

L'importanza della didattica “destrutturata” nella formazione dei docenti per migliorare lo sviluppo delle competenze cognitive nei bambini

The importance of “unstructured” didactics in teacher training to improve the development of cognitive skills in children

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Abstract

Quando Einstein affermò che “l'apprendimento è esperienza, ogni altra cosa è solo informazione”, voleva evidenziare come esista una netta differenza tra un apprendimento prettamente nozionistico, basato sulla fissazione mnemonica di fatti e concetti, e un apprendimento di natura esperienziale, più centrato su un ruolo attivo e partecipativo del soggetto. Mentre il primo risulta essere riduttivo, il secondo coinvolge il soggetto nella sua interezza, andando a considerarlo come un'unità, non più come scisso nelle sue singole componenti.

Attraverso dei programmi formativi destrutturati, offerti da tecnici, ad un campione di bimbi in età prescolare, vogliamo dimostrare l'efficacia del metodo e la necessità di training specifici per i docenti relativi alla correlazione fra neurosviluppo ed attività motorie ed espressive.

When Einstein said that “learning is experience, everything else is just information”, he wanted to highlight how there is a clear difference between a purely notional learning, based on the mnemonic fixation of facts and concepts, and a learning of an experiential nature, more centred on an active and participatory role of the subject. While the former turns out to be reductive, the second involves the subject in its entirety, going to consider it as a unit, no longer as a clean in its individual components.

Through deconstructed training programmes, offered by technicians, to a sample of pre-schoolers, we want to demonstrate the effectiveness of the method and the need for teacher-specific training related to the correlation between neurodevelopment and activities motors and the expressive.

Keywords

Didattica destrutturata, Embodied, Intelligenza Emotiva, TOM, Training, Didactics, Unstructured Programs, Emotional Intelligence, TOM

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1. Enactism

The complete overcoming of the mind-body dualism has been achieved only in the last century and has favoured the birth of numerous strands of research and currents of thought that have focused on enhancing of the individual in his globality and complexity. In this perspective the brain would therefore be composed of numerous neural networks, distributed and placed in close connection with each other; each underpins a specific function, but at the same time is strictly interdependent on the others.

In the recent years the enactment arises, a current characterized by the rejection of dualism, which states that “the human mind is embodied in the whole organism and is situated in the world, and therefore cannot be reduced to structures within of the head. The meaning and the experience are produced by the continuous reciprocal relationships between brain, body and world “. (Colombetti G. Thompson E.,2008)

Knowledge is therefore understood as an enactment, “an extrapolation of meanings and a world in the course of a sensory-motor interaction with the environment and with others” (Colombetti G. Thompson E., 2008); so it is the action itself, conscious or not, that leads to knowledge and through the continuous interaction with the external world, the subject knows, learns and realizes.

The embodied cognition is another new perspective based on the same assumptions; the basis of this theory is the awareness that the body influences cognition, as it is the body itself that is an active part of the cognitive process. Damasio, a neuroscientist specialized in the study of the neural basis of cognition, stated that our minds would not be what they are if it were not for the reciprocal action between body and brain; therefore it is precisely through the body that the subject comes into contact with the surrounding world and, through this, explores and learns.

All these assumptions make us understand how there is a close connection between action and thought and how we must consider it in teaching. In fact, every behaviour is composed of actions but “every action is knowledge and all knowledge are action.” (Maturana H., Varela F., 1984)

As previously mentioned, the basis of these theories are the awareness that the subject is a whole and it must be considered in its entirety, and in the same way the brain, which organizes and processes information in a modular and distributed way, is not separated and divided, but it is composed of numerous areas that are closely connected and interdependent with one another.

For example, during the development of the child, the brain relies on the tactile and motor experience to implement the sensory and motor areas, which will be the starting point for the formation of cortical areas, especially linguistic ones. This highlights how there is a close relationship between these cortical areas and how motor skills play a fundamental role in the construction of the mind and the cognitive faculties: “every type of activity that includes movement is efficient for cognition” (Cinti F., Troiano G., Valentini M., (2018).

A demonstration is given by the fact that in our brain the same brain areas are activated both when a movement is thought and when it is executed; numerous areas, which are responsible for sensitive processing and which also control movement, are also involved in linguistic memory; in fact the words that indicate a colour activate the areas of the lower temporal cortex, which are also responsible for the perception of colour itself.

Another example concerns the connection between the tactile experience and the hippocampus, a very important centre for memory and learning, where precisely the tactile experience increases its activity: in fact, many students report that if they perform some manipulation activity during the study it increases the capacity of concentration and learning.

The functioning of hippocampus demonstrates that experiential teaching is more efficient because it is more natural: this structure uses a lot of information from the whole body to process a memory, such as sensory information coming from the thalamus, motor coordination coming from the basal ganglia and the emotions coming from the amygdala.

As previously mentioned, there is a continuous exchange of information between the various apparatuses of our body and if these are in tune, the overall functioning of the individual is

better. Numerous studies have shown that there is an optimal condition for learning if the subject is in a status of coherent, that is “a physiological state in which the nervous, cardiovascular, hormonal and immune systems work effectively and harmoniously” (Meraviglia M.VV., 2012)

In particular, there is a close relationship between heart and brain: the heart, which through its rhythm influences brain waves, can send information about the emotional state. Recent research data have shown that the signals coming from the heart directly influence the activity of the amygdala and of the basal ganglia, leading to specific modifications. If it is sent a chaotic or altered signal, it takes place a cortical inhibition, where our reactions becomeslower and the thought more confused, causing a compromise of more complex mental processes, such as learning. This is the reason why agitated, anxious, or depressed students tend to have difficulties and do not get results that are adequate to their potential.

