Theoretical platform

Overview

The teams which joined in this project belong to Human and Social Sciences (HSS) and possess a robust expertise in the field of digital technology. They also answer, each in its specificity, the criteria of the "new epistemology" that, according to the specialists (Guichard, 2006; Wieviorka, 2013; Bourdeloie, 2013), the practice of science in the digital age involves: the employment of digital tools in the production of knowledge, the presence of specific methodological devices, the exploiting of the corpuses available through databases and digital networks, digital broadcasting of research and finally the famous "epistemic reciprocity" where the digital technology is at the same time tool and object of the scientific procedure in HSS. We shall not miss to notice that each consortium member laboratory offers an originality in the emerging of the scientific paradigms related to the digital technology: the simulation of the collaborative social situations, the implementation of virtual experimental conditions with free and infinite variations of psychological stimulations and ergonomic circumstances, and finally the creativity inferred, by and in, the individual and social, numerically "augmented" body. All these premises establish the conditions and substructure of the dynamics of researches that following the previous contacts of its researchers the consortium decided to assemble.

Also donated with capacities to espouse a meta-position and to employ a distance from its own practice, the consortium, including its German and French component, does not anyhow to move forward on the path of the quantification, nor moreover on that of the global theorization of the existing processes. The approaches proposed by the partners offer a too beautiful opportunity for to follow their peculiarities and to anticipate, if not increase, the near future developments of the "digital epistemology" approached on the horizon of the current exercise of the HSS researcher. To do this, the theory of "tool, distribution and field" could no longer satisfy the epistemologist of our times.

Thus, the consortium proposes an investigation stow with a research / creation engaging the naturalized immersive equipment and their operating protocols / scenarios, in the optics to observe the reciprocal causal dynamics. The declared aim would be an overview of the new horizon in the engineering of the scientific research and creation in HSS.

Theoretical assets: "digital epistemology"

- The digital technology is not only a possible subject of investigation of the HSS. This is also the result. Since the invention of the personal computing at the late 1970s, the hardware and the software have never ceased to evolving under the impulse of interests of the HSS, fields that have gave rise, from the late 1990s, to the invention of a new global economy, and have become professional requirements. Learning, personal constitution, social relationships, natural and mediated communication, economic practices, governance, are by far the largest commendatory of the solutions and the computing equipment, veraciously in front of the computing of scientific, industrial and military data. So, the civil domain, and specially the media engineering,

embodied the program of the Cybernetics of the universal auto-poietic machine simulating and alternate to the nervous system of animals and humans. It is also him who shapes at the moment the "peripheral" hillside of the computing and influences its algorithmics. And if the specialists admit that the connectivity and the semantization of contents in communication networks are the most prominent attributes of the computing of our time, we think that the evolution of the peripherals devices of computers is its essential factor, although still underestimated. It is precisely at this level that we observe the trend to the multi-sensorialisation and to the empowerment of objects connected to the intelligence networks. The evolution of the "interfaces man / machine", sonorous or visual, is not any more sufficient for defining the place of the sensitive factor in the computing and in the domains of its application. The inclusion of new channels, olfactory, caloric, etc. will not hide for a long time the necessity of a new, straightaway multi-sensory approach. The emergence of a new core of collective awareness, based on the holistic seizure of information from the reality by the autonomous sensitive entities will can be perceived only through the researches involving the peripherals orchestrating of the multi-sensoriality or rather inter-sensoriality, roots of which, curiously, are concomitant with the commencements of the digital networks. It is also the computer peripherals which show the process of the reanalogization of the data processing (Sobieszczanski, 2015), the latter being defined restrictive as the use of "analog libraries algorithmics" in some sensors occurring from the bio-inspired technology, but its founding concept brings the intelligibility for all the immersive tendency which knows the culture of today.

The machine to communicate of our time has to do the bridge, formerly unthinkable (Hottois, 2005), between technology and language. The technical conditions setting up the sustainability and relevancy of the media should act in exactly the same way as natural language. They must not only ensure the informational side of the communication, but also to boost the social spreading of the phenomenon of "emotional contagion". It gives rise to the theoretical links of the most interesting. As demonstrated Natalie Depraz (Depraz, 2004), the conceptual lineage of emotional contagion comes from Scheler's Gefühlsansteckung. Scheler shows it as the consequence of the conceptual apparatus of the theory of empathy of Husserl. But Husserl himself considers the theoretical foundation of Einfühlung as result of the works of Lipps and Erdmann into the domain of the "analogisation". To confront this term with the reanalogization of industrial sensors computing is not only a metaphor. The outcomes of studies of the neurophysiological substratum of the mimetic behavior designate the existence of the opened and auto-learner's circuits, associating, by the interposed emotional filters, the perceptive afferences to the cortical piers responsible of the praxis prefiguration. The dynamics of the artificial environment must be then harmonized with the dynamics of the neuronal data processing by the subject. This collusion of the perceptual ergonomics and the informative latency requires the placing, in the capture and display devices, of the analog modules. The digital technology, as equipment and object of studies, thus becomes the result, consubstantial of both: the anthropotechnical strategies and the praxis procedures of the HSS.

