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DIDATTICA SENSO-MOTORIA PER STIMOLARE LO SVILUPPO EDUCATIVO NEI CONTESTI FORMATIVI

SENSE-MOTOR DIDACTICS TO STIMULATE EDUCATIONAL DEVELOPMENT IN FORMATIVE CONTEXTS

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Abstract

The purpose of this research work is to highlight the educational contribution that the use of light sensors for motor education can provide to athletes who practice sports at a competitive level and beyond. It has been studied to what extent sensory motor activity produces positive effects not only from a physical point of view but also from a cognitive, attentional and therefore formative point of view; precisely for this reason, one of the critical points of the research is the proposal that it be adopted in the formal training context par excellence: the school. The thesis aims, by means of an accurate analysis of the literature and a series of innovative training proposals, to highlight the educational importance of the sensorimotor activity, and to demonstrate that it can and must be understood as opportunity to encourage the learning and complete development of the person / athlete.

Lo scopo del presente lavoro di ricerca è quello di evidenziare il contributo in chiave formativa che l'utilizzo dei sensori luminosi per l'educazione motoria può fornire agli atleti che praticano sport a livello agonistico e non solo. È stato studiato quanto l'attività motoria di tipo sensoriale produca degli effetti positivi non solo dal punto di vista fisico ma anche cognitivo, attentivo e quindi formativo; proprio per tale motivo, uno degli spunti critici della ricerca è la proposta che questa venga adottata nel contesto formativo formale per eccellenza: la scuola. L'elaborato si pone l'obiettivo, per mezzo di un'accurata analisi della letteratura ed una serie di proposte formative innovative, di evidenziare l'importanza educativa dell'attività senso-motoria, e di dimostrare che essa può e deve essere intesa come occasione per favorire l'apprendimento ed il completo sviluppo della persona/atleta.

Keywords

Physical education; Sensory-Motor Activities; Educational Development; Scholastic Innovation.
Educazione Motoria; Attività Senso-Motoria; Sviluppo Formativo; Innovazione Scolastica.

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Introduction

Motor activity can be defined as any movement of the body generated by the collaboration of the nervous, muscular and skeletal systems, and is planned, structured, repetitive and with a specific goal. Numerous scientific researches have shown that the practice of a motor-sport activity constant over time leads to an improvement both from a physical and mental point of view. In particular, the latest scientific studies are focusing on the link between motor activity and the cognitive axis, demonstrating that it generates structural and functional changes in the brain (Federici & Toscani, 2018; Morsanuto & Marsico, 2019; Nicolosi, 2015).

Motor practice is able to positively influence the various components of cognition: attention, memory, executive functions, therefore also having effects on learning in the school environment, as it is able to make the brain more efficient and adaptive, but above all more plastic (Federici & Toscani, 2018; Latino, Fischetti & Colella, 2020; Rosa & De Vita, 2018).

Other scientific studies have shown that motor practice is not only able to act on brain activity thought exclusively of cognitive aspects, in fact it has been observed that it generates modifications on the concentration of neurotransmitters, on the nervous and sensory system. Among the five sense organs, sight, understood as the process of perception of light stimuli, the function and the ability to see, manifests itself since childhood, and is learned, developed and strengthened with growth. Sight can be simplistically defined as the organ capable of directing the body, therefore it simplifies the ability to move around in space and perceive the entire surrounding environment.

Most of the information coming from the environment outside the brain is stored through sight, so the faster the data processing process, the faster the movement will take place, therefore through an effective motor education it is possible to both improve the physical - cognitive component, which perfects sensory skills managing to speed up and optimize the motor and neuronal response (Maffioletti & Facchin, 2016).

Multiple assessment tools have made it possible to specifically analyze the connection between physical exercise and cognitive and sensory functioning, in order to highlight the brain changes that are generated through motor and sports activity and therefore also performance. understood not only from a sporting point of view but also and above all cognitive and sensorial (Gao, 2015; Erickson, 2007; Knudson & Kluka, 2013).

As for the neurophysiological aspect, the relationship between motor activity and cognition, include complex mechanisms that favor brain plasticity and the ability to process information, allowing us to state that motor activity is capable of generating a real cognitive empowerment able to last over time. Furthermore, it has been observed that the cognitive-sensory modifications produced by motor activity can be increased by other factors, such as the use of specific sensory-cognitive training for those functions that have already been subjected to stimulation, such as skills involved in football (Alenti, 1991; Baptista et al, 2017; Berman, 1990; Miller, & Clapp, 2011; Clark et al, 2015; Gao, 2015; Erickson, 2007; Knudson & Kluka, 2013).