It therefore follows that when the brain, nervous system and other systems work in sync and our emotional state is calm, there is a facilitation of the cognitive process, and so of learning, memory, attention and creativity. “This happens because emotion and cognition are two sides of the same coin” (Immordino-Yang M.E., 2017), strongly interconnected.

Emotion also plays a very important role in learning itself, becoming “the rudder that guides student’s thinking, helping them concretely to recall relevant information and memories; through the regulation and involvement of attention, motivation and the evaluation of simulated or real results, emotion modulates the activation of neural networks for specific skills” (Immordino-Yang M.E., 2017). The amygdala is a small structure of our brain, considered the centre of integration of emotions, particularly involved in emotional memory, which works in close collaboration with the hippocampus. One of its tasks is to attribute an emotional value to information, providing the right level of attention to a stimulus and favouring storage. So, based on the emotional value the information will receive more or less attention and will be stored as more or less important.

Consequently, learning and emotion travel together, as they have traced the same path in our synapses, because when we store information in a node in our neural networks, we insert both the concept and the connected emotion.

It is necessary to specify that although a strong emotion has a powerful impact on learning, based on its value, positive or negative, there will be different processes. In both cases the information will be remembered more, but in the case of a negative emotion, it will involve a process of avoidance, while a positive emotion will have a facilitating effect on memorization.

“Emotions accompany every learning experience” where “memory is the machine, but the driver is the emotions” says Daniela Lucangeli, promoter of Warm Cognition, “If you want children to learn by getting the best out of themselves, it’s important to return to teach with a smile “.

Warm Cognition is a line of research that takes into account the emotions underlying the learning processes and starts from the assumption that positive emotions are fundamental to stimulate the child’s learning. According to this approach it is necessary to train the teachers so that they leverage positive emotions such as “the motivation to study, gratification, the sense of self-efficacy.

These cognitive mechanisms, in fact, are considered by the research positive predictive factors for scholastic success and promote learning processes” (Cucinotta C.,2017). “When teachers fail to understand the importance of their students’ emotions, they actually fail to recognize the strength fundamental in learning” (Immordino-Yang M.E., 2017).

In fact, numerous studies highlight how cognitive processes work best when one is happy, so what is required of teachers is not to make them laugh, but to be mediators of well-being in learning, stimulating positivity and happiness in the learner, in order to put it in the best conditions to understand, learn and mature.

Damasio states that “we do not think only with the brain, but with the brain and body together”, based on its numerous studies conducted on subjects with brain lesions. One of his study is noteworthy, the one that involved patients with lesions to the pathways that connect the limbic

system with the frontal regions, from which it emerged that when emotions are dissociated from cognition, the subject assumes irrational behaviours and is not able to learn effectively.

All these assumptions underline how it is necessary to stimulate the student in many aspects, the emotional, the motor, the perceptive, the cognitive, which is why “a sensorially enriched environment is undoubtedly important for learning” (Meraviglia M.VV., 2012).

From this point of view, the best methodology becomes experiential education, therefore learning through action, since “it corresponds to the most natural aspect of training: it is the action itself that must be used as a fundamental means of training itself, through the central role of doing in learning experiences” (Lo Presti F., 2016).

So, through experience, it involves fully the subject, with all his senses, emotions and motor skills and with respect to the actual events that happen; furthermore exploring, past experiences are consolidated thanks to the fact that they come back to mind, activating memory processes. In all this, words play a fundamental role in organizing thoughts and giving meaning to feelings, but they cannot replace “the strength and life of real experience” (Meraviglia M.VV., (2012). So, an “active participation of the subject” is needed to learn effectively” (Rossi P.G., 2011).

2. Didactic Innovation. Proposal of the HERACLE Laboratory for professional Development of teachers

In the field of change and development to which active teachers in nursery school are called, it is essential a continuous training of the teacher, essential to guarantee to children a harmonious psycho-physical development.

In the last years, the HERACLE Research Laboratory has set itself the objective of developing strategies for enhancing cognitive skills through deconstructed teaching programs based on warm cognition (Peluso, Torreggiani, Bonfiglio, 2017). It is important that teachers can grow professionally by expanding their pedagogical skills.

To support teachers in moving towards their increasingly complex task, the challenge is to promote training that encourages constant reasoning, rethinking and “putting into play” teaching practices.

As Vygotsky argued (1972) the creative action aims to generate something new. The process by which the creative act takes place is imagination. The game of fiction, for example, is a first form of creative action developed through imagination and identification. It reveals itself around 3-5 years and shows the child’s ability to represent reality in an abstract way. The objects assume imaginary characteristics allowing a symbolic use. The game of fiction is fundamental for the development of the child, it favors its emotional, cognitive and social growth (Tullis, 2011; Lillard et al., 2013). These psychological dimensions are, therefore, involved and developed by creative thinking (Acocella and Rossi, 2013).

