



Il ruolo del corpo nella didattica: Riflessioni scientifiche ed aree di applicazione

The role of body in didactis: Scientific reflections and areas of application

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ABSTRACT

The aim of this study is emphasize the important of corporeality within didactis. Neurodidactics identifies the relationship between the internal processes and the dynamics of the body movement, which identifies improvements in learning due to brain plasticity, making an important contribution to a didactic and disciplinary perspective by emphasizing the importance of knowledge acquisition through new ways of understanding environment, school organization and new considerations of the subjects as teachers and students.

The body-manipulative activities represented a cornerstone of the activist position which, in the first half of the 20th century, created new scenarios for the didactics, by drawing more and more inspiration from the learning models that could enhance the natural disposition of the child “to act”, recognizing in the movement and action the preparatory function for the development of thought.

In this perspective, our interest is to destructuralize the current school that is at a standstill and limited to goals, and apply a global, experiential and dynamic didactics that considers education in its etymological meaning by stimulating the possibility of developing individual skills considering the resources of every student, motivating them to unleash their creative mind by opening it up to curiosity and to the discovery of new knowledge acquired with all of their body.

Lo scopo di questo studio è di sottolineare l'importanza della corporeità nella didattica.

La neurodidattica identifica il rapporto tra i processi interni e le dinamiche del movimento corporeo, il quale identifica un'amplificazione migliorativa dell'apprendimento in visione della plasticità cerebrale, dando un importante contributo ad una prospettiva didattica e disciplinare mettendo in risalto l'importanza dell'acquisizione della conoscenza attraverso nuove modalità di intendere l'ambiente, l'organizzazione scolastica e nuove considerazioni nei confronti dei soggetti nel suo essere docenti e discenti.

Le attività corporeo-manipolative infatti hanno costituito uno dei fondamenti della posizione attivista che, nella prima metà del Novecento, aveva creato nuovi scenari per la didattica, ispirandosi sempre più a modelli di apprendimento che valorizzassero la naturale disposizione del bambino “al fare”, riconoscendo nel movimento e nell'azione una funzione propedeutica per lo sviluppo del pensiero.

In tale ottica il nostro interesse è quello di destrutturare l'attuale scuola ferma e limitata ad obiettivi, applicando una didattica globale, dinamica ed esperenziale che consideri l'educazione nel suo significato etimologico stimolando la possibilità di sviluppare capacità individuali considerando le risorse di ogni studente, motivandolo a liberare la propria mente creativa aprendola alla curiosità ed alla scoperta di nuove conoscenze recepite con la totalità del corpo.

KEYWORDS

Embodied Cognition, Neurodidactics, Experiential Learning, Perception Learning, ABI Approach.

Cognizione Incarnata, Neuro-Didattica, Apprendimento Esperenziale, Apprendimento Percettivo, Approccio ABI.

Introduction¹

Until the Eighties, cognitive sciences considered teaching in a reductionist vision focused only on the functional and practical skills of the mental abilities. Then we have witnessed the overcoming of this paradigm versus a global perspective that integrates education, cognitive neuroscience and educational practice that operates in consideration of the “revolution of the mind sciences”, which reflects the overcoming of the consideration of the unique intelligence in the recognition of multiple intelligences, such as : linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, intrapersonal and naturalistic intelligence (Gardner, 1985).

This multidimensionality is backed up by several neuroscientific research that highlights the close links between brain activity and mental activity, redefining the mind-body-environment interaction and considering that human relationships generate changes at the molecular level with huge implications on memory and learning.

In this research field there is an ongoing attempt to link didactics to neurosciences, in order to contribute to the improvement of teaching and learning practices in the consideration of the brain processes involved (Fischer et al. , 2007; Stern, 2005).

Neurodidactics identifies the relationship between the internal processes (memory, emotion, attention, mirror neurons) and the dynamics of the body movement, which identifies improvements in learning due to brain plasticity, making an important contribution to a didactic and disciplinary perspective by emphasizing the importance of knowledge acquisition through new ways of understanding environment, school organization and new considerations of the subjects as teachers and students. So it is possible to define a conceptual model that interacts on the pedagogical perspective of teachers towards an overall biological growth of students.

