



Introduction to the special issue “embodied cognition and education”

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Abstract

This special issue focuses on the theoretical, empirical and practical integrations between embodied cognition theory (EC) and educational science. The key question is: Can EC constitute a new theoretical framework for educational science and practice? The papers of the special issue support the efforts of those interested in the role of EC in education and in the epistemological convergence of EC and educational science. They deal with a variety of relevant topics in education and offer a focus on the role of the body and embodied experience in learning and educational settings. In conclusion, some further topics are suggested that will need to be investigated in the future, such as a critical evaluation of the possibility for an epistemological alliance between educational theory and embodied cognition, and the contribution that enactive cognition can provide to educational systems, organizations, institutions and policies.

Keywords Embodied cognition · Education · Educational theory · Phenomenology · Phenomenological pedagogy

1 Manuscript

The idea for this special issue derives from the need to discuss the theoretical, empirical and practical integrations between embodied cognition theory (EC) and educational science. The starting question is: Can EC constitute a new theoretical framework for educational science and practice?

Since the 1990s, EC theory emerged within the cognitive sciences by taking the hypothesis of the co-dependence of body, mind and environment seriously, and

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investigating it through a variety of methods. EC develops fundamental critiques to Cartesian dualistic ontology, internalism, the computationalist approach to cognition, classical cognitivism and mental reductionism. The devaluation of the role of the body in the Western mainstream philosophy and science has a long and articulated tradition, beginning with Greek and Christian leading schools of thoughts – see the conception of the body as the tomb or prison of the soul in Plato, or Augustine of Hippo’s condemnation of concupiscence and carnal knowledge – it has continued with the separation between *res extensa* and *res cogitans* in Descartes, and has culminated with the reduction of the body to a *thing among things* in the modern era of technology.

However, during the first half of the Twentieth century, such conceptions started to be efficaciously challenged by the phenomenological movement and in particular by Edmund Husserl (1952), Jean-Paul Sartre (1943) and Maurice Merleau-Ponty (1945). Consequently, a *phenomenology of the lived body* contributed to the inception of embodied cognition theory within the cognitive sciences in the last decade of the last century. From the very beginning, EC was innovatively constituted at the intersections between phenomenology, system theory, evolutionary theory and Eastern philosophy of mind. In the first two decades of the twenty-first century, this approach grew enormously in a number of fields, including neuroscience (Gallese 2009; Kiefer and Trumpp 2012), psychology (Glenberg, Witt and Metcalfe 2013) and philosophy (Gallagher and Zahavi, 2008), finding inspiration in the research of the late American philosopher Hubert Dreyfus (1973) and, notably, in the cornerstone book *The Embodied Mind*, co-authored by Varela, Thompson and Rosch (1991).

Authors within the EC framework are interested in a large spectrum of topics, from language (Kaschak et al. 2014; Scorolli 2014) to social cognition (Landau, Meier and Keefer 2010), including human learning and the role the body plays in it (Lindgren and Johnson-Glenberg 2013). What is still missing, however, is a solid reflection of the encounter of EC and educational science within a phenomenological perspective. So far, only a few attempts to elaborate a theory in this sense have been made (Francesconi and Gallagher 2018; Francesconi and Tarozzi, 2012, 2019; Gallagher and Francesconi, 2012).

In this special issue we want to explore the pros and cons, the utility and feasibility, the risks and gains of an EC approach to education. Therefore, authors were invited to discuss the following topics:

- Theoretical reflection on the connection of EC and educational science from a phenomenological perspective: a new paradigm or the same old thing?
- What does neurophenomenology or naturalized phenomenology tell us about education?
- Convergences and differences between EC and more traditional educational approaches, e. g., phenomenological pedagogy, pragmatism or critical education.
- The relevance of 4E (embodied, embedded, extended, enactive) cognition to educational practice.
- The role of the lived body in educational practice.
- Education systems, organizations and policies from the enactive and embodied cognition viewpoint.
- Embedded and extended cognition, educational ergonomics and environments: architecture and materiality for learning.
- Ethics, education and embodiment.
- Criticism and appraisal of EC from the educational point of view.

The papers for this issue provide richly detailed examples of how EC can trigger reflection on a variety of educational themes, deriving consequences for EC as a new theoretical framework for educational science and practice.

The issue starts with Agnes Bube’s paper on “Educational potentials of embodied art reflection” in which she analyses the theme of art education and the educational potentials of embodied reflection on artworks. Against the background of a phenomenological perspective on learning (Meyer-Drawe 2010; Waldenfels 2011 see also Agostini 2016) Bube comes to the conclusion, that disruptive moments are especially able to form perception and thought anew. The author underlines the importance of refining perception and attention through art within pedagogical contexts. Showing the potential of embodied art reflection through a concrete example from the field of object art, the article presents useful support for anybody interested in deepening the theoretical and practical connection of embodied cognition and art in a school setting.

The next article, entitled “Reflective interventions: Enactivism and phenomenology on ways of bringing the body into intellectual engagement”, written by Iris Laner, also deals with learning, reflection and reflective skills. Starting with a look at the paradoxical role of the body with regard to learning in educational policies, the main focus of the paper is on how enactivism and phenomenology can contribute to the discussion of educational interventions in schools to foster meta-cognitive skills, considering both sensorial and intellectual domains. The author concludes her thoughts by describing real interventions in a learning setting that focus on intellectual engagement, stressing different opportunities to engage with situations that are problematic and intellectually challenging for students, situations that she calls “laboratory of thinking”.