Art is therefore a privileged way of learning:

- Through the arts, thoughts and emotions can be expressed at a non-verbal level that is not yet conscious, logical and rational;
- Through the arts one can access contents of knowledge, of oneself and of others, through experiences that involve emotion and cognition. (Fiorilli, Donati, 2014)

Creativity is therefore the effect of a mind that needs to be stimulated transversely, not only in school activities, but in experiences expressly dedicated to art. This is why it is essential for teachers to acquire specific skills.

To demonstrate the importance of technical and specific knowledge, pre-school children (3-6 years) were observed while participated in stimulating activities such as imagination, creativity and motor skills. The technical operators who delivered the project were carefully selected by the scientific committee of the HERACLE Laboratory. Specifically, the laboratories proposed and examined in the research mainly involved three areas:

2.1 Artistic Methods

It's promoted a new vision of the arts through artistic experimentation in educational contexts, understood as knowledge of emotional expression, where spaces of creativity and imagination are stimulated. The realization action allows the exploration of reality from different points of view. The arts, used in psychotherapeutic professions to facilitate children's healing processes, have a new expression in the educational field (Malchiodi, 2005; Waller, 2006). There are five categories of expressive arts in literature:

1. Musical in any form, exposure to sound;
2. Visual arts;
3. Storytelling (symbolic use of words);
4. Role play;
5. Dance (Rashmi e Romate, 2014).

2.2 Theater Education

The theatre education has the intrinsic ability to evoke facts and emotions acquired by reality. This form of teaching through the guidelines of active theatre stimulates the development of emotional intelligence, empathy, involvement in the group and understanding:

1. Involves the child actively (actor) and passively (spectator);
2. Through theatricality it reaches the child with pedagogical, social and therapeutic effects, in an unconventional way;
3. Attention is paid to the process and not to the mere conquest of a specific objective (for example the final performance);
4. It is carried out within a context of intervention defined and shared among all the participants (Heras e Tàbara, 2014).

At the centre of this work of theatrical education there is the personal experience of the participants, which is manifested through dance, movement, the transformation of social relations, observation from different perspectives, in order to improve communication. The educator of theatricality ("the educator") is a facilitator who promotes and mediates situations without imposing a performing job. (Morsanuto, Cipollone, 2019)

2.3 Psychomotricity

Psychomotricity supports the evolutionary processes of childhood by acting in areas of development, (motor, cognitive, emotional-relational). He has a holistic view of the child and uses the game and the body as preferential tools in interaction. (Cittone, Villani, 2019) According to the authors listed, preventive and promotional psychomotor in preschool is widespread in Italy and in Europe. Despite this, there are few experimental studies that testify to the update. The research highlights the predictive factors that highlight the improvement of psychosocial well-being in adolescence and adulthood. (Cittone, Villani, 2019)

The aim of a research (presented at the 2nd International Conference of Education, Research and Innovation, Madrid, 2009) studied resilience and psychomotricity in scholar brazilian and portuguese students, that faces personal and social adverse factors. The Project presented, quantitative and qualitative methodologies, following programs were used started to kids from 3 to 7 years old. With this study, authors evaluate the effectiveness of the early intervention psychomotricity programs to promote resilient personalities. The implications of these results will be discussed and will be suggested changes at learning-teaching process and also at its evaluations and interventions to get scholar success. (Cró, Andreucci, Pereira, Rocha, 2009)

The disciplinary purposes are divided into:

- Intrinsically, that is through motor language with the acquisition of a wealth of motor skills, starting from the basic motor patterns, to develop sporting and expressive technical skills.
- Transdisciplinary that is expressed through multiple languages and behaviours (cross-disciplinary aims). Among the most important we recall the formation of logical concepts and, subsequently, their consolidation; the formation of relational skills and the construction of a “motor skills culture”.

3. Sample

The sample was selected in three kindergartens of the Milan’s hinterland that participated in the experimentation. As shown by the graphs below, 61% of the participants are female and most of the children are four years old.

We administrated three tests of the Nepsy II battery, specifically SO1, related to the estimation of the Theory of mind, S02 which assesses the recognition of emotions and L4 which analyses language skills.

