

the effect of using Metacognitive Strategy in teaching Maths on achievement and development of Creative thinking of preparatory school students

Summary

This Summary tackles the research problem , limits , aims , significance , hypotheses , procedures , results , recommendations and suggestions in light of the attained results .

Introduction :

Thinking in general and creativity specifically as a pattern of thinking are necessary for the current age because of the variant problems we face . These problems need more effective and convenient solutions suitable for various situations . In addition , developing the creative abilities of learners is one of the most prominent aims of contemporary education . So , creativity has become one of the common ideas in many conferences , symposium and seminars . Thus , being concerned with education requires directing extra case for creativity and thinking processes .

Mathematics is one of the subjects that aim at developing creativity . It can be taken as a means for developing students' creativity as the deductive structure of Maths is flexible enough to provide for different ways of organizing the content i.e. from the whole to the part or from the part to the whole . Maths as a subject is also rich in situations and problems which can direct students to find new different solutions for them . In Addition studying Maths trains student to criticize situations objectively .

The Research Problem :

The problem is that there are many defects which hinder the achievement of the educational aims of creativity and problem-solving. Maths has become just a kind of information transferring subject taught without any use of creative thinking or even awareness of thinking . consequently , This requires searching for new strategies for teaching Maths .

This research attempted to find answers for the following question

What is the effect of using Metacognitive Strategy in teaching Maths on achievement and development of Creative thinking of preparatory school students ?

From the above main question , the following sub – questions could be derived :

- 1- What is the effect of using Metacognitive Strategy in teaching Maths on the achievement of preparatory school students ?
- 2- What is the effect of using Metacognitive Strategy in teaching Maths on developing creative thinking of preparatory school students ?
- 3- What is the relation between achievement and developing creative thinking in Maths through using Metacognitive Strategy ?

The Research Limits :

The research is limited to :

- ◆ A sample of second year preparatory students of Fayoum schools for the scholastic year (2006-2007) .
- ◆ Creative thinking skills (Fluency , Flexibility , Originality , problem sensitivity) defined by the related literature and previous studies .
- ◆ Relative Numbers unit as it is suitable for Metacognitive Strategy and Creative thinking skills .
- ◆ Metacognition Strategy (Modeling) suggested by Wilen & Phillips as it is suitable for teaching the selected unit and creative thinking skills .

The Research Aims :

The research aims at :

- ◆ Introducing a model to show how to teaching according to Metacognitive strategy
- ◆ Defining the effect of using Metacognitive Strategy in teaching Maths on the achievement of prep students .
- ◆ Defining the effect of using Metacognitive Strategy in teaching Maths on developing creative thinking of prep students .
- ◆ Defining the relation between achievement and developing creative thinking in Maths through using Metacognitive Strategy .

The Research Significance :

The research would help :

- ◆ Teachers in learning about the use of Metacognitive Strategy in teaching Maths .

- ◆ Researchers in dealing with new approaches related to Metacognition .
- ◆ Teachers and researchers in making use of achievement test , creative thinking test in Maths prepared by the researcher .
- ◆ Curricula designers in taking into account the Metacognitive Strategy when constructing the curricula .

The Research Methods :

The researcher made use of :.

The experimental method :-

It is used in dividing the sample randomly into two groups , the experimental group and the control one . The research tools (the achievement test , creative thinking test in Maths) were administered prior to the experiment to assure of the equality two groups. After the introduction of the study's suggested unit using the Metacognitive Strategy to the experimental group , and using the traditional method with the control group , the tools were administered to both groups . concerning the statistical analysis , the researcher employed the "T" test to clarify the significance of differences between means of scores of both the control and experimental groups .

The Research Hypotheses :

The researcher tested the following hypotheses :

- 1- There is a statistically significant difference between means of scores of the experimental and control groups in the post administration of the achievement test in favor of the experimental one .
- 2- There is a statistically significant difference between means of scores of the experimental group in the pre and post administration of achievement test in favor of the post test .
- 3- There is a statistically significant difference between means of scores of the two groups in the post administration of creative thinking test in Maths in favor of the experimental group .
- 4- There is a statistically significant difference between means of scores of the experimental group in the pre and post administration of creative thinking test in Maths in favor of the post test .
- 5- There is a statistically significant correlative relation between the experimental group scores in achievement and creative thinking in Maths

The Research Procedures :

The research followed the coming steps :

