

## THE BOX OF SEEDS

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**Abstract** The article is about a short synthesis of strategy didactics adopted from the teaching of languages, mathematics and science over a period of two years. Since at the beginning of the school year the teacher realized that across the systematic observation the group was very heterogeneous about metacognitive competences and how they are related. Some pupils had difficulty with communication, had reduced logical competence and short periods of attention others showed behavioural problems. Other than that in the class there was a pupil who had a serious physical handicap. How to overcome this, a situation so problematic, significative learning in every known area? How do you encourage a pupil to build significant mind maps? In this case, the teacher looked to stimulate the pupils, their natural curiosity of the world around them and planned an activity dedicated to enable them to improve their homework. For this reason the teacher engaged them in the activity linked to their experiences to arouse and keep alive their motivation in learning. If the wish to learn is absent, this causes the pupil to loose interest in the activity and fall into different forms of evasion and dispersion. To promote active learning that develops above all in the pupils who loose their way along the educational path the skill to manage autonomously the study and the process of learning, besides for teachers to use didactic laboratories and on cooperative learning teacher uses graphics like diagrams, tables and mind maps. The last one are used by pupils to educate them since the beginning, to organize logically and retain all that is covered during the school year. This method helped the pupils who hadn't developed their communication skills in the lexicon structure.

### 1 Introduction

This work covered a period of two school years. The leading teacher in this area is a member of the website project “Le parole della scienza” (The words of science). All members believe that the following is required to acquire these skills:

1. Global understanding of the subject;
2. To pin-point information within the subject;
3. To be in a position to interpret critically in all areas.

From this, to help the pupils to develop scientific competence it is necessary that teachers promote through to the end of primary school: 1) the development of competence in oral and written language paying particular attention to enrichment of vocabulary and construction of social meaning; 2) acquiring the “meta-cognitive” competence, intense understanding to recognise the meaning behind a word – concentrate on the words and linking both. In the context of deprived culture, in which authors operate, the art of teaching addresses above all the social construction of the significance of single words followed by the propositions, intense as the systems where the relationship between words are significant. Only hard work concentrating on the significance and relationship between words will guarantee with time the possibility that the pupils will pass from confused thought to abstract and construct mind maps with better understanding of words, better organized and articulate. The experiences mentioned here were conducted with the intention to cover all stated above during the “prima elementare” with activity on objects to develop the pupils in linguistic competence (written and oral) and the skill of classification and simbolization, therefore grasping the skill of establishing relationships (**Figure 1,2,3,4**).

The living cycle of the plants is the central theme. The methodological organization is based on the key concepts (space, time, quantity, relationship, proposition, cause-effect task) of several disciplines (Maths – Italian – Science). The methodology developing is the cyclic- spiral one (Bruner) with the cyclic repetition of the same topic to develop other knowledges and relationships.