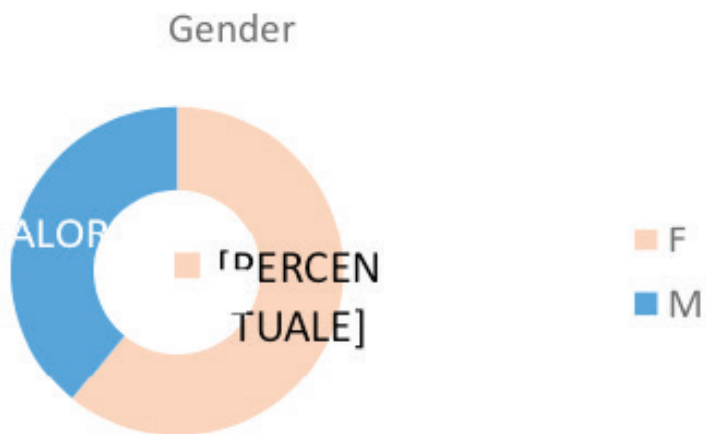


Figure 1: relationship between gender of the sample

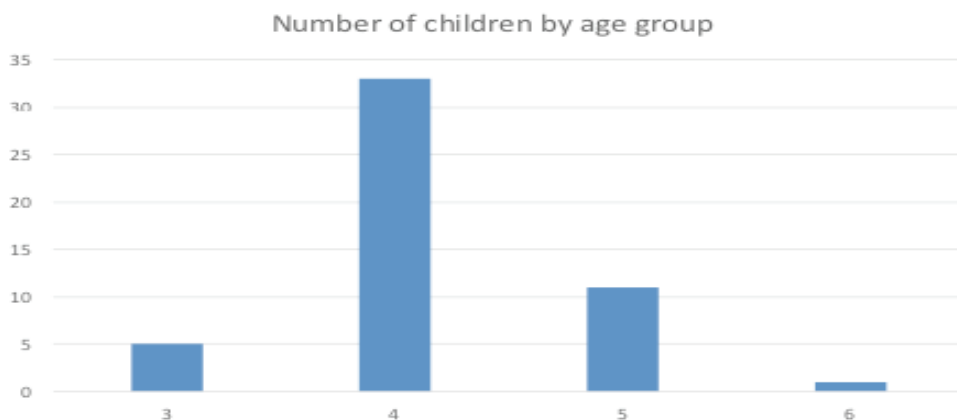
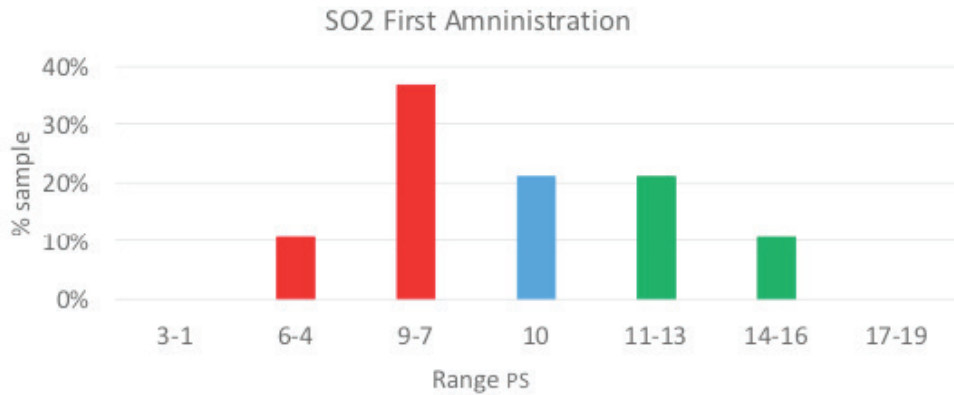


Figure 2: relationship between the age of the sample

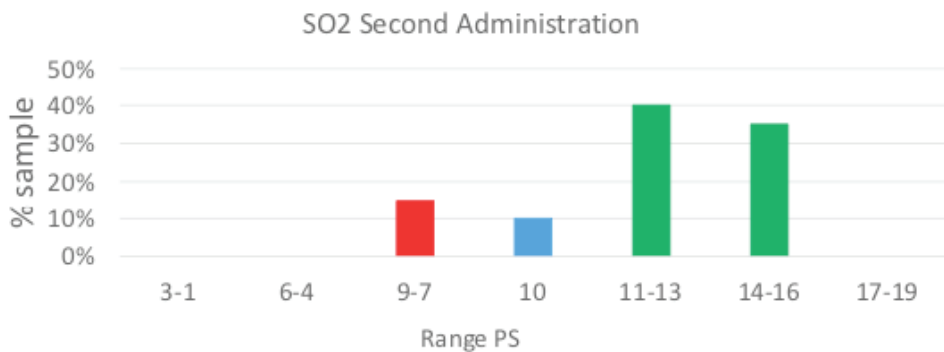
4. Data Analysis

SO2



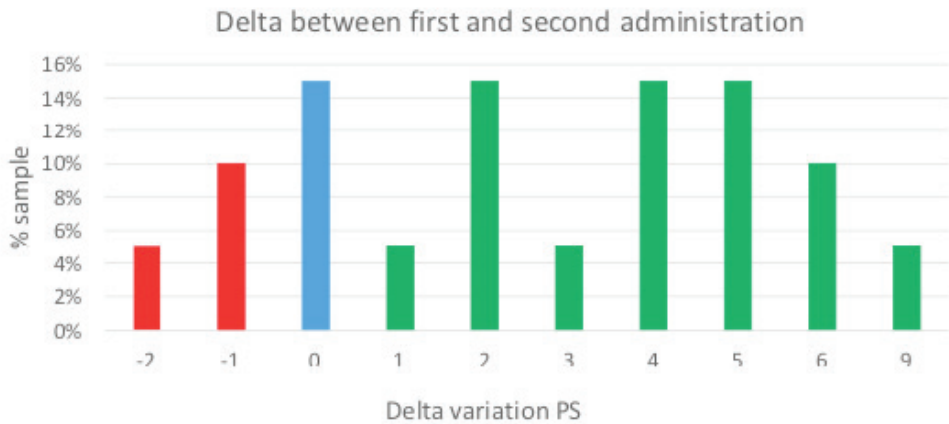
Graphic 1

The SO2 test assesses the ability of subjects to recognize emotions through a test in which we present pictures of faces of children with different emotional states. In graphic 1 the data of the first administration are reported, where on the abscissas there are the scores obtainable at the test and on the ordinates the distribution of the subjects on the sample. The blue colour indicates the average of the normative sample. This structure was used for most of the other histograms. It emerges that 48% of subjects obtained a score lower than the average and 31% higher.



