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Chapter

Physical Education in the Academy – Learning Takes Body

Chiara Gentilozzi, Antonio Cuccaro and Filippo Gomez Paloma

Abstract

This contribution, starting from the scientific framework of the Embodiment phenomenon, wants to focus on the specific issue of university education aimed at students from an Embodied Cognition-based (EC-based) perspective. For several years now, European educational policies have required member states to create programmes to increase the educational level of the population and to give more importance to the training of key competences in order to guarantee continuous learning for all citizens. At the same time, the importance of promoting meaningful learning processes is emphasised, where the individual is able to actively construct the meaning of what is presented and to transfer their knowledge and skills. It is from these considerations that the research expressed in this paper takes shape, analysing the application and outcomes of the EC-based approach in the educational pathway of the students of the Physical Education course enrolled in the Primary Education degree course at the University of Macerata during the 2022/23 academic year.

1. Introduction

This contribution, starting from the scientific framework of the Embodiment phenomenon (edited by Gomez Paloma [1]), intends to focus on the specific issue of university education aimed at students from an Embodied Cognition-based (EC-based) perspective [2–4].

It is necessary, therefore, to focus attention on some fundamental aspects that characterise the educational process understood as the practice of human training, in a narrative and context-oriented perspective [5, 6], namely, the centrality of the body in learning processes [7], the places in which these processes are implemented [8], the workshop activity as a teaching methodology and search for meaning [9]. We cannot but start from the primary place where every learning dynamic is implemented and, contextually, located.

As an interpretative lens of corporeality as the nodal point of every cognitive acquisition of the human being, as well as the meeting point between subjectivity and intersubjectivity, we use the scientific paradigm of Embodied Cognitive Science, with particular reference to the Embodied Cognition approach [7]:

> *A human body is never given for itself, but in relation to others. Bodies near and far, touching or looking at each other, dancing together, building worlds. Bodies that evoke, reflect feelings and knowledge, tell lived stories and prefigure future ones ([8], p. 111).*

In this dynamic of continuous relationship with itself and the environment, the body shapes its knowledge of the world, overcoming the scientific conception that would have it as a mere object of evaluation to ultimately acquire the dignity of a *subject of cognition* [10]. For some time now, various authors have contributed to highlighting how complex phenomena require a complex, non-linear view, open to plurality, more representative of the variety and unpredictability of evolutionary and educational dynamics and outcomes [11–14]. On the basis of this evidence, the phenomenon of knowledge does not only require the participation of the brain and the body but also that of the environment in which it is immersed: an interesting constructive dialogue between Pedagogy and Architecture has been open for more than a decade [1, 15]. Learning environments, as an extension of the human mind [16], therefore, play a fundamental role in the interconnectedness of cognitive processes. As Merleau-Ponty [17] reminds us:

> *The influx of information from sensory organs and the continuous interaction with the environment then determine how the brain takes shape.*

2. Scientific framework: neurobiological bases of learning and educational implications

The realisation that cognition is embodied and that it depends on bodily characteristics, in particular our perceptual and motor systems should therefore be acquired by all those working in education. Numerous neuroscience studies, moreover, have shown how at the moment we receive information or a stimulus from the environment, there is an activation of neural circuits in our brain/body that are expressed in mental processes, processes that would not take place without the neural circuit activation of areas of the brain and not primarily dedicated to perception [18–20], action and emotions; the same happens when these mental processes activate response reactions, i.e. neural circuits that manifest themselves in the lived environment through behaviour [21, 22]. The body becomes a situated device of cognitive action as, in addition to being embodied, it is also situated in a context that defines it. Perceptual and motor systems, therefore, are of fundamental importance in the formation of structures from which 'global functions' arise, that is, those activities that give rise to categorisation, memory and learning [23]. In this complex process, a very significant role is played by emotions, which represent the main 'spark' through which the brain processes the value to be attributed to the information coming from sensory channels [24]. As soon as the input information is relevant, an emotional circuit is activated that can lead to the execution of automatic responses, or the planning of the response, by virtue of previous experience or the result of decisions elaborated in contingent contexts [25]. Thus, following a stimulus, our output responses are influenced by prior experiences that have been formed throughout our lives during the interactions we have activated with the world around us: the way we speak, reason, and construct concepts are the result of a continuous exchange between the perceived and the experience gained from embodied perceptions. Study, learning, and training contribute substantially to neural stimulation,

