

## LEARNING WHILE HAVING FUN CONCEPTUALIZATION ITINERARIES IN KINDERGARTEN CHILDREN EXPERIENCES WITH C-MAPS IN AN ITALIAN SCHOOL

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**Abstract.** The activities were organized by a group of teachers to promote the creation of scientific thinking and acquire progressive competence through observation, manipulation, discovery and reflection. Experiences stimulate and motivate children to learn, promoting curiosity towards reality. Curiosity is related with the pleasure of learning and discovering. It is a cognitive curiosity that is originated and nourished starting from the children's current knowledge.

Children are positively motivated to learn with a metacognitive approach, situating experiences in Vygotskij's proximal development area (known as potential development area), which is a emergent area of personality in strong expansion during childhood. The concept maps built by the children are situated in these learning contexts. They are a real metacognitive structure that stimulates reflection and organization of experiences, making meanings and knowledge emerge in a personal way.

### 1 Introduction

Concept maps have been used in Falconara Alta kindergarten with 4/5/6 year children for a few years in order to promote significant learning. Our school participates in the MIUR pilot project "The Words of Science", which is based on direct observation and manipulation of object and use of verbal, iconic, musical and kinesthetic languages to describe properties of objects and environment. All teachers in the school were involved in the project. This paper includes two c-maps that we received from Paola Conversano, a teacher at "Collodi" School in Fano. The project implemented in Italian schools is similar to the American project SCIS and aims at presenting sciences as an active process, centered on a limited number of unifying concepts conquered through direct experiences on objects, year after year. A qualifying aspect of the experience is the construction of concept maps using drawings made by children after manipulation and clinic conversation.

Clinic conversation can be defined as a means used by teachers to investigate children's spontaneous knowledge on a specific issue or concept. Knowledge background is the fundamental starting element for successive learning. The objective of Clinic Conversation is to understand the child's thought and concept formulation process (E. Damiano 1995 – "Didattica per Concetti" – Juvenilia Milano 1995).

Concept-based teaching places the child in the centre of the learning and knowledge building process. The innovative aspect of this method is that the teacher performs his/her teaching action starting from the concepts expressed by children both verbally and through actions on objects. Concept-based teaching recognizes the child's capacity to conceptualize.

The teacher's action and the school experience are a significant opportunity to help and orientate children towards the systematic discovery of the world, starting from the child's existing knowledge built on his/her personal experiences. The teacher does not interfere or superimpose with the children's knowledge. The teacher attempts to give children the necessary tools to de-construct their spontaneous opinions and progressively reconstruct more adequate concepts in order to efficaciously deepen their knowledge.

### 2 Learning laboratories

The teacher's task is to build itineraries to involve children in stimulating activities, direct their energies towards complete, exhaustive learning, while maintaining a high level of interest. The importance of games during the acquisition of knowledge, the repetition of activities in multiple creative contexts allow children to develop observation techniques and activate strategies that are finalized to predefined goals, not random.

Experiences concretize and promote objectives and activities in continuous open processes started by children to build ways of thinking and interpreting reality. The conquer of language lays in the centre of this arduous

transition from “doing” with things to mentally “doing”. Maturation occurs through an assimilation/accommodation process.

Another methodology used with children is Cooperative Learning for the development of social abilities and group learning. Children are divided in small groups and tell, describe, remember, share and collect perception and ideas in turn. Cooperative Learning is a teaching/learning method whose significant variable is student cooperation. (Insegnare e apprendere in gruppo di Mario Comoglio – Miguel Angel Cardoso Las Roma)

Maps have proved useful for all itineraries, since they stimulate and promote reflections in children, with regard to organization of experiences and make learning and knowledge emerge in a personal, creative way, while telling the concept map.

Comparison and sharing favored the development of verbal and iconic language, together with socialization. Novak (2001) states: “we found that concept maps are a useful system to help teachers organize knowledge for teaching and a good method for students to discover key concepts and principles contained in classes, readings and other teaching materials”.

