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## EDUCATING ON EMOTIONS FOR EFFECTIVE LEARNING

## ABSTRACT

This contribution seeks to highlight how the didactic-educational process and the discourse on emotions for effective learning, today, cannot disregard the pedagogical relevance of a socio-emotional education universally referred to as *Social Emotional Learning* (SEL). Hence the need for a profound rethinking of the pedagogical vision and awareness that the affective-emotional-relational constitutes the *conditio sine qua non* of cognitive development.

**KEYWORDS:** *person-education-emotions-learning-relationship*

## INTRODUCTION

Recent psycho-pedagogical literature has given importance to the thought-emotions relationship, which cannot be seen in a disjunctive (aut-aut) but rather interconnected (et-et) perspective because, as the pedagogue Cambi states, the intellectual life of each of us 'is traversed by *passionate* currents, by emotions, by feelings' (Cambi, 2001, p.182; Cambi, 2015).

Emotion and the process of cognition interact intensely, especially in complex emotions, forming the basis of the processes of empathy, as stated by the American psychoanalyst L. Alan Sroufe (2001), one of the leading exponents of the theory of emotional differentiation, according to which the individual possesses an undifferentiated emotional make-up from birth, and the emotions themselves differentiate as the individual develops.

The educational process and the discourse on emotions for effective learning, today, can no longer disregard the pedagogical relevance of a healthy social-emotional education, universally referred to as Social Emotional Learning (Valbusa, Bombieri, Traina, Silva, Bevilacqua, Ubbiali, 2022, pp1-16; Mortari, 2017); hence the need for a profound rethinking of the pedagogical vision and the way of organising the educational fact to promote a harmonious and balanced development of the learner's personality.

The humanist perspective of the student-centred psychologist Carl Rogers also points out that for the achievement of effective, collaborative and creative learning, one cannot disregard the emotional involvement of the learners themselves, so much so that learning becomes truly meaningful when the content

is experienced by the student as relevant to the satisfaction of his or her affective-relational needs, emotions, and personal goals to the point that the student himself or herself becomes an active part of the teaching-learning process.

School, in fact, as Rogers wrote as early as 1968, does not do enough education for life, instead it is necessary to devote oneself to meaningful learning, that is, to teach the things that really matter to the learners, that fit into their life project, things that the learners themselves judge important and invest with motivational and affective charge. Therefore, the learner-centred approach (Rogers, 1970) proposes the realisation of learning that, not being focused solely on cognitive aspects, stimulates an emotional and global involvement of the learners' personality, that is, learning that combines the cognitive, affective-emotional and experiential planes and that encourages self-awareness and self-assessment in the learner and also develops personal commitment, the capacity for initiative and the identification of democratic and collaborative solutions to problems.

## **1. EMOTIONAL POTENTIAL AND THE EDUCATIONAL PATHWAY**

The same education that orients to reason cannot disregard affective experience for the effective promotion of the harmonious and balanced development of the learner's personality. «Affectivity will therefore not be treated as something irrational to be tamed or eradicated, but as a fundamental dimension of being-in-the-world. However, the educational and existential value of the affective dimension only finds balance in its integration with the intellectual dimension, according to a process of mutual interpenetration» (Baldacci, 2018, p. 18). For this reason, Cambi writes that «training the postmodern subject [...] also means awakening him in his emotional potentialities, welcoming them in the dialectic of his becoming a man [...], arranging them as somewhat the engines of the formative process itself and of its structures: motivational, communicative, design (starting with the design of the self)» (Cambi, 2001, p.182). This fosters the development of emotional competence, i.e. the ability to understand and cope in a functional manner