The next paper tackles an important topic in education, namely the teaching of science and mathematics. In the article “Learning and expertise with scientific external representations: An embodied and extended cognition model”, Prajakt Pande addresses a topic that has gained so much momentum in EC that an entire subfield of EC is named the *Embodied Theory of Mathematics* (e. g. Lakoff and Núñez 2000). The article presents a review of empirical evidences about the teaching of scientific and mathematical concepts by exploring the debate about external representations and offering possibilities of providing critical perspectives to the design of new digital media for learning.

Two more articles deal with other crucial topics in education, which are becoming more and more relevant in EC as well: affectivity and emotion. In the first one, “Embodied cognition, affects and language comprehension. Theoretical basis and (literary-)didactic perspectives of a physically-emotionally grounded model of understanding”, Johannes Odendahl discusses the important connection between affection and language comprehension, underlining the fact that the beginning of all understanding should be located within the emotional sphere. He discusses the impacts upon language and literature teaching in schools, giving helpful insights for didactics. The second paper, “Bodily feelings and atmospheres. The felt situational impact upon education” written by Thomas Karl Feldges investigates feelings and emotion in a more ecological way, arguing for the importance of a fundamental understanding of passive embodied experiences within educational environments. Drawing on Böhme’s (2007) concepts of the atmospheres and on the “New Phenomenology” of Schmitz (2014), he develops the notion of a body receptive and responsive to its environment and draws educationally relevant implications from it.

In the final paper of this volume entitled “The hegemony of the practical in embodied cognitive science and the question of physical vulnerability”, Jens Bonnemann takes up the phenomenologically driven focus on passivity, pointing out the importance of the *pathical* character of perception. This paper is the most theoretical within this special issue, consisting of a critical analysis of EC and its weaknesses that the author believes to be grounded in the epistemological structure of EC as developed so far. Such a critical approach can support a better construction of an embodied cognition theory of education.

Concluding this introduction, it is important to remind the readers of several topics that have been suggested by the editors but not treated in this special call by the authors and that, in our opinion, could be of great interest for the educational community in future research on EC. Most of the articles of this call are focused on the role of lived body in educational practice. This is in line with special calls of other journals on the same topic (Francesconi and Tarozzi 2013) and with the dominant trend in the small body of literature available so far. However, this tendency reveals the focus of educators and educationalists on the primacy of the practical over the epistemological on one side, and on the body over embodied cognition on the other side. Accordingly, we suggest that some topics deserve to be investigated further. Two of them are briefly introduced in the following.

First of all, there is the theoretical epistemological question: Is it possible and useful at all to have something like an embodied theory of education or an educational theory based on or oriented to embodied cognition theory? Hasn't educational science already been concerned and familiar with the embodied dimension of human experience, even before EC? What new aspects does EC bring to education compared to other theoretical approaches? In the call, we purposely proposed this theme for discussion by saying that a theoretical reflection on the connection of EC and educational science is needed in order to clarify whether this effort constitutes a new valuable paradigm or not. As outlined above, while the role of the body in learning is already debated in literature, a reasoned and critical analysis of embodied education as a theoretical framework is still largely missing. Educational science is a field that surely does not lack a constant provision of new theories and approaches, and the new “embodied education” could just be the umpteenth one. However, EC is becoming so relevant – and dominant – within the cognitive sciences, psychology and philosophy, that educationalists cannot avoid confronting its theoretical implications.

Despite the fact that such theoretical questions have not been given due consideration so far, it is important to debate if and how an embodied oriented educational approach could serve to navigate troubled issues in education. For instance, we need to clarify what EC, neurophenomenology or naturalized phenomenology can tell us about neuroeducation. Neuroeducation is a growing academic field at the crossroad between neuroscience and education but so far it has been largely colonized by standard cognitive approaches and rather ignored by EC scholars. Then, we also need to discuss the convergences and differences between EC and more traditional and well-established educational approaches like phenomenological pedagogy, pragmatism or critical education. Within these approaches, differently from cognitive science, the bodily, practical and experiential dimensions of human experience are and have always been central topics (e.g., Dewey 1934; Meyer-Drawe 1984). Therefore, educationalists within these perspectives often wonder what new insights EC can actually bring to the

debate. This special issue has attempted to provide a number of answers and opportunities to deepen the discussion. Nevertheless, we believe that more theoretical work is needed in order to further illuminate whether and how an embodied-cognition-oriented educational theory can be useful in the field of education.

The second and final topic we strongly recommend for further analysis, is the topic of education systems, organizations, institutions and policies, i.e., the macro social dimension of education. This topic has so far not been at the core of the enactive and embodied cognition approach. Indeed, EC grew within cognitive science which is grounded in biology and psychology with a strong focus on sub-personal, personal or micro interpersonal dimensions. So far, scarce attention has been given by EC scholars to the systemic and macro-social dimensions of the human experience, such as organizations, institutions, networks and other manifestations of the collective mind. This is somehow surprising if we consider that social and systemic implications for EC were already discussed in the foundational book *The Embodied Mind* (see chapter 6). Though, recently, initial steps have been taken in this direction – for example by Michelle Maiese and Robert Hanna in their book *The Mind-Body Politic* (2019) or by Shaun Gallagher and colleagues in their publications on EC, extended mind and institutions (see Petracca and Gallagher 2020; Ransom and Gallagher 2020) – we believe that more needs to be done within this line of research, including in educational research.

To conclude, we hope that this special issue on “Embodied cognition and education” will help in supporting the efforts of those interested in the role of EC in education and in the convergence of EC and educational science and that it will promote further debates and research.

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