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PRESCHOOL REGULATION DOCUMENTS IN ITALY ON MOTOR IMAGERY, OPEN LOOP, CLOSED LOOP AND DIDACTICS OF MOVEMENT

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Abstract
Purpose. To identify into the Preschool ministerial documents the educational activities and didactic on pedagogy of body and movement and the new neurological discoveries on motor control and learning
Methods. Theoretical-argumentative approach about scientific paradigms on motor control and learning and historical-documentary one about the ministerial documents on teaching activities
Results. Particular aspects, which can be connected to the new neurological theories, do not carry out. All ministerial documents does not provide any reference of motor imagery, open loop, closed loop and didactics of movement
Conclusions. It may be useful to deepen further the study and deliver the results to the governmental experts for the necessary updates to fill up the vacuum
Key words: regulation documents, motor imagery, open loop, closed loop

Introduction

To give a clear view of the preschool is necessary to declare the exact situation of the whole school in Italy by the official source.

Pre-primary education age from 3 to 6 years old. On 31 January 2008, the Italian population was 60.045.068. In the school year 2009/10, children enrolled in pre-primary schools were 1.007.108 Students enrolled in school education were 7.804.711. Of them, 2.578.650 were in primary school, 1.670.117 in lower secondary school and 2.548.836 in upper secondary school (all data refer to participation in State schools). The language of instruction is Italian, although in some areas the use of the local language is officially authorized for education. The *scuola dell'infanzia* is the first stage of the education and training system and it is not compulsory. Children who turn three within the 31st of December of the current school year can enroll in the pre-school in Italian language *scuola dell'infanzia*. Upon parents' request, also children who turn three on the 30th of April are admitted to pre-primary education. Children enrolled in pre-primary education, considering both State and non-State schools, are about the 96-97 % of the entire population aged 3-5 years. Pre-primary education is offered free of charge. Families are asked to pay a sum for transport and canteen services. Families with low incomes are exempted.

The amount of hours in one year is between 875 and 1.750 hours, corresponding at about a minimum of 25 and a maximum of 50 hours a week. Generally, children are organized in groups according to their age. Groups can be made up of a minimum of 18 and a maximum of 26 children (National system overviews on education systems in Europe and ongoing reforms (EURIDYCE 2010 pp.1-2). Pre-primary education is organized at specific segment of school called in italian *scuola dell'infanzia*, it lasts 3 years and is addressed at children from 3 to 6 years of age. The *scuola dell'infanzia* is part of the education and training system, yet it is not compulsory. These segment, already called in the past time nursery schools, are co-educational establishments and may be located on the same premises as primary schools or, when the premises are in other places, are separate. They are the only type of pre-school in both the State and non-State sectors. Responsibility for State pre-primary education establishments lies within the Ministry of Education, University and Research with the administration of the majority of nursery schools being delegated to local education authorities. As the State nursery schools are unable to meet the demand, non-State schools (private and municipal) receive subsidies from the State, provided certain essential conditions are met. In addition to subsidies, there are sources of funding provided under the terms of regional laws. This funding is provided directly to schools or indirectly through pupils' families. The State only took over complete responsibility in the sector of pre-school education in 1968 with Law no. 444. However, with the passing of time, pre-primary education has lost its assistance features and gained not only educational value, but also a full didactical autonomy even though it keeps a certain level of continuity with the primary level of education. The system was further radically reformed by Legislative Decree no. 59 of 2004, which was passed in implementation of delegated Law no. 53 of 2003 aimed at reforming the entire system of education and training. Under the terms of the reform, the

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three-year *scuola dell'infanzia* (the new name for nursery schools) is designed to foster 'the education and the emotional, psychomotor, cognitive, moral, religious and social development of children (...)' and to guarantee educational continuity with both childcare services and with schools. The *scuola dell'infanzia* is fully included in the educational system. (Structures of Education and Training Systems in Europe Italy 2009/10 Edition, EURYDICE CEDEFOP ETF Sharing Expertise in Training, p. 13)

General objectives of preprimary school is not compulsory and lasts three years (Organization of the education system in Italy 2009/2010, EURIDYCE EACEA, EU, p.49). It contributes to the affective, psychomotor, cognitive, moral, religious and social development of children and promotes their potentiality of establishing relationships, of autonomy, creativity, learning and to secure equal educational opportunities: in the respect of the educational responsibility of parents, it contributes to the integral education of children; through its autonomy and didactical and pedagogical unity, it carries out the educational profile and the educational continuity together with all childhood's services and the primary school' (Legislative Decree 59/2004, art. 1).