with one's own emotions (emotional self-awareness) and those of others (emotional awareness of others) (Benedict, 2019), developing capacities for control and resilience to adverse events (Armstrong, Halligan, Critchley, 2011, pp. 331-336). It should be emphasised, however, that these abilities must be framed and contextualised partly in the natural development of the adolescent (one cannot expect the adolescent to understand and encode emotions for which an adequate cognitive level has not been reached) and partly in the environmental and cultural context in which one finds oneself, thus closing the circle in the always valid dichotomy of nature and nurture (Plomin, 2004; Keating, 2011, pp. 245-292), the continuous interaction of which determines the product Persona and its personality. One cannot speak of the adolescent without taking into account his or her cerebral development, but neither can one without considering the surrounding environment, and it is precisely in this perspective that the wish for a school that can create a collaborative learner-teacher-family triangle, from which a didactic approach that is attentive to the inner space and formation of the student can arise, such as to foster not only effective learning but also healthy interpersonal relationships with teachers, classmates and family. The aim must be to enhance the individual with his or her own emotional life and involve him or her in the class group also with extracurricular activities so as to strengthen the relationships between teachers and learners and learners among themselves. Bruni writes: «It is undeniable that all educational activities in general are traversed by fantasies, symbolic experiences, conscious and unconscious feelings, positive and negative emotions, that is, by all that complex internal universe that influences behaviour, relationships, the quality of existence, school performance, relational life and purely cognitive learning of each of us. A complex universe that concerns all the actors in the educational processes and the relationships between them» (Bruni, 2016, p.70). Therefore, it remains important in the formation of the young person the emotional culture that cannot in any way be seen as an obstacle nor marginalised, but is a *conditio sine qua non* of the integral formation of the learner's personality, in the expression and fullness of all those potentialities that constitute him as unique and unrepeatable (Nussbaum, 2004). In fact, according to Nussbaum, intellectual capacities together with emotional and physical

capacities are important because, taken in their interrelation, they allow each citizen to reach and enjoy full independence, and therefore they are all in need of care even if in a different way.

And in reference to citizens whose dependency presents itself in different ways, he writes: «Some have high intellectual capacities, but are unable to offer or receive love and friendship; others are capable of loving, but are unable to acquire the basic intellectual capacities. Still others have high emotional capacities and intellectual abilities, but in a form or at a level that requires special care» (Nussbaum, 2002, p.109). This is why Nussbaum believes that «every real society is a society in which care is dispensed and care is received; therefore it must discover ways in which to respond to those human conditions of neediness and dependence in ways that are compatible with self-respect on the part of the beneficiary and with the absence of exploitation on the part of the dispenser» (Nussbaum, 2002, p.109). Words such as respect, trust, involvement, empathy must represent the 'pole star' that guides the individual and the class towards personal growth within a group growth, essential requirements to combat school drop-out and prevent school failure.

«Thus, pedagogy too must give back space to the emotions, recognising and enhancing them, overcoming the ancestral divorce between mind and affections and looking towards an integration between the two constituent factors of subjective life» (Mariani, 2006, p. 92).

## **2. THE CONSTRUCTION OF IDENTITY BETWEEN PATHOS AND LOGOS**

Thinking and emotions are not separate aspects of the student's experience because thinking is capable of producing emotions and these emotions influence the mode and capacity for thinking.

The emotion of thinking therefore takes on a dual significance: of cause and also of effect. In each case, the connection is such and the interaction so powerful that it is almost impossible to disregard their interconnection in both learning and behavioural processes. In recent years, philosophical, pedagogical and scientific literature has insistently drawn attention to the need to overcome

the censorship between emotions and thought by giving central importance to emotions, which for much of the last century have been confined to the sphere of the irrational without a positive spin-off in the field of education. In fact, Cambi writes: «Contemporary culture, especially on the frontline between philosophy, the human sciences and biology, has broken a long-standing censorship with respect to the emotions, becoming heir to the psychoanalytic revolution that places the drive dimension of higher organisms, the structure of their brain and the constitution of their subjectivity at the centre» (Cambi, 1998, p. 9).

In the training process, it is important for the teacher to take into account the past history and experience of each student in order to better understand his or her emotionality and thinking, which in any case affect learning and behavioural conduct. In this way, thought can have control not only over the ‘manifestation’ of emotions, but also over their production, and one can understand how much the existential path of each of us is strongly marked by this dialectic. Cambi affirms that *the new research trends around the “question of the subject* have – from and on different fields – highlighted the emotional root of human behaviour and of the very identity, more primary and profound, of the man-subject, calling for a re-definition of anthropology that goes beyond the limits of western anthropology (the separation between *pathos* and *logos*) and, in particular, of modern anthropology (inspired by the criteria of rationalisation, socialisation, sublimation) (Cambi, 1998, p. 9). *From this point of view, we can say that it is “exciting to observe in ourselves and in others this power of thought: a power that serves not only to understand but also to feel, to live a different affective life, a different relationship with life. Cambi writes: «Homo sentiens or patiens stands before Homo sapiens and Homo faber, linked as it is to the passions and emotions (the former more moral, the latter more ‘biological’), without which neither ratio nor actio are structured, defined and realised» (Cambi, 1998, p. 9; Cristini, Ghilardi, 2009; Hoffman, 2008).*

