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CORPOREALITY AND CROSS-CURRICULAR LEARNING: FROM THE ANALYSIS OF THE 2004-2007-2012 NATIONAL INDICATIONS TO FUTURE PERSPECTIVES

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Abstract: *The segmentation and specialization, which characterize the current state of knowledge, the "struggle" and sometimes the declared "incommunicability" between the sciences, today need a modification of the curricula and a consequent and necessary reorganization of educational planning and programming oriented to overcome the unidisciplinary approach. The present contribution, starting from an analysis of the 2004-2007-2012 national curriculum Indications (MIUR) and focusing on corporeality as a medium of cross-curricular learning, aims to initiate insights about the revision of programmatic guidance documents in the Italian context. The study in analysing objectives and developmental goals of the different disciplines within the national guidelines highlights the evolution of the value of corporeality by critically revisiting the usual educational scenarios where the body is often absent or little valorise. According to international educational perspectives increasingly directed toward the development of transversal skills and attitudes and recent research in the field of cognitive neuroscience, some epistemological nodes will be outlined on which to leverage so that corporeality can become a "tool" for the integration of knowledge and experience, traditionally separated from each other: those of speech (verbal dimension) with the less recognized ones of movement, gesture, gaze and the senses (non-verbal dimension). Physical education can enable the implementation of interdisciplinary and multidisciplinary paths, foster the implementation of learning environments effective to the promotion of cognitive, social, cultural and affective experiences.*

Key Words: *Corporeality; Educational Planning; Learning-Environment; Physical Education; Transversal Skills.*

INTRODUCTION

The regular practice of physical activity, as widely confirmed in scientific literature, plays a key role in the development of personality, promoting psycho-physical-social well-being. However, despite increasing evidence supporting the benefits of regular physical activity for children's physical and mental health, it seems that most school-age children are not sufficiently active (Lubans et al. 2016).

The frame of reference to set the reflection on Physical Education (PE) in the Italian school context is outlined not only in international documents; on the one hand the guidelines of the World Health Organization that outline specific actions to be implemented with the *Health and Well-being* as an objective, on the other hand, the European Recommendations on key competences for lifelong learning and the guidelines for the creation of innovative learning environments.

Europe encourages us to ensure quality education in order to reduce sedentary behaviour and promote an active lifestyle, especially in the younger population. The creation of innovative learning environments, promoted by the *Guidelines for the rethinking and adaptation of learning environments at school*, becomes a decisive aspect for planning educational actions aimed at developing life skills (ICWG, 2017).

The "*Global Action Plan on Physical Activity for the years 2018-2030*", approved in 2018 by the World Health Organization, sets out the strategic goals to achieve through policy actions to reduce the global prevalence of physical inactivity in adults and adolescents by 2030. The Plan stresses the need for a *systemic approach* and the importance of investing in social, cultural, economic and environmental, educational, etc. policies to promote physical activity and contribute to the achievement of the 2030 Sustainable Development Goals. Italy's strategies are in line with the objectives of the Action Plans promoted by the WHO and with EU policies, take into account all the determining factors that influence lifestyle and aim to implement effective health promotion actions in an interdisciplinary and integrated approach. The promotion of physical activity is a complex issue that requires strong leadership from the healthcare

sector, crucial at national level, but great interaction with other sectors, such as education, sport and culture, transport, urban planning and the economy (WHO, 2018). With the Recommendations of 18 December 2006 and the following Recommendations of 2018, the European Parliament and the Council of the European Union define the framework of key competences for lifelong learning. Key competences, all of equal importance, are those needed for employability, personal fulfilment, active citizenship and social inclusion.

The development of motor skills and the practice of regular physical exercise are the essential prerequisites for the development of children and adolescents, who should be offered different activities from primary school to secondary school of first and second degree. School physical education plays a fundamental role for the development of students and the learning of all those transversal skills useful for everyday life skills, for the demands of the world of work and social integration. (D'Anna et al. 2019)

In recent decades, the promotion and development of life skills have acquired a significant role in educational planning aimed at providing young people with the skills necessary for personal fulfilment and development, active citizenship, social inclusion and employment. In the context of this scenario, confirming the national and international regulatory framework, the scientific community recognizes in Physical Education the educational value for the global development of the person, confirming the ongoing process of change (D'Anna, 2020).