to the possibility of the constitution of new synapses and thus from synaptogenesis generate the possibility of the construction of new patterns [26]. Taking up Kandel's [27] theories, it is possible to clearly outline the meaning of neuroplasticity: it is not neurons that change over time, but rather synaptic connections through continuous interaction with the environment. Studying and understanding the neuroscience that explains the neurobiological mechanisms, the nervous system and the functioning related to the mental and social processes that are activated in a person allows us to understand what complex system is involved in the functioning of a person and how these processes have come to be configured over time based on experiences, allowing for a true anatomical and physiological modification of the nervous system [28]. Our individual experiences and behaviour are rooted in the interaction between genes and environment that shapes our brain (epigenetics) [29, 30]. Knowledge of these basic constructs is also essential for understanding how knowledge construction processes are substantiated and is of fundamental relevance for teachers who aim to implement meaningful teaching, through which students can be enabled to construct authentic learning [31]. As teachers, it is necessary to offer as much room for expression as possible through the practical and lived experience of the pupils; if we want to form a solid foundation for their creative activity, we have to make them experience school actively because the more they are explored, experienced through the senses and assimilated, the more fertile their imaginative capacity will be [32]. The brain, if not appropriately stimulated also from an emotional point of view, will tend to construct mechanical learning that will be recorded in short-term memory and that will not leave a strong, felt mnemonic trace. Take, for example, the function of the amygdala, which is crucial in its ability to bring to consciousness an emotional stimulus, albeit a latent one, by returning feedback to the primary sensory cortices, such as to influence perceptual processing itself [33]. It is therefore necessary to offer a methodological approach that goes in the direction of multisensory involvement, for a non-standardised didactic in which all subjectivity is eliminated, a model that therefore goes towards personalisation for all [34]. It is necessary to recognise to 'all' teachers the burden and honour of constituting themselves as levers of change [35] by promoting inclusive paths where the context acts as facilitator of the subject's functioning in terms of activity and participation [36]. To do this, one must not leave aside the human relationships established between teacher and student: the majority of school experiences focus on the acquisition of skills and knowledge related to the contents of various disciplines, but personal well-being and prosocial behaviour require the cultivation of the ability to understand oneself and be empathetic from an early age, qualities that emerge when one acquires an awareness of the value of being reflective [37].

3. An embodied cognition-based training model

The EC-based approach assumes and promotes a multi-perspective view that recognises and enhances the existing circular dialogue, in learning processes, in order to outline more effective training paths in the three pivotal dimensions of embodied theory - cognitive, bodily and emotional [7, 18, 19, 38, 39] - that jointly and significantly determine the teacher's teaching actions [40].

In recent years, a number of preliminary exploratory studies [4, 29, 41] have been conducted in which the structuring of the constituent elements of the EC-based integrated training approach was gradually defined.

This contribution, starting from the EC-based approach, illustrates the academic experience conducted with the students of the LM-85bis Primary Education Degree Course at the University of Macerata. This training, accompanied by a qualitative-quantitative research design, had as its pedagogical focus Physical Education understood not so much as a discipline in the primary school curriculum, but as a methodological glue, a cultural and anthropological hinge with which to intervene professionally in teaching interaction.

3.1 Structure and design of training interventions

The EC-based approach is defined as integrated in that it envisages the articulation of three non-hierarchical phases: theoretical training, practical-experiential workshop and final discussion. Each of them aims at influencing and, in turn, being influenced by the others, through reflexive practices [42] aimed at activating metacognition, also fostering relational group dynamics, where emotions and empathy are declined as interdisciplinary constructs for the understanding and educational management of indifference, a pathology of our time [43]. In this sense, a training structured according to the Embodied Cognition theory stands as a possible model capable of meeting the training, educational and didactic challenges of teachers of our time.