1. The formative role of playful and sensory motor activities

The practice of motor activity certainly manages to affect multiple areas that are crucial for the educational development of any individual, including those of cognition, sensoriality, socialization and communication. As for the sensoriality, by carefully analyzing the child's development it is possible to distinguish phases, each with its own characteristic to be developed and implemented: in the first months the newborn is intent on discovering his own body. In this phase it is very important that he is supported and stimulated using above all two of the five senses: sight and touch, so it is very important that a type of physical contact is established with the child, in particular massages and caresses. Subsequently, the child begins to have full control of his own body and to master it, therefore in this phase he will begin to use all five senses to get to know the surrounding environment. With the progress of the months, the knowledge of the world that surrounds the child becomes more and more active and the sensory component turns out to be fundamental for the knowledge of the same, and in this phase, in addition to the

appearance of the rules that must be followed by the child, the verbal component. At the age of two there is the appearance of the imagination, so the child will tend to imitate adults and any object can become something else. Through this technique he is able to discover himself but above all he begins to use his psychomotor skills appropriately. In this phase, it can be considered the basis of creativity, as the child is able to think of many different situations and at the same time find as many original solutions. The above highlights the importance of the game that allows you to acquire a mental elasticity such as to favor the ability to elaborate solutions in complicated and unexpected situations. It is important to emphasize that at this stage the axis of peer socialization is not yet developed, in fact it is possible to note that children of the same age play close together but not together. It is important to underline that in this period the five senses play a fundamental role for the correct development of the child and the full knowledge of the world around him, without forgetting that all this happens through a medium: play, that is the best way they have. to try and learn what is necessary about life, and it is for this reason that the game is defined as educational (Naccari, 2003). In order for playful activity to retain its educational value, play must be free and spontaneous and no rules such as pursuing victory at any cost are introduced, as in this way a fundamental value is lost: the pleasure of playing. Therefore, the structured and planned activity cannot be inserted in this age group, certainly pre-established activities can be proposed but without ever suppressing the freedom, creativity and spontaneity of children. The game must not be thought of as a simple motor and playful activity, but must be seen as a moment of discovery for children, who, also through the use of the sensory component, use playful activity to learn, discover and experience (Palumbo, Minghelli & Pallonetto, 2020; Sclaunich, 2016). In this sense, the role of the adult in proposing the games for the child to play is of fundamental importance, as he must make any experience that the child has stimulating, through the proposal of appropriate ideas or by providing material. Growing up, it is possible to notice that children begin to socialize with each other through play, therefore they also take on socializing value, and they also begin to understand the meaning and respect for the rules, the values of the environment in which they live, and sharing.

What has been said shows that the formation of the child, who must be considered the adult of tomorrow, occurs largely through playful motor activity, and it is important to highlight that if playing manages to have all these repercussions on it, it is thanks to continuous sensory stimulation: fine motor skills, oculo-manual / breech coordination, global motor skills, cause-effect relationship, ability to anticipate the consequences of his gestures, all this is learned by the child without any effort, through direct experience and having fun (Palumbo, Minghelli & Pallonetto, 2020; Weyland, 2017).

Some sensory games will be listed below:

• Mystery box

This game is suitable for children aged between 24 months and 4 years. It is a box that stimulates the child's dexterity and curiosity. It can be thought of as a moment to help the child learn by himself, recognizing objects, through touch. With this activity, the child will be able to practice his or her manual skills and refine the manipulation of objects, managing to identify them, also providing him with an environment full of new stimuli, which favors the learning and assimilation of all that the surrounding environment offers. to develop the five senses and grow in freedom. The environment must be full of stimuli, of reasons of interest that lend themselves to activities and encourage the child to conduct their own experiences, taking advantage of the curiosity and the desire to assimilate everything that the environment offers him, it is possible to propose this game really useful for developing cognitive skills.

Materials: a cardboard box, a glass, a pencil and / or a marker, a scissors, a cutter, some tape, a ruler, a felt.

• The litter

An activity to do as a couple that, to be carried out correctly, requires a good dose of collab-

oration and listening. Usually it is advisable to do this between an adult and a child, it consists in choosing an animal and their respective roles. This game requires the child to follow the adult with their eyes closed using only hearing, and during the journey, the latter will propose to the child to touch objects and be able to recognize them without looking at them.

Material: tactile objects and sound objects.

