build proposed hypotheses.

4. Probability testing (possible solutions): The problem may be reformulated if necessary.

5 - Evaluating the solution: It includes the derivation of general results based on proof, and also includes the contribution of successful solution in the understanding of the person and apply it from other examples of the same problem. "(Bakr: 2002, 271-272).

Brits (1993) identified the steps to solve the problem as follows:

- Identify the problem.
- Production of solutions using brainstorming strategy.
- Determine the optimal solution.
- Ensure that the solution to the problem is appropriate.

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According to Abu Zeina et al (2007, 113), Justin developed a model for problem solving training and developed it as follows:

Identify the problem: (1) Identify the exact problem.

Objective: (2) Decide the goal.

Delayed Delay: (3) Think before you act.

Generation of Alternatives: (4) Think of a number of solutions that can lead to a solution. Consider the results: (5) Think of different things after each solution.

Implementation: (6) When you think you have already found a good solution, try it. Replay: If not the first solution chosen well. Try to get back to the beginning.

zaytun (2004, 69) presented a problem-solving model consisting of the following phases:

- Identify the dimensions of the problem accurately.
- Focus on the most relevant elements of the situation.
- Reformulation of the problem.
- Recognizing new relationships between elements.
- Reorganization of relations.
- Issue many solutions related to the problem.
- Providing a variety of solutions to the problem.
- Access to new solutions to the problem.
- Review and evaluate these solutions.

Clinten and Fakhro (2000, 24-25) identified problem solving steps in six stages: Sensation / sense of problem / disorder.

2 - inventory / collect information on this dilemma / problem.

- 3. Identify the problem.
- 4. Compilation of thought.
- 5 inventory solutions.
- 6. Accepting the solution.

It can be said that the strategy of solving problems in the educational situation goes according to the following steps:

1 - Sense of the problem: This step is important for the success of this strategy, and is one of the difficulties in the strategy of solving problems, as the teacher may choose a superficial problem does not need to think many students. So he should choose from problems

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commensurate with the level of mental students, and should raise the problem of thinking students, and push them to seek solutions to them.

2. Identification of the problem: Qatami (2001: 275) has identified the indicators to achieve this step and to understand its nature and components by:

- Students' understanding of the problem.
- The ability of students to analyze the elements of the problem.
- Achieving the criterion on the performance picture of students.
- Factors are better divided into their components within the problem.

The teacher can accept the following allegations as an indicator of students' achievement of skill:

- To shorten the problem in specific and precise words.
- Identify keywords that are key components of the problem.
- To list the elements in the problem.
- to list similarities of these elements in the issues of budget.

3 - Generation of possible solutions to the problem: The student in this step to mention as many as possible of the various non - traditional solutions, and identify the relationships between them, and then identify and formulate a number of them as possible solutions to the problem. This step is usually influenced by the amount of prior knowledge and experience of the students, and also by the extent to which students practice this strategy. In this step, students are trained in basic creative thinking skills. (Ability to generate different alternatives and consideration of the problem from different angles), originality (ability to recognize new relationships, bring unconventional solutions), details (ability to add details of potential solutions), sensitivity to problems. The teacher should draw students' attention to the need to use all the information given, and experience to solve the problem.

4 - Test solutions to reach the optimal solution: This step requires students to collect evidence and information that support or reject the solutions already written in the previous step, in order to arrive at the optimal solution to the problem. To develop students' skills in this step, the teacher asks them the following question: Can the solution be validated?

5 - Testing and verification of the optimal solution: The student at this stage to test the validity of the solution or the hypothesis that he reached and to ensure appropriate to solve the problem, whether trial or observation or any other appropriate tool.

"These stages are a kind of logical thinking in the processes that an individual may exercise in addressing a particular problem. It can be used by shedding more light on problem solving strategies so that they become closer to study and understanding. However, the learner does not necessarily follow this sequence when facing a problem situation, The solution to the successful problem depends on the availability of two basic conditions: the transition from easy problems to the most difficult problems, from simple solutions to complex solutions, and the

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principles of discovery: Try serious learner in a To search for, and access to, the relationships, principles, rules and laws that lay the desired solution (Devens-Seligman, 2007).

