

Antigravitational rotate live-scene as tridimensional, multiagent and cognitive educational space

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ABSTRACT. Merlau-Ponty tactility and Deleuze and Guattari non-linearity are basic concepts for a real-time experimentation that we use to connect Arts, Technologies and Education. Thanks to Docebo saas that supports the research *Digital space makes school. Learning and education at web 3.0 time* - that involves schools (primary and secondary schools) and their ordinary activities - research is a site specific experience that choose schools to study how to innovate learning and teaching introducing a tactile use of digital spaces and to create a cognitive space integrating learning and e-learning practices. A real time scene based on tactility and non-gravity in collaboration with Altro Equipe, is developed in new Docebo Learning Management System called Docebo school, based on tactile method and performing and embodied methodologies.

KEYWORDS: e-Learning, Electric pedagogy, Tactility

1. Cfr. Meyrowitz (1993)

Electric pedagogy: toward a new sense of the place¹

McLuhan's insight on electricity as a *principle* of a revolution related to the anthropological and cultural ground, may still be considered a guideline for social research, and particularly for research that touches the issues of education and training, because it intercepts a general and continuous need for innovation and change that, combined with the growing need to act and communicate, recognizes and legitimizes the electrification of learning process and digital extension of the concepts of environment, space and culture as a new theoretical framework (Dewey, 1920). It's important to underline that this new theoretical framework, placed in pragmatism and phenomenology, is here assumed to rethink the education through a look that is critical of the traditional and classical opposition between doing and knowing, and thus between

theory and practice but also between reality and artifacts, languages, or analogic and digital languages. With electricity and then with the electronic and digital media is precisely the opposition that is put in crisis, along with linear logic, by introducing a real cognitive revolution that changed the whole way of thinking and acting because it introduced the convergence, integration, in a word network, as new brainframe (de Kerckhove, 1991) able to reconfigure the relationship between man and the world in terms of mutual interdependence and situatedness. The reticular, or interconnection, is the *figure* that characterizes all living systems and their continuous process of change/transformation so the internet and the Web represent and explode as generating principle of the reticular educational processes (and therefore as generative processes and training), based on “principles of connection and heterogeneity” and the “principle of multiplicity” (Deleuze and Guattari, 1980). The philosophers of the rhizome, in fact, emphasize that:

“any point of rhizome can be connected to anything other, and must be. This is very different from the three of root, which plots a point, fixes an order. (...) An assemblage is precisely this increase in the dimensions of multiplicity that necessarily changes in nature as it expands its connections” (pp. 7-9).

The lines intersect with other lines, in multiple directions, drawing geographies that break the linearity and two-dimensional shape and give rise to the third dimension, thickness, depth. But condition of the giving of this multilayered and non-linear geography is the principle of connection and that of heterogeneity that gives a dynamic to environment and systems. The relational dimension is shown as a generative principle: it is the origin of shaping and possibility of existence of each shape. In this sense, electricity and communications technologies that are derived from it, especially the last generation that converge on the Web and in the “culture converged” (Jenkins, 2006), they merely emphasize, on one hand, the “art to build the world and themselves” (D’Ambrosio, 2008) - performativity - and on the other, sociality and situatedness which are condition of performativity itself. Act, learn, train and self-train are *emergencies* of places and of relationships that take place, so

as to produce works and therefore actions, knowledge, identity and culture, whose geometry is not Euclidean or predictable but makes N-potential creatures and creations, being established by (N-potential) different connections possible.

The agent, or digital performer, or performer, is category with which the individual, as a citizen of the world, including electronic and digital space, is reviewed, emphasizes his creative force and places it on different levels of experience that makes it an ongoing project. The state of natural is the individual situatedness and mobility: on these terms emerges the individual himself and his agency and transforming capability. So, thanks to the connectivity that is electric and digital, individual, as a performer, expresses a state of continuous learning and training in which you can find a mobile, or dancing, identity and space.

If mobility is a defining characteristic of electronic and digital culture, we can identify their mobility as generative concept for epistemological status of pedagogy and for educational experience of contemporary.