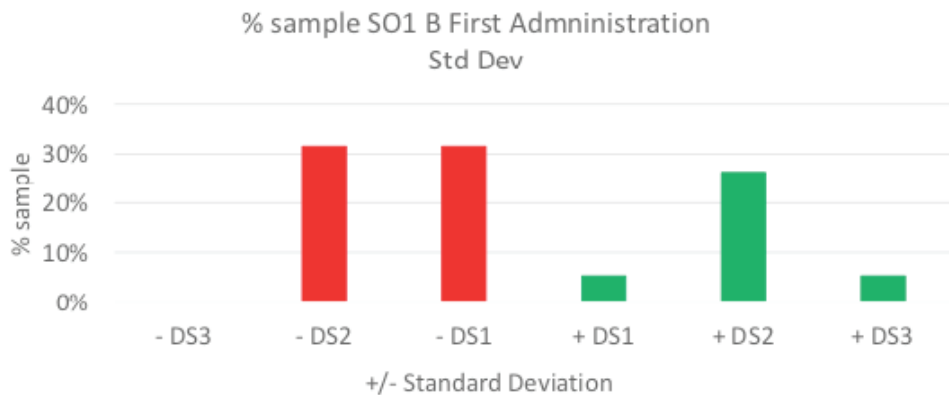
Graphic 2

The graphic 2 shows the scores obtained by the subjects in the second administration, which occurred at the end of the project, where it emerges that 15% of the population obtained a score lower than the average, while 75% higher than the average.



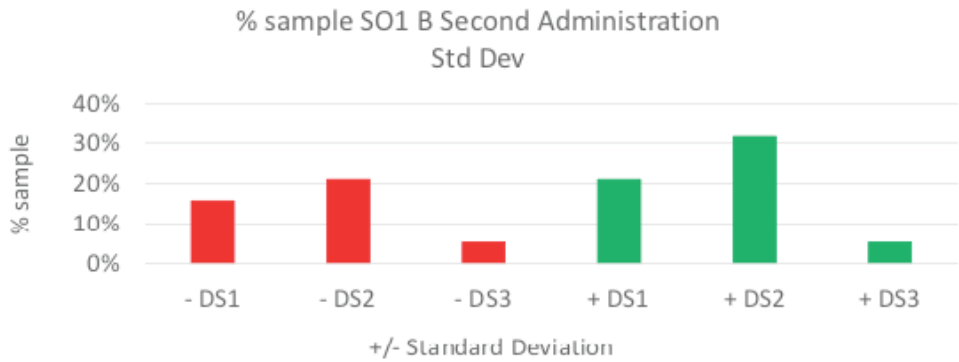
Graphic 3

In graphic 3 a comparison is made between the two administrations and it emerges that 70% of the subjects showed an improvement in their performance, confirming how a deconstructed teaching can implement the emotional and empathic abilities, going to stimulate the subject in a suitable way in order to favour an adequate development.



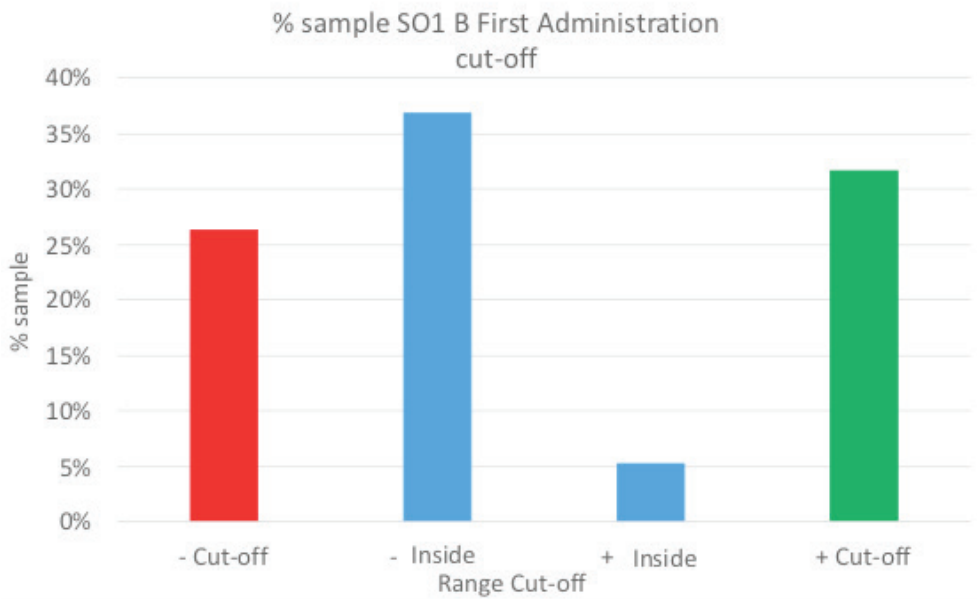
Graphic 4

The S01 test assesses the ability to understand mental constructs and to understand that others may have different thoughts. In this graphic the standard deviations are on the abscissas within which the subjects fall and, on the ordinates, there are the distribution on the sample. From this first administration it emerges that 64% of subjects fall within standard deviations lower than the average, while 35% are above average.



