

# REGULATION DOCUMENTS IN PRIMARY SCHOOL IN ITALY ON MOTOR CONTROL SYSTEM AND DIDACTICS OF MOVEMENT

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## Abstract

**Purpose.** To identify into the ministerial documents of Primary school the educational activities and didactic on pedagogy of body and movement according to 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, that can be connected to the new neurological theories, does 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.

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## Introduction

To introduce this study it is mandatory to synthesize the rules and the regulation documents and then to deduce, by theoretical and argumentative research approach, the essential data of neurological, psycho and physiological aspects on movement and its didactics.

Primary education was completely reformed with Legislative Decree no. 59 of 19 February 2004, which was passed following the implementation of delegated Law no. 53 of 28 March 2003 which aimed at reforming the entire system of education and training. Based on the new organization, the first cycle of education, which lasts of a total of 8 years, consists of primary school and first cycle of secondary school.

Primary school and lower secondary school are two different education levels, each with its own specificities, even though they are part of only one school cycle. Primary school is compulsory and lasts 5 years (from 6 to 11). It consists of a first year that serves as a transition from nursery school and two successive periods of two years. Primary education is provided at legally recognized State and non-State schools. Enrolment and compulsory attendance are free of charge at State, equal status or *parificata* (authorized) schools.

The municipality provides all pupils with textbooks free of charge. Transport and school meal services are always managed by the municipality, but

the families are requested to make contributions, except for some exemptions for particular class people. The possibility to offer financial aids directly to the families falls within the responsibility of single regions; therefore, it changes according to different legislations. It can be generally stated that provisions are contributions in money and scholarships, reductions of the payment for transport and meals up to the total exemption, for the weaker categories, as well as reductions for text books purchase. (Structures of Education and Training Systems in Europe Italy 2009/10 Edition, EURYDICE CEDEFOP ETF Sharing Expertise in Training p.16)  
Compulsory Education.

Education is compulsory from 6 up to 16 years of age. The right/duty to education and training for at least 12 years is fulfilled within the education system or up to the obtainment of a three-year vocational qualification (either at school or in the initial vocational training system) before reaching 18 years of age. Compulsory education covers the first cycle of education, made by 8 years, and the first two years of the second cycle (upper secondary education).

Admissions criteria is the enrolment to the first class of primary school and it is compulsory for all children who have turned 6 within the 31st December of the current school year or, earlier, within the 31st April of the current school

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year. Enrolment to the first year of lower secondary school is compulsory for all pupils who have successfully completed the primary school. Enrolment and attendance are offered free of charge for the whole first cycle of education. Families are free to choose the school, within the limits of available posts.

Length of school day/week/year: the school year comprises at least 200 days between the 1st of September and the 30th of June. Schools open five or

six days a week. Compulsory annual teaching hours are 891 in primary school; this amount is subdivided into 33 teaching weeks with an average amount of, respectively, 27 weekly hours.

According to school autonomy, each educational institution is responsible for the organization of its annual teaching time. At primary level schools can also organize the teaching time on an average of 30 or 40 weekly hours, but it is special and in low tendency. In the first year of primary schools also a weekly timetable of 24 hours has been introduced.

Curriculum control and content Schools of the primary school adopts National Guidelines (*Indicazioni nazionali per i piani personalizzati delle attività educative*) of 2004 together with Guidelines for the Curriculum (*Indicazioni per il curricolo per la scuola dell'infanzia e per il primo ciclo di istruzione*), issued in 2007 and introduced on an experimental basis in the school year 2007/08 and the school year 2008/09. In the next three school years (until 2011/12) the activities carried out by the schools will be monitored.

The outcomes are likely to be used to amend the Guidelines. Such guidelines define the essential performance levels that should be ensured by each school. The guidelines are nationally determined and adapted to local needs by each school according to school autonomy. Knowledge and skills are indicated for each subject; the school will help pupils to transform them into personal competencies. Specific learning objectives at primary school level have been defined for the following subjects: Catholic religion, Italian, English language, history, geography, mathematics, science, technical education and ICT, music, art and drawing, sport and motor sciences. Class size/student grouping pupils are usually grouped according to their age. According to their organizational autonomy, schools can also organize groups with pupils of different ages.

Each class is generally made up of maximum 26 and minimum 15 pupils. At this primary level teachers are generalist and then they will become specialists in one or more subjects. (National system overviews on education systems in Europe and ongoing reforms EURIDYCE 2010 pp.3-4).

