

The relationship between *Leib* and *Körper* in analysing the action of teaching

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Abstract: *According to Husserl and, later, Merleau-Ponty, Koerper is the body-object, while Leib is the lived-living body. If, as sustained by Merleau-Ponty, the two concepts are tied by an ambiguous relationship, one that does not allow a synthesis, their analysis must follow the different route of a recurring and connective nature. The research described here, is related to the action of teaching, while testing different processes and methodologies that primarily allow studying Leib and Koerper separately and, eventually, they lead into a dialogue the two perspectives.*

In space and time of the classroom living bodies discuss and experiment, in a "protected" environment, about world's dynamics and being part of it. The research considers data about the biology of the players, especially about the teacher and some of the pupils, as well as data coming from their thoughts and narrations, and data from lectures' videos. Such data originates from processes and research methodologies that belong to different epistemological fields, which have their own operational modes and require different postures. How does someone move and proceed on these terrains? A reflection is implicit. A multi-disciplinary approach is necessary when studying borderline problems. Therefore, it is fundamental to find a working methodology apt to analyse specific problems (epistemological view), or, that may derive from a paradigmatic characteristic of the present world, in other words from its built-in ambiguity (that involves ontological spheres) where, according to Merleau-Ponty the subject would be ignored if "we will not avoid the alternative between naturing and natured, between sensation as a state of awareness, and, sensation as awareness of a state, between existence within oneself, and existence for oneself" (Merleau-Ponty 2003, 285). The present study derives from the ontological ambiguity existing between Leib and Koerper, from this derives also the need of a multi-perspective approach and a dialogue among disciplinary perspectives.

Riassunto: *Il Körper, riprendendo Husserl e, dopo di lui, Merleau-Ponty, è il corpo oggetto, mentre il Leib è il corpo vissuto-vivente. Se, come ci propone Merleau-Ponty, i due concetti sono connessi da una relazione ambigua che non permette una sintesi, l'analisi di tali concetti deve poter seguire percorsi differenti, ma ricorsivi e connessi. La ricerca, descritta nel contributo, è relativa all'azione didattica e sperimenta processi e metodologie differenti che permettono, prima, di studiare separatamente Leib e Körper e poi di far dialogare le due prospettive. Nello spazio tempo della classe i corpi viventi dialogano e sperimentano in una situazione "protetta" le dinamiche del mondo, dell'es-*

sere al mondo. La ricerca prende in esame dati relativi alla biologia degli attori, in particolare del docente e di alcuni studenti, dati emersi dalle loro riflessioni e narrazioni e dati provenienti dall'esame dei video della lezione. Tali dati derivano da processi e metodologie di ricerca appartenenti a campi epistemici differenti che hanno modalità operative e richiedono posture differenti. Come muoversi e come procedere in tali territori? Una riflessione è sottesa al contributo. Un approccio inter-disciplinare diviene necessario quando si studiano problemi di frontiera e quindi è essenzialmente la ricerca di una metodologia di lavoro corretta per l'analisi di particolari problemi (ottica epistemologica), oppure deriva da una caratteristica paradigmatica del mondo attuale, ovvero dalla sua ambiguità costitutiva (investendo sfere ontologiche) dove, come dice Merleau-Ponty il soggetto sarebbe ignorato se "non sapremo evitare l'alternativa fra naturato e naturante, fra sensazione come stato di coscienza e la sensazione come coscienza di uno stato, fra l'esistenza in sé e l'esistenza per sé" (Merleau-Ponty, 2003, 285)? Lo studio presentato nasce dall'ambiguità ontologica tra Leib e Körper, da cui deriva, anche nella ricerca, la necessità di un approccio pluriprospectico e di un dialogo fra prospettive disciplinari.

Keywords: Körper, Leib, multi-perspective approach, research, education.

Three theoretical hypotheses on the importance of being-in-the-world for the learning processes

After years of cognitive hegemony, the research on the teaching action had to move toward a less unilateral mode, starting from the acknowledgment that educational models are located in a world whose capability of producing meanings is not simply a process of abstraction or mentalising. It is the result of enactive processes, the co-action between teacher and students (Giaconi, Rossi et al., 2013; Rossi et al., 2013; Rossi, Giaconi et al., 2014) as well as balance and adaptation processes that concern the complexity of the organic-living body and its relation with the environment, starting from the social environment.

The research hypothesis is contained within the reference of this scientific frame, orientated to study and deepen specific cases of the complexity mentioned above.

