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The Science Instruction Journey Model for Preparatory Stage Students' Acquisition of Scientific Concepts and Developing Some of their Creative Thinking Skills

An MA thesis

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2015

Introduction

Scientific education is concerned with facing the challenges of the third millennium knowledge in all its fields- in particular the natural science field. It is also concerned with planning modern educational models capable of establishing a conscious generation for a better society.

Because of their scientific knowledgeable base, natural science curriculums help individuals face era challenges, shape their mentality and personality, keep pace with the scientific and technological progress and acquire science methods. It is argued that it is important for students to acquire scientific connotations because they are considered the mainstay of sciences.

Despite the importance of students' acquisition of such connotations, there is some kind of shortcoming. So, there is a need for choosing the suitable strategies and techniques that enable students to acquire and develop these connotations which, in turn, help them solve problems in educational environments.

The communications and information technology revolution challenges make it important to acquire reasoning skills imposed by the third millennium. This led educational institutions to work on developing different types of reasoning in general, and creative thinking skills in particular, through offering an educational environment which motivates thinking and teach learners how to think; what to think about.

"Instruction Journey Model" is assumed to be suitable here since it combines different strategies and methods in one model.

The researcher found that there is a shortcoming in the pupils' acquisition of scientific concepts and creative thinking. It is also helpful to investigate the effect of using

Instruction Journey Model in science on the pupils' acquisition of scientific concepts and developing some of their creative thinking skills.

The problem of the study:

The main problem is that there is some kind of shortcoming in the traditional methods of teaching science. This led to a problem in acquiring scientific concepts. The researcher found that it is needed to use a more suitable modern teaching model and test its effect on preparatory school students' acquisition of scientific concepts and developing some of their creative skills.

Accordingly, the present study is intended to answer the following main question:

What is the effect of using "Instruction Journey Model" in teaching the unit entitled "fossils and protecting species from extinction"?

The following sub questions could be derived:

- ✓ What scientific concepts does included in the unit of **"fossils and protecting species from extinction"** include?
- ✓ What are the suitable creative thinking skills for the second year of prep schools students?
- ✓ What is the proposed suggestion for teaching **"fossils and protecting species from extinction"** using "Instruction Journey Model" in order to achieve the acquisition of scientific concepts and develop creative thinking?
- ✓ How can using "Instruction Journey Model" affect the students' acquisition of scientific concepts?
- ✓ What is the effect of using "Instruction Journey Model" on developing some of the students' creative thinking skills?

Research Significance:

The study is supposed to be useful in:

- Developing the methods of teaching science by using "Instruction Journey Model" which could motivate the students and make them involved in the teaching/ learning process. In addition, it develops their skills of acquiring scientific concepts and creative thinking.
- Offering the teachers a new style of teaching science so that the main objectives could be achieved.
- Providing supervisors and teachers with new strategies and results which help them organize and develop the contents.
- Drawing the attention of contents designers and developers of curriculums, in particular science curriculums, to the importance of developing some activities using "Instruction Journey Model" which could help students acquire scientific concepts and develop their creative thinking skills.

Objectives of the study:

The present study aims at:

- ✓ Illustrating the effectiveness of "Instruction Journey Model" in teaching science on the second-year prep schools students' acquisition of scientific concepts.
- ✓ Illustrating the effectiveness of "Instruction Journey Model" in teaching science on developing some of the second-year prep schools students' creative thinking skills.

Hypotheses:

The study attempts to test the following hypotheses:

1. There is a statistical significant difference between average scores of the experimental group in the pre and post-tests of acquiring scientific concepts in favor of the post group.
2. There is a statistical significant difference between average scores of the experimental group in the

creative thinking skills pre and post-tests in favor of the post group.

3. There is a statistically significant difference between average scores of the experimental group and the control group in the post test of acquiring scientific concepts in favor of the experimental group.
4. There is a statistical significant difference between average scores of the experimental group and the control group in the creative thinking skills post-test in favor of the experimental group.

Research Limitations:

The study confined itself to:

1. A random selection of Fayoum Governorate second-year prep schools students from **Al-Muhammadia prep school for girls (trained group) and Al-Tawfeeq prep school for girls (non-trained group)**.
2. The unit of **"fossils and protecting species from extinction"** taught to second-year preparatory students, the academic year 2014/2015. It was chosen for these reasons:
   - **a)** It includes some educational activities which help the students acquire scientific concepts and develop their creative thinking skills.
   - **b)** It includes subjects relative to the students' environment. It also helps students know more about the importance and formation of fossils and how extinction can affect environmental balance. In addition, it teaches students to have responsibility for reducing environmental pollution.

c) This units clarifies two objectives of teaching science:

i. Highlighting the importance of science applications for human progress. It is evident that studying and using fossils can be helpful in these ways:
   - ☒ Defining the genealogical age of Sedimentary rocks.
   - ☒ Exploring ancient environments.
   - ☒ Studying the development of life.
   - ☒ Oil mining.

ii. Appreciating the Magnificence of God's Creation and regarding the scientists' efforts in serving science and humanity through uncovering the secrets of fossils.

