Interdisciplinariness in the Curriculum of the nursery school: An example of thematic approach of the key concepts 'evolution'

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Abstract. *Unified Cross Curricular Syllabus Framework and Programs for the planning and developing activities for nursery school, taking into consideration the current scientific perceptions about the nature of Sciences, aims at the unification of these with the Technology, the Society and the Environment.*

The Cross thematic approach the development of key-concepts and the projects are the methodological approaches which are proposed for this goal. The validity of the approach of a specific key-concept of the Sciences, depends on the possibility of the small child to feel by himself the examined theme, in cooperation with peers. It also depends on the relationship and the meaning that this theme has for the personal development of the child and for the prosperity of the society as well.

The purpose of the present speech introduction is to study the approach of a such key-concept in the nursery-school. Specifically it presents an example of approaching the key-concept "evolution". This example was organized in a nursery school in Athens and functioned as a link for the horizontal interrelation of different subjects, such as Math, Language, Environmental Studies, etc., achieving by this way the Cross thematic approach.

Keywords. Evolution, cross thematic approach interdisciplinariness, pre-school curriculum.

1. Introduction

The Curricula constitute formulated proposals which refer to the content and form of school learning, to the way in which the learning should be organized and to the procedures by which the learning should be gained and exploited by the students. Their role is important in the educational process since they constitute the "tool" which the educator employs daily in activity and guides the education to the development of the type of person which every society desires.

The aim of the Kindergarten – according to the Unified Cross Curricular Syllabus Framework and Programs (ΔΕΠΠΣ) [6]– is the fully fledged development of the child's personality. This can be achieved when in the learning process emphasis is given not only to the acquisition of Knowledge, but also to the acquisition of skills, the development of feelings and the cultivation of positive attitudes and predispositions. The pre-school program includes "contents" from different cognitive fields, such as information, concepts, facts, accounts, formats, etc. This Knowledge can be obtained through the formulation of an environment which creates incentives towards active participation of the child

in the process of learning, towards the revelation, experimentation, and preservation of his/her interest and systematic teaching and correct guidance of the nursery teacher.

Further prescribed is the cultivation of various techniques (cognitive, kinetic, ect), the development of feelings, which are favored in an environment where continual interaction is observed and the cultivation of predispositions and attitudes, which can be formulated and empowered through activities suitable to infancy.

The aim of the new curriculum for the pre-school is the creation of citizens who are equipped with self-awareness, social sensitivity and the necessary social skills. These aims relate directly to the way in which infants employ scientific knowledge so that they can take the appropriate decisions and the way in which they confront and resolve problems they encounter in the course of their lives.

The new pre-school curriculum aims at the integration of the Physical Sciences, Technology, Society and Environment. The validity of teaching of a particular concept depends on the abilities of the infant to act out the same and to live out in cooperation with peers the phenomenon under study, and the relationship and the meaning which this phenomenon or meaning has for personal development and for the broader social well-being.

An important constructive parameter-tool for the discussion of natural concepts is the involvement of language. As Sutton also claims, experimental procedure can never "speak by itself", but the words which use are the necessary cultural interpretative tools which contribute to the production of social meanings [5].

The adoption by the educator of ways and methods which presuppose the active participation of the child in the entire learning process and the planning and realization of activities which aim at the fully fledged development of the children, present the characteristics of a development program which helps the children to start their school lives successfully, a fact which can decisively influence their subsequent lives.

The thematic approach, the implementation of fundamental or interdisciplinary concepts and the work schemes constitute the proposed methodological approaches in the Unified Cross Curricular Syllabus Framework and Programs (ΔΕΠΠΣ) [6] for the kindergarten.

The thematic approach (which we will adopt for the present) constitutes an organized programmed experience of learning which gives the children the ability to approach an intergraded view of knowledge linked with a particular topic[3].

The organization of activities which is linked to different cognitive and development sectors around one topic gives the children the ability to be aware of the global dimension of knowledge to link together different experiences and to be trained in a way of working which is peculiar to scientific working. [2]

2. Interdisciplinary and the fundamental concepts

Concepts constitute intellectual constructs with which the individual categories and names entities, processes, situations and phenomena based on their essential features [4].