"In this sense, one can speak at the human being about two evolutions of the nervous system functions and especially its cognitive abilities to perception and treatment of

perceptual substrata. On the one hand, the human evolves by perfecting of his common capacities engaged in the control of the surrounding nature, and there hi follows the major vectors of Evolution, fortuitous and negative selection. The *biofeedback* between his informative organs and the nature is therefore mainly noticeable in the phylogenetic scale. On the other hand, hi develops his own culture who becomes for him the field of perceptual experimentation. From there, because the world standing in front of him is his own work on which it maintains a causal impact, the perfecting biofeedback can operate already in the ontogenetic level. This statement, of course, opens the issue of a possible "cultural genetics" treated already in the Anglo-Saxon tradition since the 1970s (Wilson, 1975; Dawkins, 1976; Shennan, 2002)" (Sobieszczanski, 2015).

- The digital crossing the HSS practices, force us to consider these sciences as praxeological areas. The HSS support not only the reciprocity - the digital methodological apparatus / the digital studied as an object, but in this framework they live the reciprocity - the initiation of the feedback loop: they are motivated by the digital while pulsing, in turn, its attributes, its nature. The most interesting result of our research would be to prove by a performative demonstration that the HSS in the current office focuses a circular acceleration of the improvement of cognitive abilities, under the influence of cultural products of these same capabilities, including digital. IT "consciousness oriented" by the sensory means would thus have the suppletive purpose of the residual cognitive activities including the creative culture.

The joint program incorporates the ongoing contributions of the participating teams, by offering the development lines deployed along the vectors including:

- Use of ubiquitous equipment, pervasive, low cost, multi scalable, available in two classes: capture and display devices. It offers operative confluence of sensory technologies that can satisfy the requirement of immersion, both artificial and "ecological". It will count everything that contributes to the "naturalization" of perception techniques, of conservation percepts, of processing of sensory information and of and the results restitution.
- Use of different modal markers of the subject's cognitive activity in the *laborative* situation, and above all the exploitation of the semantic richness of the gaze, in the visual handy devices leaving experimental spaces type "containers" to join the transport spaces, the architectures and urban scenography (Shayan, Abrahamson, Bakker, Duijzer, & Schaaf, 2015) (Vidal, Bulling & Gellersen, 2015) (Gollakota & Kravets 2015) (Renaud, Chartier, Décarie, Trottier, Bradford, Fedoroff & Bouchard, 2008).
- Running of various a-modal marker of the subject's cognitive activity, undulatory - EEG, chemical, magnetic, thermal, etc.
- Running of the experimental situation with scientific, but also esthetic and creative purpose, where the subject conducts itself his own monitoring of cognitive activities, by using the modal and a-modal personal sensors.

and technical features including:

" • High resolution, so virtual images are seen as sharply and in as much detail as in reality

• High brightness and contrast, so colors are vibrant and not washed out or dim

• Production of computer graphics and the display of captured imagery, that is equivalent to or exceeds human visual acuity, in 3D with the correct viewer-centric perspective rendering for every viewer

• Input and full recognition of the viewer's or viewers' being and actions, including speech, non-verbal utterances/noise making, and gestures

• Audio (sonification) at or exceeding human aural acuity, fully surround, listener centered and focused

• Touch (tactile) input from the user and touch output from the VR system, allowing haptic input and feedback, for all users, for example [***]

• Olfactory (smell) output delivered to each user, and input recognition as well

• Taste output and input recognition

• Linking such devices together with near-zero latency and no noticeable compression artifacts

• No user encumbrances (special glasses, headphones, nose tubes) except as desired for touch feedback and taste." (DeFanti & al., 2011)

Fields of application

Engineering of media

Engineering of research in HSS

Cognitive psychology

Art, culture and cultural literacy

Communication

Economic management