The effort that has always been attempted is to realign thought with emotions in order to reconcile logical intentionality with the direction of affectivity. The contradiction and the related suffering arise from a misuse of thought, from a low self-esteem that the person has of himself.

Thinking as a source and matrix of feelings allows a glimpse of some extremely interesting educational glimmers that can be spent in the educational

field, especially in order to gain children an optimal affective competence also for the purposes of meaningful learning and healthy behaviour (Montuschi, 1987).

The Cartesian *cogito* has gone down in history under the banner of reason. It is a triumph of reason, but every triumph has its own inner resonance. It is like declaring oneself 'passionate' about one's ability to think. The passion that accompanies the act of thinking also has its own meaning, its own value, its educational relevance. Admiring one's own and others' thoughts taking shape through signs, gestures, words cannot leave one indifferent.

The emotion of seeing thought travelling along unpredictable paths can lead one to 'love' thought, not only as a possibility or as an abstract idea, but also as an observable reality, as a path that can be traced, identified, followed. This 'emotion' for thought that materialises and becomes visible is a healthy educational passion: it is a reason for respect for all the thoughts of children that articulate themselves in the most unpredictable directions; thoughts that may even derive from the final logical goal, yet advance by opening up new, even unsuspected paths. On the wave of these emotions, we can lose ourselves and fall into a spontaneism that is decidedly unfashionable today; but we can also set out to discover new paths for the education of the mind and for the promotion of correct and creative learning and behavioural processes (Iaquinta, 2019).

Emotions therefore influence the student's learning in some way. Especially in the delicate phase of pre-adolescence and adolescence, children alternate moments of joy and euphoria with moments of depression and sadness. These elements very often influence the student's learning and academic performance (Vermigli, Travaglia, Alcini, Galluccio, 2002, p. 47). It is up to the teacher to involve the student, considering his or her experience and valuing positive emotions (Polito, 2005, p.12). «Positive emotions emerge when I understand what I am studying [...] and make me more attentive. On the other hand, when I am inundated with negative emotions I cannot concentrate, but above all I feel a strong urge to distance myself and defend myself from something that haunts me [...]. Emotions are a traffic light for me, signalling how I am progressing in my studies. Green emotions indicate to me that everything is flowing smoothly, yellow emotions signal that I need to be careful and increase my vigilance, and red emotions let me know that I need to stop and ask myself why [...]. Positive emotions emerge when I like,

am interested and excited by a topic. The negative ones act as a barrier between me and the book, between me and the teacher» (Polito, 2005, pp. 64-65).

### **3. EMOTIONS AND LEARNING BETWEEN MIND AND BRAIN**

Relationships in general can be defined as the ties that exist between people, things and phenomena. We can say that the reasons why people relate to each other are manifold and, probably, the urge to establish relationships is inherent in the very nature of man because constitutively his nature is relational (just think of the typical human capacity: language). The individual person is only recognised in reference to the other, and through the encounter with the other, his uniqueness and difference are emphasised. Now the mind-body-world system is a system that implies the 'I-Thou', 'I-World' relationship, but this system also implies the ego's relationship with itself, with its body, its mind, its emotions (Damasio, 1994).

Each individual is organised, too, in a dynamic system in which the different levels and parts, the body, behaviour, communication, emotions are in relationship-interaction with each other and this complex system, in turn, is continually in relationship with the world and other individuals. The neuroscientists Manzotti and Tagliasco, with their 'theory of the extended mind' argue that the mind is not closed in on itself, it is not an empty box, but is an expanding fragment of reality itself i.e. the mind expands by encompassing everything it experiences (Manzotti, Tagliasco, 2001). «The theory of the extended mind, the close relationship between the thinking brain and the acting brain, the embodied and grounded view of the brain rooted in the body and the environment, challenge the image we have of ourselves. At the same time, they demolish the ingrained beliefs that have permeated education and its practices for centuries, based too often on a narrow and reductive view of the complexity of personality and human intelligence» (Editorial, 2018). Personal identity itself, what we think of ourselves and what we think others think of us, comes to be constructed, piece by piece, in all the exchanges of words and actions we have with other human beings.