Competences-based teaching foregrounds the awareness that the learning process involves all dimensions of the person (*cognitive, operational/motor, emotional-affective, social and metacognitive*) (D'Anna, 2018, p.49).

Corporeality can favour the full involvement of the different dimensions by relating organic-metabolic, perceptual-coordinative, motivational, emotional-relational and cognitive factors. Learning environments based on movement games are able to activate body-kinaesthetic intelligence (Gardner, 2000) and then to influence the development of skills in fields apparently far from the motor one: the cognitive field and the emotional and social ones (Pesce, 2015, p. 43).

Designing learning environments that use the body as a facilitator means being able to promote the development and improvement of cognitive functions, life skills and obviously the improvement of coordination and physical effectiveness.

The WHO document defines life skills as "*skills that lead to flexible and positive behaviour and enable individuals to effectively cope with the demands and challenges of everyday life*" (WHO, 1993). The WHO identifies a core of ten skills then divided into five areas: decision making – problem solving; creative thinking – critical thinking; communication – interpersonal relationships; Self-awareness – empathy; Dealing with emotions – stress.

Life skills are transversal, multidisciplinary, and flexible, so they adapt to any type of competence or activity. These characteristics underline the significance of life skills within numerous other skills; Problem solving, for example, is found in mathematical, scientific and technological competence, digital competence, learning to learn competence and initiative competence.

Many studies highlighted the strong relationship between physical activity and cognitive processes in children; in particular executive functions (EF), whose functioning is the basis of good learning (Giuriato et al., 2020; Biino, 2020). In neuropsychology and cognitive psychology, the term EF is used to refer to higher cortical functions responsible for controlling and planning behaviour. These are processes that allow an individual to plan and implement projects aimed at achieving a goal, but also to monitor and modify their behaviour in case of need or to adapt it to new contextual conditions (Tomporowski et al., 2008).

There are many processes that can be traced back to the executive domain: attention, impulse control, self-regulation, start-up, working memory, cognitive flexibility, use of feedback, planning and problem solving (McClelland et al., 2019). EFs are essential skills for mental and physical health, for educational success in school and then in life, for the cognitive, social and psychological development of the individual (Diamond, 2014). They are now considered even more important for school readiness than IQ. EFs positively influence subject areas such as mathematics and reading performance (Blair & Razza, 2007) and are essential for quality learning.

The present contribution, starting from an analysis of the 2004-2007-2012 national curriculum guidelines (MIUR) and focusing on corporeality as a medium of cross-curricular learning, aims to initiate insights about the revision of programmatic guidance documents in the Italian context.

The transversal nature of the body in the disciplines: analysis of national indications

The segmentation and specialization that characterize the current state of knowledge, the "struggle" and sometimes the declared "incommunicability" between the sciences, the difficulties of interdisciplinary comparison often conditioned by the complexity of globalized society, require today, more than ever, a reorganization of the school and adaptation of educational planning oriented to overcome the unidisciplinary approach, tending to isolate the objects of knowledge. «[...] It's called knowledge that which is capable of inscribing itself in a broad framework, the one that evaluates, proposes, questions how its presence modifies or transforms the quality of the complete picture ... an intelligence accustomed to analysing by separation impoverishes the possibility of understanding long-term responsibilities, the planetary reference of every act of knowledge" (Gamelli, 2006, p. 10). The recompositing of fragments into unity is in the body, thinking oneself and the other by oneself starting from corporeality becomes the focus of the "Pedagogy of the Body", which critically reconsiders the usual educational scenarios, where the body is often absent or harnessed, to integrate traditionally separated knowledge and experiences: those of the word with the less recognized ones of the movement, of gesture, gaze and senses. An interesting aspect is the transfer in the various training areas of the principles underlying body education in its various forms (such as psychomotricity, dance, relaxation techniques and use of the voice, theatre, as well as the multiple methods of care and artistic training technologies of body mediation). It is a pedagogical way where research on the body is fluidly combined with narrative training strategies. An approach that shifts the focus on interpersonal relationships and on the potential of language through the body, a body that assumes the role of "formative subject", not only part of the process of knowledge, but itself a producer of "knowledge" (D'Anna, 2020).

The analysis of the texts of the NI of the last 15 years, has highlighted several changes and evolutions concerning fundamental aspects for teaching; some of these, on which we have focused more attention, highlight the need for a new teaching approach of PE in the school environment.

