DESIGNING AND ASSESSMENT OF THE KNOWLEDGE WITH CMAPS

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Abstract. The purpose of this work is to describe the development of a database that schools can use for creating and exchanging interactive concept maps in order to improve the quality of teaching in kindergarten and primary schools. Interactive maps have been developed in a way that they can explicitly define the different top-down stages of teaching and learning. As a consequence, they can be used as a model for teacher groups that aim to share their planning and evaluating activities. Conceptual mapping provides an adequate mechanism for monitoring learning achievements and it is used as the main working method by teachers and students involved in this project.

1 Introduction

During the past school year teachers from Circle VI of Giugliano in Campania and Frosinone have planned a long term project based on 6 hypothesis. Each teacher has worked in her school using the Cmaps agreed upon. These are the 6 hypotheses:

- A CmapServer is seen as a place where resources, folders, and Cmaps can be found. It provides several basic services as well as an interface called CmapService through which new services can be added easily to a CmapServer;
- The CmapTools software allows and encourages cooperation and participation in the construction and manipulation of Knowledge Models;
- A Cmap is a learning model that can direct resources within the same model of knowledge;
- Users can customize the hierarchical organization of folders according to their needs;
- Using conceptual maps through cooperative learning in classroom settings is the appropriate strategy to achieve these goals: acquire listening skills, discussion and cooperation, exercising metacognitive skills such as analysis, synthesis, selection, generalization; assessing the prerequisites owned by pupils, and the knowledge and skills acquired during and after activities of a given classroom;
- The "National Guidelines" for the curriculum in kindergarten promote education planning at school level. Educational planning involves a number of decisions concerning basic teaching contents logistics, the preparation of human and material resources that can help to achieve targets such as the development of specific skills.

2 The educational project in the infant school: description of the teaching planning for structures with Cmaps

The goals of kindergarten can be only defined by identifying the actual location of the child in his environment. They are: 1) the search for identity, 2) the accomplishment of autonomy, 3) the achievement of competences. Through the development of different learning units, derived from five fields of experience (fig. 1), these goals can be achieved.

