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FROM SLOODLE TO METAVERSE. TEACHING AND LEARNING IN THE THIRD SPACE: INFRASTRUCTURE AND OPPORTUNITIES

DA SLOODLE AL METAVERSO. INSEGNARE ED APPRENDERE NEL TERZO SPAZIO: INFRASTRUTTURE ED OPPORTUNITÀ

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Abstract

In 2009, an interesting Second Life project brings Moodle into virtual reality. This is the first experience conducted in the virtual world to attend academic courses in hybrid mode, breaking down the boundaries between living, teaching and learning online and offline. What features made Second Life so popular, at least in the early stages? What are the points of contact between the virtual worlds and the metaverse? What are the educational prospects expected in the Metaverse today? This contribution analyzes the technological infrastructures and metaverse opportunities.

Nel 2009 un'interessante progetto di Second Life porta all'implementazione di Moodle all'interno della realtà virtuale. Si tratta della prima esperienza condotta nel mondo virtuale per frequentare corsi accademici in modalità ibrida, abbattendo i confini tra il vivere, insegnare ed apprendere online e offline. Quali caratteristiche hanno reso Second Life così famoso, almeno nelle prime fasi? Quali sono i punti di contatto tra i mondi virtuali e il metaverso? Quali oggi sono le prospettive educative attese nel Metaverso? Questo contributo analizza le infrastrutture tecnologiche e le opportunità metaverso.

Keywords

Metaverse; learning; perspectives.
Metaverso; apprendimento; prospettive.

1. Traditional learning with digital technologies

Attempts to integrate technological innovations into the teaching-learning process date back to the first decade of the twentieth century, and from the last century,

some scholars have begun to dwell on the usefulness that tools external to the traditional way of teaching could serve as a support to the student during the study phases. In 1927, Pressey's teaching machines assigned the learner scores on multiple-choice tests, allowing the task to continue only when a correct answer was given their characteristics, these machines were basically used to evaluate a performance and not to teach.

In 1954, Skinner spread programmed instruction based on his theory of adaptive behavior and the effectiveness of a teaching methodology based on the stimulus response that provides the learner with one piece of information at a time, splits the subject into small units (frames, steps) and allows him/her to verify his/her learning. The student immediately receives a confirmation of the correctness of the answer, and, in this way, Skinner achieves the goal of guaranteeing them greater autonomy in his/her learning process and, proceeding with the study according to their own possibilities. Learning thus comes to be graduated and individualized; no relevant stimulus can be avoided or neglected (as can happen in traditional teaching if the learner is "distracted"), and evaluation takes place on an ongoing basis as well as in absolute objectivity, albeit on a rigidly organized knowledge. The subject is motivated by the fact of obtaining positive feedback that allows him to continue and is directly involved in the entire teaching process.

The didactics controlled by Mager's 1972 student instead supports teaching, starting from the concrete and not from the abstract theory; from the "how" before the "why", and from the examination of what happens before the causes. All these follow a teaching program that proceeds through sequences organised on the basis of the student's logic rather than that of the teacher. Marger's vision of behaviorist derivation considers the achievement of the objectives that the student must achieve, focusing on what the student has learned and organising his development path on the basis of this. A teaching based on the evaluation of the product is, still far from the vision of teaching as a science that is focused on teaching methodologies and on the learning processes of individual students.

In summary, the use of computers and digital tools gradually becomes an important support for teaching through three different methods:

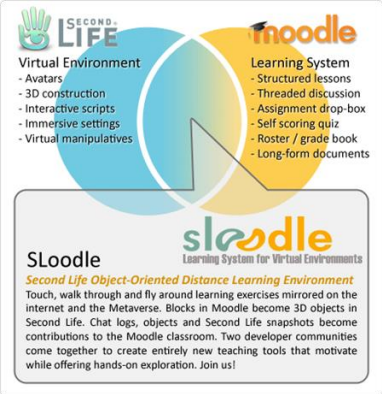
- ✓ Computer assisted instruction (CAI): the computer is used as a self-sufficient machine that is capable of providing teaching, and thanks to which the teacher presents individual lessons (very simple products, typically diskettes with structured information implemented by self-test exercises);
- ✓ Computer managed instruction (CMI): a teaching method in which the computer is used to organise teaching/learning to record data and student progress;
- ✓ Computer mediated education (CME): where the computer becomes a facilitator of the teaching–learning process. Its adoption is facilitated by the development

and diffusion of the internet and the consequent emergence of new services such as e-mail, chats and social networks. These services and environments have in turn allowed users to adopt materials of different formats and to interact in a virtual environment, also encouraging the birth of participatory cultures.