The ministerial documents are in temporal order: 1969 Guidelines for the educational activity, 1991 Guidelines for the preschool, 2004 National Guidelines, 2007 Guidelines for the curriculum, 2009 Revision of the educational organization regulated directions of the pre-school.

After this rule analysis it is useful to make a real argument about theoretical aspects of the psychophysiology of the movement and its didactics.

Recently, it begins a process that starts to break down the wall that rigidly divides the sciences of life and human sciences. Several research methods can be integrated to investigate on the whole phenomenon which may include fields of knowledge completely different such as neurobiology and philosophy to investigate on the theory of mind on motor activities or, in this case, between neurophysiology and motor skills teaching. In the theories of the movement change is big and should correspond with an adjustment in teaching to update the educational theories that relate to the body. Particular nerve cells are called mirror neurons for the property of reflecting in the mind the movements of others or of imagining their own standing still. They do not contribute to the practical execution of the movement while being structures appointed to motor nerve but they perceive it (Rizzolatti, Iacoboni, Gallese, Fogassi, Fadiga, 1996). For this reasons, this theory is called motor imagery. They have the normal nervous activity, they discharge the electrical potential and thanks to x-ray sophisticated instrumentation of brain-imaging or neuro-imaging such as Positron Emission Tomography (PET), Functional Magnetic Resonance Integrated (fMRI) of Transcranial Magnetic Stimulation (TMS) and Magneto Encephalo Graphy (MEG) it is possible to highlight. All the time occurs that when the people see, hear, proprioceptive feel inside the body information concerning the movements or of other movement when there are a minimum of interest in others. The existence of this phenomenon demonstrates that particular neurons are discharged when there is not movements. However, they can be active even it imagines a self movement but we do not run it. It means that action and perception occur in the same time and help each other in all steps of movement. Thus, there is also knowledge in the same time without the traditional sequential stages of sensitive afferent or perception, development of the motor idea, motion planning, execution of actions and their feedback. The preschool is particularly interested in this new way of scientific development for the consequences that may have on the educational activity; applications may influence the mechanisms of acquisition of motor skills and development of it among motor control by visual perception, motor imagery and performance (fig. 1).

There may also be learning in other fields of knowledge different from physical education where the relationship among body, movement and learning produces spatial, temporal, sequential, linguistic, expressive and musical learning and so on. These "learnings" are the study of the educational psychology that updates its own scientific paradigms in relation to these discoveries. Embodiment and situatedness are the center of learning in early age, which means embodied and situated cognition is into the phenomena on the body and movement to develop the learning way.

However, it is important, to point out some aspects in order to understand better how to take advantage of these discoveries as well as how to avoid an inappropriate use and distorted cultural spreading (Gallese, 2007). Finally, it is important sense-perceptive competencies, the movement in the space and the time and, at least, the body language meant as a communicative-expressive way according to the two more shared scientific paradigms: closed-loop motor control and open-loop motor control. The first provides that the perception is first and then the movement and so constantly in a continuous loop called closed-loop motor control system (Adams 1975). In this case the movements are those that are not present in the memory and are executed with the help of feedback for adjustments and corrections of errors. They are constantly updated through the comparison between what is perceived, called perceptive trace, and what you have in mind, called memory trace.

The second motor control system theory is also expected that first is the perception and then the

movement but in one or different scheme called open-loop motor control system (Schmidt 1985). Together two motor control system are the one way to explain how it executive the movement (fig. 2). It clarifies some differences about the past other model that is the movements and its trace are already present in memory and do not adjust themselves with the comparison and they can't be corrected when the feedback occurs below 200 milliseconds because the brain can't process them and use them to elaborate the adjustments and corrections. This theory states that there are in memory a wide range of similar movements among them in a sort of container or register. These patterns are already present at birth but become active in certain circumstances already in a functional manner. The new discoveries about the brain suggest a mixing up of perception/action in a single process where perception and execution are set together without a sequential order and where the knowledge derived from movement is learned in a single process.

The aim of this study is to verify if the ministerial documents of the preschool and if there are aspects of psycho-pedagogy and educational applications of any recent neurological and scientific discoveries on mirror neurons or motor imagery, closed loop motor control system and open loop motor control system. To help a development of an epistemological and psycho-pedagogical framework including any related educational applications about body and movement; to make an epistemological reflection on the theory of human movement in the educational school environment for preschool activities in connection with the primary school.
In synthesis to identify into the preschool ministerial documents the correlation between the educational activities and didactics on pedagogy of body and movement and the new neurological discoveries on motor control and learning.