It is possible to sum up the pre-required comprehensions that make the pre-conditions for class trials, introducing three theses:

1. The rescue of the phenomenological notion of "being-in-the-world" (Merleau-Ponty, 2003, 98; Husserl, 2009) involves a radical rethinking of the structure of the educational relationships. A widespread co-activity is contained in them, and surely, it cannot be simply limited to the inten-

tional level of the cognitive condition. The “world” where education occurs lies is multilayered with conscious intentional levels (real learning), unconscious intentional levels (the productive or inhibiting unconscious function concerning the transmission of knowledge), and unintentional levels, eloquently represented by the function of the body. The body co-acts: it resists, heats up, metabolises the mood, gets tired and regenerates, etc. Access to accurate representations of these physical states corresponds to the teaching actions, it is not at all indifferent to the construction of more effective processes and whenever a human is involved. This stratification is made more complex by the fact that it does not concern an intra-personal level; it works on inter-personal and social levels. The teacher student interaction is not a dual monologue, it is a co-action, whereby the world of training is a “world-shared” among teachers and students, its rules modify and unsettle all levels involved in the training and create a non replicable and self-poietic heterotopia. Therefore, a constant adaptive remoulding of this co-action is necessary to create an empathic process.

2. The chance to rescue the complex stratification of “being-in-the-world” undergoes an experimental critic of the cognitive, on the rescue and study of the role of the body, its instances, resistances, reactions and co-actions. The body is the threshold to the world; it allows us to inhabit it and to send (or receive) meanings. Evidently, this “return to the body” must avoid two possible misunderstandings. The first misunderstanding supports that the “bodily” dimension, involved in the processes of learning, is simply the whole of the neurobiological states. In this way the role of the “body” becomes simply the one of the “mind”. The excess of cognitivism should be substituted with a quota of mentalism. There is not doubt that the contribution of the development of neurosciences caused the end of the cognitive hegemony. However, it is not enough to redeem the wholeness of the meanings at stake in the body as threshold of the world dimension. Finally, there are deep non-verbal gestures, physical conditions and reactions that contribute to a positive result in the action of teaching. The second misunderstanding is to believe that to exit cognitive reductionism is follow this reversal: substitute the mind with the body. Surely, this is not the route that we intend to follow. The target of our research will not be the body as in *Körper*, but the body as in *Leib*. Here too, simplification must be avoided.

Leib is not a in the world body because it surpassed *Körper*, instead, it is *Körper* viewed in its being in the world, in its relationships, in the inten-

tional sequence given to the meanings, in the subconscious forms in which its worldly roots affect its learning, training and cooperative capacities.

3. This is why the wish of these pages is to contribute to the overcoming of cognitivism through the rescue of the phenomenological concept of *Leib* as «biological living body». The studies of *Koerper*'s biological data within of the training process is stage on the way to the full recovery of the being situated in the world and within a relational system that make it a living body, and exposed to the world, whose self perception is always connected to the attribution of meanings that are not purely biological, but exclusively human.

Enaction and analysis of the teaching corporality

How to investigate *Leib* or, better, the recurrence *Leib- Körper*?

A multi-directional approach seems to be one within the present paradigm's characteristics, where various ambiguities are not just present, but coexist and dialogue. The necessity of such an approach originates from the complexity of reality and from the absence of a narration that unifies all interpretations at source. A triangular approach becomes necessary also in research (Denzin, 1978; Trobia, 2005, p. 42) as a modality that favours an "ambiguous" analysis (Merleau-Ponty, 2003). McDonald (1992) proposes three typologies of triangular approach:

1. a researcher who uses two or more research techniques;
2. two, or more, researchers who use the same technique;
3. two or more researcher using two, or more, techniques.

Discussing plural researchers/techniques, introduces different epistemologies, or different approaches of the same discipline.

In the present analysis, that is the study of the *Leib- Körper* recurrence in teaching, two specialised areas are mostly involved: education and bio-physiology. A common mistake that more heavily affects the debate on inter-discipline, consists in seeing the disciplinary fields as being objectively and uniquely defined and theoretically united. In actual terms, the teaching world, and the bio-physiological one contain different perspectives and approaches. Here the triangular approach is based on two elements that promote co-disciplinary analysis:

- opting for approaches that, even if they belong to different disciplines, have paradigmatic analogies;
- basing the research on the analysis of the action, therefore, developing

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the triangular approach on the case study to have a shared field of investigation, where various processes are intertwined. Next we approach the two elements.