The scanning of objectives, as well as the organization of disciplines have undergone a series of adaptations that underline the need to reduce the fragmentation of knowledge and favour a greater connection between disciplines. The NI 2012, in fact, do not propose any disciplinary aggregation, in line with the approach of innovative teaching adapted to the new ways of learning of the current generation, which breaks the linearity and fragmentation of knowledge and opens up to infinite forms of aggregation.

This perspective opens up new spaces for educational action for PE, a discipline particularly suitable for the implementation of interdisciplinary and multidisciplinary paths, favourable learning environments for the promotion of cognitive, social, cultural and affective experiences (MIUR, 2018).

Through the comparative reading of the objectives of the other disciplines in the NI 2004, 2007 and 2012, an increasingly incisive use of corporeity, as a medium of transversal learning, is evident (fig.1-2-3).

National guidelines 2004 – Primary School	
Class I	
Art and image	Represent human figures with a structured body scheme
Music	Use the voice, your body and various objects, starting from musical, motor, environmental and natural stimuli, in games, situations, stories and free activities for spoken, recited and sung expressions
Classe II e III	
Music	- Musical games with the use of body and voice. - Perform by imitation, simple songs and songs, individually and / or in groups, accompanying themselves with objects of common use and with the different sounds that the body can produce, up to the use of the educational instrument, connecting to the gestures and movement of the whole body
By the end of Class V	
Unitary educational and educational activities that had the aim of helping him to transform the following knowledge and skills into personal skills:	
Health education	- Develop techniques of observation and listening to one's body to distinguish moments of well-being from those of malaise. - Verbalize personal physical states (symptoms of well-being-malaise) and identify the possible causes that determined them

Nutrition education	<ul style="list-style-type: none"> - Recognize the needs of your body and identify the most appropriate diet for its growth. - Identify the most appropriate diet for your body and your physical needs, based on the calculation of your energy expenditure.
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Fig. 1: The body as a medium of learning in the 2004 National Indications

National guidelines 2007 – Primary School	
Community languages	In the introduction - The bodily response to verbal indications and play, will allow the student to explore sounds and meanings and to appropriate them and then reuse them in a creative way
Language expressive area	- In the introduction – The word body appears five times and always emphasizing how body language together with other languages contributes to the overall formation of the student. In outlining a curriculum of the area, the transversal dimension and the specific one of each discipline must both be kept in mind.
At the end of Class III	
Music	<p>Skills development goals at the end of primary school</p> <ul style="list-style-type: none"> - Articulates timbre, rhythmic and melodic combinations, applying elementary schemes; performs them with voice, body and instruments, including those of computer technology; transforms them into short representative forms. <p>Learning objective</p> <ul style="list-style-type: none"> - Uses motor and body language to communicate and express one's moods, also through dramatization and rhythmic-musical experiences.
Art and image	<p>Learning objective</p> <ul style="list-style-type: none"> - Explore images, shapes and objects present in the environment using visual, auditory, olfactory, gestural, tactile and kinesthetic skills.
Geography	<p>In the introduction</p> <ul style="list-style-type: none"> - Geography operates in close connection with motor sciences, to consolidate the relationship of the body with space. <p>Learning objective</p> <ul style="list-style-type: none"> - Landscape – Explore the surrounding area through the sensory-perceptual approach and direct observation
At the end of Class V	
Natural and experimental sciences	<p>Skills development goals at the end of primary school</p> <ul style="list-style-type: none"> - Takes care of your body with appropriate choices of behaviors and eating habits <p>Learning objective</p> <ul style="list-style-type: none"> - Continue the observations of the day and night sky on an annual monthly scale, starting through games with the body and construction of three-dimensional models, to the interpretation of the observed motions, from different points of view, also in connection with the historical evolution of astronomy. - Respect your body as an unrepeatable entity (health education, nutrition, health risks)