Education works deep into the brain and into the neurons by changing their structure, through the subjective and intersubjective experience related to the environment and the possibility to interact with it (Daniel Siegel, 2001).

In this perspective, our interest is to deconstructuralize the current school that is at a standstill and limited to goals, competencies, results and repetitive tasks that underlie a uniformity in both teaching and learning, and apply a global, experiential and dynamic didactics that considers education in its etymological meaning (from the Latin word *educere*, to lead forth) by stimulating the possibility of developing individual skills considering the resources of every student, motivating them to unleash their creative mind by opening it up to curiosity and to the discovery of new knowledge acquired with all of their body (Siegel and Bryson, 2012).

Francisco Varela, “by combining recent developments of cognitive neurosciences with the theory of complexity, offers a mainly epistemological path aimed at reconsidering, incorporating and emphasizing the role of the lived experience (Varela 1996; Varela et al. 1996). Varela’s proposal indicates a shift of the study of the mind from a neutral condition to a situated condition, where the

1 Il manoscritto è il risultato di un lavoro collettivo degli autori, il cui specifico contributo è da riferirsi come segue: il paragrafo n. 1 e di Luisa Bonfiglio; il paragrafo n.3 di Giulia Torregiani; il paragrafo n.2, l’introduzione e le conclusioni di Francesco Peluso Cassese.

object of the study must be the mind in its various dimensions, commonly known as the “4 Es”: embodied, embedded, extended, enacted — the mind embodied in the subject, deep rooted in the environment, dependent on social interactions and being put into action” (Clark 2008; Varela et al. 1991).

In this approach, perception and action are interdependent, thus cognition acts through sensory-motor systems on the surrounding world in an adaptive way (Borghi, Nicoletti, 2012). Therefore, experience is considered as culturally embodied and dependent on a body with sensory-motor skills which structure the way of thinking.

This attribution of value to the sensory and motor system leads to greater educational attention to the body, recognizing its potential didactic value and proposing its use as a valuable tool for the development of cognitive skills heavily dependent on the body-kinesthetic experience and on the relationship with others (Iavarone, 2010).

In fact, the body-manipulative activities represented a cornerstone of the activist position which, in the first half of the 20th century, created new scenarios for the didactics, by drawing more and more inspiration from the learning models that could enhance the natural disposition of the child “to act”, recognizing in the movement and action the preparatory function for the development of thought: “learning must take place (...) through activities that are not only intellectual, but also manipulative, thus by respecting the global nature of the child who never tends to separate knowledge and action, intellectual activity and practical activity” (Cambi, 2005).

1. Educational dimensions in the body movement

Bearing out the “body” as a prerequisite for the development of higher cognitive functions allows to recognize the “sense of movement” as one of simplifying mechanisms of the complexity of the educational action for the achievement of educational purposes, which facilitates the individual’s learning and adaptation to the environment (Berthoz, 2011).

Thomas Arnold, in 1988, identified three educational dimensions in the body movement:

- the knowledge about the movement, which results in the study of various motor aspects, elaborated in different disciplinary fields;
- the knowledge through the movement, related to the acquisition of various physical, intellectual and moral skills through the motor action;
- the knowledge in the movement, which refers to the experiential and informal knowledge own of the elaboration during the movement.

In a complex vision of the didactics of movement activities aimed at the acquisition of objectives of other disciplinary areas, the context assumes a determining factor since learning about/ in/through the movement may be considered not as internalization of external executive patterns, often also implicit, but as the result of a continuous restructuring of existing patterns (Arnold, 1988).

This vision leads to consider the teaching practices taking advantage of motor activities as “embodied” and “situated” practices (Lave & Wegner, 1991; Chaiklin & Lave, 1993), which involve biological and contextual factors that condition learning. The circular interaction between intentions, actions and feedbacks

(Clancey, 1994) is the cornerstone of an effective didactic action at a cognitive level too (Clancey, 1994).

This is part of a deep cultural change that leads to “situate” and “embody” cognitive processes, recognizing the basis of perception and conceptualization in the intersubjective mechanisms and in the bodily activity: “the mediation influence of the human body on perception and conception is clear” (Cheville, 2006).