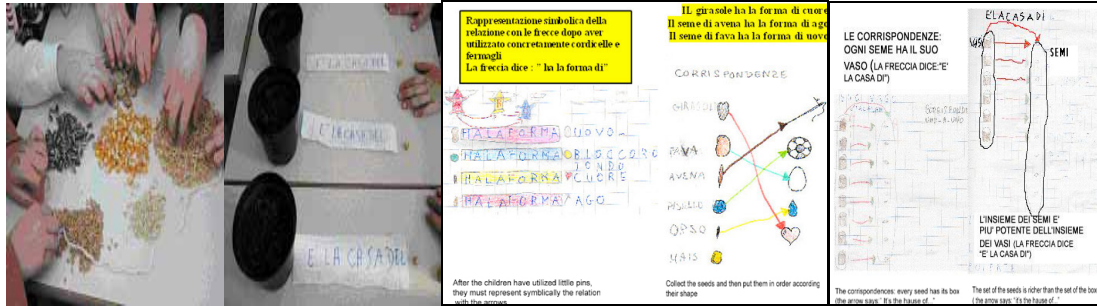


Fig. 1 classification

Fig. 2 the vase is the home of the seed

Fig. 3-4 draw relation between sets with arrows

## 2 Starting situation of the class.

The class is composed of 20 pupils. In this class there is Maria, a child with a serious physical handicap, she is watched over by a back-up teacher. At the beginning of the school year there were regular controls about metacognitive competences, that gave an idea of the class group that was very differentiated. Some children showed some difficulties with languages, had few logical competences and short period of attention. Some others showed behavioural problems. There were 5 children that showed particular difficulties. Francesco showed limited capability of listening and of concentration; he was lacking in lexical competences and had got few language structures. Carmine did not manage to be sitting and was not very tolerant with his classmates. Alessandro was lacking in lexical structures because of dialectal influences. Emma was lacking in capability of attention and reflexion and her oral and written communication was not always precise and logical in the structure. Leandra was used to cut herself off, to wander around the classroom without sitting or to stand still on the door holding her schoolbag tight and waiting her parents; she did not talk to her classmates or her teachers; sometimes when she felt the desire to communicate her experiences, she used a graphic code. To overcome all these difficulties it was necessary a teaching strategy able to act at the same time on various competences. Everything began the first year of the primary school when the teacher brought a box of grains and stimulated the children to say everything they thought watching those grains.

### 2.1 The first intervention: the knowledge's pupils about seeds

Conversation: Key question. What are these grains?

Francesco: There are broadbeans and kidneybeans.

Manuela: These are seeds to.

Sandra: Are the orange ones on the corncobs?

Alessandro: What are the corncobs?

Michele: Are there dry beans?

Emma: But are the kidneybeans seeds?

Alessia: What are these? (referring the sunflower seeds)

Emma: What a caos! Why do we not put them in order in the box?

Daniele: Why do we not put them in order in different cases?

That's how the idea of putting in order the seeds came out: the children decided to divided the seeds into little piles among them

### 2.2 Second intervention: Grouping and classification

The seeds were grouped as organized material:

1. to group and classification according form, color, dimension and species, dwelling on their names;
2. to seriate a pile;
3. to recognize the numerosity.

In this phase, the teacher noticed that if the pupils understood the relationship that joined the elements of two sets, some of them could not express it because of their linguistic difficulties like the following dialogue told during an

activity that had to stop at the set time. In the group whose conversation is cited, Alessandro had to decide the real value of the proposition and to put the seed in the set. Carmine had to describe the work. The group had on the desk the pile (Universe) of grains to classify according the property “length”.

### 3 Conversation

Emma: The bean is long

Alessandro: It is true

Emma: The corncobs is long

Alessandro: Does not responde

Emma: The corncobs is long

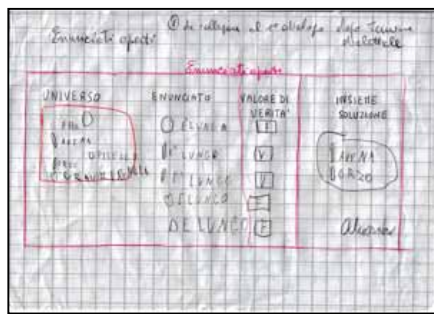
Alessandro keeps silent while Carmine, who fears that time’s up, spurs him to take a grain to decide.

Alessandro: What do I have to take?

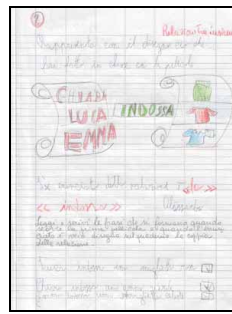
Carmine: The Orange one.

Alessandro: Ah, yes... the graurignolo! (Graurignolo is a dialectical word for corn)

To Alessandro the word corn (meaningful) evoked no intellectual image or representation (meaning). The child knew the real object (the grain) but he knew it only with its dialectical name. It was not simple for Alessandro to share the language with the class group, in fact he went on using the dialectical name (Fig. 5). To allow the child to appropriate a richer language and a kind of relation among sets grammatically arranged he could use to develop the mind maps, the teacher proposed a lot of activities this phase of work is verb centered (Fig. 6-7).