Theoretical approaches

The biological field of research's approach, refers to the ecological-enactive and auto-poietic approaches. This is based on mostly on the work Maturana, but mostly, on the one of Varela. In education the reference is the direction that bends enaction to the specificity of educating (Proulx, 2004, 2013; Begg, 2000, 2013; Durand, 2013 a, 2013b; Rossi, 2011, 2013) setting the concept of mediation as the base of the analysis of teaching (E. Damiano, 2013).

Firstly, it must be stressed that turning the attention toward the *Leib-Körper* recurrence, requires the analysis of the subject in its relationship with the rest, its being in the world.

The enactive approach contemplates the coupling of cognitive units in the self-poietic scenario. For example, studies on *Dictyostelium amoebas*, show cognitive dynamics of inter-subjective interaction that produce inter-individual units. It is based on processes of disturbance-adaptation defined as "communicational" by Varela (1991). It is an "essentially generative" communication that is not based on a preventive decision, or, on an exchange of information. "On the contrary, it builds up through co-construction, by the communicating unit, with operational meanings, bearers of coordination strongly dependent from the interlocutor's structure and by their interactions' history – among fellow members and the environment" (L. Damiano, 2009, 181). The "idea of inter-subjectivity" as participation toward an inter-individual is another thesis inherited from self-poiesis" (Idem, 183). The model used for the inter-subjectivity has much in common with the latest discoveries in neuroscience and is far from an approach that proposes a computationalist mind, which proposes a mind dissociated from the body, like "a logical machine" that knows the world through to the other's cognitive abilities. The research on mirror neurons is opening up new perspectives.

The mediation theory in education (E. Damiano, 2013) highlights the role of interaction between teaching and learning amongst the subjects involved, overcoming the process-product model where is the teacher's action that causes the learning. The complex relationship that builds up

between the actors can hardly be seen as merely cognitive, it fully involves their experience; life in the classroom, school activity is an all-round process, in which the inputs of the teacher meet, if they meet, the autonomy of individuals, their organisational closures. Learning shapes up when the student assumes, with an autonomous process, the inputs that have been proposed, when a co-active route is set. More than the adjustment toward the other, the two individuals undergo a change toward a new way to look, where novelties are connected with past, present and individual experiences. Between teaching and learning, between individual autonomy and co-activity further ambiguity can, therefore, be identified. In addition, the classroom is not a space where exchanges are only cognitive, but it is a lived and living space inhabited by people and their *Leib-Koerper*. Finally, mediation can be achieved with mediating artefacts. Proposing an ample use of mediators, active and symbolic ones (E. Damiano, 2013), can be seen also as a necessity of a global involvement of the individuals, a communication that concerns body and mind. Yet and again, without unifying the modalities, but coupling them in a process that from concrete moves toward abstraction, from immersion to distancing, repeating itself, along a path of metaphor and reification.

Methodology: case study

Which one is the methodological setting better suited to an inter-disciplinary analysis, while remaining respectful of the complexity of the subject of the study? It is essential to consider that the route considered, that will be explained later, investigates a sector today scarcely explored, using a new tool in the teaching environment. This research can be defined as explorative.

The knowledge of the phenomenon is central to the direction of co-participation to different research perspectives; it becomes comprehensible through the linear comparison of different approaches. Merleau-Ponty writes in "Phenomenology of perception": "it is this situation's global presence that makes sense of the partial stimuli and makes them count, weight and exist in the organism" (2003, p. 127). The intertwining among different angles does not, eventually, become evident as a requirement of the research, it is already present in the action. Action becomes the space-time where the interaction happens and facilitates the connection of the different trajectories around a single plot.

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The question is also methodological; it requires a protocol for the specific co-disciplinary setting. The context and the situation become the tools that find domains of analogy and tangency among the different languages and epistemologies, without the need, for the researchers, to be multi-lingual, a target beyond reach according to Blanchard-Laville (2000).

All this considered, for the singularity of the experiences that may be created, and the necessity to build an explorative route, we believe that the longitudinal case study may be the right procedure. Case study is a “research strategy activated when there is the will to acquire the adequate comprehension of a phenomenon, considering its singularity and originality. An ample and deep comprehension of the phenomenon is sought after by focusing on the interactions among the various factors, without working on making generalisations” (Mortari, 2007).