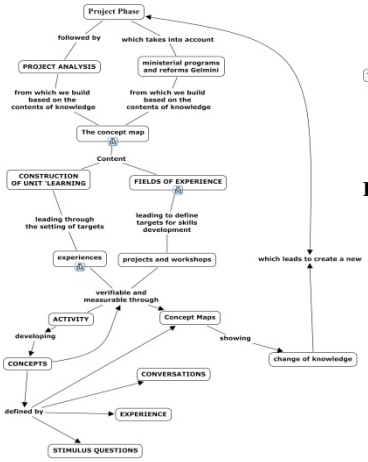

Figure 2: Cmap on Project Phase

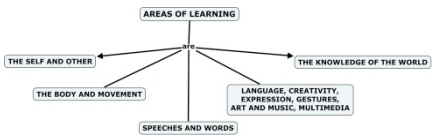

Figure 1: Cmap of the five fields of experience

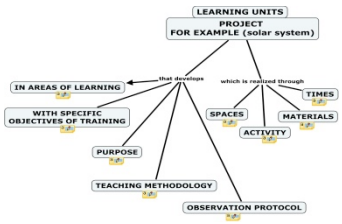

Figure 3: Cmap on Learning Units

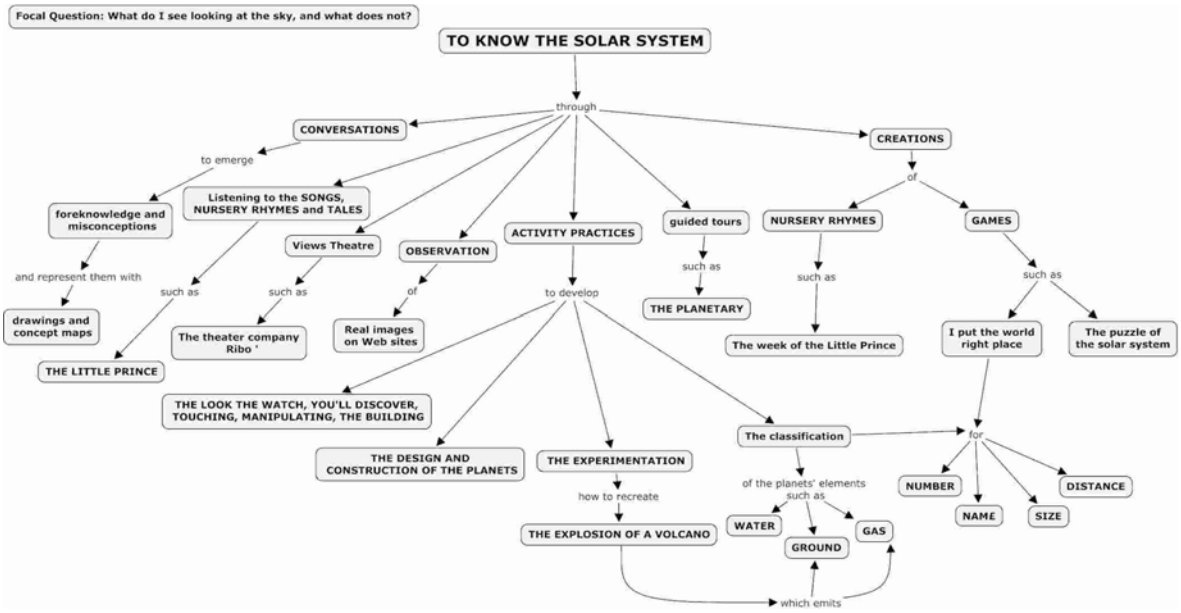

Figure 4: Cmap on Solar System

Conversation in Class

Focus question: " *What can you see when you look at the sky*? "
Children's responses:
Rita: "*The sun*"
Ilary: "*The birds*"
Chiara: "*The clouds*"
Milena: "Nothing"
Teriana: "The moon"
Abraham: "Flowers"
Michele (3 years): "The Star"
Teacher: "*Is the sky up or down*?"
Children: "*Top*"
Mark adds: "*I saw a moon over the sky*"
Abraham, Joseph, Dominic, Pasquale, "*The Sun*".


Figure 5- 6: Children response to focus question

3 Theoretical references

The experience is designed to convey the basic concepts and data that enable children learn the fundamental aspects of the Solar System. The main aim is to promote the early interest of the children in science, as ways to provide meaningful answers to their questions about the surrounding world.

The main steps arranged by teachers of the schools participating in the project are:

- reading the book "The Little Prince", both on paper and with multimedia;
- three-dimensional construction of the planets, according to their main physical characteristics and the proportions of their size in order to help children creating a correct mental representation of the Solar System;
- practical experiences that can reinforce concepts and skills that children gradually acquire;
- conversations following each practical experience, to promote the gradual shift from the concrete to the abstract level and to lead the child to a conceptualization transferable to other areas;
- construction of concept maps for assessment of subjective and objective learning.

The proposed work introduces some basic topics such as astronomy distances and sizes of the planets, the basic concepts needed to let children understand the Solar System as a physical system.

Educational objectives

- To know the basic features of the Solar System;
- To know the main features of our own planet;
- To develop the ability to observe and analyze natural phenomena;
- To acquire correct behavior towards the environment;
- To verbalize discoveries;

- To expand the child's vocabulary;
- To strengthen artistic and creative abilities;
- To encourage the development of identity, self-esteem, relationships with others, the consideration of diversity as a richness, integration into the environment and the respect care and knowledge of different worlds.

Methodologies

• recognition of prior knowledge about the Solar System;
• guided research using books and the various media;
• testing activities to support and develop the theory;
• practical construction of three-dimensional models of the planets to scale;
• checks as a moment for monitoring the effects of the experience.

The methods used to involve children are:

-Learning from experience;
-Action Research;
-Scientific method;
-Storytelling;
-Observations and field trips;
-Handcrafting activities, such as painting, collage ...

Motivating situation

The project begins by telling the tale of "The Little Prince" by Antoine De Saint-Exupery. Children listen to the story, then perform part of the story. Eventually, they start to discover what the Little Prince wants us to know. As the protagonist will decide to leave his planet and his rose to travel and discover the universe, so will we. We will leave and know the sky (both its visible and invisible elements), and we will learn to take care of our planet and environment. The known elements of the Earth are used to know other planets and to learn a common and correct language.

The tools used to realize the designed activities

-Show: "The Little Prince" of the theater company 'Dibo' ';
-Visit to the Planetarium;
- TV, stereo system, projector, computer;
-Use of the photo camera to document, remember and reconstruct the various moments.

Learning assessment

The experience has been monitored through checks at different phases of the project. Drawings, surveys, games, concept maps have been used.
Some checks - as the graphical representation of the solar system - have been proposed both in the initial and final phase of the learning process.

Route assessment

"Draw the Solar System" (aim: to evaluate the accuracy of names, the order, the color, the size of the planets)
We explore the planet earth
I build planets

Examples:

Game Group: solar system puzzle

Figures 7-8-9-10: Game Group: solar system puzzle

Performing the story of the planets

Figures 11-12-13: Performing the story of the planets

Collective map: Focus question: "*What can you see when you look at the sky*?"

Figures 14-15-16-17-18: Building a collective map about: "What can you see when you look at the sky?"

Drawing the solar system before practical experience

Figure 19: (3 year) **Figure 20:** (4 year) **Figures 21-22:** (5 year) drawing the solar system

Learning from practical experiences

Figures 23-24-25-26-27: Building planets - Choosing the right day of Little Prince's week - individual and collective evaluation concerning "The size of the planets"

Drawing the solar system after the practical experience

Figures 28-29-30-31-32: (5 year) Drawing individual C-map of the solar system after the practical experiences

4 Conclusion

These models created with Cmap by groups of work consisting of teachers and school leaders have been (and will be in the future) the basic elements for educational planning in kindergarten and primary school. These are also patterns that can help new teachers to improve their teaching abilities. Eventually - can be used by multiple users in the CmapServer to cooperate and to create databases containing resources, folders and CMAPs. In addition, individual Cmaps will be used as an evaluation tool to assess learning achievements of each child.

5 References

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