Exergames as Teaching Tools: New Forms of Human Machine Interaction

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Abstract

Video games are the focus of a controversial pedagogical debate. Generally we can divide the participants in this debate into two factions: on the one hand we have those who, defending the traditional teaching, reject any possible use of videogames for educational purposes, often without a thorough understanding of them, on the other hand who sees enormous potential in these new tools and promote them, sometimes uncritically. The data presented in this article show that video games have actually led to a change in the lifestyle of young, influencing their activities and habits and that they are an issue that the pedagogy and didactics can not avoid facing. The opportunity to create serius-games for educational purposes looks like a wonderful opportunity to capitalize the time that an increasing number of young people invested in this activity. Since video games are divided into sub-categories, each of which has its own rules and gameplay, its own grammar and syntax, before starting to develop serious-games for educational purpose it is necessary to analize the theoretical scenario of pedagogy to identify what type of video game can be realy usefull for educational purposes.Therefore the aim of this study is to analyze the different types of video games in order to identify which of these might be useful to develop video games in the educational environment.

Keywords: *learning style; field of study; length of tertiary study; gender; age; learning language experience;*

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I. Introduction

Video games are the focus of a controversial pedagogical debate.

Generally we can divide the participants in this debate into two factions: on the one hand we have those who, defending the traditional teaching, reject any possible use of videogames for educational purposes, often without a thorough understanding of them, on the other hand who sees enormous potential in these new tools and promote them, sometimes uncritically.

With a good approximation, we can say that the debate on video games has many similarities with the debate on the possible use of new media and new technologies within the school environment, since it reproduces the positions "apocalyptic" and "integrated" who had characterized him.

That these technologies represent a "hot" theme is not surprising considering the scale of the phenomenon of videogaming and the impact it has had on the habits of young people aged between 3 and 38 years, in Italy and in the world.

The video games industry, in fact, constitutes a "business" that has a very large economic budget even higher than that used for film investment.

This phenomenon is obviously related to the fact that video game sales have passed, at least in the U.S.A., those relating to the tickets of cinemas (Tanoni, 2003).

In Italy the phenomenon of gaming seems to be growing and although the age of the average gamer oscillates between 11 and 24 years, with a percentage of about 73% of this age group claim to use this technology regularly, the use of time and energy in the videogame activity is high even for the lower age groups.

The 18.7% of children aged between 3 and 5 years in fact consider video games as one of their favorite pastimes, while for girls in the same age group the percentage drops to 9.5%. With regard to the age group between 6 and 10 years, video games emerge in a clear way, with 70.4% of boys and 39.9% of girls who say they play videogame regularly and consider them as one of the their favorite activities.

The phenomenon also appears to be growing, as well as reported in the tables of ISTAT[5], especially for this age group.

The presented data clearly show that video games have actually led to a change in the lifestyle of young, influencing their activities and habits and, considering the size of the phenomenon, it is clear that video games are an issue that the pedagogy and didactics can not avoid facing.

The opportunity to create serius-games for educational purposes looks like a wonderful opportunity to capitalize the time that an increasing number of young

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[5] Fonte ISTAT. (2008). La vita quotidiana di bambini e ragazzi

people invested in this activity.

Regard to usability and the potential of these electronic products for educational purposes, the linguist James PaulGee has identified 36 principles that can help to stimulate learning that are present in many video games.

The assumption underlying the author's thinking is that "when people learn to play video games, they are learning a new literacy."

We do not have, here, the opportunity to offer an overview, albeit brief, of the scientific literature on this relationship, however, we consider useful to open this work with one of the steps by which James Paul Gee concludes his essay "What Video Games Have to Teach Us About Learning and Literacy":

"I have first wanted to argue that good video games build into their very designs good learning principles and that we should use these principles, with or without games, in schools, workplaces, and other learning sites Second, I have wanted to argue that when young people are interacting with video games–and with other popular cultural practices–they are learning, and learning in deep ways."(Gee, 2004)

Learning through video games is, according to Gee, situated and meaningful, because it is based not on the definition, but on direct experience and simulation.

Gee focuses its rilfession also on the differences between the different types of video games.

These are not, in fact, all the same, but are divided into sub-categories, each of which has its own rules and gameplay.

For example, the videogames can be: RTS (real time strategy), Action, Platform, Shooter, FPS (First Person Shooter), TPS (Third Person Shooter), of sports, RPG (role-playing based), MMORPG (Massively Multiplayer Online Role Playing Game) and, in general, we could say that each of these types of video games is characterized by its own grammar and syntax.