Fig. 2: The body as a medium of learning in the 2007 National Indications

National guidelines 2012 - Primary School
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Premise – From kindergarten to primary school	The pupil has a positive relationship with his own corporeity, has gained sufficient self-confidence, is progressively aware of his own resources and limits, when necessary, knows how to ask for help.
English Language and communication	The teacher will take care to alternate different strategies and activities: for example, song proposals, nursery rhymes, games with classmates, role-playing games, deliveries that require bodily responses to verbal indications in the language.
At the end of Class III	
Music	Skills development goals at the end of primary school Articulates timbre, rhythmic and melodic combinations, applying elementary schemes; performs them with voice, body and instruments, including those of computer technology.
Geography III	In the introduction The first encounter with the discipline takes place through an active approach to the surrounding environment, through direct exploration; In this phase, geography works together with motor sciences, to consolidate the relationship of the body with space.
Mathematics III	Learning objectives Space and figures – Perceive one's position of the body in space and estimate distances and volumes starting from one's own body.
Sciences	Learning objectives Observe and pay attention to the functioning of one's body (hunger, thirst, pain, movement, cold and heat) to recognize it as a complex organism, proposing elementary models of its functioning. Competency development goals The pupil is aware of the structure and development of his body, in its various organs and systems, recognizes and describes its functioning, using intuitive models and takes care of his health.
At the end of class V	
Sciences	Learning objective - Observe and experiment in the field - Reconstruct and interpret the movement of different celestial objects, reworking them through games with the body.

Fig.3: The body as a medium of learning in the 2012 National Indications

The figures show the detail, extracted from the NI 2004, 2007 and 2012, of the learning objectives of other disciplines that use corporeality as a medium of transversal learning. Physical Education, in fact, can and must be considered a junction and connection between the various disciplinary areas; the experience accomplished through the body and motor activities constitutes the starting point (perceptual activities) and the passageway (executive function and motor coordination processes) of every learning (Colella, 2018).

Physical Education can interconnect its contents with those belonging to different disciplines in view of a vision that is not fragmented, but broad of reality, alongside the

contemporary construction of the alphabets that are proper to it to offer tools such as the understanding of the essence of gesture and movement, the mental habit of democracy that is built with the daily exercise of respect for rules and people, as well as the promotion of positive experiences as a motivating starting point and encouragement towards good practices, [...] prevention as a competence for life, [...] self-care of environmental conditions [...] (Seclì & Ceciliani, 2014).

The body as a methodological glue to promote transversal learning

In recent years, neuroscientific research and cognitive psychology have shown the extreme significance and value of the body in the teaching/learning processes. According to the approach of *Embodied Cognition* (EC), corporeality facilitates the construction of knowledge as the active participation of the body allows the student to experience and feed emotions, understood as reinforcement input, product of the total involvement of the person as a whole (Gomez Paloma, 2013). In this regard, psychological and neuroscientific research has shown that some important cognitive functions were essentially based on action and perception as a function of experience. Body and action emerge, in the embodied vision, not only in the concepts of body consciousness and body identity but, also, in the constructs of learning, intelligence, memory, emotion (Fischer et al., 2007). From this perspective, embodied cognitive research can have important implications for education because it highlights an approach to learning that passes through whole-body engagement (Gallagher & Lindgren, 2015). Many studies have underlined the importance of gestures in learning mathematical concepts (Alibali & Nathan, 2012).

The significant role of experience, the importance of the body acting in mathematical thinking, and the multiple possibilities and modalities of experience are three key aspects that have brought the individual, and researchers, closer to embodied mathematical cognition (Hall & Nemirovsky, 2012).

The scientific scene underlines how play and motor skills are some of the key points of an effective teaching proposal in teaching English as a foreign language, in fact there are numerous disciplinary contributions, not least that of neuroscience, which, over the

years, have allowed us to redefine the processes of learning - teaching, where the body assumes an indisputable centrality. Among the most recent discoveries, the thesis of how body activation and movement improve the process of retention of a foreign language (Sambanis & Speck 2010) supporting the fact that physical activity has always been linked to a healthy mind and physical exercise has always been a vital part of education. Focusing on the area of foreign language learning, several studies explored how gestures or movements can affect specific areas of language learning, such as phonological awareness and reading, while some other studies demonstrated the impact of movement integration for language development and comprehension (Moritz et al., 2013). The results of the study by Booth et al. (2014) revealed that physical activity has a positive impact on students' academic performance, while the study by Chaddock-Heyman et al. (2014), showed that *embodied interaction* improves neural connectivity within the brain. Along the same lines, other studies in this area have emphasized the link between movement and specific words showing that children acquire new vocabulary better when they link a movement with a word (Kosmas & Zaphiris, 2019a). In addition, Glenberg (2010) pointed out that memory and perception are influenced by movement.