The theoretical phase occupies the first part of each meeting and consists of a discussion of subject-specific content placed in continuity with the training principles. Theoretical training aims to stimulate meaningful learning [44] through continuous references to prior learning and systematic reflections that relate the contents and experiences of the learners or situations in real contexts; all with the aim of linking learning to the learners' training needs.

The second phase of the meetings are the *practical-experiential workshops*, which represent the *core of* the EC-based approach. These consist of situations of *role playing*, problem posing, problem solving, project-based learning, E.A.S. (Situated Learning Experiences), storytelling, writing and reading, outdoor education, small group *cooperation* activities in the co-construction of artefacts; *games involving the* active involvement of the body; *peer to peer* situations in practical experiences of 'observing' students in the classroom context, with *the* mediation of the trainer [45]. The observation of complex real-life experiences enables the simulation of situations and fosters the identification and active participation of teachers/learners, bridging the gap between theory and practice [46, 47]. These activities succeed in engaging the teachers'/learners' bodily, emotional, cognitive and motivational dimensions from a multisensory and emotionally meaningful point of view, activating situations of perception through vision and, consistent with the mirror system construct, favouring immediate referral to action, stimulating the ability to analyse, predict and choose possible strategies. Each day of academic training concludes with a *final discussion,* in which the lecturers invite the group to report their views on their experiences. Confirming the extent to which teaching professionalism is composed of identity, personal and value elements, reflection on one's *core qualities is* useful in the literature.

The sharing of personal perceptions respects the observation of certain rules of communication, such as respecting one's own and others' speaking time, suspending judgement, practising active listening and exercising positive *feedback*: this is in order to refine each teacher's empathic and relational skills and derive appropriate reflections on communication with and between students. Therefore, reflexivity and narration, action, sharing and self-evaluation are, in short, the strategic principles and guidelines capable of guiding the construction of training experiences consistent

with the theory of Embodied Cognition, in a recursive process that emphasises the developments and interconnections that human communication is capable of generating.

3.2 Research design

This contribution illustrates the perceptions and experiences of students who attended the subject course in Physical Education using the ECS-based approach.

In order to obtain useful data for research from a qualitative point of view, a question was posed during the opening lecture through Mentimeter, an online platform that allows students to create interactive presentations and obtain feedback with elements such as questions, surveys, word clouds, reactions and more. Students can use their smartphones to view the presentations and interact by answering questions or surveys while guaranteeing their anonymity. An open question was designed at the beginning of the course that allowed students to express themselves freely: 'What do you expect from this course?'. The subsequent meetings followed the design shown in **Table 1**. *Finally*, during the last of the training days, a *final restitution was* carried out by means of a digital artefact [48], again constructed with Mentimeter, which was followed by a discussion in the form of a narrative restitution. The guidelines for this restitution were created by the trainer in such a way that the various key themes emerging from the training experiences could be opened up to the horizons of the discussion. All this is also in order to return to the teachers/learners the effectiveness of their commitment as well as, in an indirect and recursive manner, to operate a form of metacognitive processing of the experience, [49] as a means of recognition, taking charge of the individuality of each person and personalisation of the training paths. In this sense, it is noted that adequate training on Feedback Literacy, for both teachers and students, can foster the ability to understand feedback effectively, attribute meaning to the information received, manage it adequately also from a relational point of view and exploit it to improve and regulate one's own learning, taking into account one's active role and co-responsibility with the teacher and classmates. Conceptualised in a socio-constructivist dimension, as a bilateral flow of information, in reality, feedback is an active process, based on dialogue and interaction, which enables those who receive it to 'acquire information about their own work and to identify its greater or lesser compliance with a given standard, as well as the quality of the work itself, in order to produce better work' ([50], p. 6).

Getting to the heart of the matter, the qualitative analysis of the responses was based on the interpretation of the answers provided by the sample to the open-ended questions with the aim of reducing the complexity and breadth of the information collected, against which the answers considered useful for research were considered. This type of analysis allows texts to be deconstructed into a limited number of categories through the use of analytical decomposition, classification and coding procedures [51]. The open-ended questions were intended to explore the perceived effectiveness of the approach, leaving the opportunity to justify the answers in order to broaden the reflections on its strengths or weaknesses.