• I feel the clothespins

This game takes place in pairs and is ideal for the return to calm phase, as it associates tactile sensations with the body pattern. This activity consists of a child who has to lie on his back with his eyes closed, while the other attaches clothespins to his clothes. Whoever is lying with his eyes closed must name the parts of the body on which the clothespins are hung. It is possible to make variations such as for example the child must name the parts of the body in the order in which the clothespins are positioned, or you can fix several clothespins in the same point and whoever is lying down must indicate where they are and their number.

Material: three to five clothespins per pair.

• Passengers

This game consists of simulating a bus driver with his passengers. In practice, a child takes on the role of driver and sits with his back to the other children at the end of a mat, closes his eyes and / or rests his head on his knees. The companions, one after the other, sit as discreetly as possible in the bus (on the mat), and the driver tries to count the number of students who have sat down. At the signal, the driver indicates the number of passengers counted and then turns to check.

This game is a type of calm activity to be carried out in a group that favors the attention and inhibitory capacity of children.

Material: a mat

• Mysterious path

This activity is ideal to propose when the children return home because it immediately makes them active and attentive. In order for you to play, you just need to place a blanket between the corridor and the baby's room, and the different objects are scattered under the blanket, so that he walks on this path barefoot and explores it. Initially we name and describe the objects that we feel and then we also tell what these objects have transmitted in terms of pleasure or discomfort. During the game, the child can / must count the objects, sort them according to certain parameters such as consistency, shape, theme etc.

Material: a blanket, objects that can be walked on

• A good ear

This type of sensory activity does not require specific preparation, as the game requires children to work on auditory attention and the body scheme in a playful way. The activity consists on the part of the children in standing up and choosing a part of the body, so that when the adult plays the flute, they must raise or lower the corresponding body part according to the pitch of the note. The game continues with other parts of the body as well.

It is possible to make variations such as, for example, instead of raising the affected body part, when children hear the sound of the flute, they have to move around the room.

Material: a flute

• Morse Code

This type of game is based above all on the attention of children that is solicited during this quiet activity to be carried out as a couple. It consists in positioning oneself seated one behind the other and whoever is behind beats a rhythm on the back of the partner, who in turn must be able to reproduce on the floor in front of him.

As for the variations that can be made, the child in front must also reproduce the position in which the touch occurs (top right, center, etc.). While if you are dealing with more than two children, they must be positioned in a circle behind each other, so the rhythm is given by a pupil who transmits it to the partner in front of him, and so on until the rhythm returns to the first pupil and the latter will have to recognize his rhythm.

• Slipper attendant

This type of sensory activity has great playful potential. It consists of forming a circle with a rope, and a child who is sitting in the center with his eyes closed, while around him are the slippers of his companions, or brothers, parents, etc. The latter try to retrieve their slippers without being touched by the supervisor (the child in the center), and the game ends when everyone has taken back their two slippers.

Material: pupils' slippers, a rope.

• Hawk eye

This sensory activity mainly uses sight. In fact, the game consists of being in a circle and when the adult names an object that is in the surrounding environment, when it is identified the child must touch it and return to its place as quickly as possible. For this game to be successful, the child must not move before having identified the object, and if it is not possible to make variations such as, for example, identify and indicate the object from where they are.

Material: various objects present in the environment that surround them.

• The five senses

This activity requires that there is great attention and concentration on the body. It consists of standing comfortably with the knees slightly bent, with the feet hip-width apart and, if possible, closing the eyes. It is important that great attention has been paid to the ears, in the sense that it is necessary to understand what kind of noises can be perceived, then concentrate on the nose to try to understand what smells are heard. Subsequently, all the concentration passes to the feet, with the aim of perceiving the contact between the feet and the ground, finally the attention then passes to the sensations of heat or cold in order to understand which parts of the body are hot, which instead cold or if the whole body is the same temperature or is neither hot nor cold.

Finally inhale and exhale deeply three times and open your eyes again.

2. The educational importance of Motor Sciences in the sensory field in the school context

The Scholastic Institution performs countless tasks, among which there is certainly a wide-ranging planning capacity capable of thinking about the proposals that are intended for learners in a logical and consequential path, in an overall and multi-year vision in continuity. This way of thinking and working presupposes the ability to recognize and highlight the importance, centrality and transversal nature of the various disciplines, in particular Motor Sciences and the concept of corporeality and motor skills in school experience. Understanding and accepting that motor activity plays a pivotal role in the child's educational growth process means promoting proper development of the personality and learning processes (Casolo, 2019; Ceciliani, 2018; D'Alessio, 2016).

