

THE IMPORTANCE OF MOVEMENT IN DADA METHODOLOGY TO PROMOTE SCHOOL WELL-BEING AND MEANINGFUL LEARNING

L'IMPORTANZA DEL MOVIMENTO NELLA METODOLOGIA DADA PER FAVORIRE IL BENESSERE SCOLASTICO E L'APPRENDIMENTO SIGNIFICATIVO

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ABSTRACT

Il presente lavoro riporta un'analisi interdisciplinare ed una riflessione pedagogica sulle potenzialità del movimento come strumento educativo, integrato all'interno della metodologia DADA (Didattiche per Ambienti di Apprendimento).

Partendo da un'analisi delle teorie costruttiviste ed ecologiche, il contributo analizza come il movimento influisca positivamente sulle abilità cognitive e l'attenzione degli studenti promuovendo apprendimento significativo e favorendo benessere scolastico.

This article reports an interdisciplinary analysis aimed at carrying out a pedagogical reflection on the potential of movement as an educational tool, integrated within the DADA methodology (Didactics for Learning Environments).

Starting from an analysis of constructivist and ecological theories, the contribution analyzes how movement positively influences students' cognitive abilities and attention, promoting significant learning and favoring school well-being.

KEYWORDS

School well-being; movement; DADA methodology; meaningful learning; teaching-learning process.

Benessere scolastico; movimento; metodologia DADA; apprendimento significativo; processo di insegnamento-apprendimento.

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Introduction

In recent years, movement has taken on a central role in pedagogical and neuroscientific reflections, questioning the traditional mind-body dualism. The body, understood as a fundamental tool for learning and human development, has become the focal point of approaches that combine cognitive, emotional and social dimensions.

The interaction between body, movement and learning environment, interpreted through the lenses of constructivist and ecological theories, is configured as a key element to promote scholastic well-being and the enhancement of transversal skills.

Motor skills not only improve physical performance, but stimulate cognitive and executive functions, promoting brain plasticity and greater concentration.

At the same time, innovative pedagogical approaches such as the DADA methodology (Didactics for Learning Environments) integrate movement into educational processes, proposing dynamic and flexible environments that enhance the physicality and active involvement of students.

This article explores the link between movement and learning, analyzing the theoretical bases that support it and the practical implications in the school context.

Through an interdisciplinary analysis, the potential of movement as an educational tool is investigated and the new frontiers of teaching are reflected upon to promote global student well-being.

1. The interaction body-movement-learning environment: from the constructivist vision to the ecological dimension.

Cartesian dualism of mind and body is a constant object of scientific research and its careful pedagogical reflection in the scholastic and educational context. Over the years, the body and movement have been re-evaluated in an interdisciplinary perspective as fundamental means and tools for the development of basic knowledge for the development and maturation processes of students, thus overturning a previous intellectualistic and abstract vision.

Awareness of one's body can be considered as the tool that allows each individual to know himself and the world, in a bio-psycho-social perspective, one of the paradigms on which neurodiversity and human development are based, a sort of ecological dimension that favors a careful analysis of the needs of each student, in the name of one's personal well-being.

The interaction between body, movement and learning environment represents a central theme in pedagogical sciences, especially in the field of theories that place direct experience and context at the center of learning processes. In this perspective, the different educational contexts, and the pedagogical-didactic approaches, have been shaped over time thanks to two main scientific-cultural orientations that have highlighted how body and movement constitute the basis of significant learning in a perspective of scholastic and global well-being of the person: the constructivist theory and the ecological theory.

The constructivist orientation, inspired by the studies of Jean Piaget and Lev Vygotskij, focuses its attention on the person, an active subject able to give meaning to his/her self through experience and his/her own possibilities of movement and choice. The person is, therefore, placed at the center of the teaching-learning process, in a learning-centered pedagogical perspective strongly opposed to a teaching-centered pedagogical approach. Learning, therefore, is an active process of building knowledge through interaction with the environment (Piaget, 1970; Vigotskij, 1978).

Kelly G.A. (2017), in the Personal Construct Theory, does not make a dichotomous distinction between mind and body, which are considered as an inseparable whole, but underlines how a person's processes are psychologically channeled by the ways in which he or she anticipates events through knowledge of the external environment.

The constructivist approach highlights the learning environment as an opportunity and stimulus for the learner (Howland et al., 2013), who then activates the resources available in it to promote what Ausubel et al. (1983) define as meaningful learning, which correlates the contents already learned by the student to give meaning to what he learns and use the knowledge acquired in subsequent contexts for problem solving and carrying out activities.

Knowledge is therefore linked to concrete action and involves a global experience that is based not only on the cognitive level, but also on the affective and emotional level, in a dense network of social collaboration and interpersonal communication.