The case study highlights “the evolutionary character of the real phenomena” (Mucchielli, 1991), within a tight relationship between specificity and interactions, where the borders between phenomenon and context are not self evident (Yin, 1981).

The specificity of this qualitative procedure is the “case”, which “an integrated system, whose components do not necessarily have to work well or appear rational (Stake, 1995) and its main goal is to “facilitate the comprehension of something else” (*Ibidem*).

The case configures as room for mediation for the “triangulation” (Denzin, 1984) going in four directions:

1. Triangulation of data source: researchers appreciate that data do not change in different contexts;
2. Triangulation of researchers coming from different disciplines: they examine the same process;
3. Triangulation of theories: they interpret results from different specialised viewpoints;
4. Triangulation of the methodology: working with different methodological procedures to validate a research and its interpretation.

Therefore, the case study becomes “common ground” to build a mixed research setting, where the role of experience becomes fundamental, as well as the practice of research. Case study is characterised as the place to let in a new relationship, as mentioned in the paragraphs above, as an ontological ambiguity, an ambiguity of data and process, and between living body and object body.

3. Research design

To describe experimentation in a mixed environment we believe that the following steps are important in the outlining of the case study:

1. Problem to be investigated: which question first? Which questions to be asked at interdisciplinary level? (problem statement).
2. Cases or samples: have there been published case studies on this theme? (mono-disciplinary, inter-disciplinary).
3. Planning the case study: description of the field of investigation in relation to time and space (where and when), building of inter-disciplinary co-participation.
4. Choice of devices and procedures of data gathering and epistemic tools (biographical texts, interviews, etc...).
5. Planning the process phases (according to linear or circular logics), describing procedures adopted to analyse and interpret data and processes.
7. Sources.

In relation to point 2 we specify that the present study contains innovative elements. There are experimentations that use indicators of biological data in sports, medicine¹ and in affection analysis (Picard; Vyzas; Healey, 2001). However, studies that connect biological elements to teaching have not been found. It was impossible to find similar research routes and make them reference points. This created the necessity of a circular project to fine tuning the research protocol.

Following the same structure, we describe the experimental protocol made by the University of Macerata (Italy) during the academic year 2013-2014.

3.1 Problem statement and planning the case study

The Interdisciplinary reflection involved a research team composed by professors and researchers in general and special didactics, philosophy, neurophysiology and neurolinguistics. The questions at the basis of the research are: how is the ambiguity between living and object body studied? Which are the biological data that could be useful in the studies on teaching and

¹ <http://sensewear.bodymedia.com/SenseWear-Press/SW-Press-Releases>

structural coupling in the classroom? Which is the relation between physiological, pedagogical and psychological data and the teaching action? How can devices that provide biological information be useful to investigate the relationship *Leib- Körper*?

The research questions led the researchers to opt toward multiple data gathering: video taping the lectures, recording the actors thoughts and narrations, measuring energy expenditure using a non invasive device, the Armband SenseWear (ASW) used in sports and medical research fields. The choice was to measure metabolic consumption because it is a complex variable (Berthoz), it holds in itself various elements like body temperature, skin's PH, surface humidity. Furthermore, this device calculates acceleration in the three directions, and counts the steps that have been done.

The research was implemented in three university lectures, it involved two teachers and two students for each teaching. In one case, the same student attends the lecture of two teachers.

The two teachers and the two students wore the ASW during the research, This did not allow just investigation about the teacher's behaviour, but, also to relate the behaviours of the three directions, and to collect elements connected to the relationships within the class system.

The narrations of the actors (teachers and students) were not secondary, they allowed seeing the connection between data and emotional, cognitive processes.

4. Data analysis

We believe that the route that we followed, which is the evolution of the analysis, could be useful to understand the interpretation of data, and the relationship with the instrument, changed with the time. This instrument was not designed for educational purposes, it monitors data that do not have an apparent link with education.

The first reading (Giacconi et al., 2013) showed some differences toward other typologies of activities studied with ASW, whose data are available in literature. We have compared the relationship existing between the energy expenditure of the teacher and the longitudinal acceleration. If in activities like walking, fast or slow or in sedentary work, the measure, with certain measure units, equals 1. In teaching, with the same measure unit, the average result equals 3 that is the expenditure of energy is not simply caused by

movement. Initially, we thought that the difference was caused by cognitive activity, however, the physiologists soon pointed out that such consumption is minimal and not recordable by the devices in our possession. They suggested that there could be a link with muscular activities unconnected to walking, but relevant in teaching: *the movements of the torso and arms, the movements of the muscles related to speech, or the activities of the body while teaching*. The fact that cognitive activity was not recorded is evidenced by energy expenditure while reading and writing, usually 1 MET², much inferior to consumption during the lecture, where it varies from 2 to 5 MET. Likewise, we found an enormous difference in consumption, in a conference, between the phases of listening and intervention, or, in lecturing while other colleagues intervene.

