



## **THE POTENTIALS OF BODILY EXPERIENCE IN THE MEANINGFUL LEARNING: A TEACHING-METHODOLOGICAL HYPOTHESIS FOR A DYNAMIC CONSTRUCTION OF CONCEPTS**

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The potentials of the body and the movement in fostering the processes of knowledge has been widely described by the scientific literature (Lakoff & Johnson, 1999; Sibilio 2002; Barsalau, 2005). The evidences emerged in many scientific areas on this topic have suggested to experiment, in the educational field, a teaching model that could dynamically adapt the theory and methodology of concept maps proposed by Novak and Gowin (Novak & Gowin, 1984; Novak, 1993; Cañas A. et al., 2004;).

The proposed teaching model represents an opportunity to use the symbolic gesture and the action to create a network of interconnected concepts.

The proposed teaching method was experimented in an Italian primary school (Sibilio, 2011) where there have been experimented teaching methods aimed at building dynamic concept maps through the use, in a vicarious or complementary way, of several forms of communication and activities able to bring out the potentials of the body and the movement as regards to the attribution of meanings. Carrying out the experimental experience, it has been supposed the possible creation of relationships among different concepts through the body-motor activity to create propositions that can extend their meaning.

This educational approach has allowed to use gestures and motor actions as "bodily-kinesthetic labels" that, like the words, have represented events and objects, whose combination of simple units has encouraged the construction of a wider meaning. The results of the educational research have been assessed on the basis of the ability to translate the learned contents into a verbal code measurable through specific monitoring tools of the learning reflected in memory and in the recognition of some keywords (Reynolds & Bigler, 1994).

**Keywords:** Didactics, Concept maps, Body, Action, Meaningful learning, Rote learning.

### **INTRODUCTION**

The potentials of the body and the movement in fostering the processes of knowledge has been widely described by the scientific literature of many disciplinary fields (Lakoff & Johnson, 1999; Sibilio 2002; Barsalau, 2005).

Cognitive sciences, psychology, philosophy, pedagogy and many other scientific-disciplinary domains have been interested in understanding the way in which the body and movement are involved in the mechanism of learning.

More than the previous models of learning, such as behaviorism or cognitivism, the scientific revolution (Khun, 1962) that has led to consider the constructivism a leading paradigm in the theories of learning has highlighted the active role of the person in the cognitive activity.

The important epistemological assumption of constructivism is that meaning is a function of how the individual creates meaning from his / her own bodily experience (von Glasersfeld, 1988).

Starting from this assumption, many educators have worked to develop new teaching strategies targeted to foster the construction of a “*meaningful learning*” (Jonassen, 1991).

One of the teaching strategies deriving from the constructivistic paradigm is the use of the concept maps developed in 1972 in the course of Novak’s research program (Novak & Musonda, 1991).

Concept maps are graphical tools for organizing and representing knowledge. They include concepts and relationships between concepts indicated by a connecting line linking two concepts (Novak & Cañas, 2008).

This learning technique was based on the learning psychology of David Ausubel (1963; 1968; Ausubel et al., 1978) whose fundamental idea is that learning takes place by the *assimilation* of new concepts and propositions into existing concepts and propositional frameworks held by the learner.

According to Ausubel the concepts are acquired by children recognizing regularities in the world around them and identifying language labels or symbols for these regularities (Macnamara, 1982).

Even if new concept and propositional learning is mediated heavily by language, this acquisition is also mediated, in a very important way, by concrete bodily experience: hence the importance of “*hands-on*” activity for any learning process.

It is therefore fundamental to give importance to the participation of the sensory-perceptive system to attribute meaning and catch the regularities in the events and objects (Sibilio, 2011).

In this theoretical perspective, the observation of the event or object that is a prerequisite for the attribution of meanings cannot be limited to a process based only on a visual or auditory channel, but it is rather a personal and more complex synthesis of information-sensory perception and bodily characteristics of the subject.

The use of the potentialities of all the sensory system, as well as of the movement, that can be considered a sixth sense (Berthoz, 2000) to construe meanings requires the knowledge of the complex and multidimensional nature of the mechanisms of learning and memory.

Ausubel made a very important distinction between “*rote learning*” and “*meaningful learning*” whose distinction is not a simple dichotomy but rather a continuum: *learning can vary from highly rote to highly meaningful* (Novak, 1998). Knowledge learned by rote tends to be quickly forgotten, unless much rehearsed.

Human memory is in fact a complex set of interrelated memory systems and is the result of the interactions with inputs from our affective as well as psychomotor inputs.

The most critical memory systems for incorporating knowledge into long-term memory are the short-term and “*working memory*.” All incoming information is organized and processed in the working memory by interaction with knowledge in long-term memory (Novak & Cañas, 2008).

One of the strategies that can be used to consolidate the relationship between memory and learning is to build associative mechanisms based on bodily experiences that because of their multisensory feature could contribute to recall specific memory traces that facilitate the attribution of meaning.