### *2.1 Itineraries with construction of c-maps by kindergarten children*

#### **Title: The world of plants**

(Many children consider plants to be simply trees)

Educational goal: make children understand that plants are very similar in many things, but different under many aspects.

#### **Procedure description:**

**Conversation** - Children sit in circle and establish shared rules of social behavior: taking turns, listening, establishing sitting modes, keeping the task, participating, asking for explanations, expressing non-verbal encouragements)

#### **Step 1:**

1. Always start from the spontaneous knowledge children have on plants during conversation
2. Stimulation question asked by the teacher: can plants be found everywhere?

- Answers by children:

- There are trees in the garden

Teacher: Are there trees at the river mouth?

Children make hypotheses.

- No, because there are no trees

- There are no leaves

- There are only small plants

- There are no plants

- Flowers are flowers, they are not plants.

Task: to find main differences between tall plants, low plants, flowering and non-flowering plants during trips to school garden, river mouth and wood (Arboretum with a variety of plants).

#### **Step 2.1: Exploration Game**

##### **Observation - Discovery**

Trips to garden, river mouth, wood where children play the following game:  
look for a tall plant. Once they find it, each child must touch and hug the plant.

Question: How did you find the plant?

Children's answers:

Alessia: I looked for the tree

Matteo: I chose the tallest tree

Vanessa: the tree is a tall plant

Jacopo: the tree is big and tall because of branches

Teachers took Jacopo to touch a shrub, which has branches just as a tree, to see that height is not determined by the presence of branches.

Linda: the plant is tall (she touched the tree), instead this plant is low (she touched the shrub).

### **The exploration game continues searching for low plants.**



**Figure 1.** A.: i chose daisies, because they were low and close to the ground.

Both misknowledge and first correct concepts emerge during this interaction process, through conversation, with perception-evocation and reflection.

Starting from a perceptive base, through senses, children start to “remember” what they already know about this topic. Through evocation children slowly build meanings on what they have seen, heard, touched. These are fundamental itineraries for scientific concept building.



**Figure 2.** Group work: the task consists in looking for a plant, finding it and drawing it.

#### **Step 2.2**

**Group work:** the task consists in looking for a plant, finding it and drawing it.

Children perceive the learning goal as important and have the expectation to reach the goal with the help and assistance of their group mates.

Sentences: the teacher said to draw only tall plants.

- Did you see it? There are no leaves.

- I saw it. There are just a few leaves.

- I will put just a few leaves in the drawing.
- Ok
- It is still a tall plant.

Children build the first meanings through dialogue, observation and reflection, sharing and helping each other (Cooperative Learning).

Active and creative participation, careful observation of experiences stimulate curiosity and motivate children to ask questions and make first hypotheses: these are fundamental itineraries for the construction of a concept map for the experience and/or scientific concept.



Figure 3. Group map

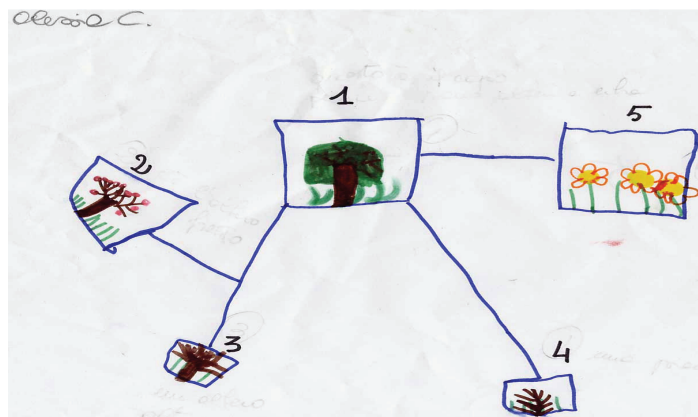
### Step 2.3

Children are asked to draw an element from the experience and place drawings in the gym, starting from the important drawing (with all the plants they have discovered) and using different materials (sheets, color pencils, strings, tape).

