Additional Reference List

1) Enactivism (by Valentina Prenna)

Maturana H.R., Varela F.J. (1987), *The Tree of Knowledge: The Biological Roots of Human Understanding*, Boston: Shambhala.

Varela F.J., Thompson E., Rosch, E. (1991), *The embodied mind: Cognitive science and human experience*, Cambridge: MIT Press.
This is the basic book for Enactivism. Moving from Merleau Ponty's phenomenology, the authors argue that the new science of mind must reconsider the role of the body in experience and cognition: our bodies must be seen both as physical structures and as lived-experiential structures, outer and inner, biological and phenomenological.

Reid R. (1996), "Enactivism as a methodology", in L. Puig, A Gutiérrez (Eds.), *Proceedings of the Twentieth Annual Conference of the International Group for the Psychology of Mathematics Education*, *4*, 203-210.
In this paper Enactivism is proposed as a new methodology for research in mathematics education; some key concepts of Enactivism such as autopoiesis, structural coupling and determinism and co-emergence are transferred into the activity of research giving a new idea that is opposite to the "stereotypical image of the experimental research". 1. the interrelationship between researcher and data, in which we find ourselves learning new things within a context which is partially of our own creation. 2. the interrelationships in the research community, in which we as autopoetic researchers engage with other researchers in ways which preserve the structural coupling between us. 3. coemergent autopoetic ideas which live in the medium of our minds, and of which we are emergent phenomena.

Chiel H.J., Beer R.D. (1997) "The brain has a body. adaptive behavior emerges from interactions of nervous system, body and environment", *Trends Neurosci. 20*, 553-557.
In this paper, adaptive behavior is described as depended both on the functioning of the neurons and neural circuits and on the interactions between neuron system-body-enviroment, each of which have complicated and rich dynamics. The body offers constraints and opportunity of interactions and actions in the environment, and the nervous system receives continuously feedbacks from the body and from

the environments. So, in cognitive science there is a growing awareness of the need to take into account the embeddedness of the brain both in the body and in the environment to understand cognition.

Lakoff G., Johnson, M. (1999) *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. New York: Basic Book.
The central idea of this book is that "our sensory-motor systems thus limit the abstract reasoning that we can perform. Anything we can think or understand is shaped by, made possible by, and limited by our bodies, brains, and our embodied interactions in the world-the body and brain have an important role in human reason and language-metaphor are largely embodied: Metaphor appears to be a neural mechanism that allows us to adapt the neural systems used in sensory-motor activity to create forms of abstract reason.

Begg A. (2000), *Enactivism, a personal interpretation*. http://www.ioe.stir.ac.uk/docs/Begg%20Enactivism%20.DOC (verified in October 2012).
This paper describes Enactivism as a new theory of learning, according to the author's interpretation; he highlights new concepts of Enactivism earlier underestimated, putting in evidence some criticisms about constructivism and Cartesian dichotomies, describing phenomenology, considering the contributions of neural biology and systems theory and the importance of non cognitive knowing.

Pagano G. (2000), *Il marchio enattivo della realtà virtuale*. http://org.noemalab.eu/sections/ideas/ideas_articles/pdf/pagano.pdf.
This paper describes the system of Virtual Reality as an enactive cognitive technology: in Enactive approach to cognition, there is a circularity between action and experience and between action and knowledge. Cognition depends of the kinds of experiences made possible by having a body with certain sensory motor capacities. The system of Virtual Reality are projected for a subject that is immersed into them with the globality of his body, they are based on interactivity, on the usage of sensory-motor and kinesthetic skills, on a process of knowledge that is dependent on the cognitive possibilities of the body. They are perceived and enacted.

Thompson E., Varela F. (2001), "Radical embodiment: neural dynamics and consciousness", *Trends in Cognitive Sciences*, 5, 10.
The authors proposed a new approach to neuroscience of consciousness moving from three statements: research2: (1) understanding the complex interplay of brain, body and world requires the tools and methods of nonlinear dynamical systems theory; (2) traditional notions of representation and computation are inadequate; (3) traditional decompositions of the cognitive system into inner functional subsystems or modules ('boxology') are misleading, and blind us to arguably better

decompositions into dynamical systems that cut across the brain–body–world divisions.

Noe A. *Action in perception* (2004), Cambridge, MIT Press.
This book present a new view of the relation between perception and action that is opposite to the "classical sandwich model". For enactive approach to perception, to perceive is having an implicit knowledge of patterns of sensory motor dependencies: the perceiver implicitly understands the effects of movements on the consequent sensorial stimulation. So, perception is active and connected with cognitive processes.