Specifically, the following operations were conducted:

• manual content analysis of the first type [52];

• occurrence count;

ARGUMENT	TOPIC	ECS-BASED ACTIVITIES
ECS: Embodied Cognitive Science foundations and theoretical models	Educational implications of neuroscience; From perceptual to cognitive processes; Intersubjectivity; Capability approach; ECS contribution to inclusive education.	Dramatisation by the students of the main cognitive and biological processes through the use of body and speech, creating original 'scripts' structured from the theoretical awareness acquired.
Body, environment, relationship	Perceptual neurophenomenology; Mechanisms of environmental conditioning; Body/brain-mind-environment relationship; Space/time/relationship design.	The students took part in a theatrical-assisted workshop, through which they were able to experience the main dynamics involved in the construction of the educational setting, in the awareness and management of their own bodies, and in the ability to verbally and in writing return their experience by exposing it to the group in narrative form
Anatomical-functional aspects	Anatomy and physiology; Systems and apparatuses; Motor skills and abilities; Modes of task organisation; Assistance and equipment.	The students took part in a mindfulness course in the search for greater awareness of their own bodies and breathing; afterwards, the various theoretical constructs were presented based on the reflections gained from the experience.
Theoretical models	Representation in body format; Somatic Marker; Mirror Neurons and Embodied Simulation.	The students were stimulated to experiment with alternative learning modes: the construction of knowledge in accordance with the Morinian construction of knowledge (Chaos Theory) and from the perspective of a Gadamerian-derived hermeneutics of knowledge.
Motor skills and abilities	Motor skills and abilities; Ways of organising the task; Assistance and tools.	The students took part in a workshop course where coarse and fine motor skills were experimented with in ways of organising the task with increasing difficulty and using specific equipment.
Educational planning and inclusion	Corporeality as a mediator between neuroscience and didactics; Innovative teaching models and methodologies; Embodied Cognitive Design: learning environments; Didactics for competences; International Classification of Functioning (ICF); Technologies for inclusion	The students were divided into small groups. Each group designed motor activities for primary school students, taking into account real contexts and specific situations. Each group reported on their work and submitted it for collegial discussion

Table 1.
Proposed EC-based topics and activities.

- decomposition of texts into a limited number of categories;

- analytical decomposition, classification and coding procedures [51].

The research design also envisaged the collection of quantitative data collected at the end of the workshop activities through Google forms (questions with quantitative measurement on a Likert scale from 1 to 10, where 1 corresponds to 'not spendable' and 10 corresponds to 'fully spendable').

3.3 Statistical survey

The sample of the present research is represented by the students of the Physical Education course - enrolled in the Primary Education Degree Course held at the University of Macerata in the year 2022–2023; during the first semester they attended 48 hours of teaching, without compulsory attendance, and 10 hours of laboratory with compulsory attendance, for a total of 157 students, 11 of whom were males and 146 females.

82.8% of the students are enrolled in the first year, 6.4% in the second year, 5.1% in the third year, 2.5% in the fourth year, 0.6% in the fifth year and 2.5% of students enrolled out of course.

The students who attended both curricular lessons and the workshop in presence were 58.6% of the sample and 7.0% in e-learning mode. 17.8% stated that they occasionally attended curricular lectures, while 16.6% did not attend any of the curricular lectures.

The constitution of the sample by age is shown in **Table 2**, by educational qualification in **Table 3**.

3.4 Results

The number of open-ended responses that students actually uploaded onto the Mentimiter system during the first curricular lesson was 87, while 157 responses were recorded upon completion of the workshop training cycle, via Google forms.

An initial observation of the preliminary analysis of occurrences, which is currently in progress, about the first question on initial expectations, shows the most frequent use of content/disciplinary terms such as 'motor schemes', 'functioning of the human body', 'anatomy' and 'motor skills' and methodological terms on how to construct a Physical education lesson such as 'psychomotor exercises'.