3. The scientific concepts included in the unit of **"fossils and protecting species from extinction"**.
4. Some of the creative thinking skills (fluency, flexibility, originality, problem sensitivity).

Methodology:

The study used the descriptive and the semi-experimental methods.

- **The descriptive method** is processed through reviewing the literature which helped forming the theoretical framework.
- **The semi-experimental method** is used in designing:
  - ✓ An experimental group studied the unit using "Instruction Journey Model"
  - ✓ A control group studied the unit using the traditional method.

Procedures of the study:

The present study followed the following procedure:

1. Reviewing the related literature and previous studies dealing with the following topics: scientific concepts acquisition, instruction journey model, creative

thinking and the characteristics of preparatory schools students.

2. Analyzing the scientific content of the unit to specify the included scientific concepts and basic science processes.
3. Preparing a list of the scientific concepts included in the unit and showing it to the jury members.
4. Reforming the unit according to "Instruction Journey Model":
    - Defining the general objectives of the unit and the procedural objectives of each lesson.
    - Preparing a teacher's guide containing procedures to be followed according to "Instruction Journey Model".
    - Preparing the student manual.
5. Designing the scientific concepts acquisition test related to **"fossils and protecting species from extinction"** unit introduced to second year prep school students.
6. Designing the creative thinking skills development test related to the selected unit.
7. Showing the educational materials and measuring tools to the jury members to judge their validity and reliability.
8. Applying an Exploratory test to a sample of students to test the validity and reliability of the measuring tools.
9. Dividing a random sample of students into a control group and an experimental one.
10. Applying two pre-tests on the two groups and processing the results statistically.
11. Teaching the selected unit using the "Instruction Journey Model" to the experimental group and using the traditional method to the control group.
12. Applying two post tests on the two groups and processing the results statistically.
13. Explaining the results and offering recommendations.

Results:

At the end of the study, the researcher has found:

First: The scientific concepts test:

There is a statistical significant difference at (0.01) between averages of scores of the experimental and control groups students in the post scientific concepts test in favor of the experimental group.

There is a statistical significant difference at (0.01) between averages of the experimental groups in the pre and post-tests of the scientific concepts test in favor of the post test.

Second: the creative thinking test:

There is a statistical significant difference at (0.01) between averages scores of the experimental and control groups students in the post test of the creative thinking skills test in favor of the experimental group.

There is a statistical significant difference at (0.01) between averages scores of the experimental group students in the pre and post-test of the creative thinking skills test in favor of the post test.

Recommendation of the study:

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

1- Preparing a training program to train teachers to use "Instruction Journey Model" when teaching science for the purpose of developing creative thinking.
2- Encouraging science teachers to use "Instruction Journey Model" in teaching as it helps students be accurate thinkers and makes learning meaningful.
3- Focusing on using modern methods in teaching science, 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 science learning and teaching during all

educational stages from start to finish, so as to concentrate on the required learning skills.

5- Increasing the interest in developing science and multimedia labs at schools and offering aids which help develop creative thinking- in particular- and educational goals in general.

6- Creating a free, safe and stable educational environment to achieve creativity and its development.

7- Shortening the curriculum to allow teachers have more time for thinking and creative thinking.

8- Reconsidering science curricula, their content and organization, and presenting them in attractive and interesting ways in order to foster the creative abilities of the students, depending on research and experimentation to avoid memorization.

9- Reviewing current assessment methods by including questions which measure the creative aspects to help students think creatively.

10- Developing science teachers preparation programs in order to modify teachers' attitudes towards creativity and innovators which help prepare a creative teacher acquainted with science and knowledge and aware of education, its methods, approaches, duties and creative aspects to help students develop their creative skills.

11- Preparing educational programs that depend on teaching and learning science for developing creativity at variant educational stages depending on the fact that creativity is a phenomenon that could be learned.

12- Encouraging school administrations to pay attention to creative activities setting and establishing educational institutes responsible for creative and talented students.

13- Implying creative thinking developing programs in summer activities and encouraging students join them and reward talented students.

Suggestions of the study:

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

1- Researching the effect of using "Instruction Journey Model" in teaching science on developing other educational aspects such as: different thinking types - learning retention.
2- Researching the different methods of teaching science and their effect on developing scientific concepts and creative thinking of preparatory stage students (e.g. conflict map – Introspection based learning strategy.
3- Researching the use of integrative teaching methods and their effect on developing scientific concepts and creative thinking of preparatory schools students (e.g. concept maps, learning cycle, mind maps, cooperative learning).
4- A study of the extent of creative thinking development of science learners.
5- Studying the effect of using suggested teaching Strategies and educational programs on developing the scientific concepts acquisition.
6- Studying the effect of using suggested teaching Strategies and educational programs on developing creative thinking in science.