Based on these considerations, the kind of didactics to be developed is an experiential learning, whether these are sensory, mental and emotional experiences. Experiential learning involves a “direct experience with the phenomena studied rather than a simple reflection on the experience, or just the consideration of the possibility of doing something about it” (Kolb 1984), through a reflection on everyday experience and becoming a learning path that helps grow personally.

In the theory of the Experiential Learning, understood as “learning cycle” –the cycle of the experiential learning, the four sequential phases are described: Concrete Experience, Observation and Reflection, Forming abstract concepts, Testing in new situation. Learning can start from any of these stages considered as a continuous spiral, where the one who learns becomes able to anticipate the possible effects of any action thanks to the use of the experience in here and now, and the feedback to change practices and theories. Learners can develop a greater propensity for one of these sequential phases that lead to a diverger, converger, assimilative and adaptive/accommodating learning style.

The diverger style is typical of those who learn by observing and carefully meditating on the surrounding reality. This style leads to the acquisition of skills through the experience. This model allows to highlight the events by analyzing various facets, because people are particularly skilled in the imagination. The strength is the ability to cooperate, collaborate with others and establish affective relationships. The brainstorming, defined as a technique that allows to deal with certain problems through creative solutions, enhances this learning model. When we speak of assimilator style, we refer to the learning of a person who theorizes about inductive reasoning and focuses more on theoretical models, rather than practical models. The learning style that focuses on the practical application of the different concepts is to converger.

People are led to implement hypothetical and deductive reasoning and certain problems. They work according to practical objectives and are not influenced by emotions. The person who sees himself in the adaptive\accommodative style tends to solve problems in an intuitive and immediate way. He is focused on “actively experience” things rather than “theorizing about” ideas, assuming any risks it can bring (Kolb and Fry, 1975).

The experiential learning is linked to a vision of mind embodied in the body which allows the subject to activate his resources in terms of creative, intellectual, bodily and decisive solutions, designed to achieve the objectives in an atmosphere totally pleasantly and accommodating way which makes everyone free to express himself. To confirm such a link, interesting studies on the Brain Imaging and Affordance also show how motor information activates automatically when watching objects that can be easily manipulated and experienced, such as tools (scissors, hammers, etc.), clothing, foods, etc., rather than other non-manipulable objects like houses/faces/animals.

The explanation of this activation is given to the fact that, when watching objects (Tools), the memory of actions associated with these object emerges instinctively (Grezes et al., 2003). Moreover, as shown, the left premotor cortex

responds preferentially to objects that can be manipulated, such as tools, clothes and fruits, compared to those that cannot be manipulated (Gerlach, Law and Paulson, 2002; Kellenbach, Brett Patterson, 2003).

Such visions can somehow confirm the importance and the contribution that a didactics based on these terms can generate.

This structural viewpoint that develops within the Theory of Embodied Cognition recovers the sense of the experience, and the innovation brought by this theory is to acknowledge a link between all the mechanisms of cognition, including categorical inferences and abstract concepts, with the operations carried out by our bodies through a mostly unconscious process. George Lakoff: "We are neural beings. Our brains take their input from the rest of our bodies. What our bodies are like and how they function in the world thus structures the very concepts we can use to think. We cannot think just anything-only what our embodied brains permit"(Lakoff and Johnson, 1999).

2. The Motor Theory of Language

Therefore, the motor system would no longer represent a simple system responsible for the implementation of the action, but the means through which to interact with the outside world, understand the meanings and develop logics of the mind. From this it follows a vision of the person understood as psychophysical unit whose cognitive mechanisms, including the ability to speak, currently appear naturalized and deeply rooted in the sensorimotor bases of the body and in its constructive interaction with the environment.

The body component is seen in relation to the linguistic faculty in two perspectives: on the one hand, the alignment of language development with that of the body (Shafer, Garrido-Nag, 2007); on the other hand, language is seen as arising from the social interactions where the presence of the body is essential (Baldwin, Meyer, 2007). The synthesis of the two approaches leads to an interpretation of the language development dynamics in terms of system: "language emerges as a result of the continuous interaction of the components of the system and the environment", leading us to consider the performance variability and the influence of transient states as carriers of a non-static but eminently dynamic knowledge in which the active component takes on a dominant role (Hoff, 2009).