CONCLUSIONS

The scientific evidence that had emerged from multidisciplinary studies on the relationships between the physical, cognitive, affective and relational characteristics of the person, allowed in recent decades to attribute full citizenship to the body and movement in the field of educational research, contributing to a critical rethinking of the teaching practices mainly adopted in the Italian school. In particular, the scientific investigation has enhanced the potential of the body and movement in fostering teaching-learning processes aimed at developing the personality of the subject receiving the educational action.

Since motor activity exerts cognitive input on executive functions (attention, inhibitory control, working memory, flexibility, etc.), *embodied cognition* has begun to permeate the sciences of motor activity and sports through the perspective of situated dynamics,

that is, conscious learning in the complex subject-environment system (Stelter & Roessler, 2005).

The educational repercussions that the theory of *embodied cognition (neuroscience) and the approach to embodied education* (phenomenological pedagogy) seem to envisage the world of motor activity and sports, can be traced back to the enriched educational proposal, initially declined for school Physical Education, but extendable to the sports context. Particular importance is given to *educational corporeality*: the body in motion intended as a mediator capable of giving meaning to the teaching experience (Pesce et al., 2016).

The body is a device of action through which, by realizing experiences, it is possible to develop learning and produce knowledge. It is therefore a mediator of knowledge: one learns by and through the body (Carlomagno, Palumbo, Sibilio, 2014).

Body-based teaching is effective both as a methodology for facilitating learning and as an inclusive strategy for special educational needs (Sibilio, 2012; Paloma Gomez, 2014). The *Embodied Cognitive Science-based* approach (Gomez Paloma, 2015) confirms the value of the body as a powerful tool for mediating learning and amplifying the acquired knowledge.

The most recent theories in the field of educational research have led to the recognition of an absolute centrality of action in the teaching-learning process, inducing to recover the neuroscientific evidence that suggests looking at action as an embodied dynamic process, synthesis of perception and knowledge, in an enaction mechanism that involves the body in its totality in a co-evolutionary dynamic with the environment (Rivoltella et al., 2017).

The *Embodied* dimension of learning in educational planning can increase the opportunities for global development, not only within the PE school discipline, but also integrating with other curricula through interdisciplinary teaching, in which the same corporeality is predisposed as an indispensable entity for the activation of a learning process that has a real and significant significance for the acquisition of skills.

In the light of the scientific evidence placed in the foreground by the international literature, more than 10 years after the publication of the National Indications, there is a need for a rethinking of the entire school curriculum of the first cycle school, which can

no longer be framed according to a logic of vertical linearity of the individual disciplinary epistemologies; overcoming this rigid and reductive vision, PE will be able to acquire greater relevance and the right educational recognition.

From the simple reading of the goals, but even more so if the focus shifts to the learning objectives declined in the four thematic nuclei (*"The body and its relationship with space and time"*, *"Body language as a communicative-expressive modality"*, *"The play, sport, rules and fair play"* and *"Health, well-being, prevention and safety"*), a strong healthy and performative approach is evident, which emphasizes the introduction to sport and sports practice. In contrast of this orientation, there is little consideration of the symbolic and cultural value of the body and of the embodied matrix of learning (D'Anna & Ambretti, 2023). The thematic nuclei, while pertaining to the practical and recreational-expressive technical matrix of the PE, could be declined in a capillary way within the other areas of citizen training, offering content support at an interdisciplinary and methodological level at the level of transversal skills.

The Italian cultural scene is changing thanks to a series of hopeful political initiatives. Recently, thanks to Law No. 234 of 30 December 2021, the graduate teacher in motor sciences was introduced in the fourth and fifth classes of primary school. Even the organizational, managerial and practical conditions to ensure that motor activity does not remain marginal or superfluous, such as the limited hours in the context of weekly programming or the often-inadequate spaces for the implementation of motor and sports activities, are the subject of attention by national policies.

So, the Plan for infrastructure for sports in schools *was issued*, financed by the *National Recovery and Resilience Plan (PNRR)* which provides a budget for the safety and construction of school gyms. The announcement aims to increase the availability of gyms, sports facilities including outdoors, building, securing or renovating gyms or outdoor sports areas to be used as gyms for schools of first and second cycle education. It is desirable that the latest legislative measures can start a process of renewal, also through the implementation of professional updating courses for teachers, in order to promote innovative educational paths that enhance the embodied dimension of learning.

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Normative documents

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