Every totality of concepts constructs the content of a scientific field. Each science carries its own knowledge, concepts, generalizations, methodological approaches and skills which are exercised in the particular science and which people employ in their attempts to comprehend and manage matters.

Nevertheless there is also a very broad category of concepts, like for example the concepts *system, interaction*, which can be employed in every scientific field or cognitive area, in a great variety of topics. It is a question of so-called fundamental concepts or Macro-concepts [4].

These concepts can constitute a theme of study in order that their basic definitions be displayed and the modifications which exist as they transfer from branch to branch. They could even be employed as a context of investigation of interdisciplinary or domestic concepts of the separate branches.

In the interdisciplinary approach learning is organized in a way which leads to an interrelation between different cognitive objects or cognitive fields. In this way an integration of the content of teaching is a achieved, which is realized in specific methodological approaches. Interdisciplinary knowledge does not come to supersede or to abolish the intradisciplinary knowledge, but to consolidate, extent, and deepen it and to make known the linking elements of the different cognitive fields.

It is necessary therefore for us to search out the main intradisciplinary elements, the concepts of the cognitive fields and to see the way in which they can

transcend their own framework and compose the holistic authentication of matters. The role of concepts is essential in the way in which this transcendence takes place. When we elaborate a topic we initially locate the intradisciplinary or domestic concepts of the specific scientific field to which the topic under investigation belongs. Subsequently we speculate on ways in which we can extend them to the other cognitive fields. These extensions must not be fortuitous or fragmentary. The intradisciplinary concepts can be correlated with the fundamental ones. With the fundamental concepts as vehicle we pursue the horizontal interweaving of different fields, attaining in this way the interdisciplinary approach.

Through the exploitation of concepts the child can penetrate with thought the level of simple information and understand more deeply what we want to "teach". With the systematic development of concepts in the framework of the content of teaching and learning and the cultivation of the faculties of systematization of knowledge and its acquisition, the students can incorporate the new information in an integrated construct of knowledge and deepen it. [1]

3. Model of thematic approach to the study of the key-concept 'evolution'

3.1. Learning field of opportunity: Study of environment: Natural environment and interaction

3.2 Topic: In the age of the dinosaurs

3.3. Organization of class: All the children in the class.

3.4 Comment: Dinosaurs are a favorite subject for all children. Often children bring to their class little plastic toy dinosaurs which are on the market and which they love to play with. Moreover occupation with the topic serves also the goals of the Curriculum.

The educators encourages the children to express thoughts, knowledge and motions about dinosaurs, which are taken into consideration in the planning of the activities.

3.5 Occasion: The occasion could be a film relating to dinosaurs/a book/ a visit to a museum/games on the market, etc. The occasion influences the method of approach to the topic and the formulation of questions directed towards the children.

_What was the film or the book;
_What were the dinosaurs like;
_How did you feel when you saw the dinosaurs;
_What were their names;
_How big were they;
_What colors were their skins;

3.6 Previous experiences of the children: Encouraging the children to speak the educator poses questions:

_What can you tell me about dinosaurs;
_What animals are similar to dinosaurs;
_ In what environment did the dinosaurs live;
_Tell me some characteristics of dinosaurs.
_What do dinosaurs eat;
_In what age did the dinosaurs live;
_Why did the disappear;
_In what museums can we see dinosaurs;

3.7 Learning targets:

■To broader their knowledge about dinosaurs.
■To get to know and to reveal similarities and differences between dinosaurs and other animals as regards:
_Their habitat
_Their external characteristics
_Their food
_Their way of reproducing
■To recognize the need for food and air for survival.
■To begin to become aware of food relations between different organisms.
■To discuss and understand that there were categories of animals which lived in older periods and do not exist nowadays.
■To understand the interaction between the environment and the activities of Man, to locate problems and to seek reasons.
■To compare the present with the past and distinguish changes.
■To understand the chronological sequence of events
■To make use of technology
■To express themselves in art forms.
■To familiarize themselves with seeking information form sources.
■To familiarize themselves with the recording and organization of information.