Language, like the body, is the being-open to the world and embodies the meaning of the existence of things, as the act of listening to be, the primordial act of creating meanings, references and concepts. Language, in this perspective, is not considered an autonomous entity, but a mental faculty, the characteristics of which are inextricably linked to the overall functioning of the human mind and tightly rooted in the body.

This is backed up by studies that provide further evidence in favor of an embodied perspective of language, and that find in the organization in chains of actions (typical of the motor system) a structure that is also reflected in verbal language. These mainly involve the understanding of language and show that, during the processing of sentences, a detailed motor simulation of situations (objects and actions) described (Fischer & Zwaan, 2008; Zwaan & Taylor, 2006) is created, and that this simulation is modulated by either proximal and distal aspects.

It "changes in function of the effector involved in the action expressed by the sentence (hand / mouth / foot) and is used to respond, as well as the purpose

expressed by the phrase and as shown, for example, by the similarity of the patterns results obtained with the hand and the mouth “ (Borghi et al., 2008). Scientific investigations carried out with the use of positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) have shown that there is a link between action verbs and motor programs, between hand movement and language, and that the role of speech perception, exerted by the motor system, underlies the mechanisms of speech production (Devlin & Watkins 2006). A further contribution of enormous scientific importance to the study of the neural basis involved in language is currently offered by the discovery of mirror neurons; these neurons, in their dual role executive and observational, offer an essential (biologically founded) key to interpretation of the role and the importance of the experience, particularly that motor, in communication exchanges.

“The system of human mirror neurons ... encodes transient and intransitive motor actions; It is able to select both the type of action and the sequence of movements that make it up; Finally, it does not requires an effective interaction with the objects, activating even when the action is simply mimed too (...) the system of mirror neurons is able to encode not only the observed action ... but the intention with which it is carried out – and this is probably because the observer, when watching the someone else performing an action, anticipates the possible subsequent actions to which the action is linked” (Rizzolatti & Sinigaglia, 2006). The Motor Theory of Language suggests to consider phonetic gestures made by the speaker to produce them as language perception objects, reproduced in the brain as real *“invariant motor commands”* (Lieberman & Mattingly, 1985). In this perspective, the *“movement vocabulary”* in the mirror neurons represents the channel that connects the recipient and the sender of the message in a process of sharing meanings (Rizzolatti and Arbib, 1998).

Considering the body rooted in the linguistic and cognitive skills of a language, embodying all the cognitive processes, leads to rethink the current practices in favor of a recovery of the bodily and motor dimension also in the language learning process. When carrying out such a complex activity, the body assumes both a cognitive function, creating a close relationship with the mechanisms of thought and knowledge made explicit by the communicative behavior, and a social role, thus favoring through communication: participation, sharing and collaboration. The movement, as well as the action, also plays a fundamental role in a concept of communication as: *“an interactive observable exchange between two or more participants, holding mutual intentionality and a certain level of awareness, able to share a particular meaning based on symbolic and conventional systems of signification and signals, according to the culture of reference “* (Anolli, 2002).

In the same line of research, the other principle that conditions the relationship between body, action and language is represented by the enaction. This term emphasizes the growing certainty that cognition is not comparable to the representation of a predetermined external world, but is the product of the perceptually guided actions that the human being carries out in it. *“By using the term action we mean to emphasize once again That sensory and motor processes, perception and action, are fundamentally inseparable in lived cognition”* (Varela et al., 1993). The enactive approach focuses on the study of how the perceiving subject guides his actions in a given situation and, since the contextual elements vary according to the action performed, the surrounding reality would be conditioned by the sensory-motor system of the perceiver. This system determines the way in which the subject acts, at the same time, influenced by environmental events that condition the reality that surrounds him.

3. The effectiveness of the didactics integrated to corporeality

The study of the function carried out by the body and the movement with educational purposes in didactics requires to “understand”, and at the same time “explain” the ways through which it is possible to make the didactic action effective by employing the body and its motor potentialities. This new perspective arises from theories of authors such as P. Dennison “*movement is the door of learning*”, McLuhan “*there is no learning without fun and there is no fun without learning*”, A. Damasio “*research has convinced me that emotion is an integrated part of learning*”, A. Einstein “*means learning experience, anything else is just information*”.