In this sense, it is self-evident that everyone's identity is formed by virtue of the relationship, the bond and the conditioning established both with other



individuals and with the environment that surrounds us. Therefore, every relationship implies an exchange, an interaction or rather always a communication: of the self with itself, of the self with the other, of the self with the world because we are a constitutive part of the world and the world is in us. Morin says in this regard: «We are in the world and the world is in us. Our mind is in the world and the world is in our mind, just as the individual is in society which, in turn, is in the individual. We need a thought that gives itself the mission and function of shuttling incessantly between the inside and the outside» (Morin, 1990).

It is necessary, therefore, to recover a concept of experience understood as a process of integration between mind-body-world and hence of interconnection not only between subjects but between subjects and the world, the latter understood in the plurality of its expressions: natural, cultural, historical, etc. All this must remind us of the pedagogical sense of caring for the mind and at the same time for the mind-body-world system and as a system that also includes the world of the emotions because, as LeDoux recalls, «a mind without emotions is no mind at all» (LeDoux 2002, p. 34). It is clear that each one of us is a unique and unrepeatable identity that is constitutively different from all other identities, but it is also true that each one of us is in a relationship with the world and the history we live, and this should make us reflect on the fact that each person constitutes a dense web of connections of which he or she is a part.

If the world is in the mind, the mind is in the world, this means that our ideas and beliefs, our feelings, emotions are not locked in the mind as if it were a safe because it is not. Contini states that «the world is in the mind means that the mind does not correspond to nerve cells but is an ever so slightly mysterious function that exceeds our ability to understand it fully (can the eye see itself?) that expands by encompassing more and more of the world, through knowledge and through emotions, by experiencing the relationship with the other than oneself and by inhabiting that space of encounter with language» (Contini, 2009, p. 9). All emotions and feelings are embodied and acted out in everyday experience. The same ideas, the same thoughts, the same emotions that are part of my personal being, acting with others and in the world, can be harbingers of thoughts of peace, of empathic feelings, of supportive relationships, of self-care and care for others (Rossi, 2004; Rossi, 2006; Rossi, 2019).

Each one of us is an inside and an outside, not in the dimension of an *aut-aut* but of an *et-et* and that is why we must act on our inside so that we can act on the outside because, as Cambi says, the subject is loaded with passions, emotions, affections and it is there that a good part of his identity lies, and it is there that a good part of his relational life is played out. «So pedagogy, but also the school, must give back space to emotions: recognise them, value them [...] thinking of an integration between the two factors of subjective life, but also social, cultural. We need to move towards a recomposition of dualism, drawing up cognitive and emotional curricula together, models of subjectivity capable of integrating the two hemispheres, pedagogical theories that place this recomposition at the centre» (Cambi, 2001, pp. 182-183; Cambi, 1998; Cambi, 1996; Massa, 1992; Goleman, 1996). Learning, in order for it to be truly meaningful, that is, capable of producing change, cannot be considered only in an intellectual key and therefore concerning only cognitive functions, but must also bring into play emotional-affective-relational factors and therefore consider the subject in the totality of the dimensions that constitute him or her (Geake, 2017).

Freud himself emphasises how wrong it is to consider our intelligence as an autonomous force, neglecting its dependence on the emotional, affective life, thus forgetting interiority, and in one of his works *Psychology of the Gymnasium* he recounts that he found it difficult to establish what interested him most between what was taught and the attitudes and movements of his teachers. Freud writes: «The emotion I felt when meeting my old gymnasium teachers leads me to make an initial admission: it is difficult to establish what interested us more, whether we were more interested in the sciences we were taught or in the person of our teachers. In any case, the latter were the object of a continuous subterranean interest for all of us, and for many the path to the sciences necessarily passed through the persons of the teachers; many stopped in the middle of this path, and for some (why not admit it?), it was thus barred forever. We courted them or turned our backs on them, we imagined that they felt sympathies or antipathies that probably did not exist, we studied their characters and formed or deformed our own on their model. They aroused our strongest revolts and forced us into complete submission; we spied on their small weaknesses and were proud of their great merits, their knowledge and their justice. Deep down, we loved them very much, if only they gave us a reason to; I don't know if all

our teachers realised this. But it cannot be denied that we had a very particular attitude towards them, an attitude that could have its drawbacks for those concerned. They were, in principle, equally inclined to love them and hate them, to criticise them and venerate them» (Freud, 2003, pp. 478-479).