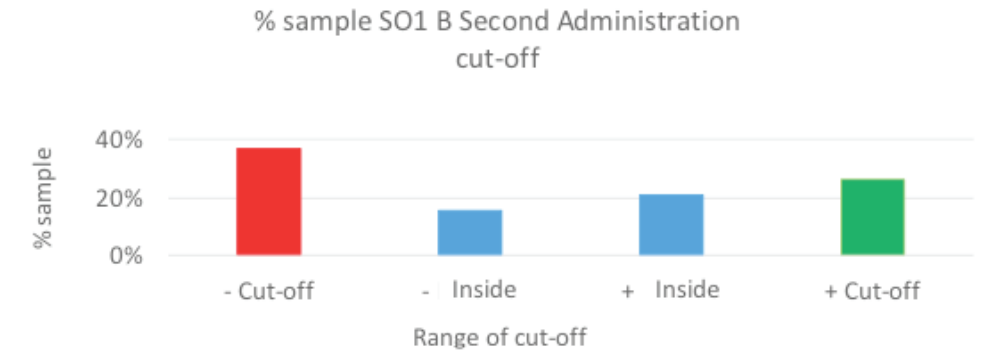
Graphic 5

The graphic 5 shows the standard deviations of the subjects to the second administration of the test: in this case it can be noted that only 42% returned in negative standard deviations, while 58% in the positive ones.



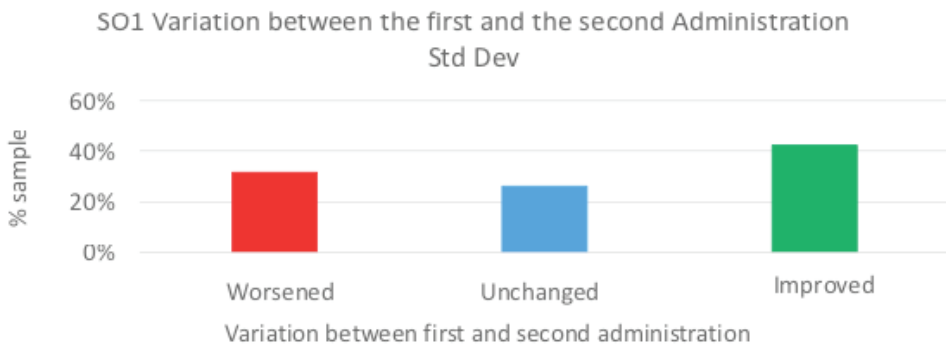
Graphic 6

In this graphic on the abscissas there are the cut-off values and on the ordinates the distribution on the sample. Graphic 6 reports whether the subjects returned or not within the cut-off limit in the first administration, where 27% showed a score lower than the cut-off, while 33% higher than the cut-off.



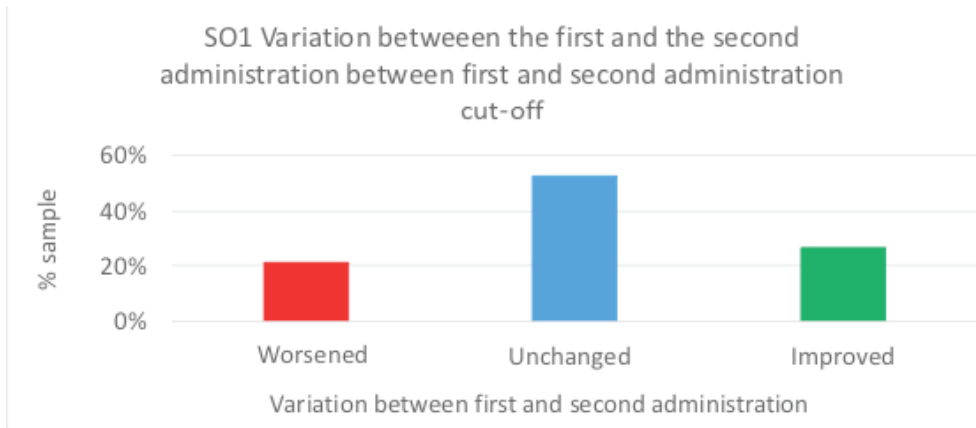
Graphic 7

The graphic 7 shows the distribution of subjects above or below the cut-off in the second administration. The subjects with scores below the cut-off were 37%, but at the same time the subjects with an outcome that falls within the cut-off and that exceeds it have also increased. In fact, graphic 7 shows that the subjects who showed an improvement were 27%, unlike the 22% which showed lower performance. With reference to these scores, it is advisable to reflect on the presence of external factors which in the second administration may have affected the subject's performance, such as the period of the year, i.e. the end of June, in which the test was performed.



Graphic 8

The graphic 8 shows a comparison between the standard deviations in which the subjects returned in the first and second administration, highlighting how the subjects who showed improvements during the development of the project were 43% of the population while the subjects who demonstrated only 31% worsened.

