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## Interdisciplinarity, disability and inclusion: knowing to educate

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### Abstract

This contribution delves into the institution of interdisciplinarity, in the light of Cognitive Motor Training, through an exploration of epistemic devices to reflect on issues relating to interdisciplinarity, disability, inclusion and the construct of Knowing to educate. The aim of the research is to reflect: a) on the web of complexity that supports inclusion and scientific evolution; b) on how, epistemologically, the complex epistemological process is vitalised; c) on narrating how transdisciplinarity combines neuro-activation, Cognitive Motor Training and Inclusion through the aphorism of "Knowing to educate". In particular, the need for a complex epistemic substratum emerges to dynamize transdisciplinarity in the inclusive dimensions inherent to the humanization process.

**Keywords:** interdisciplinarity; transdisciplinarity; neuron activation; cognitive motor training; inclusion.

### 1. Introduction to interdisciplinarity

The problem inherent to the definition and organization of knowledge appears to be difficult to resolve in human education. Through Morin's thought (Crispiani & Pellegrini, 2004, p. 97) we derive the fundamental paradigms that can act as a reference for redefining the position of the school with respect to contemporary civilization.

Morin highlights the issues ignored by the contemporary scientific panorama and derives an approach to knowledge and educational teaching by defining the paradigms necessary for the epistemological platform:

- a) the biological and anthropological foundation of the sciences;
- b) the ecological, global and contextual approach to knowledge;
- c) metadisciplinary relations (Morin, 2000, p. 124);
- d) introspection as a process of conscious evolutionary autonomy;
- e) the uniduality of the mind;
- f) understanding being, existence and life.

In light of the facts unfolding in reality, I believe that scientists, through a series of innovations and mainly through the ongoing ecological transition (Pellegrini, 2023, p. 7), are attempting to make up for the educational demand that contingent reality requires. However, any modification implemented by it is implemented on the basis of the same cognitive palimpsest, sharpening the specialist and technocratic culture, which in this argument is included in the complexist perspective.

Starting from a conscious vision of the context surrounding me, I maintain that the implementation of complexity theory (Morin, 2007, p. 64) constitutes the global and ecological approach through which to redefine the entire structure of knowledge and the pedagogical debate that it suits.

The following aims to outline the fundamental problems that affect the globality of training resources and which in the author are configured in the possible relationships that can be implemented within the triad "mind – culture – society" (Morin, 2007, p. 111), for introduce not only questions inherent in a specialized manner to teaching or epistemology, but to get an idea of what complexity is and what culture represents in this also complex reality.

The theme is configured on the basis of a global and progressive introduction to complexity, which is outlined both in a diachronic and synchronic sense, until reaching the heart of the discussion. This explanatory method implemented by me has the dual purpose of understanding the genesis and evolution of complexity theory in a contextual and global manner and of giving a vision of epistemology and pedagogy, also addressed on the basis of an ecological, global and contextual. This distances itself from a finalistic and immediate solution of knowledge, but introduces us to a paradigmatic, planning vision of man, as it does not intend to impart a quantitative movement on the learning-teaching process, but on the contrary the epistemologist of complexity intends humanize it, that is, create knowledge adequate to the bio -anthropological rhythm of all living things.

With E. Morin the great problems reopen in a plurality of areas including the epistemological and epistemological one with planetary repercussions, since they affect the plurality of aspects of man, such as:

- the relationship between philosophy and science, between heart and mind, between ideal and reality;
- the unity and complexity of knowledge;
- the processing of thought;
- disciplinary reports;
- the relationship between the observer and the observed;
- the density of education and teaching;
- the structuring of knowledge;
- renewed way of conducting scientific work.

Therefore the study I conducted has the great aim of reconsidering the entire cognitive horizon and pedagogy in light of the complexity of this proposal.

With the intention of offering an option to the organization of the cognitive system, through the thought of E. Morin I outline a series of purposes and perspectives outlined by him, which contribute to the aforementioned reorganization, such as:

- raise awareness of the present abstract and fragmentary cognitive modality, no longer adequate for the global context;
- understand relationships by revealing their logic and the connections that characterize them;
- introduce the renewed concept of understanding;
- introduce us to complex reality.

Therefore I undertake to highlight, reveal and interpret the "new humanism" thought of by E. Morin, which invasively involves pedagogy, teaching, disciplines, science and culture (Pellegrini, 2023, p. 14).