Another psychoanalyst Fenichel (1978) confirms that every intellect is weak when the affections work against it. Head and heart, therefore, cannot be separated, but must be combined because only the harmonisation of thoughts, affects and emotions allows the subject to grow and evolve fruitfully. So it is appropriate to ask, at this point, what place do emotional, affective and relational factors occupy in our classrooms and what impact do they have on learning and behaviour, including problem behaviour. Another question is: how much dignity and importance do these factors hold for teachers? While it is true that in schools today too much emphasis is placed on intellectual achievement and competition and little care is taken to educate young people in collaboration, to establish a good relational and empathic climate that can facilitate the realisation of the student's own potential and whose realisation can lead him or her to essential growth as a person.

Emotions affect both the teacher and the learner. It may be that the former, experiencing emotional states in his or her daily work, is either willing to get in touch with them or assumes defensive attitudes towards them. The teacher, in short, can either become fully aware of his or her emotions, of the way they act and influence his or her behaviour and thus accept them as his or her own, or deny them, project them onto others, as unbearable feelings that our narcissism cannot recognise as part of itself, because it is feared that the 'bad' parts may destroy the 'good' ones. Getting involved is definitely positive and more productive in the relationship with students. What about the learners' emotions? Even for them it is not easy to talk about 'what they feel inside'; on the contrary, emotional illiteracy is often widespread among pupils because the family has not been able to appropriate the emotional syllabary for them, because parents are often preoccupied with teaching their children only to obey. Often, therefore, emotions give rise to problems for teachers and pupils alike: problems of uncertainty, disorientation, risk, doubt, etc. Yet emotional factors are decisive in learning processes because they set in motion the desire to receive approval from adults; the desire to know reality, to know one's own

capabilities and also the desire to exercise one's own mind, all four aspects, however, present a double face, one active and the other passive. In fact, the desires mentioned above are accompanied by fear: fear of receiving disapproval, fear of knowing reality, fear of knowing one's own incapacity, fear of putting one's mind to work. Desires and fears thus inhabit the learner's mind, condition its existence in some way, and can function as an incentive, a stimulus, a drive for discovery. Facing desires and fears is like embarking on a travel adventure to discover unexplored lands and, while encountering difficulties, one must be aware of one's own emotional states, that is, what is happening inside us at specific times and, above all, know how to accept and master it.

Certainly, contact with one's own emotions enables a richer and more personalised communication. An educator, therefore, should always be clear about the importance of emotional culture to foster learning and correct behaviour in his pupils and create a relational and empathetic climate within the classroom. Unfortunately, even today, too much emphasis is placed on intellectual achievement and competition, while little attention is paid to cultivating the affective and relational emotional culture, which can certainly have a considerable impact on the formation of children's personalities and their behaviour. What counts, for many, is still the grade, the question, the desire to complete a certain programme, so that the intermediate stages of the journey from non-knowledge to knowledge are considered of little importance. Thus, 'out of the picture' risk remaining the affective-emotional relational elements, and the interiority of the child in the relationship with the teacher remains extraneous. Of course, educating is not easy, and the goal of knowledge, in the pedagogical journey, encounters various travelling companions called interest, pleasure, fatigue, pain, frustration, anxiety, that is to say, everything that is usually ill-tempered, because one seeks instead easy paths, with ready-made answers, that are able to eliminate obstacles and uncertainties. The knowledge one arrives at is never is never 'definitive', but is knowledge that raises new questions, new queries, new needs, that does not follow a path with a direction already determined a priori, it is susceptible to change depending on the range of possibilities that each student has with regard to his or her own curiosity and interests. Faced with learning, the young person may be seized by various fears, such as that of confusion, disorientation, fear of not