Methods

Integration of different types of research into a single model with an ecological approach. Theoretical and argumentative research that analyzes methodological and didactic patterns of motor activities according to the main educational psychology and neurological and physiological theories. Historical and documentary research that analyzes the methodological and teaching contents of physical activities in preschool obtained from ministerial papers. Comparative research that correlates the different models of study of physical activities for children.

Results

First of all it declares specifically the contents of single document relating the investigation. Secondly, in declaration, check the didactics and the education sentences to search the neurological and physiological elements relating the body and movement. The document 1969 Guidelines for the educational activity contains a double orientation: the first one orientated to the harmonic development of the body and its natural expression by guide of the master and the second one to include the complexity of movement to help to develop the child to grow up. There is not nothing elements on motor control system or didactics method to teach.

The document 1991 Guidelines for the preschool contains a strong appeal for a didactic guided by the free doing and acting and the provision of appropriate learning environments for a rich and extensive stimulation. The field of knowledge is divided by areas and that of body and movement is enhanced as other fields of knowledge. The teacher's role is slightly active tending in some cases to director of operations. It is not found evidence related to the new discoveries neither data on the type of motor control. The document 2004 National Guidelines is a mere list of objectives to be achieved in the form of motor skills and there is no single reference to teaching. Basically, it refers to the document above and does not refer to any element related to the theories of motor control or to the recent discoveries.

The document 2007 Guidelines for the curriculum resumes the contents of the document Guidelines for preschool and they are contextualized in a disciplinary process that goes from childhood to the end of the first education cycle. It widens the sense of continuity of teaching action without indicating specific teaching methods. It does not indicate a specific item on motor control and does not address to new scenarios on movement in the light of the discovery of mirror neurons or the other two motor control system theories. In all the documents there is no cultural basis of theories of motor control and there are no elements of new scientific discoveries about the brain from the motor point of view. The psycho-pedagogical paradigms are totally based on the overall contents on learning generalizing the teaching in all fields of knowledge. Ultimately, there is no trace of a scientific specificity about body and movement nor there is a cultural content on the theories of motor control. The last regulation documents (D.P.R. 20 marzo 2009 n.89 2009 Revision of the educational organization regulated directions of the pre-school) does not address the solution way because give at the single autonomy experimentation the leading of next steps. In this moment there is not the results of experimentation and the Minister of Education did give the indications yet.

Discussion

All documents are lacking in cultural references about motor control and there is a total absence of general knowledge and specific one on human movement. However, psychological and didactics aspects are not in relationship to a new discoveries of functioning of mind, but the references are exclusively regarded the pedagogical authors. The unique and overall knowledge is useful for the holistic approach to knowledge but it does not realize at all the objective of the recent scientific knowledge of a field of motor activities. What is needed is a detailed review of the psycho-pedagogical principles at the basis of ministerial documents with the purpose to insert clear links to the theories of motor control and human movement. As Ján Figel says in Early Childhood Education and Care in Europe: Tackling Social and Cultural Inequalities EACEA P9 Eurydice (2009) "Pre-primary education has the highest returns in terms of the social adaptation of children. Member States should invest more in pre-primary education as an effective means to establish the basis for further learning, preventing school drop-out, increasing equity of outcomes and overall skill levels. For this reason, the Commission has identified pre-primary education as a priority theme for cooperation between Member States in 2009-10, in particular to promote generalised equitable access and reinforce the quality of provision and teacher support". For this reason, it is trying to find some remarkable points to compare the aspects on new scientific research on motor control systems and pre-school educational document.

In this way it wants to give relevance to the European Commission's attention regarding the infants' institutional education given after 2009 in several states in European Union. It seems to be a quite difficult overview highlighting just a portion of these system without a description of the entire structure.