A preliminary analysis of the occurrences on the answers given as final feedback during the last lesson of the course to the question 'Were the expectations you had, with respect to this teaching, fulfilled? Justify your answer'. the words of satisfaction

18–24	25–39	40–50
77,07%	19,11%	3,82%

Table 2.
Sample age groups.

| Higher Education Diploma	Degree	Other/Unspecified
69.4%	26.08%	3.8%

Table 3.
Qualification.

emerged for 'non-frontal lessons', 'reflection', 'connection between theory and practice', 'emotionally involving' and also thanks to the answers to the second feedback question proposed immediately after 'What impressed you most about this course' the words emerged are in line with the satisfaction of the initial expectations and with the answers given to the first question, with a greater attention to the relational aspect. In fact, we note the recurrence of 'interaction and participation', 'involvement', 'human relationship' and 'enthusiasm'.

From the preliminary survey of occurrences, the words 'body' and 'mind' 'emotions' are most frequently used, confirming the centrality of the active involvement of the body in the training approach and its ability to guide cognitive content as well.

The responses collected at the end of the workshop activities through Google forms revealed the following data.

1. 'How spendable do you think the skills acquired during this workshop will be in the professional field?', 77% answered in a range between 8 and 10 points, expressing a high perceived spendability, while 21% between 6 and 7, thus indicating a sufficient spendability and finally 1.9% attributed 5 points, noting a spendability below sufficient (see **Figure 1**).

2. 'How much do you think this workshop further clarified the concepts illustrated during the teaching and facilitated their understanding?', 49% of the participants expressed a score in the range 8–10, 28.7% expressed a score between 6 and 7, while 21% expressed a score between 4 and 5. Finally, 1.3% expressed a score of 2 (see **Figure 2**).
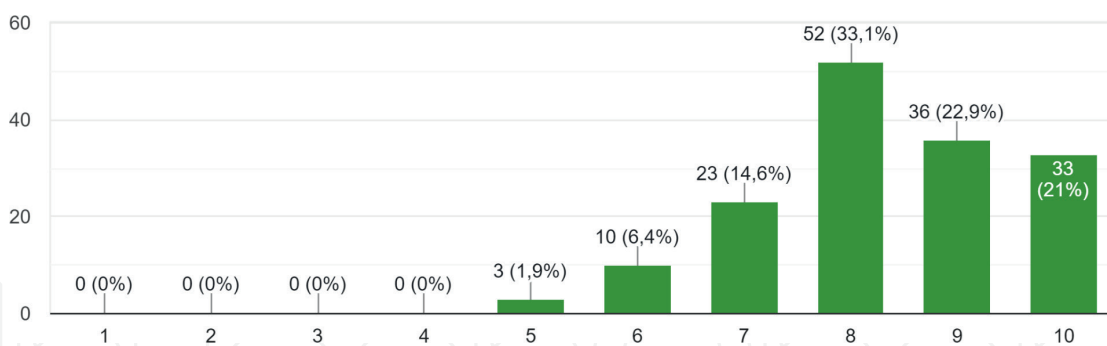
Figure 1.
Percentage of answers of the students on the level of marketability in the professional field of the skills acquired during the workshop.
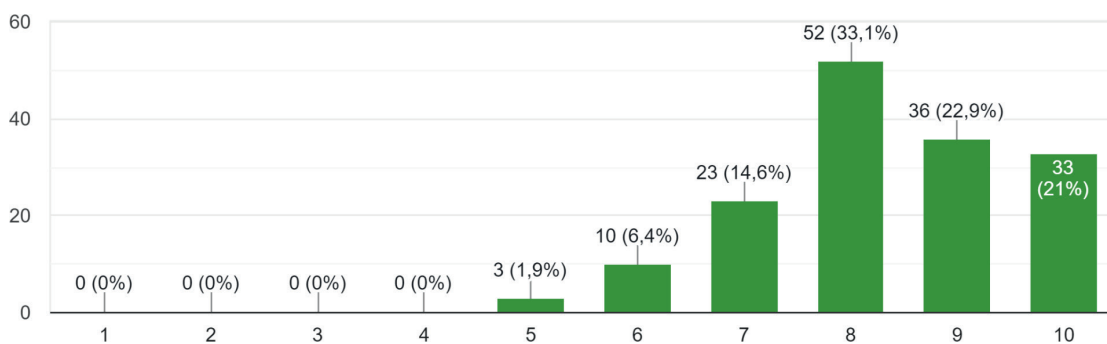
Figure 2.
Percentage of answers of the students on the level of impact of the workshop on the understanding and clarification of the concepts illustrated during the teaching.