Learning to solve the problem, as in the case of learning concepts, has been influenced by a number of different factors, some of which are related to the nature of the problem itself, such as its plainness, difficulty or clarity, or the availability of information about it, some of which relate to the learner himself, his or her previous experiences, abilities, I wrote by the nature of the problem or the extent of his ability to persevere and bear ambiguity, The interaction of these two types of factors affects the strategies of the learner in solving the problem that they face; therefore, it must be taken into account when training to solve the problem in the normal school conditions (Finan, 2005, 14).

The implementation of this strategy requires that students be placed in positions and problems that are important and relevant to their reality, while challenging their thinking and pushing them to research and collect the necessary information and verifying their validity in order to find a solution (Lin & Cho, 2011, 110).

The teacher has a major role to play in achieving the desired objectives of using this strategy. The teacher should feel free to think about the psychological and physical security of the punishment. He should also train them on how to accurately identify the problem and how to formulate appropriate hypotheses and direct them to make use of all available sources to reach as many solutions as possible. Tradition, because we do not know which solutions are more appropriate than others before analyzing, testing and comparing them(Maan, 2006, 102).

When talking about a problem-solving strategy, it is necessary to distinguish between a problem solving strategy that is commonly used in the educational process in one sense:

- Problem solving strategy in a familiar way.
- Problem strategy in creative ways.

These strategies differ from each other in the goal, in how they are dealt with, and in the desired outcomes. This strategy requires the student to have basic creative thinking skills (fluency, flexibility, originality, and details) so that the student can identify the problem and realize its dimensions, requirements and possible solutions. , And the result of this strategy is to reach creative solutions. The problem solving strategy is in a familiar way. The aim is to arrive at an appropriate solution to the problem. It is not required for authenticity. In the process of thinking, the student does not use all the skills of creative thinking. It may be limited to my skills of fluency and flexibility. But can accept and favor logical solutions, although they have been reached by others as long as they represent an appropriate and satisfactory solution to the problem (Moma & others, 2013, 152).

#### **Previous studies:**

Due to the importance of the strategy of solving problems in the development of creative abilities of students has been referred to these studies, whether Arab or foreign, to explore the location of this study of studies and research in this area, the following is a chronological presentation of these studies:

Proudfit (1981) conducted a study to compare the impact of two teaching methods on the performance of fifth graders in problem solving. The sample consisted of 24 students from the

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fifth grade who were randomly divided into two groups to ask themselves a set of questions according to the polyia model: understanding the problem, designing the solution plan, implementing the solution, and reviewing the solution. The second experimental group in which the researcher trains the students to solve the largest number of problems. The researcher used the individual interview strategy for students to learn about their problem solving processes. Among its most important findings:

1 - There are statistically significant differences between the experimental group and the control in the performance of problem solving for the benefit of the experimental group. There are no statistically significant differences between the two groups in understanding the problem.

The study sample consisted of (236) students of the first grade secondary, and were divided into two experimental groups, and control, The study found that the experimental group was superior to the control group in creative capacities.

The study of Gore and Sammehfeld (1985) sought to compare the impact of the problemsolving strategy among creative and non-creative students. The study sample consisted of 227 randomly selected students. The study found that the level of problem solving is influenced by the creative abilities of students.

Al-Rashidi's study (2005) aimed to demonstrate the impact of a study strategy in solving problems in achievement and creative thinking. The study used the semi-empirical method on a sample of (71) students in Oman, randomly divided into two control groups. The study revealed statistically significant differences in achievement, fluency and elasticity, and overall ability of creative thinking for the experimental group. The results did not show statistically significant differences in originality between the control and experimental groups. Hall also aimed to identify whether sex, grade level, and level of creativity had an impact on the use of strategies to solve the mathematical problem and ways of solving it when dealing with The study results showed that there were no statistically significant differences in the number of solution methods attributed to the grade level, while there were statistically significant differences in the number of solution methods attributed to gender in the study. The sixth grade was in favor of females, while there were no differences And the results showed that there is no relationship between the degree of creativity and the number of solutions in students.

The study of Ciltas (2012) aimed to examine the effect of mathematical modeling on the level of creative thinking among university students. The researcher used the semi-experimental method. The mathematical modeling method was applied to a group of students from a university in Turkey while applying the control group The results showed that the method of teaching applied to the experimental group had a positive effect on the levels of creative thinking among students.

Moma, Kusumah, Sabandra & Afgani (2013) conducted a study aimed at developing creative thinking for high school students through productive learning. The study sample included 191 students who were divided into experimental and control groups. The study was used as a measure of thinking Mathematical creativity, in addition to a learning-based learning program applied to the experimental group, the results indicated that the experimental group surpassed the control group in the ability to think creatively sports, while the results did not reveal a

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statistically significant interaction between the learning method and the school level in the development of Creative mathematical thinking among students.

