Fayoum University
Faculty of Education
Curricula and Methodology of Teaching Department

"Developing Normal and Visually Impaired Elementary Stage Students' Science Curricula in Light of the Cubic Curriculum Dimensions for Treating their Learning Difficulties and Enhancing their Conceptual Understanding and some Science Process Skills"

A Dissertation Submitted in Partial Fulfillment of Ph.D. Degree
In Education, Curricula and Teaching Science

Prepared by:

Tamer Shaaban Desoky EL-Sayed
Assistant lecturer
Curricula and Teaching Science
Curricula and Methodology of Teaching Department

Supervised By:

Prof. Dr/
Mohamed Reda AL-Baghdady
Professor of Curricula and Teaching Science& Educational Technology

Prof. Dr/
Amal Rabie Kamel Mohamed
Professor of Curricula and Teaching Science

2012

Summary of the Study

Introduction

Transformations carried by the future impose the seek to extrapolate its most prominent features and the search for the appropriate formulas by which we can be ready to face the Scientific and Technological Revolution of fast and successive changes, in all fields of thought and work, Now the nations entity is linked to their capacity to develop intellectual and Scientific resources and to making their Educational institutions take modern techniques to achieve its goals and confront the future challenges. The Development of Education is one of the challenges facing the Egyptian Society when building its individuals because Education is the product of Human beings who are capable of creativity, production and global competition which still needs to the capacity of quality

The Curriculum in any area of knowledge is a tool Education uses to achieve all its Requirements, so it must be real and Effective tool in the activation of mind and investment of energies, and as a result, there is a claim to update and develop Curricula Scientifically to cope with the speedy transformations and moving to the

production and application of knowledge not only to acquire it.

It is therefore imperative that policies should develop Curricula in general and Curricula of Science in particular and direct them to the future, they must be planned to contribute to the preparation of Students for employment, and contribute to raise their Awareness of the Environment in which they live and of the different Methods of Interaction and Adaptation with it as Science Curricula are the Curricula that can contribute to the preparation of students for the future by providing them with knowledge, Skills, and Attitudes necessary to cope with Economic, Political, and Social changes and help them to adapt to emerging Issues , Problems and Concepts related to their daily life, through the use of the appropriate entrances and directions to keep pace with these variables

The Science Curricula for the twenty-first century are rapidly changing dynamic Curricula investing capacities of Science and technology and its uses in the life of students as a basis for their contents (Curricula), with the aim of preparing the Students' to accept development and improve the use of Science tools.

These Curricula must be subject to Experimentation, continuous a Evaluation and Amendment that is consistent with rapid changes in this century.

proceeding from the views and ideas, which stressed the Concepts as the basic rule on which learning rely and from what the process of Education and learning may impose of difficulties facing Students' to understand and gain scientific Concepts and their associated mental operations. Since those difficulties do not obviate the need of learners to information when studying Science, thought must be given to find the treatment of these difficulties **Therefore, the Researcher chose cubic Curricula**

This was proposed by wragg, E .c, 1997 as a framework through which we build the activities contained in the unit. The present unit design made in the light of the current cubic curriculum may enrich the teaching and learning process for both the normal and the visually impaired Students'.

The problem of the study

Given the importance of Enhancing conceptual Understanding and Science Process Skills for both

normal and visually Impaired Students' in the first episode of basic Education, which will have an impact in helping the student to understand the surrounding events and phenomena, and, consequently, its reflection on their ability to face life, given the presence of various difficulties that prevent the attainment of this goal; some of these difficulties are related to the content of the material of Science subject and some others are related to the pupil himself. And what confirms the existence of such difficulties is the reluctance of learners to study Science, where an inner barrier arose toward Science studies making them imagine they cannot understand it leading them hate Science and their Educational level becomes low.

From the above, it is clear there are some learning difficulties in Science learning as well as the presence of some of the shortcomings in the development of conceptual Understanding and some Science Process Skills. In an attempt to address this problem, the current study sought to answer this main question:

What is the perception proposed to Developing Normal and Visually Impaired Elementary Stage Students' Science Curricula in Light of the Cubic

Curriculum Dimensions for Treating their Learning Difficulties and Enhancing their Conceptual Understanding and some Science Process Skills?

From the former main question, there are the following sub questions:

1- What are the difficulties of Science learning facing normal primary school Students'?

2- What are the difficulties of Science learning facing visually impaired primary school Students'?

3- what are the scientific Concepts contained in Science curriculum for normal and visually impaired Students'?

4- what Science Process Skills contained in Science curriculum for normal and visually Impaired Students'?

5- What is the effect of the development of Science curriculum which is taught to the normal Students' in the light of the dimensions of the cubic curriculum in:

A - Treating learning difficulties

B - Enhancing Conceptual Understanding'

C - Enhancing Science Process Skills

6- What is the effect of the development of Science curriculum which is taught to the visually impaired Students' in the light of the dimensions of the cubic curriculum?