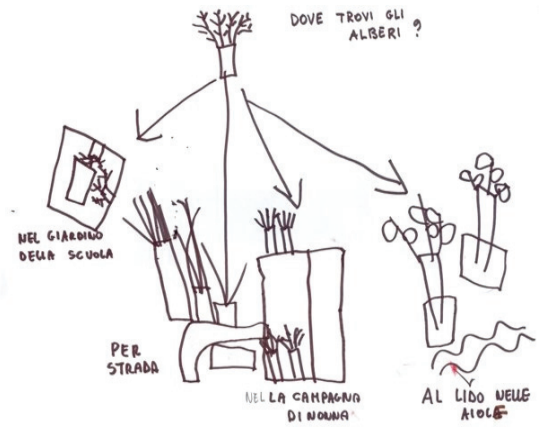
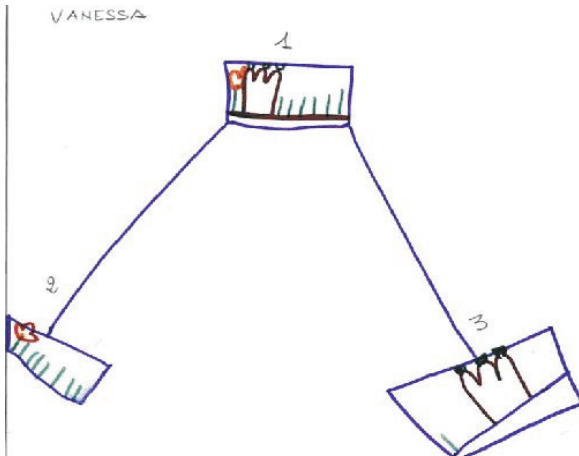
Brainstorming for map construction: children share perceptions and organizations of their experience (Cooperative Learning). Children establish the first relations between words and drawings through language and conversation, guided by the teacher.

Task: to positively motivate children to learning, from a metacognitive viewpoint, offering experiences that stimulate curiosities through games (with different materials and different spaces).

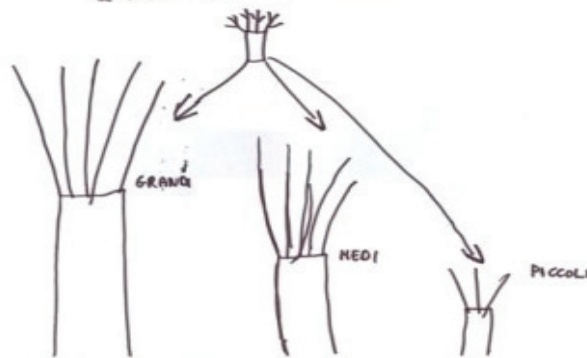
### 2.4 Each child tells the experience with map construction.



- 1) This is the most important because there are trees and grass
- 2) a flowering tree
- 3) a tall tree
- 4) a low plant
- 5) low daisies



QUANTI TIPI DI ALBERI ?



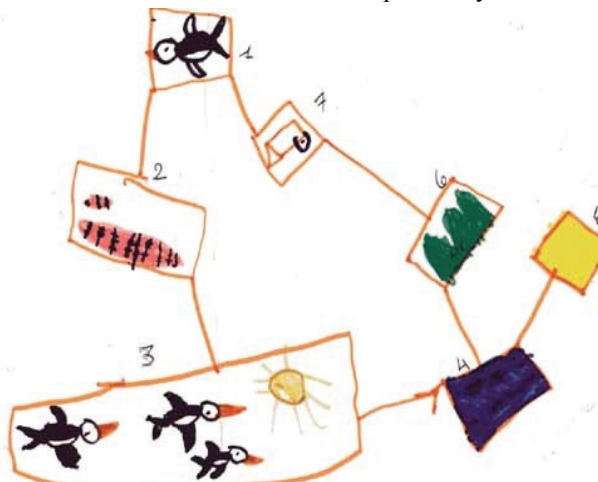
## 2.5 Swallows

A question is asked to find out what children know about the word "Migration"

Why do swallows migrate?