Learn the gameplay of each type of video game is therefore acquiring a new literacy.

Also Young, in 2004, felt the need to bring the research on the benefits of video games as learning environments within the general framework of learning theories:

"To understand video games as learning environments, it is essential to look carefully at the qualitative descriptions of learning in video game environments and apply to it what we know from learning theory about how people think and learn. An ecological psychology view of learning from video games would highlight principles focusing on the primacy of goals and intentions that guide perception-action within the constraints of the game design and user interface. From an ecological perspective, then, the task of game design becomes one of selecting goals and creating environments in which those goals can optimally be pursued, while taking into account those things that gamers tell us are keys to enjoyable, engaging experience." (Young, 2004).

Assuming that each type of video games constitutes a semantic domain itself, it is necessary to analyze the theoretical scenario of actual pedagogy to understand what type of video games may be able to reflect and express it.

2. Purpose

The aim of this study is to analyze the different types of video games in order to identify which of these might be useful to develop video games in the educational environment.

3. Videogames and learning processes

Currently, the pedagogical tradition which has long privileged, regarding the processes of learning and meaning, the logical knowledge is challenged by a long series of scientific disciplines.

Learning processes today are in fact considered, from disciplines such as neuroscience, psychology, philosophy, etc.., such as phenomena "embodied" or "situated".

The modern scientific thinking, therefore, gives the body the role of "knowledge machine" (Varela, 1990), and considers knowledge as mapped in our sensory-motor system "which not only provides structure to conceptual content, but characterizes the semantic content of concepts according to the way we function in the world with our body "(Gallese, 2005).

The body ceases to be considered as a simple medium between the brain and external reality, and becomes the "main device through which, creating experiences, develop learning and producing knowledge" (Rivoltella, 2012, p. 109).

Acknowledging these instances, pedagogy and didactics have attributed to the body and its movement a central role in the teaching / learning processes.

The body (Sibilio, 2011) thus becomes the pivot of a teaching that starts from the assumption that "the abstraction and generalization can produce learning only if were built starting from bodily experience of the world"(Rivoltella , 2012, p.109).

In this perspective can also be included the current research aimed to decline in education the concept of "Simplexity" proposed by Alain Berthoz (Berthoz, 2011).

In his work "Simplexity" (Berthoz, 2011), the French author identifies a number of strategies and mechanisms that the body puts in place to deal with the complexity of reality.

The attempt to decline the concept of simplexity for educational purposes with the aim to use the mechanisms that the body implements in the natural processes of adaptation to the environment to foster the learning processes is perfectly in agreement

with the pedagogical perspective outlined here that see the body at the center of the teaching/learning processes (Sibilio,2011).

A video game, to be defined as instructional or educational, should therefore be able to reflect these theories and allow the body to express its potential redefining, enriching and expanding the strategies that it implements in the processes of learning and meaning.

4. Conclusions

Generally, we can define a game as a software that allows you to play interacting with images projected on the screen. Video games are then games where the rules are automatically managed by an electronic device that uses the displays and monitors to provide output.

Although, from a historical point of view, most of the video games make use of input devices that flatten the degree of involvement of the body only on the eye-hand combination (mouse, joystick, keyboard, joipad, etc), it is necessary to establish that games of last generation make use of different forms of interaction.

We refer here to the type of video games known as "exer-games", a term derived from the merger of exercise and games.

This type of video games is characterized by a high degree of involvement of the body and, thanks to the development of technology, allows to exploit the full potential of the body in the processes of learning and meaning.

In particular, all consoles of the current generation make use of devices that can increase the level of involvement of the body in the human-machine interaction, think for example at the nunchuck of Nintendo, at the Kinect of Microsoft or at the PSMove of SONY.

The development of these devices and exergames has led to the emergence of new types of interfaces and new forms of interaction.

In particular, the NUIS (Natural User Interfaces), often used within the Exergames, moving towards an efficient use of the senses and of the body, appear today as the normal development of graphical user interfaces, and could be a useful teaching tool.

combining physical activity with natural interfaces(NUI - Natural User Interface) and Gesture Recognitiontechnology, reproduce, in the digital environment, the fundamental questions of perception and phenomenology, confirming that the built-in actions within a digital interface are " fluid and functional crossings between virtual and physical realms" (Hansen, 2006).

The embodiment is therefore the focus of pedagogical studies and of current trend of video games.

In light of the foregoing, the specific structure of exergames seems to have great potential for educational purposes and the development of video games based on this logic of interaction could generate useful teaching tools.

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