Digital Umwelt:
Towards a Didactic Use of Natural Interfaces

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ABSTRACT

The spread of Natural Interfaces, based on devices which allow the retrieval to the Human Computer Interaction of natural paradigms of human interaction (sound, voice, touch, movement), limiting graphic interfaces: the interaction doesn’t occur “through the mirror” (Carroll, 2012) of the screen, but it takes place through movement, in the natural space of the user, in relation to an augmented (digital) umwelt that inter-acts continuously with the user’s whole body. The aim of this work is to present natural interfaces as the tool that constitutes the effective place of convergence between body and movement, manipulation of spatial reference systems and man-machine interaction, and inquire the possible didactic declinations.

Keywords: Didactics, Human Computer Interaction, Natural User Interfaces, Umwelt, User

INTRODUCTION

The relation between space, movement and cognitive processes is object of enquiry since a long time and for different scientific trajectories. Though it’s impossible to make a comprehensive framework of this enquiry, Alain Berthoz words can synthesize it:

[… ] space is used in many ways to simplify neuro-computation, whether it is the geometry of neurons and most elementary proteins, the use of the propeller, not only for the genome, but for the distribution of sensory cells in the cochlea, the distribution of signals in neural maps or columns, or even the change in the geometry of the neural maps depending on whether the function is sensory or motor (Berthoz, 2012).

At this point I would like to keep on the use of space to simplify some cognitive processes. It seems to me, indeed, that neural basis of mental manipulation of the spatial reference systems (egocentric, allocentric, geocentric,
close space and distant space) are one of the fundamental principles of our rational thought and, in particular, of human attitude to geometry, to reasoning, to changing point of view, to logic ramifications.

It seems to me that neural basis make possible, in cooperation with the emotional brain, the interaction with the other, the intersubjectivity and also the empathy. For example, Frances Yates and Mary Carruthers have shown how, since the Greek period, spatial coding is used in mnemotechnics to replace or find objects, places, events, words, concepts, but also to individuate new combinations, to invent stories, to create associations.

Architecture is another illustration of the way we need space to order concepts and ideas. The great specialist of ancient Rome John Scheid has discovered a Roman manuscript where it is mentioned a city tour to educate Roman élite, and especially the strangers, to social life habits. The document also contains principles and rules organized according to the map of the journey in Rome. Each chapter is associated to a monument or to an important place. We can suppose that this method of presentation helped students in recording the contents of the document. In other words, we can say that the use of space is not only a simplex mechanism for senses, as I affirmed before; it also is a “outil de la simplicité pour la pensée rationnelle” (Berthoz, 2011, p.195).

Natural interfaces, as a tool giving back to HCI the third dimension, overcoming the leveling on the Cartesian tipical of the GUI, and giving to user the space that surrounds him/her making it available to digital context, seem to represent the tool which constitutes the ubi consistam of convergence between body and movement, manipulation of spatial reference systems and man-machine interaction.

It is not surprising that one of the field for the development and the spreading of NUIs is represented by videogame.

Starting from this basis, the present work intends to argue first the relation between videogames and literacy, then trace the main differences introduced by NUIs in video-playful interaction, drawing the scenario of enactive interaction which is produced in the new forms of HCI, to enquiry their declinability in the didactic scope and affirming the need, for those that are involved in Instruction Design, to investigate the opportunities offered by NUIs, avoiding the typical logics of discrete interfaces in an environment characterized by a continuous interaction.

**VIDEOGAMES AND LEARNING**

Videogames are the central theme of a pedagogic controversial debate. We could generally divide participants in two factions: on the one hand there are those that, defending the didactic tradition, refuse all possible implementations of videogames for educational aims and demonize their use, often without having a profound knowledge of them; on the other hand there are those who think that these new tools have huge potentialities and promote them, sometimes in an uncritical way (Corona & Cozzarelli, 2012). Approximately we could assert that the debate on videogames goes along the debate, still open, on the possible use of new media and new technologies in the didactic field, proposing again “apocalyptic” and “integrated” positions that have characterized it in the past.

The fact that these technologies represent a “burning” issue is not surprising if we consider the importance of the video-playful phenomenon and its impact on young people’s (from 3 to 38 years) habits in Italy and in the world.

First of all it’s necessary to precise that video-playful industry constitutes a very big “business” which has an economic budget even higher than the cinema industry one (Tanoni, 2003). This phenomenon is obviously linked to the fact that incomes deriving from videogames selling exceeded, in USA, the incomes of tickets for the cinema. Videogames such
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