3.8. Interdisciplinary concept: evolution

The concept of biological evolution and particularly its integrating role in nature, provides answers to fundamental questions which relate to the world around us: Similarities between organisms, biodiversity, etc. The concept of "evolution" in the specific unit about dinosaurs refers to the evolution of life on our planet. The concept of evolution which embraces continuity and change-elements which investigate the process of evolution of living organisms, and also of cities, villages-constitutes a

major concept for the Study of the Environment and relates to the broader, fundamental concept of "change". This concept transcends the limits of the study and can function as a link for the horizontal interweaving of different learning fields, achieving in this way the interdisciplinary approach.

Interdisciplinariness: Language, Mathematics, Study of Environments, Technology, Speculation, Dramatic Art.

Proposal units: The diagram with the units serves to restrict the topic to easy approach units which are linked to the planning and development of activities, and also as a guide for the valuation of the thematic development after valuation.

Duration: One month. The children's interest is taken into consideration.

Topic presentation packet: Printed material, books, objects related to the topic, addresses of related web pages, ideas for linking home with kindergarten.

Kindergarten information file: Concerns information from reliable sources, statistical data and other useful knowledge about the topic.

3.8.1 Group and individual creative activities

The activities which follow are characteristic and have an interdisciplinary nature. They aim to assist the kindergarten in understanding the manner in which it approaches a topic linking different cognitive fields. Each pre-school teacher with a view to the knowledge, imagination and interest of the children could extent it to various other activities.

Investigations in corners organized suitably for this purpose:

a) Dramatization Corner: The educator leaves at the disposal of the children material related to paleontologists: shirts, trousers and skirts, research pockets, cameras, straw hats with wide brims, research brush, plastic toy dinosaurs, plastic bones, plastic dinosaurs eggs, magnifying glasses, torches, binoculars, geographical charts, pictures of dinosaurs skeletons, and books with archeological findings. The educator can also create a tent for sheltering the findings about dinosaurs.

b) Construction corner: The educator enriches the specific corner with plastic toy dinosaurs in different designs, sizes, forms, etc. He/she can also furnish it with materials (sand and small plants, paper, cardboard, glue, etc.), which will serve the children for the creation of a model.

c) Plastic arts corner: There must be clay and moulds in the shape of the dinosaur.

d) Mathematics corner: The educator leaves at the disposal of the children pictures of dinosaurs for classification by size, height, etc., puzzle with dinosaurs, tombolas. Also small toy dinosaurs and dino eggs for matching and measuring, wooden dino-skeleton, etc.

Preplanned research in the broader environment (organized visit to the Goulandris Museum).

Preplanned activities about concepts which are going to be clarified: Characteristics of dinosaurs (carnivores, herbivores), dinosaurs fossils, in the footprints of dinosaurs (relation of size-evolution).

Activities which have not been foreseen: Activities which have not been foreseen can result in the course of topic development. The pre-school teacher listens and records carefully the ideas and thoughts of the children and the development of the topic is adjusted to their interests and needs.

Emerging activities which can be development in the work schemes: The reading of books related to the topic of dinosaurs, the film Jurassic Park, anything a child said or brought and the interest shown by the others provide the occasion for development of additional activities, of shorter or longer duration, related to the topic.

Closing activities: Writing up of individual files, writing up of collective file, exhibition of individual and group work.

3.9. Evaluation: Observation, recording, study of children's work, readjustment of aims, revision of activities and general appraisal of targets which were attained as regards knowledge, abilities and skills.

4. Ideas for the planning of activities on the theme of dinosaurs

4.1. Carnivorous dinosaurs - herbivorous dinosaurs

Thematic fields: Language, Study of Environment, Mathematics.