## 2. Challenges and prospects

Interdisciplinarity (Morin, 2007, pp. 217-221) is a thought perceived by scientists as an important perspective for addressing the complex challenges that characterize contemporary society (Smith et al., 2018, p. 34). This is representative of a human propensity aimed at inclusion, as a process that aims to actively and fully involve individuals affected by diversity, becoming an ethical and social imperative (Jones, 2016, pp. 567-579). However, the ways of plurality used to promote inclusion remain a topic of keen interest and heated debate in academic and professional circles. Interdisciplinarity refers to the collaboration between different disciplines in order to integrate knowledge, perspectives and methodologies to address complex problems (Klein, 2010, p. 231-325). On the other hand, inclusion is about creating environments that welcome and value diversity in all its forms, promoting equity and mutual respect (Thomas, 1995). Exploring the connections between interdisciplinarity and inclusion can lead to

new perspectives and innovative practices that address inequalities and promote social well-being (Anderson & Meyer, 2017).

One possible strategy to promote interdisciplinarity and inclusion is the adoption of integrated approaches that contextually combine theory, research and practice (Gupta, 2019). For example, educational programs that incorporate experiential interdisciplinary projects can provide students with opportunities for authentic learning and collaboration (Banks et al., 2008). At the same time, establishing organizational policies that foster diversity and equity can create inclusive practice environments that promote creativity and innovation (Choi & Rainey, 2010).

### **3. The horizon of meaning: Knowing to educate**

This research is preparing to follow the paths of inclusion according to a transdisciplinary approach precisely through the eyes of Pedagogy, which in turn develops in behavioral science, reflecting on a multiplicity of critical elements that affect the scientific and professional panorama, as well as civic attention to generate enabling practices on the basis of shared and widespread values: humanity is committed to seeking ways to encourage the self-paced interactive mode for the self-activation of behavior.

Therefore, scientific evolution and its multidisciplinary expansion are sensitive to the discovery, treatment, maintenance and transformation of behavior through neuroactivation.

A set of tensions has always regulated knowledge, but particularly in this phase, scientific thought reflects on entirely epistemological questions.

They are problems that concern the definition and delimitation of the working domain of knowledge and its purposes, that is, of the purposes and methods of research and of the founding paradigms, of language, which is one of the weakest areas of pedagogy, of the terms of scientific and literature accreditation and other factors that constitute the epistemological status.

Scientific innovations, as we have also seen in recent years, appear very pressing, as does epistemological reflection. If we take the DSM-5 as a reference, we see that from that phase, therefore from the early nineties to today, there has been a continuous re-selection or conceptual and lexical re-reading of many problems.

We observe concepts that are still unstable and in movement - think of the concept of neurodevelopment, of the distinction between phonological and phonetic, of the distinctions between integration and inclusion: they are all lexicon, that is, they are all terms that testify to today's epistemological tension.

The same tensions concern the paradigm of education. Education is a concept, a lexicon and a semantic area that has its own history in humanity, but which also combines this with a definitional fragility. Starting very clearly from the second half of the twentieth century, but with antecedents dating back to Itard JM (Crispiani, 2019, p. 19) and then to the nineteenth century, education has expressed a series of evolutionary trends of which two seem to us to be the most interesting.

The first trend is professionalization, that is, the fact that education beyond school has become a job with a strong professional identification for many people.

The other trend is the expansion of one's domain in the sense that education from the ethical, civil or military formation of the person has expanded its boundaries and today the discussion also arises in terms of qualification, therapy, training, didactics, training, consultancy and mentoring.

The phenomenon itself makes it evident, therefore it becomes evident if we consider the dominant feature of the helping relationship, it constitutes the element and the lexical formula, the module around which today it is agreed to recognize or lead education. Therefore education fundamentally as a "helping relationship" (Crispiani, 2019, p. 9). It is interesting to observe how in most educational, re-educational and rehabilitative treatments, treatments of an educational nature are actually carried out, that is, treatments based on the helping relationship.

The vast majority of treatments for the Autism Spectrum, Fragile We therefore observe a series of pushes towards a new structure that we can summarize in indicators. Meanwhile, a general affirmation of educational action, today society reserves great expectations towards educational treatments. On the other hand, the expansion of education which concerns human behavior in all phases of life.