#### **METHODOLOGY:**

Since the study seeks to know the impact of problem solving strategy in developing the creative abilities of the second middle school students in the field of family education in Tabuk city, the researcher followed the semi-experimental approach to achieve the objectives of the study. Non-experimental variables that may affect the search results have been adjusted to ensure that the experimental and control groups are equal.

#### The study population:

The sample of the study was randomly selected from the first grade students in the field of family education in the city of Tabuk from the middle school(24). The study sample consisted of (54) female students in the first grade. Two students were randomly selected to represent one experimental group and the other control group

#### **Study tool:**

The researcher developed a scale for measuring creative abilities after returning to the second grade intermediate curriculum (family education), the second unit (household affairs).

It was applied to intermediate second grade female students, and the following table illustrates the exercises included in the scale.

Table (1) shows the exercises included in the final image of the creative capacity scale and the time taken in the responses

| Exercise<br>Number | Exercise Practice Statement  | Response Time   |
|--------------------|--|-----------------|
| 1                  | Call words about household appliance names                               | about 4 minutes |
| 2                  | Call for three uses of electricity                                       | 2 minutes       |
| 3                  | Call three uses related to water   | 2 minutes       |
| 4                  | Create words from spherical letters related to electricity               | 3 minutes       |
| 5                  | Create a word from water-related letters                                 | 6 minutes       |
| 6                  | Call words that have the same meaning as the given word "synonyms"       | 3 minutes       |
| 7                  | Remember the student fundamentals of dealing with household appliances   | 5 minutes       |
| 8                  | Proposing three methods to rationalize water and electricity consumption | 5-minute        |

### **Study Procedures:**

In this study, the researcher applied the scale in a tribal application at the beginning of the first semester (1439/1440). The second grade teachers were trained on the problem solving strategy and were asked to apply it during their teaching to the students during the semester, Application away.

The researcher also prepared a plan to teach the second unit of the family education book for the first grade according to the average problem solving strategy (Appendix 1).

## Apply the metric propositionally:

The scale was applied in advance to ensure that the pupils of the experimental and control groups were equal in creative abilities. This is illustrated by the following table:

Table (2) shows the tribal application of the creative capacity scale of the experimental and control groups

| Skill             | the group    | Average | standard deviation | Т    | sig  |
|-------------------|--------------|---------|--------------------|------|------|
| Fluonov           | Experimental | 24.56   | 3.89               | 0.58 | 0.01 |
| Fluency           | Control      | 23.98   | 3.92               |      |      |
| Flowibility       | Experimental | 25      | 3.71               | 1.04 | 0.01 |
| Flexibility       | Control      | 23.98   | 3.92               |      |      |
| Authenticity      | Experimental | 5.58    | 0.76               | 0.40 | 0.01 |
|                   | Control      | 5.49    | 1.16               |      |      |
| Extensions Expand | Experimental | 10.62   | 1.94               | 0.95 | 0.01 |
|                   | Control      | 10.05   | 1.93               |      |      |

Table (2) shows that there are no statistically significant differences at the level of (0.01) among the students of the experimental and control groups in the tribal application of the measure of creative abilities, which confirms the equivalence of the study groups in their creative abilities before training them on problem solving strategy.

## RESULTS

After the implementation of the study procedures, the analysis of statistical data obtained the following results:

First: Results related to the first question, which states: Are there statistically significant differences at the level of (0.1) between the average scores of the experimental group and the students of the fluency master group due to the implementation of the problem solving strategy?

The researcher conducted a (T) test of the differences between the scores for fluency levels, and the following table illustrates these results.

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Table (3) The results of the post application demonstrate the creative capacity scale of the<br/>experimental groups and control of fluency.

| The experimental group |                    | Control group |                    | Т    | sig                     |
|------------------------|--------------------|---------------|--------------------|------|-------------------------|
| Average                | standard deviation | Average       | standard deviation | 6.14 | Statistical function at |
| 69.12                  | 3.56               | 63.37         | 3.57               |      | (0.01)                  |

From the previous table, there are statistically significant differences at the level of (0.01) in the fluency ability for the students of the experimental group who were trained in problem solving strategy.

Second: Results related to the second question, which states: Are there statistically significant differences at (0.1) between the average scores of the experimental group and the control group?