Energy consumption is monitored in the same individual during a lecture, and it proved that it is equal to walking fast. It is like saying that teaching involves multiple muscular activities, whose expenditure equals the muscular work in walking fast.

A comparative analysis *between multiple time intervals has shown that the consumption was higher in stages when:*

- foothold intensity was higher;
- talking was more intense and faster, higher voice pitch;
- body involvement (movement of hands, arms and torso) was more intense;
- facial expression was more accentuated.

Interviewing the teacher showed that these phases corresponded to the phases in the lecture that focused on the key concepts, where the most important elements were listed. Consumption was inferior when examples were given, or stories were narrated. There is evidence of a connection among teaching action, emotional participation, biological data.

The comparison between similar activities in different contexts is also interesting. It is enough to think to the teacher's front lecturing, to lecturing PhD students, and to a training seminar for high school teachers (Tab. 1).

² MET is a unit of measurement for energy consumption it equals to the energy consumption in a specific activity (conversion of oxygen consumption 1 Met = 3.5 ml/VO₂/kg = aprox. 1 Kcal/kg/h). the daily consumption while resting for a man of 70 Kg : 1 MET x 70 Kg x 24 hours = 1680 Kcal. Therefore, it depends on mass of the individual.

Table 1 – Average energy expenditure in different educative contexts

	Front lecturing. First year average on 12	Front lecturing Fourth year average on 7	Conference with PhD students	Conference with teacher on a training course	Research group meeting
MET Value	2.24	1.99	2.79	2.94	1.13

Data show a link among energy consumption, physical-cognitive effort and emotional level. The last data, related to the debate within the research group, is inserted only as an element of comparison. Some researcher (Tudor-Locke et al., 2009) worked out the energy expenditure for different activities, from this study emerges that the MET for “Working and Work Related Activities in Education, Training, and Library” is usually at 2.50, in line with our investigation.

In the first three lectures of the first year, average was 2.57 MET, while, in the last three lectures it was 2.02 MET. The difference between the initial and final phases of a course, depends from the empathy with the classroom that takes place (if it takes place) during the running of the course, it makes the environment more familiar and the process becomes less tiring. The differences between classes in the first and fourth year are connected to various factors: in the first year the number of students and the size of the classroom are bigger, the audience is monitored with higher attention as they are less used to university lectures, a less chartered route with fewer supports for the lecture (slides). The 30% difference between the average consumption in the first two situations (lectures in university teaching) and the last two (relationships with a non familiar public) depends, instead, from the higher tension that exists in less usual context with a more exigent audience, from the need of an higher attention toward the receivers who are considered excessively critical and that should have real time monitoring as they are unknown.

There is one more element coming from the MET graph, related to time: the value swings with regular frequency, but with different width, so much that it can be called rhythm. Furthermore, the rhythm of the examined teachers (so far 2) has some recurring characteristics. Firstly, in the (about 30) lectures analysed for the same teacher, the period is roughly

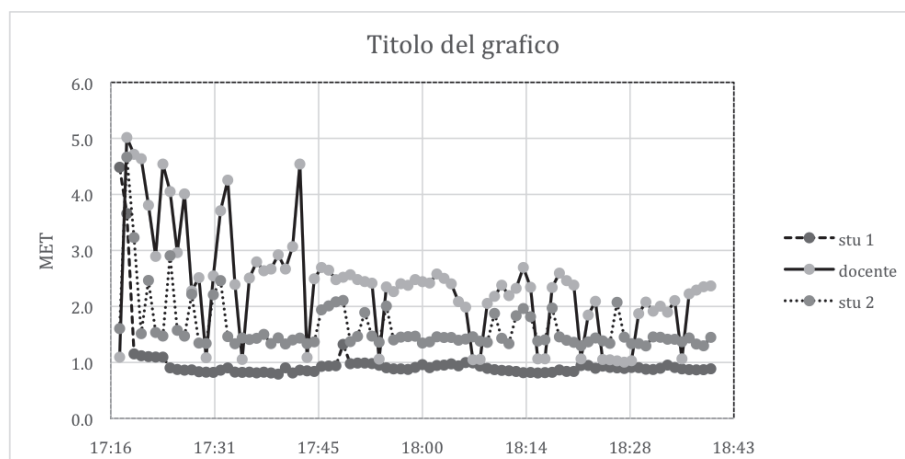
constant, apart from the evidence of an increase during the evening lectures, with a value that swings approximately every 4 minutes.