Psycho-pedagogical theories have recognized in the movement and action a characteristic that is a prerequisite to the development of thought: “*Learning should take place (...) through activities not exclusively intellectual, but also manipulative, thus respecting the global nature of the child who never tends to separate knowledge and action, intellectual activity and practical activity*” (Cambì, 2005).

It is about recognizing to the educational use of the body and of the movement a transversality potential, because the multi-sensorial and motor dimensions of the subject being educated represents a key to access knowledge. The interdisciplinary approach would allow to use all the intellectual forms that the individual has to search for the most effective communication solutions for translating the thought into words, aimed at creating the relationship with the other.

For the social development of the person the use of motor games that satisfy the expressive and communicative needs of the child, opening new relational horizons, seems to be efficient. They have been recognized a potentiality at a cognitive, relational, social and expressive level because, through the game, the child uses and perfects his verbal and non-verbal languages, creating the conditions for a better use and production of communication. In the communication processes, the body language complements and supports the spoken language “*in order to develop new forms of enhanced communication.*” In this perspective, the body and the movement assume a relational and communicative connotation essential to the full development of the individual’s personality in its morphological-functional, intellectual-cognitive, emotional and social-moral components. Through the movement, with which a wide range of gestures ranging from facial expressions to various sporting performances are produced, the student can explore the space, learn about his body, communicate and relate to others.

It’s important to create enthusiasm in teachers to organize meaningful actions involving the learners’ empathetic, communicative and bodily relationship skills by amplifying the “emotional mind” (Iannaccone, Lombards, 2004). Consequently, “*which method would be most appropriate to reach this educational goal?*”-“*To propose an internal workshop at the school can be a different way to acquire knowledge.*” “*The workshop is intended as an experiential learning environment that incorporates not only cognitive and social knowledge and skills, but especially affective and emotional skills that emphasize the construction of personality and individuality, in the consideration of multiple intelligences* (Nardi, 1999). Currently, research groups and scientists in the field of education emphasize that the role of corporeality is important in the activation and strengthening of learning processes.

The effectiveness of the didactics integrated to corporeality was assessed by the biological parameter of the cortisol, comparing the changes in salivary cortisol in 250 students attending primary school, in order to assess their learning levels. In the two groups, one experimental and one of control, quantitative differ-

ences of cortisol levels emerged: it was higher in the experimental group, which was subjected to a corporeal didactics. This result indicates that a stimulating and dynamic learning, causing a variation in cortisol levels which in turn amplify a mnemonic storage of events in an emotional key, leads to an improvement in performances. For what concerns this study, we can see how learning through an authentic experience of the “lived body” is interconnected to physiologic-cognitive processes that allow the acquisition of a long-lasting knowledge (Filippo Gomez Paloma, Veronica Fragnito, 2013).

We can say that living in an abstract culture often makes us forget that concreteness is a very important aspect of learning, because children need tangible examples to manipulate reality, to do active games and make movements. Modern schools are trying to respond to this new three-dimensional view of the subject-person (Gamelli, 2001). They are trying to break with this piecemeal, notional and mnemonic approach of knowledge, ushering a season that does school with the body (Balduzzi, 2002), which clearly expresses the need for a doing-education by taking care of the fully considered subjectivity. These innovations give start to a teaching that makes its own instances acquired by the movement of the so-called “*active-pedagogy*”, in opposition to the traditional humanistic education, which recognizes the value of an innovative teaching method that foresees the link between the activities of study and reflection on the experience of life, making use of three-dimensional human mind, body and language, to allow learning and child development. (Bourdieu, 1988). In these perspectives there is the meeting of the world of education with the world of life, rather than with an abstract world, where the interaction between body, mind and language is possible, and involving the student in the learning process and not forcing him to reproduce the language according to the old-fashioned grammar, and this coalition is the winning agreement for the future school and for teaching that breaks the mold with the classical tradition of the lectures and the rote learning (Barbato, Milite, D’anna, Gomez Paloma, 2013). Further confirmation that the pedagogical debate seeks the affirmation of a conscience based on the importance of psychomotor skills is the consideration that, from their birth, children are sensitive to environmental stimuli, so it is essential that the educational-teaching activities develops by forming their personality in their perceptual, emotional and sensory complexity within the mental development. Essential was the contribution given by Jean Le Boulch, who considering the individual in his entirety, stresses the Importance of affectivity in the path of a motor, logical-communicative, psycho-physical maturity of the child (Le Boulch, 2000). In this theoretical framework, a didactic proposal that unites all the points raised so far, for a project aimed at promoting the development of language and logical thinking, was developed. If considering language and movement as tools of thought, then didactics should propose activities aimed at providing a range of facilities for children, able to translate emotions and perceptions into words, so educating them to communicate their experiences by using spatial and temporal reference points to describe objects, people and events. Activities that help organize logically events and circumstances should be promoted. In this sense, the didactic path will be developed in different points:

1. *First step of body involvement*: the teacher explains children what they can explore, highlighting some places and objects; children, as a result of the pre-determined course, begin to move into the environment;
2. *Second step in the classroom*: during a group discussion, children will create

benchmarks in order to guide their thinking; the teacher's role will be to stimulate discussion through questions on the characteristics of the reference chosen by the students and the characteristics that do not belong to them anymore;

3. *Third step of benchmarks representation*: the abstract benchmarks are converted to the draws that will be reproduced in their description with affirmative and negative phrases; the teacher asks questions to stimulate their perception of the body in a three dimensional environment (eg. "Was the object of your left or right? Did we turn right or left in that point?" etc.).

The educational goal proposed here is to develop, from the earliest school years, logical communication skills by relating them to concrete and simple contexts, considering the treasure that an experiential learning can generate. Eduard Buser proposed in 2005, at his school in Biberist (Switzerland), the project called "Study in the movement", which exploits the movement and the stimulation of the sensory channels to enhance learning. By employing various tools, such as beams, balls, clubs and music equipment, according to the well-known teacher, a long-term learning can be promoted because the movement is one of the child's instinct and innate desire through which he expresses himself, his emotions and comes into contact with others, thus helping him becoming part of the group. In fact, ten years ago, Eduard Buser introduced a harmonica in some music lessons. During a collective game, the children had to learn to listen to each other, adapt their pace to that of their mates and create a pleasant melody. In these music breaks, the young players should have moved spontaneously. The experiment could have then come to an end, but Eduard Buser went far beyond that. He decided not to restrict the movement to single music lesson, but to introduce it in other classes, proposing children to get on balance platforms and walk freely in the classroom while repeating words or talking with their classmates. The movement related to a topic may include, for example, the representation of letters, numbers and moving notions, the experimentation of forms such as the circle, the triangle and the square through large motor movements in the space. Or yet, it's possible to encourage students to solve arithmetic tasks by counting steps back and forth, examining in depth and better understanding the stories by putting them on stage. The purpose is precisely to vary more learning, repeat the movements with the didactic object, thus allowing them to better connect the various sequences through a multiple load. Since reading in the classroom is not limited only to the books but also to texts written on the blackboard or posted on the walls, also the sight is a sense to be trained to avoid stressing him too one-sidedly. Thirty years of experience at school have taught Buser that forcing a child to sit down all morning long is like a torture! The child feels uncomfortable, suffering and his concentration decreases. The movement acts as a regulator, or even as a reducer of the adrenaline level. His lessons are not based on dogmas or teaching theories, but rather on the need for relaxation, tension, mental and physical challenges of children. The focus was on the performance, concentration, motivation, self-confidence and group dynamics of the current and former Buser's class (for a total of 39 children). The survey shows that the 84% of students believes that the study in movement is very useful. From the concentration profile it is surprising to note that none of the children complained of not being able to concentrate well in the classroom. Four out of five students affirmed to "stay focused throughout the duration of a task", confirming that despite (or thanks) to the study in movement an atmosphere strengthening concentration can be generated. Self-confidence is particularly important for motivation. In this context, the teacher's work

bears its fruits. The 85% of students claims to be “proud of their performance.” Instead, it seems that the boost of confidence in their own abilities (as well as other factors) cannot be attributed to the study in movement because of the absence of comparative information (controls). Moreover, when asking questions to which the students could provide free answers, such as “What do you like doing at school?” most of them mentioned the study in movement (22 times in total, 17 students mentioned it precisely while attending Buser’s lesson) (Stampfl i-Marbacher M., Wuthrich-Hug M., 2006).