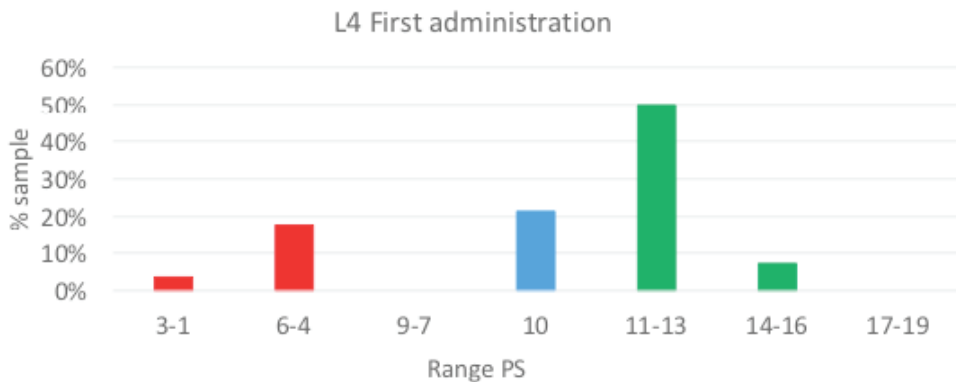


Graphic 9

The graphic 9 shows a comparison between the subject 's cut-offs in the first and second administration, showing that 28% of subjects showed improvements, while only 21% worsened.

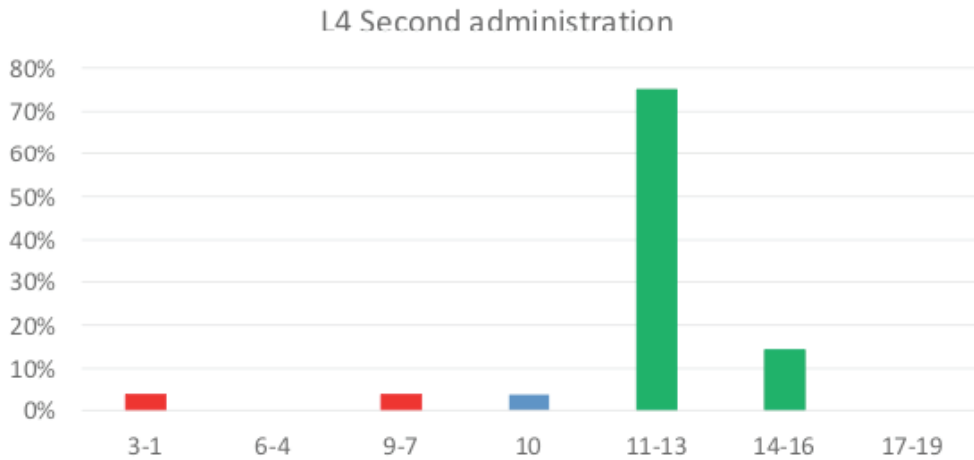
In general, these data have underlined how an experiential teaching can contribute to the improvement of the abilities of mind theory, since it is able to stimulate certain skills in an adequate manner.

L4



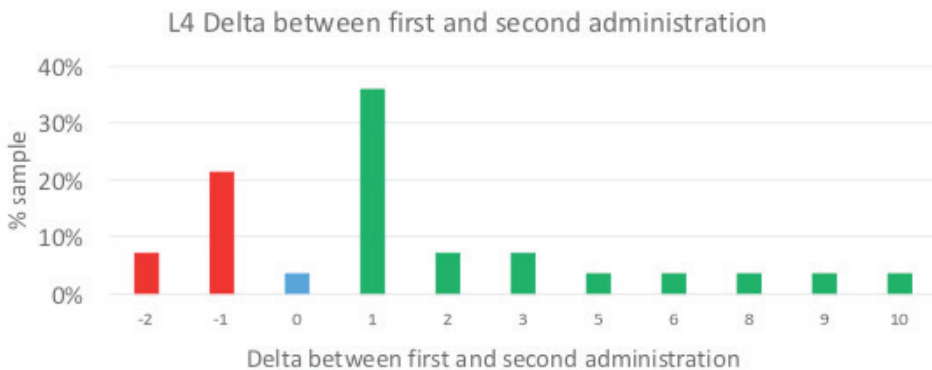
Graphic 10

The L4 test allows to evaluate the subject's phonological awareness through phonological processing exercises. The graphic 10 reports the subject's scores at the first administration, where 20% obtained scores below the average and 58% higher.



Graphic 11

The graphic 11 shows the scores obtained by the subjects in the second administration, where 6% obtained scores below the average and 90% higher.



Graphic 12

The graphic 12 shows a comparison between the scores obtained at the two administrations, where the subjects who showed a best performance were 65%. It can be seen how the proposed activities contributed to a better development of the representation and manipulation of the phonemes that make up the words, entailing a strengthening of linguistic skills.

Conclusions

As the data analysis and related research shows, an unstructured approach that allows children to enhance their creative, communicative, motor and stimulates skills. It also improves learning. All of the examples proposed works use the body as a mediator. We can therefore

correlate our research with the Embodiment Thesis: many features of cognition are embodied in that they are deeply dependent upon characteristics of the physical body of an agent, such that the agent's beyond-the-brain body plays a significant causal role, or a physically constitutive role, in that agent's cognitive processing (Wilson, Foglia, 2017).

As the authors point out there are three distinctive functions for the body that embodied cognitive science might ascribe: as a constraint on cognition, as a distributor for cognitive processing and as a real-time regulator of cognitive activity (Wilson, Foglia, 2017). Such determinate forms of the Embodiment Thesis can ascribe the body either a significant causal role in cognition. This is why, through this work, we wanted to demonstrate its importance.