The aim of this paper, and of project *Digital space makes school. Learning and education at web 3.0 time*, is therefore to observe the educating community to bring out its plastic geography that includes the opening as its own element spacing and requires a non-Euclidean re-sensorialitation of the whole experience, being first tactile and then digital. In this sense, pedagogical thought and reflection married to educational emergency can only be located in a contemporary way to do the electrical technology, participatory and inclusive (McLuhan, 1964), a new and complex Hyper-aesthetics educational scene. Observe different levels of interaction and the multiple scenes and recognize the educational pedagogical significance, even in their electronic and digital extensions, means emancipation from alphabetic and appropriate the electric epistemology (de Kerckhove, 2001) to re-affirm a paradigm that makes relationship as human species specific habitat of all time. McLuhan (1964) in his most famous work insists that:

“all technologies are extensions of our physical and nervous system to increase the power and speed. (...) The use of any medium, or an extension of man alters the patterns of interdependence between people as alters the relationship between the senses” (p. 99).

But the contemporary thought of McLuhan makes his works and his scientific contribution to the study of media and communication, as necessary step for those who want to question today on the future of education and the future of Man. In title *Understanding media: the extensions of Man* we could add: *Of his educational spaces and extensions*. As to say that the extension and the mutation of Man is always situated and thus refer to a context that builds the Man himself and in which he takes shapes. Locate becoming Man means to highlight the educational environment in which he is immersed in and through which makes relationships. And to situate phenomenon of education means acknowledging its relational matrix, and therefore power and aesthetics.

So, education includes physical plans and symbolic ones, the body and the mind: the interconnection of these different plans builds cognition. It is here that the contribution of Neuroscience² and Siegel D. (2012) and New Robotics becomes more evident and significant, together with the cultural psychology of Bruner (1986, 1990) and the social psychology of Gergen (1991). These references are complementary to theoretical pedagogical thinking located in the flow today, and are scientific basis for a new epistemology that unites, connects, brain and mind, thought and action, individual and environment. If we analyze in detail the main relevant literature, we find that the key concept is relationship. As an example, we quote what Kenneth J. Gergen (1991) wrote about the “Bending of Life-Forms”:

“New patterns of relationship also take shape. In the face-to-face community one participated in a limited set of relationship – with family, friends, storekeepers, clerics, and the like. Now the next telephone call can thrust us suddenly into a new relationship. (...) One of the most interesting results of this electronic expansion of relationships occurs in the domain of parent-child relationships. (...) The technology of the age both expands the variety of human relationships and modifies the form of the older ones” (pp. 63-64).

The proposal for an electric Pedagogy - as *emergence* of an active pedagogy (Dewey, 1916) - implies, then, on the epistemological level, an “incorporation” of an aesthetic paradigm (D’Ambrosio, 2006) and, in practice, a continuous educational planning investing

2. Johnson-Laird (1983) and Siegel (2012)

and moves between different geographies, thanks to the ability to create ever new cognitive spaces.

Remapping the pedagogical and recognize all technologies such as cognitive technologies or “psycho-technology” (de Kerckhove, 1990), means to broaden horizons and break existing paths and travel up to unknown territories outside official topography. Motion joins sensory of cognition: to open and create new spaces that are acted out as educational spaces, we need to recognize them and to situate and act into this new environment. In fact, thanks to cognitive sciences (Matura-Varela, 1980) and some ecological vision (Morin, 1965) used to reflect the sense of becoming in the world, mobility is the ability of organisms to respond to the environment, situating and interconnecting with it; in this ecological sense, neuro-sciences have finally connected body to cognition, perception to movement. Where we find active and living space, then this becomes world-of-life and cognitive space. But to navigate the new educational and teaching geography designed and made possible by new media, it is not simply purchase a new map. The agent itself is a generator of cognitive maps and mapping of a continuous state of educational extension and multiplication.