It would appear that the interactions and mediation processes that take place in them hold the transformation potential that leads to learning. A learning that involves all the participants, albeit each with his own trajectories. Therefore, we all hope that the EC (Embodied Cognition) becomes a functional *modus operandi* for the construction of knowledge, so that everyone can turn from mere passive spectator into the real protagonist of his own educational success. One of the interventions used in many programs for early childhood with the aim of satisfying the special needs of children and families, which originated with Diane Bricker and her colleagues at the University of Oregon, is the activity-based intervention (ABI). It is defined as a transactional “child-directed” approach that incorporates an intervention on the significant individual and routine objectives and goals by using programs that help identify the child’s functional and generative skills using a stimulus-response behavior (Bricker and Cripe, 1992).

Novick (1993): *“ABI is a combination of strategies selected in early childhood of fundamental behaviors aimed at the development”*. Pretti-Frontczak, Barr, Macy’s and Carter (2003), *“It is considered a naturalistic approach to didactics and is commonly described in terms of integrated education”*. It is an approach aimed at children, and that follows their interests and actions.

ABI is composed of four key sequential elements:

- 1) the programmed use of routines and the starting of activities that are functional and can be generalized in different contexts, events, people and time;
- 2) the inclusion of goals and objectives in the programmed use of routines and in the starting of activities;
- 3) the use of logical antecedents and consequences (timely feedback);
- 4) the selection of targeted skills that are generative and functional to the objectives by experimenting various learning opportunities.

This approach can be used in all the environments: home, school, playground, etc., any environment that allows the child to move naturally as a learning opportunity. Research on the ABI showed that it is effective for children of different age groups and with developmental disabilities. It was also shown that activities in a natural environment help children learn the tasks with better results, compared to children who perform abstract tasks without a context (Ozen, Ergenekon, 2011). Piaget (1970):

“Cognitive theory is used to support the use of a natural environment that helps the child to develop and build knowledge”.

Dewey (1959): *“(…) students are best stimulated when they can manipulate authentic experiences”*.

Vygotsky (1978): *“The ABI theory is very important because it focuses on learning as a social process in an approach of social interaction between caregiver and child”*.

This is a very good strategy because every adult, in the child's life, can be trained to use this approach. The caregiver must simply find the opportunity to identify a target, and then to integrate learning in the situations. Using the natural environments and situations by following the routine (ex. When eating, dressing), the play and the daily activities should include consequences (reinforcements) that make both a positive and a negative sense for every action. It is better for the child to start the transaction, and then for the adult to take part in it by guiding and encouraging his explorations once started (Bricker et al, 1998).

The activities selected by a child require little external support and will be repeated as the results are attractive, appealing and satisfying, since the events that occur are chosen to elicit a targeted response and are significantly associated with the response. All this explicates an intentionality combined to a programming in knowing why you are doing what you want, and the result as a goal. The goal is expressed in allowing the child to be independent in his social and physical conditions, and thus to be able to use his skills in any environment or situation (Bricker et al, 1998). Traditional standardized assessments, often used to determine the suitability of children in their abilities, have limitations:

1. The evidences and activities often do not reflect the child's functional programming;
2. The results obtained are difficult to correlate directly to the targets of the intervention for a consistent assessment.

An alternative suitable as a measuring system is the AEPS (Bricker, 2002), used by the ABI's approach, useful because it can provide guidance for the contents of the intervention with the programming of strategies that include the verbal, the non-verbal, the partial or complete manual skills and an assessment based on a curriculum that covers multiple areas of development (Bricker, Waddell, 1996).

Using an ABI approach, associated with the AEPS assessment and observation tool, showed an increase in social competence after integrating selected social objectives in the classroom routine. The results suggest that this embedding strategy may offer an efficient approach to social individualization in pre-school age.

Conclusion

The studies proposed, show that the interconnections between perception, action, emotion and cognition produce molecular changes with relative improvements in learning process. We have seen that experiential learning, neurodidactics, inactivity learning and activity-based intervention, move on different heterogeneous aspects and come to consider the body as a mediator in acquiring skills and developing individual and prosocial skills. Corporeality must be the founding element of didactic programs, especially in evolving age, in order to enhance cognitive experience to speed up the acquisition of skills.

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