Bodily action is, therefore, particularly significant in situated learning, in which knowledge is constructed within authentic and relevant contexts. For example, practical activities such as observing nature or manipulating materials stimulate not only motor skills, but also cognitive skills, such as critical thinking and problem solving. In this sense, body-environment interaction becomes fundamental to making learning meaningful and transferable to real situations.

The ecological orientation, instead, bases its theory on the relationship between organism and environment (Smith and Smith, 2007). Bateson and Longo (2000) speak of ecological mind, capable of creating reciprocal bonds with nature. The mind is itself environment, since it is an integral part of it and, for this reason, it cannot be imagined as separate from the environment itself.

Gibson (1979) offers a further interpretative framework to understand the importance of movement in learning. According to this perspective, human behavior cannot be understood without considering the system of dynamic relationships between the individual and his environment. Gibson introduces the concept of *affordance*, or the opportunities for action offered by the environment in relation to the individual's capabilities.

In education, this means designing learning environments that encourage movement and physical interaction, offering flexible spaces and materials that encourage exploration, curiosity, and creativity. For example, a classroom that includes manipulative tools, sensory paths, or areas for motor activities encourages students to experiment and discover new possibilities for action. This approach fosters autonomy and a sense of competence, essential aspects for effective learning.

Edelman (1992), in his theory of neuronal group selection, offers a revolutionary framework to understand the dynamics of the human brain and its relationship with the body and the environment. This theory, often referred to as *Natural Darwinism*, is significantly intertwined with the principles of *Embodied Cognition*, an approach that sees human thought and behavior as phenomena rooted in the interaction between mind, body and environment and that the body, and the brain as part of the body, contributes to determining mental and cognitive processes (Borghi and Cimatti, 2010). Both perspectives propose an overcoming of the traditional dichotomy between mind and body, emphasizing the importance of corporeality and neural plasticity in cognitive processes.

Edelman's theory and *Embodied Cognition* share a systemic and dynamic vision of cognition, in which the body and the environment are not accessory elements, but essential components of the cognitive process.

These convergences offer fertile ground for innovation in fields such as pedagogy, rehabilitation and artificial intelligence. In the educational field, above all, understanding the relationship between movement, experience and learning can inspire practices that enhance the active involvement of the body. Teaching strategies based on experiential and multisensory learning find solid foundations in the intuitions of Edelman and *Embodied Cognition*, for which the educational

relationship, in its becoming alive and concrete between subjects interacting with the learning environment, is characterized as an ecosystem (Moliterni, 2013).

2. The impact of motor skills on cognitive abilities and attention.

In recent years, a growing body of scientific evidence has highlighted the importance of motor skills for cognitive development and attention, especially during school age. This relationship is particularly significant in the educational context, where movement can be an essential lever to promote learning and the overall well-being of students.

Motor skills, which include gross coordination (walking, running) and fine coordination (writing, manipulating objects), not only improve physical performance but also play a crucial role in the development of neural networks. Neuropsychological research suggests that movement stimulates synaptic activity and brain plasticity, creating connections that involve cortical and subcortical areas (Diamond & Ling, 2019).

Motor activity promotes neurogenesis in the hippocampus, a region critical for memory and learning, and improves the interconnectivity between the motor cortex, cerebellum, and prefrontal areas involved in executive functions (Hillman et al., 2019). These processes favor the development of complex cognitive skills, highlighting the role of movement as a tool for brain enhancement.

Numerous studies indicate that motor skills are closely related to cognitive abilities, especially executive functions, such as working memory, cognitive flexibility, and inhibitory control. According to Bardid et al. (2020), children who show greater motor development tend to perform better in cognitive tasks, such as problem solving and mathematical reasoning.

An important link has been observed in activities that require motor coordination, such as team sports or rhythmic dances, which improve multitasking and organizational skills. In addition, exercises that stimulate balance and motor control also seem to improve the efficiency of working memory and sensorimotor integration (Haapala et al., 2022).

The connection between movement and cognition is explained through the “action-perception” model, according to which motor experiences feed the perceptual system and improve the mental representation of external stimuli (Stodden et al., 2021).

Attention is a central component of learning and behavioral regulation in school. Numerous recent studies have shown that physical activities, especially

aerobic and dynamic ones, have significant positive effects on sustained and selective attention.

A study by Van der Fels et al. (2019) showed that regular sessions of physical activity improved students' ability to concentrate, thanks to an increase in cerebral blood flow and activation of the prefrontal cortex, the seat of attention control. Programs that included short motor breaks during lessons showed an immediate improvement in alertness and the ability to solve school tasks (Donnelly et al., 2022).

Furthermore, physical activities offer opportunities to regulate stress and emotions, creating favorable conditions for optimal learning. More physically active children tend to demonstrate greater cognitive resilience and better emotional control, factors that directly influence academic performance.