This way of thinking about things presupposes that at the basis of the whole educational-didactic process there is motor activity with its innumerable interdisciplinary and transversal values typical of education through movement and play (Casolo, 2019; Le Boulch, 2009 ; Nicolosi, 2015). Thinking about movement to get to know the environment around us reveals the importance of the five senses as to observe everything that surrounds us, the five senses are used: touch, taste, smell, sight and hearing. . Each sense organ collects information from outside the body and transmits it to the brain, which in turn transforms them into perceptions. This is how the human being is able to receive information from the world around us. When one

thinks of the school context, one must necessarily think of the multiple forms of education and instruction that it is able to transmit to learners thanks to the various disciplines all having the same educational value, and sensorial education, associated with motor activity certainly covers a fundamental role for allowing the harmonious and complete development of pupils (Federici & Toscani, 2018).

Maria Montessori affirms that the child must be free to experience the surrounding reality in order to develop creativity and independence, and in this sense, sensorial education is of primary importance because it allows the harmonious and complete development of the little ones and the increase. of the senses becomes a means to explore the world.

Therefore in educational institutions, especially in childhood ones, it is not only important to involve children in a sensory laboratory in order to experiment indoors, but also to think for them games that bring education outside through the five senses, as for touch, for example, but outdoor activities could be proposed in a playful form in which one explores through the use of hands.

It is important that any school is equipped with places where the sensory laboratory can be implemented, but above all that this space is adequately equipped in order to be able to meet the needs of children. Therefore it is necessary that the sensory laboratory is able to offer the perception of sensations such as hot, cold, rough, smooth, rubbery, rigid, heavy or light. This type of activity is very important for the child's learning, as all the information that he learns to detect is negotiated not only by touch but everything happens thanks to play, so in a free and playful way.

Through play, the child discovers the pleasure of learning, and this way of seeing will allow him to be an open and curious person in the future, eager to discover, experiment and eager to acquire new knowledge. This way of thinking is certainly triggered by the scholastic institution, and among the various disciplines the motor sciences with their transversal being certainly have a dominant role, as through the game the child learns many logical concepts that would be too complex for him if faced. in a different way (Ceciliani, 2018). When the child plays, thanks to the playful aspect and the sense of freedom inherent in the game itself, he feels master of that particular situation, so even unconsciously he begins to use, in addition to his motor skills, the five senses in order to get to know the game better. surrounding environment and perceive all the necessary information so that you can reach the set goal, managing to positively influence self-esteem.

Proposing sensory motor activities in the school context means wanting to improve the way in which a child reacts to his environment through visual, auditory, kinesthetic, olfactory and gustatory perceptions, all this in consideration of the fact that children, especially those of the school childhood, have a physical and emotional desire to see, hear, touch, smell and taste things that are within their reach and new to them.

In addition to the five senses, there are other aspects that are of the same importance: corporeality and motor skills, which are necessary for a harmonious development of the child's personality, in order to allow proper adaptation with the environment. Also in this case, kindergarten plays an important role, as it promotes awareness of the value of the body understood as one of the expressions of the personality and as a functional, relational, cognitive, communicative and practical condition to be developed in order to all training plans.

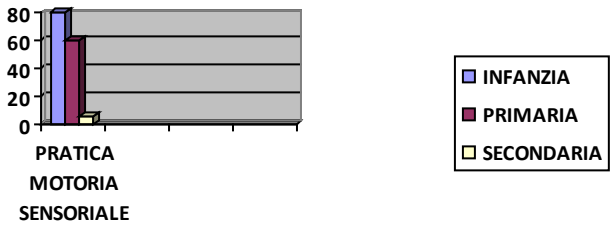
Therefore, motor activity, and all the various experiences (sensory, emotional, communicative, etc.) that it entails, represents a mode of interaction by the child with the outside world, and is in continuous development and will lead to the structuring of the personality.

Scientific studies have shown that sensory motor education is offered above all in kindergarten and primary school, two degrees in which, paradoxically, the subject of motor science is not present, but is offered in the form of private projects or in the case of of the primary also through CONI. It is important to remember that in kindergarten the maturation of personal identity is pursued, which must take place thanks to the integration and interaction of all aspects (biological, psychic, motor, intellectual, social, moral and religious). Furthermore, as regards

the development of skills, it takes place through the consolidation of sensory, perceptive, motor, social, linguistic and intellectual abilities.