being able, of discovering oneself inadequate, of not being valued, etc. All of this leads to a negative self-perception and equally negative attitudes towards schoolwork (e.g. inconstancy in commitment, difficulty in memorising, lability of attention, falling performance and results), all of which pave the way for dropping out and dropping out of school. What does this mean? It means taking note of reality, of one's own limits, one's own difficulties, but also of one's own qualities, one's own resources, from which one must always start, if one does not want to feed fantasies of omnipotence, and then risk plunging into the frustration of impotence. All this produces uncertainties and doubts, for which not only students but also teachers need help and encouragement to cope, and this can become a very valuable opportunity to reflect on personal difficulties and what they can teach us, with all the risks that such work entails.

One must be convinced that anxieties are not avoidable, but this cannot be seen in a negative sense; on the contrary, they can offer an indispensable contribution to real intellectual and emotional growth.

#### **4. NEUROSCIENCE AND EDUCATION**

The recent development of neuroscience has helped to raise the cultural debate on the dichotomy between the physical sciences and the humanities. In this perspective, reconsidering personalistic pedagogy makes it possible to propose a multi-voiced reflection on the relational and intentional structure of the person on the themes of conscience, freedom, ethics, responsibility, emotions, learning and training. All fundamental aspects that concern human action and education. The interest and acquisitions of neurosciences are growing so exponentially that we can speak of a pervasiveness of their effects on other disciplinary fields, not excluding pedagogy. Olivieri writes: «Education implies the adaptation or assimilation of evolutionarily predicted or biologically primary cognitive skills for secondary or non-developmentally predicted purposes, and corresponds to that process through which the will to learn is inspired. Educational programmes, in turn, are the brain's instructions to perform an action» (Olivieri, 2014, p.15). Cognitive neuroscientists have long regarded education as a long-term application of their research findings.

And they claim that the two disciplines, neuroscience and education, are interdependent as there is a field of research for both. «While it used to be difficult for educational researchers to assess the promise of educational neuroscience due to a lack of cross-disciplinary knowledge, the situation is definitely changing today, and more and more neuroscientists are looking to the educational field for answers. [...]. The neuroscientific approach has shown particular promise in education in three areas: (1) understanding the neural basis of the mental representations that underlie formal, non-formal and informal learning; (2) discovering neural markers of educational risk; and (3) evaluating the many educational debates that have not been resolved through behavioural data alone» (Olivieri, 2014, pp. 16-17).

Pedagogy is a science of education that must be characterised not only theoretically, but also in operational terms, and for this reason it is called upon to resolve the often complex and difficult difficulties of individuals who are unable to pursue their existential and educational journey with dignity, and are therefore in need of special help and care. And here the development of neuroscience can make a considerable contribution to the pedagogical sciences. Pedagogical anthropology must therefore offer quality answers to the questions that difficult existence presents, proposing innovative educational paths and experimenting with inclusive teaching strategies. This is why it cannot shut itself up in disciplinary isolation, but is called upon to interact with other disciplines. In fact, as Pinto Minerva states, the irruption of the categories of difference and plurality have, in pedagogy, a double effect: *on the one hand, they have initiated a profound reinterpretation of the I-world relationship, highlighting [...] the web of interconnections where the boundaries between forms of life are widening, hybridising with each other [...]; on the other hand, they have entailed a profound epistemological redefinition of pedagogical knowledge, as autonomous and also constitutively interdisciplinary knowledge. A knowledge made up of interweavings and intersections with other knowledge with which it shares the same field of investigation [...]. Individual spheres of knowledge indispensable to the elaboration of that “general reflexivity that connotes general knowledge on education as complex, critical and problematic knowledge, in its itinerary of deconstructive, analytical-recognitive, reconstructive and project research, sustained by the utopian instance of a just and pacified world»* (Pinto Minerva, 2016, pp. 55-56).

Dialogue with medical sciences, neuroscience, sociology and psychology is fundamental in order to be able to act competently in the educational field, especially with those subjects that show learning difficulties, maladjustment, marginality, let us say the weakest groups that are now a constant reality in our education and training system (Fogassi, 2019).