4. Discussion

Here are some extracts from the most significant open-ended responses: '…I thought it would be a frontal lesson, but dialogue, debates and questions have positively developed each lesson', 'I actually expected the usual frontal lessons with content, so, it was a pleasant discovery that above all has made me reflect a lot on how I want to shape my teaching', 'yes (expectations were met), because I found that involvement, that passion, that stimulation of curiosity and emotion that I expected. Thank you for this Physical education course, which was also a life course and an incentive to improve ourselves', 'yes *(expectations were met, Editor's note)*, because I was able to better understand everything that lies behind the world of Physical education, which until now I only associated with the two hours of gymnastics', 'it was an interactive course, in which many of us actively participated with questions, group work. The lessons were never boring'; 'yes *(expectations were fulfilled, Ed.)*,) because teaching Physical education in a purely notional way would have been extremely boring both for the teachers/colleagues and of course for us students. Instead, the brilliant idea was to involve them emotionally as well,' the expectations I had were quite different…. I am happy that the professor aimed above all to make us construct our own thinking', 'from this course I didn't know what to expect clearly and even now that it is over I couldn't really describe what it left me, but certainly positive traces. I think the fruits of this course I will reap and understand over time'.

Finally, a deconstruction of the texts into a limited number of categories was carried out, which made it possible to trace back the words used, through a conceptual map and subsequent categorisation, to the constructs underlying the approach.

As can be seen from **Table 4**, the ability of integrated training to influence the personal dimension and morphology of the teacher emerged as a common element among the open-ended responses: to engage the three embodied dimensions in an integrated manner by offering the opportunity for a holistic training experience; to motivate and activate participation and leave significant traces of the experience; to establish a relationship of trust with the teacher; to establish a bridge between theory and practice through direct perception experiences that fostered constant reference; to promote metacognition.

This element offers the opportunity to emphasise how experiential theoretical-practical training is deliberately declined within university didactic lessons, and not merely relegated to laboratory hours, as a 'bridge' connecting theory and practice to offer an opportunity to reinforce the theoretical and specific training content that is indispensable.

With regard to the quantitative data, it is interesting to reflect on a few points. First of all, comparing these data with the answers to the question on the frequency of both teaching and laboratory (where 16.6% of the sample declared that they did not

Relational dimension	Motivational dimension	Theory-practice connection dimension
Future teacher	Dialogue	Active participation
Personal growth	Openness of mind	Reflection
Passion	Involvement	Metacognition

Table 4.
Main categories of the teacher's personal dimensions and professional morphology emerged as recurrences expressed in the open answers of the students.

attend the curricular course), it is evident that participation in the curricular part is a fundamental factor in answering the question. On the other hand, it is possible to infer that the perception of laboratory activities as a necessary, integrative and inter-acting part of the curricular course remains high, making the laboratory an essential component for the construction of a meaningful learning pathway.