In primary school, the objective to be achieved for learners is recognition as a value of corporeality, which for the child represents the global way of being in the world and therefore of acting in society, highlighting that bodily expression is both a condition and a result of the multiple dimensions of the person: rational, aesthetic, social, operative, affective, moral and spiritual religious.

Finally, as depicted in the following graph, in secondary school, unfortunately, much importance is not given to motor activity of a sensory type, as the pupil begins to know and is able to read reality, even the body one, using various interpretative models: scientific, literary. It is of fundamental importance that the learner is able to give meaning to his actions and to give meaning to his own corporeality as a person's way of being.



Graph. 1: Percentage of sensory motor practice in the various school grades

Exercise and Sports Sciences will therefore also represent a great opportunity to ask questions and reflect on issues of great importance, among which it is certainly possible to include the importance of physical education in primary school and, in the light of what has been said, the need to propose, even in secondary school, a type of motor activity that is stimulating and training for the five senses. In fact, recent scientific studies have shown that there is a sensory approach also for the training of professional athletes, therefore it makes no sense to think of eliminating sensory activity already starting from lower secondary school, indeed it could be deleterious, in how much, as already amply argued above, motor practice in general, involves an improvement not only from a physical point of view, but also from a cognitive, social, communicative and relational point of view.

3. Motor sport-sensory teaching in sports training contexts

With the term sensory-motor skills we want to highlight the importance of the transmission of sensory information to the central nervous system during the execution, training and adaptation of movements (Le Boulch, 2009), in other words it could also be defined as the continuous and constant relationship that exists between the nervous system and the muscles, and in order for a sensory-motor training to produce the desired effects it is necessary to know these simple mechanisms of interaction.

When we talk about sensory-motor training, we must think of a type of coordinative training whose purpose is the improvement of the movements that follow each other, and to do this we need to improve the coordination between the various muscle groups and the single muscles.

Coordination is the basis of the performance of the sensory-motor system, it can be defined as the body's ability to master the various motor situations, whether predictable or not, therefore they are the basis of all the performance of the sensorimotor system because every movement has a certain quality in the first place. Every imaginable movement is first of all a coordination performance of the sensorimotor system which, however, is not possible without a minimum capacity of resistance and strength.

It is important to differentiate the sensory-motor skills from proprioception. In the first case, as already described, the information collected occurs through the large receptors, such as the eye, the ear, while in the second case it occurs through the small receptors (proprioceptive receptors), such as those present in the muscles or in the joints. Therefore it is possible to affirm that proprioception is part of the sensory-motor skills.

AFFERENCE	EFFERENCE	PROCESSING
Visual apparatus	Muscular system	Spinal cord
Hearing system		Encefalic trunk
Vestibular apparatus		Cerebellum
Somato-sensory system		Basal ganglia
		Somato-sensory cortex

Table 1: Systems and organs involved

When a sensory-motor training is carried out, different systems are solicited, each with a different function:

- the receptors have the task of translating all the information that comes from the external environment into the body;
- the afferent pathways, whose purpose is to transport information to the spinal cord and the brain;
- the efferent pathways, which must carry information to the periphery and to the effector muscles;
- the spinal and supra-spinal neuronal networks of the sensory-motor skills, whose purpose is to transform the afferent information into a motor response that is direct and calibrated to the situation;
- the musculature, which puts into practice what was established by the previous stimuli, through a muscular tension that can have as its purpose both stabilization and therefore a type of dynamic equilibrium, and a targeted and therefore dynamic movement.

Sight is considered among the five senses, the one most responsible for a good sporting performance, as it is able to orient and direct the body. In order for all this to happen correctly, the brain also contributes to the processing of information coming from the outside, which captures and analyzes more than 80% of the information that is captured by the visual system (D'Alessio, 2016). Performing a type of sensory-motor training that is "training" means that the faster and more efficient the activity is, the more the commands will be transmitted quickly and precisely to the motor system. The athlete will have to perform multiple motor actions quickly and with great coordination, whether they are of a simple level up to a more complex one, plus he will have to be able to continuously adapt them to the changing situations of the game.

So vision can and must be improved, educated, trained. Much of motor and cognitive learning depends on the quality of visual perception, the interpretation of stimuli and how they interact with the motor system. It is important to establish that this is a process that is learned continuously during mental and body development, and for this very reason it is malleable.

One of the most widely used methodologies to train the senses concerns the use of light sensors, which are used above all for visual enhancement, sensory and psychokinetic integration. They are based on perceptual training, specifically on visual training, with the aim of helping to improve attention on important targets while neglecting distractors. This training methodology is based on the involvement of various factors: balance, vestibule-ocular system, visual abilities, kinesthetic sense; motor-coordinative skills; hearing; cognitive abilities; and it is for this reason that many scientific researches have stated that visual-motor training was what was missing in order to achieve a high-level sports performance.