The great founders of special pedagogy, starting with Itard, Montessori, and Decroly, immediately understood the importance of *educere* and, making use of the medical-scientific knowledge in their possession, were able to research and experiment innovative methods and activities in order to be able to offer educational responses capable of giving human dignity to their pupils.

In recent times, neurosciences, neurophysiology, neuropsychology, neuroethics (Evers, 2009; Sheridan, Zinchenko, Gardner, 2006, p. 267) and neuro-pedagogy (D'Alessio, Minchillo, 2010), as well as the new studies on the brain, are offering special help to pedagogy itself to understand in depth that pre-adolescent and adolescent world that experiences crises of disorientation, identity and maladjustment that often result in the field of dispersion, in the most serious cases in deviance and, unfortunately, even in crime (Angelini, 2020).

Neuroscientific discoveries are also revolutionising the paradigms of education, not without repercussions in rethinking education and all the processes inherent to it, also in consideration of educating to the mind-body-meaning connections in the various contexts (Contini, Fabbri, Manuzzi, 2006). I believe that pedagogy can and must benefit from the discoveries in this field by taking on the task of understanding and enhancing the evolutionary capacity of the brain-mind: in this way it is possible to plan an education strategy that uses the environment to allow the maximum and best development of mental potential. M. Contini writes in this regard: «One might ask oneself whether it is legitimate and sensible to investigate connections and encroachments between pedagogy and neuroscience from the side of the philosophy of education, without, at the same time, being able to welcome and listen to the voice of neuroscientists, on the same theme, in order to establish the terms of a common debate. I think so, she continues, and I believe that the partiality and imbalance of this initial phase of analysis and reflection may be useful to verify, first, [...] the status of thinkability that we, scholars of education, elaborate on such connections and encroachments [...] and how we translate

them into words, with which words [...]. It is a kind of dress rehearsal between us, to stage our representations and reflect on them together, in order to verify how much we understand each other if, instead of reflecting only within our theoretical frameworks, we open up to other knowledge, particularly neuroscientific knowledge» (Contini, 2009, p.89).

Indeed, pedagogy could benefit from the progress of neuroscience even if, as Borgna says, the neuroscience discourse lacks a reflection on the miracle through which an objective datum becomes subjective, through which the set of facts, ascertainable from a neuroscientific point of view, is transformed into a set of meanings (Borgna, 2003, pp. 17-22). It is a question of betting on the paradigm of complexity to which E. Morin (1993) and thus on the subject of pedagogy and human sciences on the one hand and neuroscience on the other, in order to make what usually does not fit together in our culture interact. In particular, it is a question of understanding the connection between nature and culture, between the sciences of nature and the sciences of the spirit, which are in any case polarisations that come to us from afar with their opposing representations of that ancient problem, philosophical and scientific at the same time, which concerns the soul-body relationship or as it has lately been called the Philosophy of mind and therefore the mind-brain relationship analysed today both by philosophers and by neurophysiologists and neurobiologists, and which certainly can no longer be liquidated through the paradigm of disjunction, but rather through the paradigm of 'distinguishing in order to unite' of Maritainian memory. Galimberti, in this regard, writes that it is necessary to go beyond «the laceration between the exact sciences and the humanities, which has been somewhat the diaphragm and the wound of our culture, which continues to proceed according to this duality» (Galimberti, 2013, p. XIII). The same A. Oliverio states that brain structures «are not rigid and predetermined like any machine. On the contrary, brain organisation is plastic, so that the relationships between a particular structure and a particular function vary over time, depending on the necessity of environmental demands, including the internal environment of our body and brain» (Oliverio, 1995, p.29).

In fact, in recent decades extraordinary results have been achieved thanks to the unthinkable progress of neuroscience, which has shown how cognitive and emotional processes can be traced back to and identified with structures



and functions of the human brain; one thinks of the cognitive functions, linked to the activities of the associative cerebral cortex, and of the emotional functions linked to certain centres of the limbic system, and in any case both regulated and determined by various chemical substances and by the neurotransmitter system (Contini, 1999). At this point, it must be said that the interconnection of knowledge can no longer be postponed because it constitutes the basis for building a bridge between neuroscience and the human sciences in order to understand the common roots of the human being's cipher and which concern the need for truth and knowledge present in man.

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