**Fig. 5** Figurative  
 Logical proposition  
 Universe : several seeds (A.write “graurignolo”)  
 Open proposition : “... is long”  
 Value of truth : “oats seed is long” (true)  
 Solution : oats and barley



**Fig. 6** Relation between sets.  
 Draw what you did in the classroom with the membranes.  
 (Luca is wearing t-shirt –active form)



**Fig. 7** Discover the relation (the child writes: “it is wore by...”).  
 (passive form)

#### 1.1 Third intervention: From the grain used as object of classification to the seed

During next phase work the teacher move attention of the classroom on fuction of the seeds in reality already in the mind of some pupils there is an idea of the seed as something little from which the plant can be born, but they cannot accept the idea they can eat the seeds. Concerning the origin of the roots and other parts of the plant they have got strange unreal ideas. Only through the regular observation of the growing process of the plant they can understand that their previous knowledge about it were wrong.

### 4 Conversation. Key question: Can a little plant be born from these grains?

Francesco: From kidneybeans nothing can be born because my mother cook them to eat and we do not eat seeds.

Emma: The kidneybean is not a seed but it contains a very little seed.

Luca: When I attended the nursery school I sowed lentils and I saw something was born sticking the cotton wool on one side and on the other side a little plant was growing up.

Maria: It is not true. Lentils can be eaten they cannot be seeds.

Carmine: What was the name of that thing that stuck the cotton wool and sucked the water?

Michele: Well, is the lentil a seed? And the kidneybean?

The teacher: Do you want to know who is right?

## 5 The sowing and the first germination

At the end of the conversation the pupils put the seeds in the dish so everybody can see the developing of the process. After fifteen days the dish is like a jungle, the highest plants will be the lentils and the wheat, other plants are developed too, in fact it is possible to distinguish them because of their characteristics. . Through the regular observations and conversations, the knowledge about the meaning of root is well designed, in the same way the concept of seed, peel and cotyledon.

In a parallel way to the building of scientific knowledge continues the work for building a social language meaning and logical of preposition. In the figure Fig. 2-4-6-7 there are some exercises to use a right relationship between two sets and the symbolic representation by arrows. During the first year pupils have learnt that the reality can be represented in different way and different codes. In particular all the exercises on arrows references and on the logical of preposition are the support to understand the structure of mind maps and build them.

### 2. Second year of primary school: start building mind maps

At the beginning of second year of the primary school teacher induct pupils to remind the words and the knowledge learned through the experience of sowing and stimulate pupils to think on the idea that if they don't know the object that the word represent, they can't remind any mental images. From this simple consideration the pupils acquire a shared definition of the word "concept" and the word "bond"(that, in, from,...); the first one is used when we want to say about things that all can imagine, while the "bond words" don't remind in the pupils any images. Later the teacher proposed a series of exercises on sentences building, using the representation of the relationship between two concepts with the arrows. In the phase the pupil will pay attention on asking himself what will be the one that better defines the relationship between a concept and another.

The meaning of the association existing between two different concepts can be defined in many ways and all are precise and logical: the richness and the flexibility of the language complete the work.

#### 2.1 Mind maps construction

At the end of this path there will be a list of ten (plants, trunk, leaves, seeds, soil, dimension, shape, colour, roots, green) Fig. 8 concept-word concerning the experience of the sowing and with them the first mind maps will be developed. The pupils decided with the teacher to use bond-words in order to transform easily the map in a descriptive text. In effect, the pupils could already use that kind of relationship they were using, a kind of relation grammatically arranged (time, person, category, number, cause/effect). For this reason there are many maps that are different concerning the utilized bond-words.

Fig. 8: Alex's map

Fig. 9: Transformation of the map in text:

Plants have got the the trunk that was born from the roots that are in the soil.  
Plants have got leaves that are green.  
Plants were born from seeds that have got dimension, shape and colour.



Conclusion: The logical and linguistic process that allowed the pupils to build the mind maps, showed many improvements in the abilities of reflection, memorizing, organization, analysis and synthesis. All the meta cognitive competences are used in the building of the mind maps..

## References

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J. D. Novak, *L'apprendimento significativo*, Ed. Erickson 2001