Training with light-acoustic sensors consists in using panels and tools with the aim of producing multisensory stimuli, the purpose of which is to train reactivity and coordination through visual or acoustic stimuli, moreover they improve neuromuscular efficiency and cognitive.

Specifically, the sensors are equipped with lights of different colors that can be activated via a wireless pocket remote control. The lights have a different color and are programmable in various modes so that you can diversify your training whenever you want, and finally they are easy to adapt to any surface or to rest on the ground.

During a sporting performance, in particular, during a football match, sight plays a role of great importance, specifically, three fundamental steps follow one another: the eye sees and collects information from the outside, the brain receives the information coming from the eyes and processes them, the body moves according to what is established by the previous two processes. The game of football has evolved over the years, in fact nowadays the athlete is required to have a great cognitive ability especially in reference to two aspects: space-time, as the player must be able to cope with the multiple game situations that may be possible. present during a match, without ever forgetting the various factors that contribute to each other: the relationship of one's body in space with the ball, teammates and opponents, the various game situations that may arise.

So it is possible to say that training that involves the use of light and acoustic sensors, allows you to develop not only sensory skills, but also cognitive and technical ones, aspects that are necessary for a player to be able to express all their potential and in a very short time. This type of training favors the reduction of periods of blindness caused by:un inadeguato controllo dei movimenti saccadici (movimenti a salto degli occhi) dai quali deriva un ritardo dell'elaborazione cerebrale per un mancato arrivo di stimoli visivi al cervello;

- mastering fixation (the ability to quickly and more consciously look at a target audience (companion, door, space);
- increase the ability to focus on near and far targets by enhancing the sense of depth and consequently of modulation of the force expressed in the technical gesture, of timing;
- increase awareness of peripheral vision.

What has been said makes it clear that the task of sensory-motor training, in particular with the use of light-acoustic sensors, has as its final objective the optimization of the visual-acoustic stimulus, so that all the information arriving at the intermediate stations of the brain will be received in a complete and detailed way, consequently favoring an optimization of cognitive processes, which will also generate positive effects on coordination, technique and tactics.

The player needs to expand and enhance all his abilities of perception and processing of a certain gesture in a specific game situation, as it must be assumed that any mistake, pass, shot or other originates from a wrong interpretation. at the brain level.

The main effect of this training method is above all the ability to be able to simultaneously stimulate various axes: visual, neurological, cognitive, coordinative, technical-tactical (individual and collective) and psychological. Being able to create this synergy in the continuous search for growth and better performance, at all ages and in all categories, generates the possibility of creating the thinking footballer, able to express his thinking and thinking skills to the fullest. understand more than others with a higher speed of interpretation.

Conclusions

The benefits dictated by physical exercise are innumerable and can touch various spheres related to the person, starting with physiological aspects, up to purely psychological, social, emotional relational, cognitive, all related to mental health and individual well-being. This article discussed the importance of sensory motor activity, in particular its relevance within the school context, to then arrive at a type of sensory sports teaching that can be useful for athletes of any sport but in especially for football. A training methodology that involves the use of light / acoustic sensors brings considerable advantages to the athlete, starting with the cognitive and attentive ones up to a real improvement in sports performance, in fact the effects of constant and regular training over time, they are visible at multiple levels, and go beyond motor functions, extending to cognitive functions such as memory, attention and decision speed which allows the athlete to choose in a few seconds which motor gesture to use in a specific game situation.

Proposing this sports didactic approach means subjecting the athlete to complex exercises that can be considered cognitively stimulating in themselves, and if physical exercise lays the foundations to facilitate the mechanisms underlying learning, it is possible that a cognitive stimulation, deriving from 'use of light / acoustic sensors can make changes more significant and lasting. This type of training experience starts from the assumption that motor activity improves brain metabolism, but this change can only be generated if there is a context in which there is a request, therefore if the athlete is exposed in a training environment from the point of view of cognitive effort, by challenging the brain to acquire new skills or to stimulate the improvement of existing ones, it is possible to induce a strengthening of the brain networks that support cognitive functions subject to variation, consequently generating an improvement not only in sports performance but in everyone the aspects that make it up. Based on what has been highlighted, the possibility of developing new scientific research is hypothesized that envisage the adoption of this innovative approach also in motor and sports training proposals in school contexts.

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