General objectives in Primary school are, through the exploitation of the pupils, personal diversities, including those due to disabilities, “fosters the personality development, the acquisition of basic knowledge and the development of skills, from ICT literacy up to the first logical-critical organization, as well as learning expressive means, Italian language and English language literacy (Organization of the education system in Italy 2009/2010 pp.60-61). Furthermore, it intends to place the bases for the use of scientific methodologies in the study of the natural world, its phenomena and laws, and to exploit social and orientation skills in the space and time as well as to teach the fundamental principles of civil coexistence” (Legislative Decree no. 59 of 19 February 2004). Primary school aims are clarified in the National Guidelines (*Indicazioni nazionali*) for the personalized study plans of 2004 and in the new Guidelines for the curriculum (*Indicazioni per il curricolo*) introduced on a trial basis for school years 2007/08 and 2008/09.

The ministerial documents are in temporal order: 1955 Programme **for the educational activity in elementary school**, 1985 Programme **for the educational activity in elementary school**, 2004 National Guidelines in the first cycle of the school, 2007 Curriculum Guidelines the first cycle of the school, 2009 Revision of the educational organization regulated directions for the first cycle of the school.

To continue after the analysis of education system we need to start a deductive and argumentative investigation on new aspects on mind and movement and its didactics.

Several research methods can be integrated to investigate on the whole phenomenon of theory of the mind, which may include science fields that are completely different such as neurobiology and philosophy to investigate on the motor activities and the mechanism to learn or between neurophysiology and motor skills.

Recently, the neurological and scientific research has placed highlight to the need for links among the different fields of knowledge to explain the phenomena according to human science instead to confine it only internally to the life sciences.

To explain how the mind works only from the organic point of view may be restrictive, the same may hold if you approach the subject only from the philosophical point of view. The occasion is the new scientific evidences on the function of the brain and its mind theory; new discoveries show the relation and relationship between two different research approaches.

Certain nerve cells that are activated when they see, hear or perceive through touch a movement but do not produce actions and movements. They do not give any contribution to the practical execution of the movement while being structures appointed to motor nerve but they receive the information without the movement, such as the imagination (G. Rizzolatti, 2006, M. Iacoboni, 2008, V. Gallese, 2006, V. Gallese, 1996).

They can be seen when they activate, i.e. they discharge the electrical potential and it is possible to highlight 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 Encephalography (MEG). This phenomenon happens all the time when the subjects see, hear, feel on the body or inside the body information concerning the movements of others when there is interest in those activities and actions. It has been demonstrated the existence of particular neurons (mirror neurons) that, in the absence of movement, discharge, activate and reflect the motor activities of others around the body.

Furthermore, they discharge even when we imagine a movement but we do not run it. It is then defining a new theory of motor control called imagery motor. This opens a new scenario on learning of motor activities for imitation and on teaching based on simulation and demonstration. It means that action and perception occur at the same time and help each other in all phases of movement. Thus, there is also knowledge at 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 importance of the playful-motor activities suggests a new way of doing school, which can be carried out only acknowledging the centrality of the person. The “learnings” of Embodiment and Situatedness are the center of learning in early age, which means that they are embodied and situated; cognition into the phenomenon on the body and movement to develop the learning way are the study of the educational psychology that updates its own scientific paradigms in relation to these discoveries. (V. Gallese, 2007).

Finally, these discoveries bring into discussion the theories of motor control that temporally distinguish the afferent perceptive phase from the executive efferent one 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.

Movements are those that are not present in motor 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 is also expected to be the first is the perception and then the movement but in one or different scheme called open-loop motor control system (R.A. Schmidt, 1985).

The aim of this study is to verify if the ministerial documents of the kindergarten there are aspects of psycho-pedagogy and educational applications of any recent neurological and scientific discoveries on mirror neurons and on motor imagery; to help to develop 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.

### Methods

1. Integration of different types of research into a single model with an ecological approach. 2. Theoretical and argumentative research that analyzes methodological and didactic patterns of motor activities according to the main educational psychology and neurological and physiological theories. 3. Historical and documentary research that analyzes the methodological and teaching contents of physical activities in preschool obtained from ministerial papers. 4. Comparative research that correlates the different models of study of physical activities for children.

### Results

Theoretic and argumentative elements are divided in two types. First of all, the single sentence on knowledge, didactics and the methodology of motor activities. Secondly, it verifies if there are psychological and physiological elements in the didactics and the methodology sentences.

The document 1955, Programme **for the educational activity in elementary school** is very short and contains a few elements for the harmonic development about behaviourist aspects. It has a double orientation: the first one is orientated to the harmonic development of the body and its natural expression by the guide of the master and the second one to include the complexity of movement to help to develop the child to grow up. There are no elements on motor control system or didactics method to teach the movement as well as the neuro- scientific research.