Another trend is the professionalization of educational practices which are no longer attributable solely to parents and teachers, but to a range of professionals in a trans-professional structure.

At the origin of this phenomenon we also see a strong reinforcement of skills on human behavior, that is, the professional today is an expert in human behavior.

The educationalist is no longer indebted to knowledge from other qualifications. It knows human behavior and the diversity of human behavior.

Morin (Morin, 2000) gave us of transdisciplinarity. Pedagogy, as a behavioral science, has a transdisciplinary relationship with other sciences.

A further important marker that stands out as a science and as a profession, one cannot exist without the other because we need to "know to educate" (Crispiani, 2019, p. 9). Not only does considering Pedagogy the Science of Education and the Science of Human Behavior produce two strong professional gains. On the one hand, greater scientific competence, on the other, greater autonomy in treatments, i.e. adherence to explicitly educational enabling treatments.

The perspective is therefore towards effective and clinical habilitation procedures based on knowledge of human processes and therefore on a biological perspective.

The biological perspective cannot fail to deal with neuroscience and the array of knowledge and problems that these highlight today.

In reality, this closeness to biology and neuroscience has precedents in the history of pedagogy which have been present in Italy, but also in other European countries starting from Austria and the central European area and France. They can be reunited with Biopedagogy (Fraunfelner, 1994), Clinical Pedagogy (Crispiani, 2001), Neurodidactics and Neuropedagogy (Rivoltella, 2012).

It is in this area, of biopedagogy and neuroscience, that for some time now the experience of the Itard Network and the practices of Cognitive Motor Training (Crispiani, 2015) have focused attention on the Institute of Neuroactivation (Crispiani & Palmieri, 2023).

#### **4. Transdisciplinarity and Cognitive Motor Training**

Neuroactivation is a category of neurobiological nature which in pedagogical settings is considered as a neurobiological process with educational activation. What does this mean? It means that this neurobiological process that physiologists and neurophysiologists see as neuroactivation can be stimulated by electrical instruments and probably by drugs, but they allow an educational activation. This can happen precisely through Cognitive Motor Training.

A complex range of neurodevelopmental disorders are affected by this phenomenon of neuroactivation. They are those phenomena of individual cognition that manifest diversity and disorganization affecting cerebral physiology, i.e. normal neural functioning.

These are biological conditions in which fluidity, i.e. the constancy of movement and the order of cortical flows, are disordered beyond conditions of brain damage.

These are therefore dysfunctions of a qualitative nature, i.e. not connected to structural damage and with operational dysfunctions, therefore also of a qualitative nature.

In reality we observe a discontinuity of the conduct and a slow cerebral viability. The slow cerebral viability means that neuroactivation has moments of hesitation.

The causes of this condition of slow neuroactivation can be electrochemical, brain anomalies, then neuronal migrations, anomalies of inter-hemispheric exchanges, anomalous self-regulation processes and anomalous information processing.

The phenomenon of neurological disorganization which is the counterpart or opposite, the antagonist of the best-known concept of neurological organization. Neurological disorganization is present in Dyspraxia, Neurodevelopmental Disorders and many other disorders.

The main manifestations are found in executive slowness, in disorder, in the slow incipit, i.e. the first start of action, i.e. in neurological randomization, in functional discontinuity from which the phenomena of distraction and inattention, from tiredness, from cognitive confusion and overall from dyspraxia. From Crispiani's research (Crispiani, 2015) we find an interest in the lack of settlement of lateral dominance, believing that the failure to stabilize lateral dominance is one of the causes of neurological disorganization and the syndromes connected to it.

Now I express one last concept which concerns the development of neuroactivation, through a process of cognitive and motor enabling that we define as Cognitive Motor Training.

What is meant by neuroactivation ? We mean a set of brain processes that concern the speeding up of the incipit. Some neurophysiological studies have highlighted how there are many correlates in dyspraxia, obviously motor and cognitive, among which the slowness of the incipit stands out. A series of dynamic vectors favor neuroactivation, the rapidization of the incipit, the acceleration of overall action and the strengthening of the inter-hemispheric exchange, which is produced with the lateral and rotatory, cruciate and rotator motor patterns, because the cruciate patterns and rotational patterns require an acceleration of the exchange between the right and left lobes.