Learning targets: To describe and compare the characteristics of dinosaurs. To broaden their knowledge of living organisms. To develop and employ the appropriate terminology with reference to describing and comparing dinosaurs. To interpret general elements of the world which surrounds them

through processes of observation and description, comparison and classification.
Materials: Photographs of dinosaurs of different kinds.
Description of activity: The educator starts the activity by discussing with the children the differences between carnivorous and herbivorous animals. He/she questions and guides the children with the aid of photographic material to track down the characteristics of each species. With its aid the children record the different characteristics on a board. Subsequently the educator asks the children to decide which characteristics correspond with carnivores and which with herbivorous requesting them simultaneously to justify their views. After the discussion on the dinosaurs diet the educator gives the children photos of different foodstuffs in supermarket adverts to cut out. He/she prepares two cards on one of which the children are asked to place the carnivorous dinosaurs and the corresponding foodstuffs which they eat and on the other the herbivorous dinosaurs and the corresponding foodstuffs.

4.2 Fossils: witness of the past

Paleontologists do excavations and dig rocks from caves to find fossils.
Interdisciplinary fields: Language, Study of Environment, Mathematics.
Learning targets:
To understand the way in which information is revealed to us from the past.
To realize the chronological sequence of events.
To broaden knowledge about the natural environment.
To reveal the significance of fossils for the interpretation of life in the past and of the changes in nature.
To employ the appropriate vocabulary to describe fossils.
To take measurements using arbitrary or standard units of measurement.

Description of the activity

After discussion and observation of related books the educator encourages the children to discuss how animal and plant fossils are shaped, e.g. dinosaurs inhabited the Earth Died/With the passage of time their bones were covered with earth and fossilized/paleontologists found fossilized bones and assembled them piece by piece so that we could see a complete dinosaurs/How do paleontologists find fossils?/What precisely do paleontologists do with fossils? Why are fossils so important?
The educator shows the children with the aid of pictures and books the tools which paleontologists use for finding fossils. Subsequently they themselves become paleontologists and try to uncover bones from a wooden skeleton of a dinosaurs which the educator has hidden in the school sand pit. He/she explains to the children that they must dig to find dinosaur bones. He/she gives the children the necessary time to do their excavations. Afterwards they discuss the method adopted by the paleontologists, e.g. they accurately record the area of rock where they found the bones, sketching and measuring the distance between them with a view to reassembling the dinosaurs skeletons afterwards. The entire work is done slowly and carefully uncovering the sand with a brush.

When the children find the bones the educator tries to draw their attention to the outline which the fossils leave on the rock. As soon as the children's excavation finishes he/she asks the children to share their observations and discoveries.

4.3 In the footprints of the dinosaurs

Interdisciplinary fields: Language, Mathematics, Speculations.
Learning targets:
■To interpret general elements of the world which surrounds them through processes of observation and description, comparison and classification.
■To take measurement employing arbitrary or standard units of measurement.
■To enrich their language with words connected with mathematics.
■To sketch different kinds of lines and outlines and to compose different figures and shapes.
Material: Books with pictures of the footprints of large dinosaurs, large sheets of paper, scissors and ruler.

Description of the activity

With the help of the educator the children sketch the footprints of the dinosaurs on card (in real dimensions) and fix them up in the school area. They take cave that the distance from one footprints to another represents the actual dimensions of the stride of a large dinosaurs. Next, the educator asks the children to reproduce the outline which their footstep leaves on a piece of paper and to measure and compare the size of their footstep with the size of a dinosaurs footstep. The educator urges and guides the children to employ the appropriate

vocabulary (larger, smaller, equal, twice the size of Dimitra's footstep, tree times the size of Anna's footstep etc.). He/she ask them to measure and compare the distance between the dinosaurs steps and the distance between their own. Next, he/she asks the children to measure how many steps they themselves need to take to get from one dinosaurs step to another.

When they finish measurement and experiments they shave the results of the measurements amongst themselves and discuss their conclusions. The educator can proceed to the development of the activity also including his/her own footstep in the problem of measurement (in this activity it would be better if possible for older children also to participate) so that the children realize that the size of our footstep changes as we get other.

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