The document 1985, Programme **for the educational activity in elementary school** is longer than the past one and, for the first time, speaks on motor education in a cognitive aspects in several interface of physical education and sport in the developmental process between five years old and ten. It 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. Despite this innovation, the document is incomplete about the new discoveries on motor control system and there are no scientific elements on neuroscience applied to movement and the learning process through the body.

The document 2004, Attachment A – National Guideline for the Programs of studies of the first cycle of education National Guidelines for Personalized Programs of the Educational Activities in the first cycle of education, Specific Learning Objectives, **Recommendation to put into practice the National Guidelines for Personalized Programs of the Educational Activities** is a very innovative regulation tool to teach properly to a new discoveries on individual learning process. It takes in light the relation between the teaching and the learning in an unicum. It writes in double column, where there is specified knowledge and ability in motor and sports science, as a sort of a new scientific paradigm of physical education and sports in primary school. It 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 neuro-scientific discoveries.

The document 2007, The Guidelines for the curriculum of the first cycle of education, as the last one a large paper where there is written a lot of knowledge and process of motor and sports science in a new vision for this research field. It resumes the contents of the document Guidelines for primary school 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 neuro-scientific 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.

The document 2009, Revision of the educational organization regulated directions for the first cycle of the school does not explain the innovation in new rules, but it postpones to a new experimental study the final revision and does not hint anything. It recommends to trust in two last documents: 2007, the Guidelines for the curriculum of the first cycle of education and 2004, National Guideline for the Programs of studies of the first cycle of education National Guidelines for Personalized Programs of the Educational Activities in the first cycle of education, Specific Learning Objectives, **Recommendation to put into practice the National Guidelines for Personalized Programs of the Educational Activities.**

Therefore, there is no trace of a scientific specificity about body and movement nor there is a cultural content on the theories of motor control.

In these documents there are not elements and/or methods to establish the application of motor control system in its three scientific ways and forms: closed loop, open loop and motor imagery. The big vacuum is the absolute absence of psychological and pedagogical aspects on movement that could have the theoretical aspect of new discoveries.

### Discussion

Documents are lacking in cultural references about physical education and this results in a total absence of knowledge of general and specific aspects of human movement, motor control and psychological aspects. The unique and overall formulation of knowledge is useful for the holistic approach to knowledge but it does not realize at all the objective of base knowledge of a field of knowledge. 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.

Finally it suggests 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.

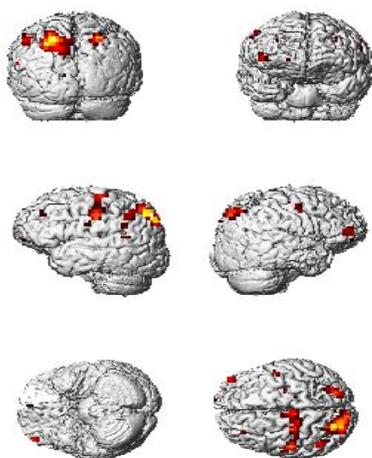


Fig. 1 Soc. Neurosci. Abstr., Vol. 26 p.967, 2000

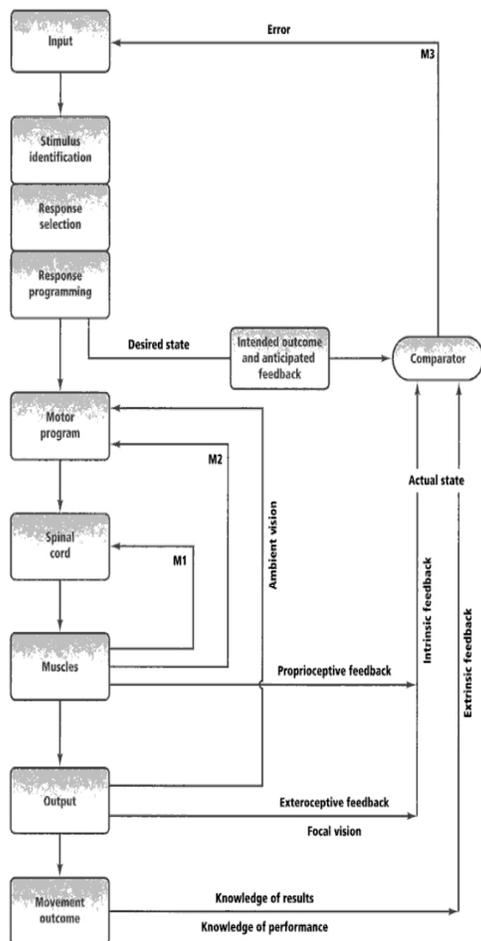


Fig. 2 Schmidt R.A. and Wrisberg 2008

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