Another important vector of neuroactivation is speeding up self-regulation and self-inhibition. All our behavior is given in its manifestation by self-regulation processes, by self-control processes, but also by self-inhibition, let's try to imagine when self-inhibition is slow. Recovering a formula dear to De Ajuriaguerra (De Ajuriaguerra, 1953) we can say that neuroactivation practices favor the improvement of cerebral harmony, also shared by Villanova and Lacerenza (Pellegrini, 2023, pp. 15–17).

The concept of cerebral harmony is combined with the principles of neuroactivation, since this union turns on the active principle that makes it effective, such as working on the wholeness or neuroactivating all functions, from motor to perceptive, to emotional, to social, to communicative, to thinking to activate them in fluidity but not in speed: the closest indicator of fluidity is the constancy of action.

Another indicator is intensity. The treatments according to the Crispiani Method are not slow, not playful and not with many pauses, but they are intense and work on the sequentiality of space and time and are therefore combined with finalized actions. To give you an example, not a motor scheme as an end in itself, but a finalized motor scheme such as throwing a ball. Finally, all these

practices are erected and conducted by a basic motricity, which can be built on a motor sequence, but also by a plurality of simultaneous sequences in the manner of a multitasking process.

The last of the concepts concerns the treatment that operates with an organization process that is in trouble and finds itself in a condition of disorganization with respect to which the Crispiani Method works in favor of the reorganization and that is the re-acceleration and position of linearity for the overcoming the randomization of cortical flows through Cognitive Motor Training.

Cognitive Motor Training is a transdisciplinary and therapeutic approach that integrates physical exercises with cognitive tasks to improve motor and cognitive functions. Recent studies show that this type of training can bring significant improvements in motor skills, memory, attention and executive functions. Its effectiveness has been demonstrated in a variety of populations, including the elderly, patients with neurological and athletic disorders, constituting an important profiling of treatment, life plan and inclusion.

## 5. Conclusions

In summary, the transdisciplinarity that pervades the enabling and professional approach is constitutive of an approach that by connecting disciplinary structures offers ample possibilities for addressing the social, economic and environmental challenges of our era (Taylor, 2014). However, to maximize their impact, it is therefore necessary to develop integrated approaches that are sensitive to the context and needs of the communities involved (Jones & Miles, 2020). Only through collective and collaborative engagement can we fully realize the transformative potential of transdisciplinarity and inclusion in promoting global well-being (Johnson, 2021). The problem of the certainty of inclusive practices and the definition of knowledge appears to be difficult to definitively resolve in education. Instead, it is essential to put into circulation the issues ignored by the contemporary scientific panorama to derive an approach to knowledge and educational teaching through the definition of the paradigms necessary for the epistemological platform:

- a) the biological and anthropological foundation of the sciences;
- b) the ecological, global and contextual approach to knowledge;
- c) metadisciplinary relations ;
- d) introspection as a process of conscious evolutionary autonomy;
- e) the uniduality of the mind;
- f) understanding being, existence and life (Pellegrini, 2023, p. 13).



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## **Interdyscyplinarność, niepełnosprawność i inkluzja: wiedza w służbie edukacji**

### **Streszczenie**

Niniejszy artykuł analizuje instytucję interdyscyplinarności w kontekście Treningu Poznawczo-Motorycznego, wykorzystując narzędzia epistemiczne do refleksji nad zagadnieniami związanymi z interdyscyplinarnością, niepełnosprawnością, włączeniem oraz koncepcją „Wiedzieć, aby edu-

kować". Celem badania jest refleksja nad: a) złożoną siecią, która wspiera włączenie i ewolucję naukową; b) epistemologicznymi aspektami ożywiania złożonego procesu poznawczego; c) sposobem, w jaki transdyscyplinarność łączy neuroaktywację, Trening Poznawczo-Motoryczny i włączenie, wyrażonym aforyzmem „Wiedzieć, aby edukować”. W szczególności podkreślono potrzebę istnienia złożonego podłoża epistemicznego, które umożliwi dynamizację transdyscyplinarności w wymiarze inkluzywnym, nieodłącznie związanym z procesem humanizacji.

**Słowa kluczowe:** interdyscyplinarność; transdyscyplinarność; neuroaktywacja; trening poznawczo-motoryczny; włączenie.