This question arouse the children's curiosity and interest immediately, resulting in more questions. At the end of the experiences the children:

Explain why swallows migrate with a concept map

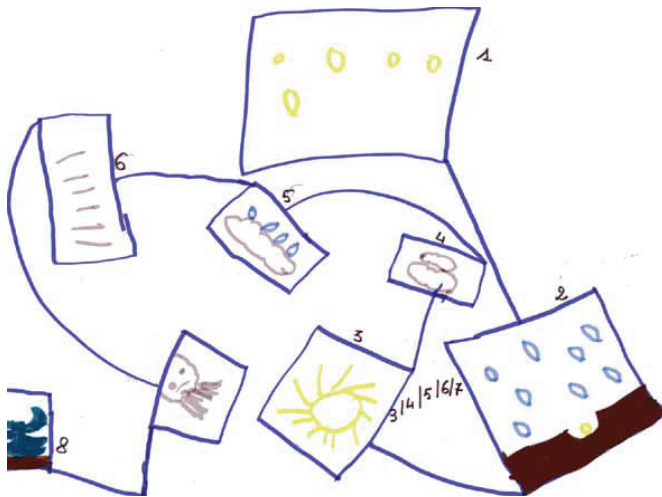


- 1) swallows leave;
- 2) swallows eat worms and cannot find food in winter in Italy;
- 3) swallows go to warm countries in groups, because baby swallows must stay in the group not to get lost;
- 4) swallows fly over the sea;
- 5) swallows pass the sea and reach the desert;
- 6) swallows go through hills and mountains;
- 7) finally swallows arrive in warm countries and build their nest until spring arrives in Italy.

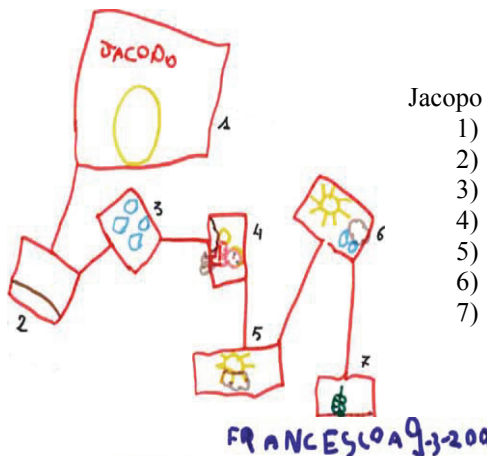
## 2.6 Sowing

Children sowed in October and plants are checked after a few months to see if they have grown. Children tell their experience through successive drawings, where they show different spatial-environmental situations over time.

Telling the experience with a map

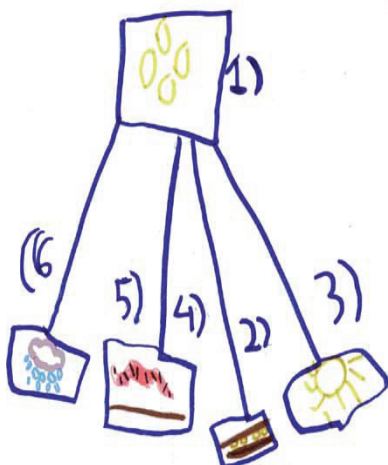


- 1) seeds
- 2) seeds were put on the ground
- numbers 3-4-5-6-7 show the passing of time
- 8) seeds grew into a not very tall plant



Jacopo

- 1) the seeds and the soil for the seeds
- 2) the rain makes the plant grow
- 3) it's me planting the seeds
- 4) sunshine makes the plant grow, not the cloud
- 5) rain and sunshine make the plant grow
- 6) the plant has grown
- 7) the plant grew because of all these things