It is therefore fundamental a specific training of the teachers that develops in child specific interdisciplinary skills such as empathic, communicative abilities, creative ones and finally the motor ones. Teaching must therefore pass through the body and the warm cognition.

Bibliography

- Acocella A.M., Rossi O. (a cura di, 2013), *Le nuove arti terapie*, Franco Angeli, Milano.
- Ascione A., Paloma F.G., Tafuri D., (2016), *Embodied Cognition: il ruolo del corpo nella didattica*, Formazione e insegnamento XIV/1
- Barone T., Eisner E.W. (a cura di, 2012), *Arts based research*, Sage Publications, Los Angeles.
- Bruner J.S. (1970), *Il conoscere. Saggi per la mano sinistra*, Armando Editore, Roma.
- Cittone C., Villani D., (2019), *Promozione del benessere in età prescolare attraverso interventi psicomotori: una revisione narrativa della letteratura*, "Giornale italiano di psicologia, Rivista trimestrale" 1-2.
- Colombetti G. Thompson E. (2008), *Il corpo e il vissuto affettivo: verso un approccio «enattivo» allo studio delle emozioni*, *Rivista di estetica*, 37, pg. 77-96
- Crispiani P. (2006), *Fare teatro a scuola. Progetti educativi di attività teatrali dalla scuola materna alle scuole superiori*, Armando Editore, Roma.
- Cucinotta C. (2017), *Una sfida alla didattica contemporanea: la Warm Cognition*, State of Mind
- Dieleman H. (2012), «Transdisciplinary artful doing in spaces of experimentation and imagination», *Transdisciplinary Journal of Engineering Science*, 3, 44-57.
- Fiorilli C, Donati M., (2014) *Le arti espressive a scuola*, LUMSA - Libera Università degli Studi Maria SS. Assunta, Roma.
- Fiorilli C., Albanese O. (a cura di, 2008), *Il pensiero del bambino: credere, pensare, conoscere*, Edizioni Junior, Milano.
- Heras M., Tàbara J.D. (2014), «Let's play transformations! Performative methods for sustainability», *Sustain Science*, 9, 379-398.
- Immordino-Yang M.E. (2017), *Neuroscienze affettive ed educazione*, Cortina Raffaello
- Knowles J., Cole A. (2008), «Arts-informed research». In J.G. Knowles e A.L. Cole (Eds.), *Handbook of the arts in qualitative research: perspective, methodologies, example and issues*, Sage Publications, Thousand Oaks.
- Lillard A.S., Lerner M.D., Hopkins E.J., Dore R.A. Smith E.S., Palmquist C.M. (2013), «The Impact of Pretend Play on Children's Development: A Review of the Evidence», *Psychological Bulletin*, 139 (1), 1-34.
- Lo Presti F. (2016), *La funzione della corporeità nello sviluppo della conoscenza*, *Formazione ed insegnamento*, supplemento n.1/2016
- Malchiodi C.A. (2005), *Expressive Art Therapies*, Guilford Publications, New York, pp. 1-45.
- Meraviglia M.VV. (2012), *Sistemi motori. Nuovi paradigmi di apprendimento e comunicazione*, Springer-Verlag, Italia

- Mesulam M. (1998), From sensation to cognition, *Brain* 121, pg 1013-1052
- Moreno J.L. (1946), *Psychodrama*, Vol. 1, Beacon House, Beacon.
- Morsanuto S., Cipollone E., Peluso F. C., (2019), Theatral Education as a unstructured didactic form, *Giornale Italiano di Educazione alla Salute, Sport e Didattica Inclusiva*, anno 3 n.1
- Nicholson H. (2005), *Applied drama. Theatre and Performance Practices*, Palgrave Macmillan, Basingstok.
- Pastena N. (2015), Concezione autopoietica dell'apprendimento e "approccio delle capacità" nei processi educativi delle future generazioni, *Formazione e Insegnamento XIII/1*
- Pilotto S. (2004), *La drammaturgia nel teatro della scuola*, Edizioni Led, Milano.
- Rossi P.G. (2011), *Didattica enattiva. Complessità, teorie dell'azione, professionalità docente*, Franco Angeli, Milano, pg 82.
- Tullis, P. (2011), «The Death of Preschool», <http://www.scientificamerican.com/article.cfm?id=thedeathofpreschool>
- Maturana H., Varela F. (1984), *El Arbol del conocimiento*, (Organización de Estados Americanos, OEA, 1984); tr. it. *L'albero della conoscenza*, Milano, Garzanti editore, 1992.
- Maturana H.R., Varela F.J. (1980), *Autopoiesis and Cognition: The Realization of the Living*, D Reidel Pub Co
- Peluso F. C., Torregiani G., Bonfiglio L. (2017), The role of body in didactics: scientific reflections and areas of application, *Formazione e Insegnamento XV/2*
- Rashmi R., Romate J. (2014), «The use of expressive arts as intervention for children», *International Journal of Physical and Social Sciences*, 4 (3), 406-422.
- Vygotskij L.S. (1972), *Immaginazione e creatività nell'età infantile*, Editori Riuniti, Roma.
- Waller D. (2006), Art therapy for children: How it leads to change, *Clinical Child Psychology and Psychiatry*, 11 (2), 271-282.
- Wilson, R. A., Foglia, L., (2017), "Embodied Cognition", *The Stanford Encyclopedia of Philosophy*, Spring Edition, Edward N. Zalta.