Proulx J. (2004), "The Enactivist Theory of Cognition and behaviorism. An Account of the Processes of Individual Sense Making", *Proceedings of the Complexity Science and Educational Research Conference*, Canada, 115–120.
In this paper the author points out some key concepts that distinguish enactivism from behaviorism in locating decisional mechanism. He starts with the importance of agent in the learning process, stating that it is not the environment stimulus, but precisely one's internal structure that determines the changes that happen. These internal dynamics, in turn, enable us to perceive in our environment potential triggers. If we do not 'see' the triggers in the environment, we cannot be 'affected' by them. Decisions don't arise in the environment, but it is through the agent's interaction with the environment that its internal dynamics can recognize potential triggers in it and get triggered by them4. Learning is not determined by the environment, but it depends on it "you get triggered by what you can get triggered by".

Frielick S. (2004). "Beyond constructivism: An ecological approach to e-learning", in R. Atkinson, C. McBeath, D. Jonas-Dwyer, R. Phillips (Eds), *Beyond the comfort zone: Proceedings of the 21st ASCILITE Conference*, 328-332. Perth. http://www.ascilite.org.au/conferences/perth04/procs/frielick.html

Thompson E. (2005), "Sensorimotor subjectivity and the enactive approach to experience", *Phenomenology and the Cognitive Sciences*, *4*, 407-427.
This paper focuses on dynamic sensorimotor activity. Recent dynamic sensorimotor approaches to perception and action have made important contributions to the scientific and philosophical understanding of consciousness. The aim in this paper is to build on these advances in order to address the "body-body problem," the problem of how to relate one's subjectively lived body to the organism or living body that one is.

MCGee K. (2005), "Enactive Cognitive Science", *Constructivist Foundations*, *1*, 19-34.

In this paper it is described Enactive Cognitive science as an approach to the study of mind that seeks to explain how the structures and mechanisms of autonomous cognitive systems can arise and participate in the generation and maintenance of viable perceiver-dependent worlds, opposite to the traditional cognitive view in which cognition in representation of a pre-given world.

De Jaegher H., Di Paolo E. (2007), "Participatory Sense-Making: An enactive approach to social cognition", *Phenomenology and the Cognitive Sciences*, *6*, 4, 485-507.

This paper proposes an Enactive approach to social cognition. It talks about participatory sense making moving from the idea that the interaction processes can take on a form of autonomy. For the author the problem of social cognition can be redefined as that of how meaning is generated and transformed in the interplay between the unfolding interaction process and the individuals engaged in it.

Thompson E. (2007), *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*. London: Harvard University Press.

Moving from the awareness of the continuity of mind and life, the Author proposes to bring phenomenological analyses of experience into a mutual relationship with scientific analyses of life and mind.

Li Q. (2008), "How enactivism helps reform e-learning", *Asian Women*, *24*, 4, 1-20.

This paper is focused on Enactivism applied in Educational Technology and describes how it provides a more encompassing framework to meet the current epistemological challenges for education caused by rapid development of technology.

Lozano M.D. (2008), "Characterising algebraic learning through enactivism", *PME 32 and PME-NA XXX*.

The author proposes an approach to Algebraic learning based on Enactivist theoretical framework, describing a longitudinal study in school. Through an Enactivist analysis of six themes (effective behaviors) algebraic learning was found to be promoted in classrooms where the embodied, rational, emotional and social aspects of learning were taken into account.

Oliverio S. (2008), *Esperienza percettiva e formazione*, Milano: Franco Angeli.

Proulx J. (2008), "Some Differences between Maturana and Varela's theory of cognition vs Constructivism", *International Journal of Complexity and Education*, *5*, 1, 11-26.
The paper highlights three main differences between the theory of cognition of Maturana and Varela and Constructivism: the biological roots of cognition, its phylogenic and ontogenic basis, and the nature of reality and knowledge. It focuses on the third point with the idea of "bringing forth a world" as the real conceptual shift.

Damiano L. (2009), *Unità in dialogo. Un nuovo stile per la conoscenza*, Milano, Bruno Mondadori.
This book is based on a philosophical and scientific vision opposite to the computationalist one. It is focused on some concepts related to Enactivism: self organization, autonomy and co-emergence; complexity as an irreducible feature of the modern reality; involvement of the observer in a dialogue with the reality he studies to understand it; mirror neurons and intersubjectivity.

Thomson E., Stapleton M. (2009), "Making Sense of Sense-Making: Reflections on Enactive and Extended Mind theories", *Topoi, 28*, 23-30.
In this paper authors describe the differences between Enactive approach and the Extended Mind theories focusing on a new concept of autonomy and sense making. The following issues are treated: following issues: (1) the debate between internalism and externalism about cognitive processes; (2) the relation between cognition and emotion; (3) the status of the body; and (4) the difference between 'incorporation' and mere 'extension' in the body-mind-environment relation.

Fuchs T., De Jaegher H. (2009), "Enactive Intersubjectivity Participatory sense-making and mutual incorporation", *Phenom Cogn Sci*, *8*, 465-486.
In contrast with the current theories of social cognition based on a representationalist view, this paper proposes the social understanding as a dynamical process of participatory sense making (through the interaction and coordination of two embodied agents) and mutual incorporation (the lived bodies of participants form a common intercorporality). Through intersubjectivity common meanings are generated.