In light of this evidence, integrating movement into teaching practices represents an effective strategy to promote both cognitive development and student attention.

Incorporating motor activities into learning content, such as games that require movement to learn math or science concepts, can improve retention and understanding.

Short bursts of physical activity during class improve students' ability to concentrate and reduce stress levels.

Flexible learning environments and innovative teaching methodologies that allow for spontaneous movement, such as classrooms with modular workstations and play areas, encourage greater active student participation.

Physical education classes should include activities that develop fine motor skills and executive functions while promoting cooperation and problem solving.

The link between motor skills, cognitive functions and attention highlights the need to rethink the role of movement in schools. It is not just about promoting a healthy lifestyle, but about using movement as a lever for cognitive enhancement and meaningful learning. Investing in educational practices that integrate physical activity, or simple movement between classes, can produce tangible benefits on an academic level and contribute to the global well-being of students.

3. D.A.D.A. methodology: an innovative strategy to promote school well-being

DADA methodology (Didactics for Learning Environments) is one of the most innovative approaches in the contemporary pedagogical panorama, configuring itself as a strategy capable of integrating cognitive, emotional and relational

aspects in the educational experience. Based on a constructivist and socio-constructivist conception of learning, the DADA methodology promotes flexible and dynamic environments, designed to encourage active student participation, cooperation and psychophysical well-being.

DADA methodology is based on three main pillars:

- *Dynamic learning environments*: the organization of school spaces plays a crucial role in the DADA methodology. The environments are designed to be flexible and adaptable, encouraging movement and interaction between students. Thematic classrooms, modular furniture and open spaces allow students to move freely, reducing staticity and promoting more engaging and multisensory learning (Cornoldi, 2018).
- *Student-centricity*: in the DADA model, the student is the protagonist of his own learning. Through active methodologies, such as problem-based learning and cooperative learning, the ability to solve problems, creativity and participation are stimulated (Costa et al., 2021).
- *Integration between body and mind*: DADA methodology enhances the interaction between movement and cognitive processes, recognizing the role of the body as a mediator of learning. Motor, artistic and laboratory activities are integrated into the curriculum to stimulate not only academic skills, but also emotional and social ones (Molina & Perini, 2020).

The DADA methodology aims to promote scholastic well-being, defined as that state of physical, psychological and social balance that allows students to actively participate in the learning process, through different channels:

- *stress reduction*: flexible learning environments and movement integration help reduce students' stress levels. Recent studies have shown that regular movement during school hours has a positive effect on cortisol, the stress hormone, improving overall well-being (Hillman et al., 2019);
- *promotion of social relations*: cooperative activities and group work improve communication, empathy and social cohesion among students. The DADA methodology encourages the creation of peer support networks, an essential element for a positive school climate (Van Ryzin et al., 2020);
- *active involvement*: the possibility of moving and choosing between different learning modalities increases the sense of autonomy and responsibility of the students, improving intrinsic motivation and involvement (Ryan & Deci, 2017).

The neuroscientific basis of the DADA methodology confirms the importance of dynamic environments and multisensory approaches to promote learning. The joint activation of motor and cognitive areas during physical and laboratory activities stimulates brain plasticity, improving memory, attention and problem solving skills (Diamond & Ling, 2019).

The DADA methodology also uses approaches based on embodied cognition, according to which the body plays a crucial role in the construction of knowledge. Learning is not seen as an exclusively mental process, but as a continuous interaction between mind, body and environment. The dynamic environments and practical activities proposed by the DADA model reflect this integrated vision (Shapiro, 2019).

The implementation of the DADA methodology involves a significant transformation of teaching and organizational practices:

- *design of inclusive spaces*: schools must rethink traditional spaces to create environments that encourage movement, collaboration and interaction. The adoption of flexible furniture and the organization of themed classrooms are concrete examples of this transformation;
- *teacher training*: teachers play a key role in the DADA methodology, acting as learning facilitators. Specific training is needed to develop skills in designing interdisciplinary activities and using innovative strategies;
- *personalization of learning*: DADA methodology encourages a teaching approach centered on the individual needs of students, offering personalized paths and valorizing diversity;
- *dynamic evaluation*: the evaluation takes on a formative and continuous dimension, focused not only on cognitive outcomes, but also on the social and emotional skills acquired by students.

DADA methodology represents an innovative and inclusive model, capable of responding to the challenges of contemporary education. By integrating cognitive, emotional and physical aspects, this methodology promotes more meaningful learning and greater school well-being. Its adoption requires a cultural and organizational change that involves all the actors of the educational system, but the long-term benefits for students and teachers fully justify this investment.