- 1- Reviewing the related literature and previous studies dealing with :
 - creative thinking in general and in Maths specifically
 - Metacognition and its strategies .
- 2- Preparing " **The student's booklet** " of relative numbers including the activities carried out by the students and showing it to the jury members to judge its validity and adjust it in light of their comments .
- 3- Preparing " **The teacher's guide** " including the methods of teaching to be used in teaching " relative numbers unit " in light of Metacognitive Strategy and showing it to the jury members to judge its validity and adjust it in light of their comments .
- 4- Preparing " **The achievement test**" , ensuring its validity and reliability and determining its duration .
- 5- Preparing " **The creative thinking test in Maths** " , ensuring its validity and reliability and determining its duration .
- 6- Selecting the research sample and dividing it randomly into two groups , the experimental group and the control one .
- 7- Administering the tools to the two groups gaining pre- data and analyzing it statistically .
- 8- Teaching " relative numbers unit " using Metacognitive Strategy to the experimental group , and the traditional method with the control group
- 9- Administering the tools (the achievement test , creative thinking test in Maths) to the two groups .
- 10- Recording the results , analyzing them and formulating the research conclusions .
- 11- Suggestions and recommendations .

The Research Results :

In the light of the previously introduced procedure , the results reveal that :

1. There is a statistically significant difference between means of scores of the experimental and control groups in the post administration of the achievement test in favor of the experimental one .
2. There is a statistically significant difference between means of scores of the experimental group in the pre and post administration of achievement test in favor of the post test .
3. There is a statistically significant difference between means of scores of the two groups in the post administration of creative thinking test in Maths in favor of the experimental group .
4. There is a statistically significant difference between means of scores of the experimental group in the pre and post administration of creative thinking test in Maths in favor of the post test .
5. There is a statistically significant correlative relation between the experimental group scores in achievement and creative thinking in Maths

The Research Recommendations :

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

- 1- Preparing a program to train in service teachers in using Metacognitive Strategies while teaching Maths for developing creative thinking .
- 2- Encouraging Maths teachers to use Metacognitive Strategies in teaching as they students aware of their thinking .
- 3- Focusing on using modern methods and approaches in teaching Maths and avoiding the traditional ones which concentrate on memorization without taking care of the students effective participation .
- 4- Using the methods which develop creative thinking in Maths learning and education in all educational stage , starting with kindergarten to the stage of higher studies so as to concentrate on the learning skills required for the changing future .
- 5- Producing educational aids which help in teaching Maths and helping students reveal their creative abilities .
- 6- Creating an educational environment distinguished by freedom , safety and stability to achieve , creativity and its development .
- 7- Abridging the curriculum to allow teachers to device more time for thinking and creative thinking .
- 8- Reviewing Maths curricula , their content and their organization and presenting them in attractive and interesting ways which

foster the creative abilities of the students , depend on research and experimentation and avoid concentrating on memorization .

- 9- Reviewing current assessment methods by including questions that measure the creative aspects to help students to think creatively .
- 10- Developing Maths preparation programs and the inservice training programs in an attempt for modifying teachers attitudes towards creativity and innovators and preparing a creative teacher acquainted with science and knowledge and aware of education , its methods and approaches , its duties and its creative aspects to help students develop their creative abilities .
- 11- Preparing educational programs that depends on teaching and learning Maths for developing creativity at variant educational stages depending on the fact that creativity is a phenomenon that could be learned .
- 12- The school administration should pay attention to setting creative activities , Maths groups , Maths clubs and competitions , in addition to establishing schools which take care of inventions and attract creative and gifted (talented) students .

The Research Suggestions :

In the light of the research results , the researcher recommends conducting the following studies :

1. Studying The effect of using Metacognitive Strategy in teaching Maths on the development of other learning aspects (e.g. different thinking ways , learning retention) .
2. Studying The effect of using other Metacognitive Strategies in teaching Maths on developing creative thinking .
3. Conducting research works dealing with different methods of teaching and their effect on developing achievement and creative thinking of prepatory other stages students and through teaching maths (e.g role playing , constructive learning , teaching though multiple intelligences).
4. Conducting research works about using integrative teaching methods and their effect on developing achievement and creative thinking of prepatory students (e.g concept maps , learning cycle , mind maps , cooperative learning).
5. Studying the development of metacognition awareness of students studying Maths .

6. Studying the effect of using suggested teaching Strategies and educational programs on developing metacognitive skills .
7. Studying the effect of using suggested teaching Strategies and educational programs on developing creative thinking in Maths .