And in this state, it is not possible to distinguish students from teachers, or good from bad teachers: Rethinking the education and conduct training, placing them in the electrical principle of the reticular and digital, has the value of real redefinition of a theory of knowledge, where the particular concerns about a *doing* that mobilizes a *how* and therefore involves questions of methodology and process that is again becoming part of a practice-oriented education that empowers all agents of the educational community and calls for responsiveness and performativity to the areas in which we act and interact. The structure and the pedagogical methodology that will be setting cannot proceed by models or for modeling, but for structures and systems generated and regenerated by their social and supportive. Precisely in this sense, then, the electricity can be understood as the symbol and the metaphor of a knowledge increasingly linked to a relational matrix, connective and, for this, generative. Because communication was identified as a condition, the habitat itself, the experience of knowing and thus of the form and formation. So we can say that changing the ways and forms of communication, man has also changed and multiplied the possibilities of training and so the educational theory, such as

mobile and electrical epistemology in which it is based, has become useful for a “good social and politic navigation” (McLuhan, 1964).

From extended media to extended identity: the electronic space as cognitive space. Epistemological suggestions

Remap “the pedagogical” means to emphasize the importance of educational and training contexts and the need for action conceived as a performance, as a phenomenon emerging from a constructivist, reflexive, activist philosophy. Retrieve a look and a sensitivity towards the pedagogical notion of space is a necessity and an opportunity: pedagogical itself. Today, that beginning from the urban space look has given heed to the environment and therefore also to the actions, to respond to the environment measurable performance in terms of social wellbeing, it's more legitimate work in an interdisciplinary sense to design environments, whether physical or digital, because they are living spaces, capable of being relational spaces and places of learning and cognition.

As mentioned above, in full post-electric era, so strongly marked by digital culture and the concept of synthesis³, the educational and training institutions are crossed and interconnected in new and other environments that are redefining the map of the pedagogical whose geography is layered, network and above all on time. In relation to this new space, identities are recognized for their cognitive dimension and hence their constitutive plasticity that requires appropriate methodologies to take shape and to make themselves, both for individuals (or agents) and for the environment. Going back to what was said before, by the way remember that Deleuze and Guattari (1980) *A Thousand Plateaus* have foreshadowed with the geography and layered rhizomatic web of enabling us today to look to the rest of reality, and read it as the net, so that it becomes a metaphor of reality, of a thousand plans, strata, within which and between which each one is situated or located. But perhaps the two philosophers have gone one step further: just as Freud had given place to the unconscious, so they have given a thick and a three-dimensional depth of thought. This “architecture of intelligence” (de Kerckhove, 2001), non-centric and multidirectional, that the philosophers of rhizome open to

3. Synthetic is a concept generated into New Robotics studies and it is related and opposite or integrated with analytic concept. “The synthetic approach introduces engineering practice into scientific research. Correspondingly, a particular phenomenon of interest (e.g. how do we recognize a face in a crowd, or how do we move and walk) is approached from an implementation perspective. Design for emergence tries to minimize designer bias and the pre-definition of the artifact's resultant properties. This represents a novel approach uncommon both to engineering and science. The synthetic approach originated from within the framework of pre-cybernetic robotics.

The term synthetic method was employed by psychologist Kenneth Craik to describe the process of testing behavioral theories through machine models (Craik, 1943). The synthetic approach is not meant as a replacement but rather a complement for the traditional analytical approach. The analytical sciences are very well established and have contributed immensely to the increase of mankind's knowledge about and control over the natural world. Nevertheless, starting from about the second half of the twentieth century, science began to take notice of an increasing number of natural phenomena that seem to notoriously resist clarification. By now it is clear that these phenomena share some fundamental properties that largely defy an analytical approach. These phenomena are typically based on a large number of constituents that operate in parallel and whose interactions with each other and their surroundings must be described by non-linear mathematical relationships. Also, we have become aware of the fact that these phenomena are not anomalies or exceptions, but rather represent the vast majority of systems of interest. Examples abound and can be found in the purely physical world (e.g. climate, star formation, the creation of snow flakes), biological organisms and societies (brains, gene regulation, body movement, swarm behavior, spread of diseases), and man made social, technical and socio-technical systems (cellular automata such as Conway's Game of Life, the Internet, the stock market, cities, fashion