4. Movement in the DADA methodology: reflections on the new frontiers of teaching well-being.

In the perspective of the integral development of the student, cognitive, emotional, social and physical, the DADA methodology finds in movement one of the founding elements of this approach, intended not only as a simple movement

between learning environments, but as a structured and conscious pedagogical practice. In this framework, movement becomes a catalyst for school well-being and a determining factor for the construction of significant learning.

Numerous neuroscientific studies have highlighted how movement is closely linked to brain plasticity, or the brain's ability to adapt and reorganize itself in response to new stimuli (Diamond, 2007). During movement, brain areas that are fundamental for learning, such as the hippocampus and the prefrontal cortex, are activated, promoting memory, attention and problem solving skills (Jensen, 2005).

The DADA methodology exploits these neuroeducational principles through the design of diversified environments, where physical movement is an integral part of the learning experience. Students are no longer tied to the static nature of the classroom, but are encouraged to move, explore and interact with spaces and materials that stimulate different learning methods. For example, moving from a science lab to a classroom dedicated to artistic activities is not only a physical transition, but an opportunity to activate different cognitive areas and promote the contextualization of knowledge.

One of the most immediate benefits of movement is its positive impact on the psychophysical well-being of students. Research shows that physical activity reduces levels of stress and anxiety, while improving mood and emotional resilience (Ratey & Hagerman, 2008). In a school context, this translates into a greater ability to face daily challenges, promoting a more positive attitude towards learning.

Furthermore, movement helps to counteract the negative effects of a sedentary lifestyle, which can lead to postural problems, obesity and a reduced ability to concentrate (Strong et al., 2005). The DADA methodology, integrating movement into educational activities, offers a concrete solution to these problems, promoting a healthier and more active lifestyle.

Movement, in the DADA methodology, is not an end in itself, but a means to build meaningful learning. According to Ausubel's (1963) meaningful learning theory, students learn better when they are able to connect new knowledge to what they already know, integrating it into their mental schemes. Movement promotes this process, involving the senses, the body and emotions in a holistic educational experience.

An often overlooked but crucial aspect is the role of movement in building social-emotional skills. Through group dynamics and collaborative activities, students learn to communicate, negotiate, and resolve conflicts constructively (Zins et al., 2004). These skills, known as soft skills, are essential not only for academic success, but also for professional and social life.

The DADA methodology encourages these interactions, creating environments where movement is synonymous with cooperation. Team games, experiential workshops and moments of reflection in movement promote the construction of a positive school climate, in which each student feels an integral part of the educational community.

The flexibility offered by the DADA methodology allows it to respond to the needs of an increasingly heterogeneous student population. Students with special educational needs, for example, can greatly benefit from motor activities that stimulate coordination, spatial perception and awareness of their body (Tomlinson, 2017).

Movement also facilitates the personalization of learning paths, adapting activities to the different cognitive styles of students. Some learn better through hands-on experience, while others find a visual or kinesthetic approach more effective. The DADA methodology, thanks to its flexible and movement-oriented structure, offers opportunities to accommodate these diversities, making learning an inclusive and accessible experience for all.

Movement in the DADA methodology is not just an accessory component, but an essential element for the construction of an innovative and student-centered educational system. Through the involvement of the body, mind and emotions, movement contributes to transforming the school experience into a path of global growth, which embraces all dimensions of human development. Investing in approaches that enhance movement means not only improving academic performance, but also preparing students to become aware, resilient and creative citizens.

Conclusions

From the interdisciplinary analysis it clearly emerges how movement is a key element for learning and school well-being, overcoming the traditional mind-body dualism. The interaction between body, environment and cognitive processes translates into opportunities to develop transversal skills, stimulate brain plasticity and promote the global growth of students.

Constructivist and ecological theories demonstrate that active bodily involvement in learning allows students to attribute meaning to educational experiences, making them more authentic and transferable. Movement not only improves motor and cognitive skills, but also enhances executive functions such as working memory, cognitive flexibility and attention. These benefits are reflected in greater concentration, better academic performance and stronger emotional resilience.

The DADA methodology is an innovative teaching approach that integrates movement as a structured and conscious practice within dynamic and flexible learning environments. The centrality of the student, the value of corporeality and the interaction between different learning methods represent the cornerstones of this strategy. Thanks to the design of spaces that stimulate physical and mental interaction, the personalization of training paths and the use of multisensory approaches, the DADA methodology promotes the global well-being of students, reducing stress and promoting intrinsic motivation.

In conclusion, investing in the integration of movement in teaching is not only an educational necessity, but an opportunity to rethink the school as an inclusive and well-being-oriented ecosystem. The new frontiers of teaching, founded on solid neuroscientific and pedagogical foundations, indicate that meaningful learning and psychophysical well-being can be fully achieved only by enhancing the inseparable link between mind, body and environment.

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