A- Treating learning difficulties

B - Enhancing Conceptual Understanding'

C - Enhancing Science Process Skills

7- What is the effect of the development of Science curriculum in the light of the dimensions of the cubic curriculum to treat learning difficulties and develop conceptual Understanding and some skills of Science processes to normal Students' compared to the visually impaired ones in the elementary schools?

The Aims of the study

The study aimed to know the impact of developing Science curriculum for primary Students' whether visually impaired or normal ones in the light of the dimensions of the cubic curriculum for:

A- Treating learning difficulties

B - Enhancing Conceptual Understanding'

C - Enhancing Science Process Skills

Importance of the study:

The study might be important as:

1- Keeping pace with the nature of Science as to pay attention to Science operations in the teaching of Science through presenting a model to train normal and visually Impaired Students' on some Science Process Skills , which would impact on the positions of other Educational life situations.

2- Developing methods of teaching Science and using a number of Educational strategies contained in cubic curriculum for a more efficient learning.

3- Providing a number of substantive tools which effectively determine learning difficulties and determine the causes of learning difficulties, diagnostic testing, Conceptual Understanding test ' , and Science Process Skills test that may benefit teachers in building tests similar to the rest of the units of the curriculum .

4- The study offers a model of building, organizing and implementing Science curriculum in the twenty-first century , namely the cubic curriculum proposed by

wragg in 1997 where we can prove its usefulness and demonstrate its effectiveness and this what the current study tried.

The study Limitations

The study is limited to:

1- Designing the content of the first unit (living organisms) planned on normal and visually Impaired Students' of Science, fourth year primary (the second semester) in the light of the dimensions of the cubic curriculum to allow the building of rich and effective Educational situations, in addition to the activities through which conceptual Understanding and some Science Process Skills can be developed

2- A sample of fourth-grade primary Students', the first group of normal Students', while the second group is of visually impaired ones. and each group is divided into two groups: experimental group, and the control one.

3- Learning difficulties of Science identified through the study

4- Scientific Concepts contained in the unit

5- Some Science Process Skills contained in the unit.

The study Hypotheses:

To answer the questions of the current study, the validity of the following zero hypotheses was tested:

1-There are no differences of Statistical references between averages of normal Students' ' scores for the two groups, the experimental and the control one in the following:

A- Difficulties of Learning Science Test

B- Conceptual Understanding Test

C- Science Process Skills Test

2- There are no differences of Statistical references between averages of normal Students' ' scores for both experimental and control groups separately before or after in the following:

A- Difficulties of Learning Science Test

B- Conceptual Understanding Test

C- Science Process Skills Test

3- There are no differences of Statistical references between averages of the visually impaired Students'

' scores for both experimental and control groups afterwards in the following:

A- Difficulties of Learning Science Test

B- Conceptual Understanding Test

C- Science Process Skills Test

4- There are no differences of Statistical references between averages of the visually impaired Students' ' scores for both experimental and control groups afterwards in the following:

A- Difficulties of Learning Science Test

B- Conceptual Understanding Test

C- Science Process Skills Test

5- There are no differences of Statistical references between the Normal Students' scores in the scope of its effect and the Strength of the relationship and percentage of average earning and the visually impaired Students' scores in each of the following:

A- Difficulties of Learning Science Test

B- conceptual Understanding Test

C- Science Process Skills Test

The study approach:

The current study followed semi-experimental method to include Two unequal groups, the experimental group and the control one of normal Students' and other two groups for the visually Impaired Students', where a unit of living organisms is developed in the light of the dimensions of the cubic curriculum for the two experimental groups while the two control groups study the same unit with the current methodological organization.

Procedures of the study

To answer the study questions and test the correctness of its hypotheses, the following steps were taken:

1. To answer the first, the second, the third and fourth questions, the following was taken:

   A- Learning about the difficulties and problems that hinder the learning of the visually Impaired and normal Students' of fourth year primary through the preparing and application of a diagnostic test to students as well as two survey forms to know the

views of teachers and counselors On identifying those difficulties and their causes and to prepare a list of the difficulties .

B - analysis of the scientific content of the unit with the aim of identifying scientific Concepts, and skills of learning processes.

C - Preparing a list of the scientific Concepts contained in the unit and presenting them to a group of arbitrators to express their views

2- To answer questions5, 6 and 7 which are related to surveying the effect of developing the Science syllabus of the normal and sight Impaired Students' in the light of the dimensions of the cubic curriculum to treat learning difficulties and develop conceptual Understanding and some skills of learning processes, we have taken the following steps:

A- Building Educational and measurement tools.

- Designing the selected unit in the light of the dimensions of the **curriculum cubic.**
- Preparing of the students' book
- Preparing the students' handbook.

- Preparing Instructor's guide
- Preparing Difficulties of Learning Science Test
- Preparing conceptual Understanding Test
- Preparing Science Process Skills Test
- Verifying the Reliability and Validity and constancy of tools, and then presenting them to a group of arbitrators in the area of specialization for their opinion and making the necessary adjustments.