With regard to the expendability of the training experience in real teaching contexts, 77% of the students involved noted a very high possibility (between 8 and 10) of being able to use the knowledge and skills acquired during the training in practice. In this sense, the participants note that activities structured with an ECS-based approach allow not only a co-construction of the learning phenomena and the necessary content knowledge but also a recursive relationship between theory and practice that increases the perceived expendability in real contexts. 21% of the participants noted a sufficient possibility, while a very low percentage (1.9%) did not point to a direct link between ECS-based approach and spendability. Precisely with regard to the desirable recursiveness between theory and practice, it is possible to note that the non-compulsory nature of the curricular didactic course, as opposed to the compulsory nature of the laboratory course, created a discrepancy for at least 16.6% of the students who did not attend any of the curricular lessons, making the laboratory experience the only didactic experience they tried out. At the same time, this percentage of students is precluded from comparing the two components of the experience. In fact, 49% of the students expressed the perception of a greater clarity of the contents exposed in the curricular didactic part thanks to the laboratory prac-tice, to which we can add - in the perspective of an all in all positive perception - the 28.7% of the students who identify as sufficient the perception of integration between didactic activity tout court and laboratory practice. 21% of the students noted an unsatisfactory perception of the experience: in this percentage, it is possible to infer that the part of the students who did not take part in the teaching activities and only participated in the laboratory experience (16.6%) is involved. Finally, only 1.3% noted a substantial didactic non-usefulness of the laboratory part compared to the curricu-lar teaching component of the training course.

5. Conclusions

On the basis of the results outlined above, it is possible to note that one of the sub-stantial elements of the university training pathway for primary cycle school teachers is the recursiveness between teaching theory and practice, emphasising the need to actively construct one's own training pathway, participating in the construction of meanings and activating oneself in order to effectively connect what has been learnt in one's own study pathway and what has been physically experienced. It is possible to note that, taking into account the different cultural backgrounds of the students participating in the training project and the different age ranges to which they belong, it is necessary to promote ongoing and continuous training courses that take these ele-ments into account. In this sense, for several years now, European educational policies have required member states to create programmes to increase the educational level of the population and give greater importance to the training of key competences in order to guarantee continuous learning for all citizens [53, 54]. With regard to the expendability of acquired knowledge and skills in real-life contexts, the importance of promoting meaningful learning processes is emphasised, where the individual is able to actively construct the meaning of what is presented and to transfer his or

her knowledge and skills. For this reason, the research focused on the promotion of self-determination and self-regulation in school and vocational learning. The high percentage of satisfaction found with the ECS-based approach to didactics makes it possible to emphasise the importance of a substantial reconstruction of didactic and training logics useful for rethinking and problematising in such a way that the complexity and unity of the elements at play in learning processes, i.e. body-mind-environment, can be recognised. The ECS-based approach enabled students to become the protagonists of their own learning process and not just the subjects of the educational intervention. From the qualitative elements found in the research (**Table 4**), it can be seen that at least three fundamental dimensions characterising the training process, i.e. the relational, motivational and theory-practice connection dimensions, come together. If the occurrences underline a deep rootedness with respect to the perception of oneself in the perspective of personal and professional growth, identifying one's own path as directed towards the construction of the figure of the future teacher, passion turns out to be an equally important element. It therefore becomes necessary to recognise and accept that emotions represent significant and indispensable elements in the learning process. It is precisely emotions, in fact, that attribute meaning and significance to cognition, making it permanent and usable even in different contexts [55]. The results emerging from the research lead us to recognise the value of the motivational dimension in an academic training process. In this sense, the concepts of dialogue, open-mindedness and involvement assume relevant value and significance. In this sense, pedagogical reflection on the trainer's didactic actions must necessarily take these elements into account, preparing the setting in a shrewd and targeted manner, addressing not so much a passive audience as an audience to be understood as active, alive, relationally connected. The open-mindedness, the non-preclusion of one's own training space to the other and to the idea of the other, creates the prerequisites for a greater involvement to be implemented through a substantial and not merely formal perception of a dialogic syntony. A syntony that can be built by taking into account the human, emotional and personal elements present in each of the students, understanding them not as mere users of an investment in didactic terms but as a human group in training, profoundly interrelated, the subject of complex dynamics, positively interdependent. It is, therefore, necessary to implement an educational transformation that operationally recognises the value of the community [56] as an integrating background on which to build customisation processes.

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† The present research was conducted by the team of authors. Chiara Gentilozzi is responsible for the Introduction, the Scientific framework, the Analysis of results and the Conclusions. Antonio Cuccaro is responsible for the Methodological procedure. Filippo Gomez Paloma scientifically supervised the product.

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