Because of in pre-schools the average Italian children's age is between 2 and 5 and the terminology used to identify this type of school philosophy is used in different ways, such as words like 'kindergarten', 'childhood school', 'infant school' or 'pre-school'. This remarkable effect can be also discovered nowadays in denominations and theories of different states of EU early-childhood educational systems. In some languages, these types of institutes are called 'pre-schools' or 'infant schools'. It may refers to a dominant teaching activity influence. "Italy is a democratic republic organized on the basis of a Constitution drawn up in 1946-47, which came into force on 1st January 1948. Its history since the Second World War has been characterized by tremendous economic growth and unequal advances in modernising the social and political structures of the country. Much negotiation has taken place between the different political tendencies and between government and the traditional institutions. Over more recent decades, local, provincial, and regional entities have joined the debate, with a very-present emphasis on the values of diversity and decentralisation." (OECD, 2001. p.8.) As it can be know, Italy has more than 50 years of experience in democracy. Developmental process of its educational system traditionally has run together with a changeable democratic society.

Because of it is just quoted that the importance and prominence of Pre-primary education in terms to returns of the social adaptation of infants. Thus, the Member European States should invest more in this segment of school due to the education as an effective means to establish the basis for further learning in Primary school, preventing school drop-out, increasing equity of outcomes and overall skill levels. The Italian state have to follow the European Union's leadership. For this reason, the Commission has identified pre-primary education as a priority theme for cooperation between Member States in 2009-10, in particular to promote generalised equitable access and reinforce the quality of provision and teacher support".

So at the close of the past century, Italy achieves universal provision of preschool education, through a combination of several services programmes, availability and goals. Attendance at a *scuola materna/scuola dell'infanzia* is now commonly accepted as the first and essential stage of the educational system and a vast majority (over 95% state-wide) of Italian three-, four-, and five-year old children now attend some form of pre-primary school. The distinctions among types of pre-primary schools are variously identified, both in conversation and in the literature, as (a) public or private, (b) state or non-state, or, most commonly, (c) state, communal, or private.' (OECD, 2001, p.15-16).

Finally it suggestions to address the traditional way to concern the training' teachers throughout a new one of Master Degree to Preschool education such as in the most states of European Country in accordance to Bologna process and to Dublin descriptors following the new discoveries on motor control system and new didactics in application of it. .

Fig. 1 Soc. Neurosci. Abstr., Vol. 26 p.967, 2000

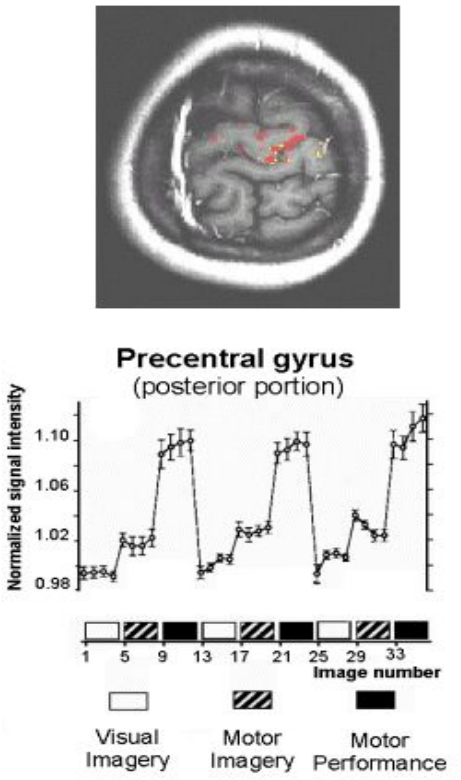
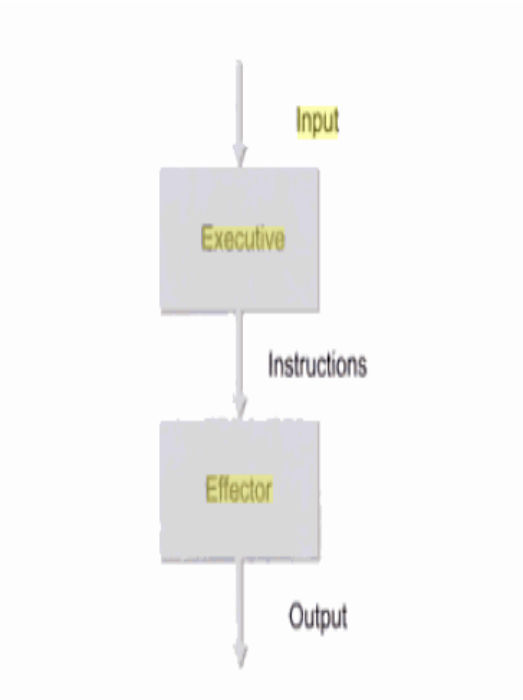


Fig. 2 *Schmidt e Wrisberg* 2008



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