changing, compositions and rearrangements, becomes an actual staging of an unconscious manufacturing worlds and it claims a nomadic status, wandering, capable of generating new trajectories and also new wishes and different variables and states of identity. One is reminded of the movie written and directed by Christopher Nolan *The Inception*, which results in images of the dream and the architecture of the mind and the thought takes its creative force. Creative force generated by continuous and oriented, as well as possible, grafts. The spatiality, depth and complexity of thought is changing and unstable related to the ability of that space to be informed by a relationship. Dom Cobb, the protagonist of the film, says:

“What’s the most resilient parasite? An idea. A single idea from the human mind can build cities. An idea can transform the world and rewrite all the rules. Which is why I have to steal it”.

Ideas are mobile as identities they express. To create worlds, shaping thought, produce knowledge and identity, the grafts are needed; and grafts also claim their contingency and transience. In this sense and even more from a pedagogical point of view, transit and situate, at the same time, become generative, in order to proceed for no more opposed pairs but for synthesis and aggregations, without this sounds as unifying or standardising, but planning and mapping. Why action should be planning and mapping must be able to recognize and reflect on what it produces, to elevate the practice of knowledge and self-knowledge, and so consider the artifact open or de-completed or never finished.

For what has been argued, it would seem that each electric space contains a cognitive charge that makes them contexts for learning and training. But the Electric paradigm is to be declined more properly with a methodology that was developed as part of research in artificial intelligence. The paradox is that, from binary machines (computers) we are now able to produce and reproduce no-hierarchical structures or, we might say, hypertext, which trace streams that proceed in a coplanar, crossing and connecting in a horizontal to what they encounter. Another apparent paradox is that research and experimentation of the New Robotics are oriented to the knowledge of Man and then they identify robot as

an object with mimetic functions through which the human being deconstructed and then re-build it and, then, know it. It has been setting in this field of research, a proper methodology whose slogan is *Understanding by Design* (Bisig-Pfeifer, 2008) so that the design becomes a necessary action to activate a process of understanding. Learning process takes place in a cognitive space, we defined *electric*, in which the observation is action that puts into mutual relationship subject and object, individual and environment, and makes possible a re-construction and generates a field of relations (such as a magnetic field, in fact) into which you can also imagine what does not yet exist. Bisig and Pfeifer (2008), themselves, recognize and state that:

“we have observed that the synthetic methodology is well suited in an education context in that it helps to spawn and maintain a high level of motivation in students and can act as a teaching methodology to communicate even very abstract concepts in a comprehensible and tangible way” (p. 6)

Methodology of Understanding by design develops the concept of “continuous reconstruction of experience” introduced by Dewey (1916) and developed by all that pedagogy who recognizes in constructivism and then captured in digital culture an opportunity to accept in full the tactile paradigm as a theory of knowledge able to consider artifacts as cognitive devices. From this point of view it seems that the challenge is still to grasp if you think the Web itself can be lived as it was once the scene and the public square, with the same social and political tension, and recognize digital space educational and cognitive matrix.

Antigravitational rotate system

As we documented in a first short video⁴, and into tactile and electric theoretical framework, to develop our research - *Digital space makes school. Learning and education at web 3.0 time* - we made a live-scene to study how experience a tactile methodology and epistemology in school context and how extend it to a web based Learning Management System. From real experience - involving school teachers and scholar, academic researchers, students and

trends). These phenomena are the result of the individual properties of the constituents (the neurons, the cells in a cellular automaton, or the humans in a fashion trend network), and of the complex interaction patterns among these constituents. By building artifacts bottom up from components to compound aggregates to whole systems, the synthetic sciences can study the properties of a whole system and how these properties depend on the interrelationships and behaviors of its components” (Bisig-Pfeifer, 2008, pp. 124-125)

4. <http://vimeo.com/67490787>

teacher, artists - we set an observatory we can synthesize this way:

- System of rotations: to break the routine
 - Mutation in self-perception and the perception of space: you draw other trajectories; space becomes generative (in terms of identity and on the environment as a whole, that are understood as weaving)
 - Space inside-outside
 - Jobs in interaction with others and other data environment: from the fragments to a possible unit
 - Mutual generativity of agent and environment
 - Perception-communication becomes interaction: to program to interact (and not “run”)
- System of projections of glossary
 - Central role of actual word and of interaction: the written word is actualized in the environment
 - Return sensory-perceptual dimension to the word
 - From stability (of the meaning) to mobility of the word that makes it generative and not defining, and that makes agents as environment to actualize and incorporate the sense
 - The word comes into interaction with other data environment and thus is part of a complex process that generates a dynamic system of actions and feedbacks embodiment
- System of projections of video and lights
 - Visual space: the embodiment of visual dimension of word or of other data simultaneously present in the environment
 - Through the repetition (of live video) it opens and leads to stratification of data that inform agents and will hand back the depth and multisensory (produced by the interaction with the sound system and the live scene)
 - Generative images: because they generate exploring and wandering
- System of sounds
 - Power of “excitatory” sound (which is material, vibrant, sound) that generates and conveys the ability of the space to be environment of interaction
 - The interaction becomes timing and tuning

- The sound space where each agent is autonomous and is located in the environment, and updating it and itself
- Sound-environment
- Methodology
 - The “dance” between the spaces: the ability to move between different languages exploring the multiple dimensions through which it is possible to cross and have knowledge of the real
 - Do interaction: update the data and regenerate them so as to produce mutation (of the data, of the agent and of the whole system-environment)
 - Exploration of reality without order or default hierarchies: rotation
 - Actualization of complexity of the real
 - Body and spatial data flow into environment

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Sintesi

Il contributo illustra i principali risultati del progetto “Digital space makes school. Learning and education at web 3.0 time” dell’Università degli Studi Suor Orsola Benincasa di Napoli, che coinvolge alcune scuole primarie e secondarie osservate nella quotidianità delle loro attività.

La ricerca si fonda metodologicamente sulle teorie del primato della percezione e del valore della dimensione tattile nei processi cognitivi di Merleau-Ponty ed è esplicitamente ispirata ai principi di non-linearità, molteplicità, connessione ed eterogeneità di Deleuze e Guattari.

Essa, grazie all’impiego esperto della piattaforma e-learning Docebo SaaS, si focalizza su un contesto scolastico situato ed attuale per indagare come sia possibile trasformare radicalmente l’apprendimento e l’insegnamento introducendo l’uso tattile degli spazi fisici e digitali; e dare vita così ad un ambiente cognitivo ed educativo fortemente innovativo mediante l’integrazione di pratiche di apprendimento diversificate, in presenza e a distanza.

Attraverso una sperimentazione che combina con successo la dimensione artistica, quella tecnologica e quella educativa, il processo di apprendimento avviene in uno spazio cognitivo “elettrico”: l’osservazione si fa azione, in grado di mettere in relazione reciproca soggetto e oggetto, individuo e ambiente; di rendere possibile la ricostruzione; di generare un campo di forze interrelate – sul modello di quello magnetico – in cui è possibile immaginare quello che ancora non esiste.

Per sviluppare un LMS più evoluto, Docebo school, lo studio si concentra infine su un’esperienza multisensoriale coinvolgente a livelli esperienziali e cognitivi diversi, basata sulla percezione tattile e sull’assenza di gravità, che vede l’attiva partecipazione di una pluralità di attori: insegnanti, ricercatori, studenti, artisti. Qui una rotazione antigravitazionale, spezzando la routine, modifica la percezione del sé e la percezione dello spazio, consentendo di esplorare la realtà senza alcun ordine gerarchico precostituito. Contemporaneamente animano la scena tridimensionale una varietà di forme di interazione, parole e suoni, immagini, luci e suggestioni visive, in modo tale che si evidenziano nettamente la matrice corporea e percettiva e la natura multidimensionale della cognizione e dell’apprendimento.