The researcher conducted a test (T) for the differences between the elasticity of the elasticity and the following table shows the results.

Table (4) shows the results of the post-application of the creative capacity scale of the experimental groups and the control of resilience.

| The experimental group |                    | Contro                     | l group | Т    | sig                     |
|------------------------|--------------------|----------------------------|---------|------|-------------------------|
| Average                | standard deviation | Average standard deviation |         | 5.56 | Statistical function at |
| 68.52                  | 3.49               | 63.37                      | 3.57    |      | (0.01)                  |

From the previous table, there are statistically significant differences at the level of (0.01) in the elasticity capacity for the students of the experimental group who were trained in problem solving strategy.

Thirdly, the results related to the third question, which states: Are there statistically significant differences at the level of (0.1) between the average grade of the students of the experimental group, and the students of the control group of the originality skills attributed to the implementation of the problem solving strategy?

The researcher conducted a test (T) for the differences between the scores of the capacity of originality, and the following table illustrates these results.

Table (5) shows the results of the post application of the creative capacity scale of the experimental and control groups of originality capacity.

| The experim | ental group        | Contro                     | l group | Т    | sig               |
|-------------|--------------------|----------------------------|---------|------|-------------------|
| Average     | standard deviation | Average standard deviation |         | 1.22 | Not<br>functional |
| 8.76        | 0.50               | 8.59                       | 0.68    |      | Tunctional        |

The previous table shows no statistically significant differences at the level of (0.01) of the originality capacity between the experimental group and the control group.

Fourthly, the results related to the fourth question, which states: Are there statistically significant differences at the level of (0.01) between the average scores of the students of the experimental group and the students of the control group of the extension skill due to the implementation of the problem solving strategy?

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The researcher conducted a test of the differences between the mean scores of the additive capacity. The following table illustrates these results.

Table (6) shows the results of the post application of the creative capacity scale of the experimental and control groups of originality capacity.

| The experimental group |                    | Control group |                    | Т    | sig        |
|------------------------|--------------------|---------------|--------------------|------|------------|
| Average                | standard deviation | Average       | standard deviation | 0.28 | Not        |
| 8.08                   | 0.80               | 8.03          | 0.93               |      | functional |

From the previous table, there are no statistically significant differences at the level of (0.01) of the addition capacity between the experimental and control groups.

The results of this study show that the impact of the problem solving strategy on the development of the ability (fluency and flexibility) of the experimental group at the expense of the students of the control group is very clear.

The results of this study also show that the impact of the problem solving strategy is not clear in the development of the ability (authenticity and addition) of students in the experimental group.

#### **Recommendations:**

1 - Training teachers on problem solving strategy to contribute to the development of creative abilities of students.

2 - Include content in the curriculum attitudes and problems that challenge the buildings of mental pupils.

3 - interest in the development of the creative abilities of students through strategies and methods that have proven educational studies effectiveness.

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# Annex (1) the teaching plan for the social skills unit for first grade students is average in family education.

Grade: The second is average First semester Subject: Family Education

## Unit Title: household affairs Pages: 20 pages Time Period: From:-1440/1/14 1440/2/14

|  | Materials and   |                    | Evalu                            | ation  |   | Self-   |
|--|---|--------------------|----------------------------------|--|---|---|
| Products   | equipment Teaching<br>(Learning strategies<br>Resources)  |                    | Strategies                       | Tools  | Escort activities   | reflection<br>about unity   |
| At the end of the unit,<br>the student is expected<br>to:<br>1. Summarize things to<br>consider when buying<br>home appliances.<br>2. Distinguish between<br>home appliances in<br>terms of care methods.<br>3. Improved handling<br>of home appliances.<br>4. The rationalization<br>of her life is used when<br>using water and<br>electricity.<br>5. Appreciate our<br>property efforts in<br>providing electricity<br>and water. | school book<br>work papers<br>Photos and<br>drawings<br>And<br>explanatory<br>panels<br>Blackboard<br>and chalk<br>Internet | Problem<br>Solving | Observation<br>Communicat<br>ion | Monitoring<br>list<br>Give<br>appreciation<br>Oral<br>questions<br>About the<br>subject<br>And<br>supervision<br>of<br>Implementat<br>ion of<br>activities | Research<br>Reports<br>Activities<br>in the<br>classroom<br>Wall<br>paintings | I feel good<br>about:<br>Challenges<br>Optimization<br>proposals: |