B - field study

* Selecting the two study samples from primary four classes whereas a sample of normal Students' is selected as well as a sample of sight Impaired Students', each sample is divided into two groups: the experimental group and the control one

* Applying Difficulties of Learning Science test, the conceptual Understanding test, and the Science Process Skills test before wards.

* Applying the above mentioned tests afterwards.

* Teaching the two experimental groups using the cubic curriculum system while using the current methodology system in teaching the two control groups.

C: Monitoring data and doing the suitable Statistical processes.

D: Analyzing and explaining the results.

E: Offering suggestions and recommendations.

Results reached

Statistical Treatment of the Results of the Research Experience Resulted in the following:

1- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one afterwards in Difficulties of Learning Science in the side of the experimental group.

2- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one separately before and afterwards in Difficulties of Learning Science in the side of the afterwards application.

3- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one afterwards in the conceptual Understanding test in the side of the experimental group.

4- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one separately before and afterwards in the conceptual Understanding test in the side of the afterwards application.

5- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one afterwards in the Science Process Skills test in the side of the experimental group.

6- There is a Statistical referential difference at level 0.05 between averages of the normal Students' scores for the two groups: the experimental group and the control one separately before and afterwards in the Science Process Skills test in the side of the afterwards application.

7- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired Students' scores for the two groups: the experimental group and the control one separately afterwards in Difficulties of Learning Science in the side of the experimental group.

8- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired Students' scores for the two groups: the experimental group and the control one separately before wards and afterwards in Difficulties of

Learning Science in the side of the afterwards application.

9- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired Students' scores for the two groups: the experimental group and the control one afterwards in the conceptual Understanding test in the side of the experimental group.

10- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired Students' scores for the two groups: the experimental group and the control one separately before and afterwards in the conceptual Understanding test in the side of the afterwards application.

11- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired Students' scores for the two groups: the experimental group and the control one afterwards in the Science Process Skills test in the side of the experimental group.

12- There is a Statistical referential difference at level 0.05 between averages of the visually Impaired

Students' scores for the two groups: the experimental group and the control one separately before and afterwards in the Science Process Skills test in the side of the afterwards application.

13- The scope of its effect and the Strength of the relationship of the two groups of a large study, as well as percentage of average earning , which confirms the effectiveness of the proposed model cube in the unity of (living organisms) for Normal and Visually Impaired Students' in fourth grade elementary .

Recommendations of the study:

In light of the subject of the study and results of following is recommended:

1. Providing a model for building, organizing and implementing the science curriculum in the century atheist twenty is "a model cubic curriculum" proposed by the Wargg 1997; which confirmed the results of the current study its feasibility and effectiveness, but it needs more study in the branches of other sciences.

2. Whereas the results of the current study has shown the effectiveness of the use of a model cubic curriculum in treating learning difficulties and Enhancing Conceptual Understanding and Science Process Skills, it is recommended researcher trained science teachers in basic education planning and teaching science lessons according to the model cubic curriculum.
3. Contributing to the development of different curricula to cope with the model cubic curriculum with the preparation of educational tools necessary to do so.
4. Training teachers to teach science to their students based on the understanding to achieve the quality and qualitative outcomes aims of taught.
5. Improve the quality of science teaching that provides students the knowledge and skills worthy of understanding which allows them opportunities to deepen the understanding and employment and avoid Misconceptions.

6. Re-consider the organization of science primary content in accordance with the model cubic curriculum.
7. Continuous assessment of student achievement through performance original indicative of scientific understanding, and the development outlook for the final assessment of what is beyond the students get the highest score as a result of conservation.
8. Work on the changing role of the textbook from being the only source to being an outline of what can be performance, and a book of reference for summary big scientific ideas and the overall questions and performance and not coverage.
9. Design curricula of special education with the need to take into account the nature of visual impairment when building and designing science curriculum provided for pupils visually impaired in the primary stage, and through the development of consideration for the needs of the educational for that category, and also characteristics of academic and social, mental and psychological, linguistic and cognitive.

10. The need to take into account the activities that provide for the visually impaired students through the teaching of science nature of visual impairment for that category, do not include those activities or experiences procedures require the use of the sense of sight.

Suggested Studies:

In light of the findings of the study results, the researcher recommended conducting the following studies:

1. Make a similar study on a sample of middle school students and among other subjects.
2. Know the impact of teacher training on the use of a model cubic curriculum - through training programs - the interests of the teacher and trends toward teaching based on understanding.
3. Investigate effective use of a model cubic curriculum, in the development of habits of mind producing and Metacognition skills.
4. Organizing Science Curricula using the Cubic Curriculum for enhancing Conceptual Understanding and some Science Process Skills in other branches of science at various grades.

5. Organizing science curricula using the Cubic Curriculum for the development citizenship and political awareness.
6. Organizing science curricula using the Cubic Curriculum for the development critical and creative thinking.
7. Organizing science curricula using the Cubic Curriculum to overcome the learning difficulties in different classrooms.
8. Make further studies with other groups with special needs to identify learning difficulties Science primary and stand on the reasons that hinder student learning