Proulx J. (2009), "Directions and possibilities for enactivism and mathematics education research", *Proceedings of the 33rd Conference of the International Group for the Psychology of Mathematics Education*, *1*, XXX-YYY.
This paper describes some contributes that Enactivism could give to Mathematics education research regarding learning and teaching, pointing out the differences between Enactivism and Constructivism.

Li Q., Clark B., Winchester I. (2010), "ID and technology grounded in Enactivism-a paradigm shift?" *British Journal of Educational Technology*, *41*, 3, 403-419
This paper explores enactivism as an alternative paradigm in the field of instructional design and technology (IDT), describing its contributes to this field comparing similarities and differences between enactivism and objectivism and constructivism.

Holton D. (2010), "Constructivism + Embodied Cognition = Enactivism. Theoretical and practical implication for conceptual change", *AERA 2010 Conference.*
This paper explores Embodied Cognition and Enactivism as an advancing of Constructivist theory and describes some theoretical and practical implications of for the design of effective learning environments that support a conceptual change.

Di Paolo E., Gapenne O., Stewart J.S. (2010), *Enaction. Toward a new paradigm for Cognitive Science*, MIT Press.
This book presents the framework for a new approach to cognitive science. The proposed paradigm, enaction, offers an alternative to Computational Theory of Mind in viewing cognition as grounded in the sensorimotor dynamics of the interactions between a living organism and its environment. Some chapters describes aspects of enaction paradigm; others address specific areas of research, including artificial intelligence, developmental psychology, neuroscience, language, phenomenology, and culture and cognition.

Damiano L. (2011), "Vita, Cognizione e scienza come processi di co-emergenza. Segmenti dell'evoluzione teorica ed euristica della scienza dialogica", *Riflessioni Sistemiche*, *5*.
This paper moves from the definition of the theme of "self organization" and connect this concept to the processes of life, cognition and science to characterize them as co-emergence.

Ward D., Stapleton M. (2011), "Es are good: cognition as enacted, embodied, embedded, affective and extended", in F. Paglieri (Ed.) *Consciousness in interaction: The role of the natural and social environment in shaping consciousness*, Philadelphia: John Benjamin.
Moving from the idea that cognition is enactive (it depends upon the cognizers' interactions with their environment) authors present some statements to support that it's also embodied, embedded, affective and extended.

2) Enactivism and neurosciences. Intra-individuality and inter-individuality

Gallese, V. (2005), "Intentional Attunement. The Mirror Neuron System and its role in interpersonal relations", *Interdisciplines*, http://www.interdisciplines.org/mirror/papers/1.

Gallese, V. (2003), "La molteplice natura delle relazioni interpersonali: la ricerca di un comune meccanismo neurofisiologico", *Networks*, 1, 24-47.

Gallese, V. (2003), "Neuroscienza delle relazioni sociali", in F. Ferretti (Ed.), *La mente degli altri*, Roma, Editori Riuniti, 13-43.

Rizzolatti, G., Fogassi, L., Gallese, V. (2001), "Neurophysiological mechanisms underlying the understanding and imitation of action", *Nature Reviews Neuroscience*, *2*, 661-70.

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Carr, L., Iacoboni, M., Dubeau, M.C., Mazziotta, J.C., Lenzi, G.L. (2001), *Neural mechanisms of empathy in humans: a relay from neural systems for imitation to limbic areas. Proc. Natl Acad. Sci.*, *100*, 5497-5502.

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3) Simplexity (by Paola Aiello)

Aiello, P. (2012), *La ricerca didattica sul corpo in movimento verso la semplessità. Aspetti epistemologici e metodologici*, Lecce: Pensa.

Alon, U. (2006), *An Introduction to Systems Biology: Design Principles of Biological Circuits*, Boca Raton: Chapman & Hall.

Alon, U. (2007a), "Simplicity in biology", *Nature*, *446*, 497.

Alon, U. (2007b), "Network motifs: Theory and experimental approaches", *Nature Reviews Genetics*, *8*, 6, 450-461.

Berthoz, A. (1997), *Le Sens du Mouvement*, Paris: Odile Jacob.

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Berthoz, A., Jorland, G. (Eds.) (2005), *L'empathie*, Paris: Odile Jacob.

Berthoz, A., Petit, J.L. (2006), *Physiologie de l'action et Phénoménologie*, Paris: Odile Jacob.

Berthoz, A., Vercher, J.L. (2006), *Le traité de la réalité virtuelle, volume i: L'homme et l'environnement virtuel*, Paris: Les presses de l'Ecole des Mines de Paris, Collection Sciences Mathématiques et Informatique.

Berthoz, A. (2006), *Emotion and reason: the cognitive neuroscience of decision making*, Oxford: Oxford University Press.

Berthoz, A., Petit, J.L. (2008), *The Physiology and Phenomenology of Action*, Oxford: Oxford University Press.

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Sibilio, M. (2012), *Traiettorie non lineari nella ricerca nuovi scenari interdisciplinari*, Lecce: Pensa editore.

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