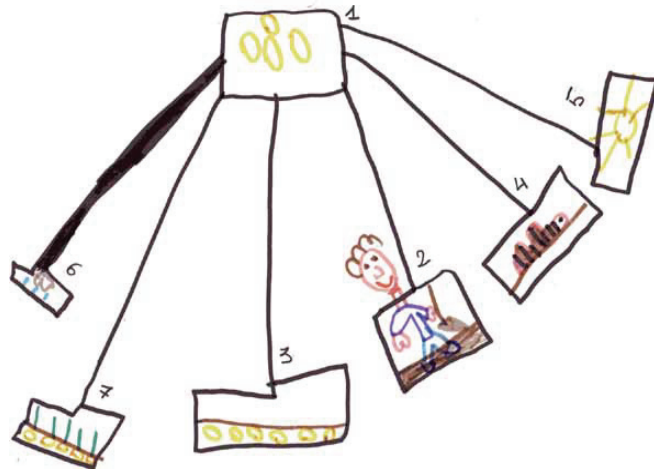


Francesco: here I tell what seeds need to grow

- 1) seeds
- 2) seeds are in the ground
- 3) sunshine makes the plant grow
- 4) a worm
- 5) this is the work done by the worm
- 6) rain makes the seeds grow

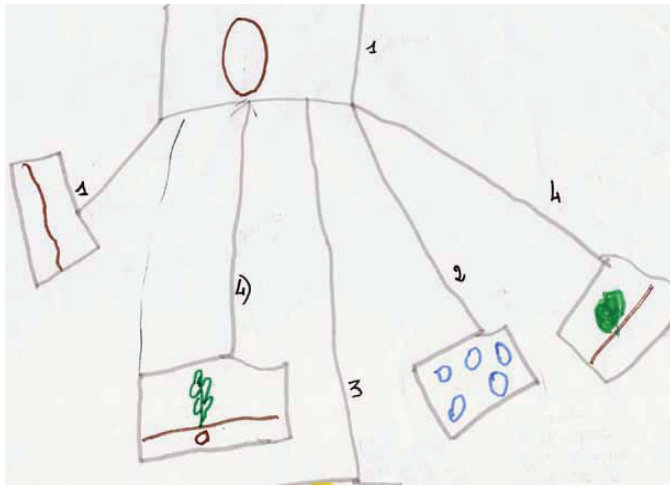


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Elia

- 1) seeds
- 2) it's me digging the soil
- 3) I put the seeds in the ground
- 4) we found a worm
- 5) the plants need sunshine
- 6) the plant grew a little
- 7) the plant



Davide: this map is about seeds

- 1) the seeds
- 2) I planted the seeds
- 3) We let the seeds grow
- 4) I moved this link here because I made a mistake
- 5) And then the seeds grew.

## 2.7

Each drawing made by the child included in the concept map is related with the child's thought. Situations propitious to evolution of one specific component are also propitious for the development of other components.

## 3 Conclusions

The teacher asks a question to the children: what does "building a map" mean for you? With this question we wanted to clearly identify the children's perception of c-map building. We were aware of the way we used to give guidelines, but we did not know how children would receive our guidelines in making c-maps, because approach to the method is always a subjective perception.

Answers given by children:

- 1) – Do you like building maps in a group? (teacher)
- 2) **P**: each of us made a drawing on the growth of seeds
- 3) **T**: we put the first important drawing on the table
- 4) **F**: from the main drawing we linked strings and attached them to other drawings with tape
- 5) **M**: first we thought about the seed experience, then we spoke about it.

Question made by teacher to stimulate children: Do you like building maps by yourself?

- 1) (As one): it's fun;
- 2) Jacopo: the map is not a drawing and it's nice because I can say everything I have in my mind and I can draw all the boxes I want;
- 3) Davide: I can make a lot of drawings and tell a lot of things;
- 4) Francesco: I am curious to see what is in each box;
- 5) P: we make maps to learn.

#### **4 Summary**

In conclusion, each child wants to express himself/herself uniquely in the c-map. Children are not inclined to share their ideas with other children or follow the group. They prefer to work alone, because the c-map is perceived as an individual sequence of situations, which express the peculiarity of the learning process. On the other hand, children like to discuss and talk about their experience, both during implementation and after conclusion.

Having the same structures, maps immediately permit visual reading. They provide a common starting point, from where similarities and differences can be immediately identified by children, stimulation meditation, language and socialization with other children. They are an easy, creative tool used by children to organize and represent their knowledge. In their own words, "they can tell what they have in their mind and open as many boxes as they want".

#### **5 References**

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