Secondly, there is evidence related to the energy consumption graph between a frontal lecture and a discussion lesson: in the latter, the width of the swinging is much wider than in the former, even if the frequency is constant. Interaction requires higher consumption compared to the needs of front lecturing, during intervention spells, while listening consumption falls drastically.

When comparing the graph relative to teaching activities to the one of other activities, notably, the graph figure consumption/time is totally different because of the absence of a regular rhythm and a smaller distance between chests and wave knots. We think that presence of a short period and an ample difference between chest and wave knots in teaching activity is linked to the work of the teacher and the need to alternate constantly the attention from the classroom to managing the contents. It is also interesting to verify the value of the knots (lower points of the waves), which inferior in those teaching activities where listening to others increases.

Also, ASW data allowed investigation on structural coupling. The enactive approach, as described above, highlights that the systems within a context (teachers and students in the case of didactic) surface thanks to reciprocal inputs and to their internal organizational structure, settling processes that produce coherent systems of the second order. How do they develop with the time? How do they connect with the teaching devices used? In which phases, and which devices? Figure 1 shows the MET graph of a lecture. It is worthy to note that from 17.44 to 17.54, and from 18.08 to 18.22 the thread of allknbcvrvvvgbnhjjuikhgdfgkmjhsamg fthe teacher's energy expenditure and that of one, or two, student some symmetry emerges. It is the analysis of the video and the descriptions of the actors to specify the present situations and the meaning of what the analysis that only energy expenditure can suggest.

Figure 1 – MET of a teacher and two students during lecturing



5. Conclusions: Armband data as indicator of emergencies

Since early surveys it appeared that ASW lets the attention focus on situations that, perhaps, would be ignored. ASW data do not give any interpretation of those situations, they will eventually be examined and understood through other experimental observations. Emergencies make sense and get a meaning only analysing what really happens in a knot or in the chest of the curve. The role of the video, and the synchrony between armband and video data, becomes necessary and, in any case, any analysis that deterministically associates MET data to a *Leib-Koerper* state is not possible. For example, while examining the MET's curve on a student graph, there was a peak during a period of the lesson; the METs of the other student and of the teacher did not show the any discontinuity in the same time lapse. The video showed that in that period (50 seconds) the student was writing a text on the mobile phone and looked busy and emotionally involved.

This example gives another indication. The pedagogical analysis of the teaching action often presents the scene as if it was totally determined by school activity. Using an instrument that always considers the entire being, produces an overall picture that is not always taken into account. The MET

depends from the whole body; its values can be determined by all physiological functions.

The analysis just started surely highlights, in relation to teaching, elements linked to the corporality of the educational relationship that are too often underestimated. Paying attention to the body is not new in teaching. Dewey and, before him, Comenius did not remark just that the role of body was underestimated in teaching, but that it was often seen as a burden to learning and a distraction for the student. The ongoing analyses push the debate forward, also because of the studies that evolved during the last half century, in philosophical research within phenomenology, in neurosciences, in enaction and in sciences of embodiment. It is not just interest on “also” the body, it is the interest on the person as a recurring and unifying system made of mind and body. It is a body that participates actively to the knowledge, which plays a non-secondary role in communicating and managing the class.

A last point before ending. The ongoing research involves different indicators and other sciences. It also involves two directions for the analysis of the system-man connected in a linked recurring mode; we summarised them with the terms *Leib* and *Koerper*. The necessary multi-perspective look does not find just a reason at epistemological level, it originates from the ontological structure of human action. Likewise, focusing on different indicators able to provide clues only in a contextualised space that puts them in relation, where a reductive look would be, at least, dangerous, must be supported by the research methodological information. And, by a reflection on the ontological model that has been adopted. Merleau-Ponty’s proposal and his highlighting of the ambiguity and the repetition among different elements place co-discipline on a constitutive plane, which is not confined to a methodological indication. On the contrary, it relates to an emblematic element of the current paradigm, or, the complexity of reality, the fragmentation of the world we live in, the need for networks that link all contexts without making them an *unicum*.

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