The retention of information learned can in this way take place in long term memory, as does information learned meaningfully. This not only permits the utilization of the knowledge in new contexts, but also the retention of the knowledge for long periods of time.

## **AIM**

According with these assumptions, the research was aimed to verify the effectiveness of a didactic method based on playful and motor activities targeted to construe meanings using associative mechanisms able to "drag" essential information to the learning process into the long-term memory.

## **RATIONALE**

The rationale of the teaching method that has been experimented was based on the following points:

- 1) The relationship between memory and learning is functional for all teaching activity.  
The mnemonic system constitutes a necessary, albeit not sufficient, condition for learning mechanisms (Bear et al., 2002) and in this sense it plays a key role in education because it represents one of the prerequisites for the development of knowledge. Memory is in fact governed not only by "mechanical-repetitive principles, it also responds to associative principles that facilitate the ability to recall information (Costanza, 2008).  
  
In teaching the association between information and bodily experiences, having a specific meaning for the subject, can help to facilitate the recalling process (Baddeley,2001). From this teaching perspective the bodily-motor experience, given its multi-sensorial nature and its emotional potential, can be regarded as an original tool to be used for instructional purposes.
- 2) The meaning of certain words, concepts and logical structures respond to a symbolism that can be "translated into a dynamic shape" through gestures and actions.  
In this sense, many concepts can be represented either by motor representations that reproduce them or by symbolic forms focused on movements and mime-gestural actions assuming by analogy specific meanings.
- 3) Words, concepts and logical structures can be learned even without verbal or iconographic information, as it can be seen in the presence of sensory deficits and specific learning difficulties.
- 4) Teaching methods are effective if they are able to promote learning process through the integration of action, feeling, and thought that is at the basis of meaningful learning.
- 5) Body and movement can be teaching and learning tools and alternative or complementary ways to communicate meanings, words and construe logical structures.

## **METHODS**

The research was conducted by adopting an integrated model of action research and experimental research.

The action research envisaged:

- a formal agreement between 14 schools and the Department of Education of the University of Salerno (Italy) to share the aims of the research, the methods and the procedures;
- the establishment of a working group composed of university researchers, school teachers and headmasters, to share the methodological choices and the negotiation of practical-teaching proposals according to the educational needs resulting from a previous analysis of the most widely used teaching practices;
- a training course for the school teachers and headmasters (held by the University of Salerno) focused on the methodological aspects of the didactics of movement activities.

The experimental research allowed to evaluate the effects of the chosen teaching methods as independent variables on conceptual learning through the educational use of the body and movement and it required a 45 minutes lesson (using body and movement) given by teachers on a common pre-established topic addressed to the students belonging to the experimental group following the methodological suggestions emerged during the training course.

## **SAMPLE**

The research was carried out using as sample a group of primary schools pupils (aged 7-11) of the Region of Campania (Italy) agreed with the Department of the Science of Education of the University of Salerno, for a total of 16 classes.

The sample group made of 260 pupils was divided into two groups, an experimental group (attending the experimental lesson) and a control group (attending a traditional lesson based on a oral-trasmissive method).

## **INSTRUMENTS**

The instrument used to assess the “retention” of the target words taken as verbal labels of the concepts to be learned was the Test of Memory and Learning by Reynolds and Bigler, in particular the subtest Word Selective Reminding which measures learning through the memorization of 8/12 words used during the learning units.

## **RESULTS**

The application of the experimental teaching methods, based on the use of the kinesthetic potentials of the body to promote the learning of concepts and the memorization of the words related to them, has showed an increase in test score for the 68.75% of the classes (11/16), while in 12, 5% of the classes (2/6) no changes were observed and in 18.75% of the classes there was a decline in values.

## **CONCLUSION & DISCUSSION**

The results refer to the evidences emerged from the test administration, in the full awareness of the impossibility to be generalized for the presence of many intervening variables constantly

undermining the validity of research especially because it was conducted in an educational setting, with children. It can be assumed, however, as observed (in a significant percentage), that the proposed movement activities, as an alternative to traditional teaching methods, have fostered the acquisition of the concepts representing the “nodes” with which consequently create the connections of meanings, acquired through the educational-teaching itinerary based on body and movement proposed by the teachers. In this perspective, gestures and actions have represented "bodily – kinesthetic labels" which, like the words, may represent events and objects, whose combination in simple units fosters the construction of meaning. By taking this approach, many interconnected motor labels may create propositions expressing a broader significance. The construction of a proposition requires that the learner memorizes and acquires the meaning of each label and creates a relationship between the different labels also through the acting body. The proposed teaching approach has therefore been an alternative mode of teaching, broadly consistent with the theoretical principles governing the construction of concept maps by Novak and Gowin.

Through the development of motor label referring to specific concepts, logical structures and perceived constants, together with the definition of actions, gestures and mime-gestural forms, it is possible to plan teaching activities that use the body and movement in the construction of conceptual meaning.

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