2. From Second Life to Metaverse: Infrastructure, Teaching and Learning

The development and diffusion of the www protocol, as we have seen, has accelerated the process of technological development in favour of a potential that the Net could have offered to everyone, and so it was. We get to the present day with an increasingly constant growth of IT tools for instance to lead users interacting remotely and create new lives or, better, parallel lives within virtual spaces exploited in schools as important territories for achieving objectives educational and didactic. In the last 30 years, the popularity of computers and the emergence of various digital technologies have pushed educational research even further, experimenting it even within virtual worlds (Wang & Burton, 2013). Since then, virtual worlds have evolved from simple text-based interfaces to real three-dimensional (3D) environments that simulate the real world also through particular graphic representations (e.g. avatars), allowing interaction between users and simultaneously with the surrounding environment (Collins & Jennings, 2007; Smart et al., 2011). These are real-second spaces that give rise to a hybrid life experience between real space and virtual space (Hann et al., 2018). Virtual worlds such as Active Worlds, Whyville, World of Warcraft, There, Minecraft and Second Life have also been adopted as educational as well as playful and social environments (De Lucia et al., 2009).Among these three-dimensional virtual worlds, Second Life represents the most used platform in education and schooling (Wang & Burton, 2013; Reisoğlu et al., 2017). The system provides its users (called *residents*) with an avatar considered the alter ego that is configured as a mediator of real exchanges between human beings. The world is a completely 3D world, and each user can move from one space to another, from one city to another, simply by choosing from a list. The possibilities for generating educational opportunities in Second Life appear to be immense. What's in Second Life? There is essentially a new world, a virtual world that offers such a vast number of services, also training ones. The technological infrastructure is not so different from that of other less widespread virtual worlds from which it takes the persistence of the environment and its evolution even when users disconnect (Macario & Ondrejka, 2014), as well as the synchronous interaction and real-time collaboration between people and between people and the environment. The interesting aspect is that Second Life also integrates some elements of MUVE 3D (3D multi-user virtual environment). Of the MUVE 3Ds, Second Life takes possession of the spaces and the simulation that can be carried out within them, where the participants learn from the experience, observing the results of their actions. While

sharing common characteristics with other 3D virtual worlds, Second Life is also a unique virtual world. It is not a virtual game, as there are no game-like levels or activities (an aspect that most distances it from virtual worlds), but a real virtual space in which users can socialize with other residents and, participate in various activities useful in real life.The reason Second Life has been used in secondary school and higher education is due to its great potential for improvement by user action through collaboration. The peculiarity of the world of Second Life is to leave users the freedom to take advantage of the copyright on the objects they create, thus soliciting innovation and enrichment of the existing objects thanks to the contribution of its residents. Among the important creations, in 2009, Second Life was implemented by moodle, the most used learning management system (LMS) ever. The project, called SLOODLE (play on words between *Second Life* and *Moodle* but actually an acronym for "*simulation-linked object-oriented dynamic learning environment*") was designed to provide teachers with a series of tools for designing training activities and also supporting their evaluation.



Student responses are stored within the Moodle platform, again offering a practical solution for documenting, and analysing responses. Of course, it is more of an innovation carried out on the technological front than on the assessment front. This revolution concerns the implementation within Second Life an "other" environment, making it a "virtual world" characterised by transmediality. In Second Life, the integration of evaluation activities and feedback associated with existing Moodle tools represents an absolute novelty for the first two decades of the 2000s.

3. What do we know about the metaverse

Recently the arrival of new virtual worlds is becoming more insistent: Metaverse, and Meta by Facebook is an example of this. The term is not new. Meta was coined in 1992 in the literary field by Neal Stephenson, the novel *Snow Crash* (Stephenson, 1992). In this novel, Stephenson defines the metaverse as a large virtual environment (Joshua, 2017). More recently, a metaverse called OASIS appeared in the 2011 novel *Ready Player One* by Ernest Cline (2018 ed.it), scripted for the 2018 film of the same name by Spielberg. In the novel, the metaverse is a shared virtual space that combines virtual reality, augmented reality, and the internet. Alang (2021) defined the metaverse as the layer between self and reality, locating in the metaverse a 3D virtual world where all activities can be performed with the help of augmented and virtual

reality services. These environments are gradually gaining popularity in recent years since especially during and following the COVID-19 pandemic companies need to move their activities online, guaranteeing the immersiveness and active participation of everyone.

Mark Zuckerberg's introduction and publicity of Meta to Facebook shifted everyone's attention to the metaverse and made it a topic we talk about in our daily lives. Meta di Facebook is much more (at least on paper) than we expected: not a simple social network that will entrust the management of services to other companies, but a company (Facebook) that bets on a large IT platform to live in the metaverse, involving other companies in order to create a revolution comparable to the birth of the internet and the rise of smartphones (Hardawar, 2021).

The metaverse is based on technologies that enable multi-sensory interactions with virtual environments, digital objects and people. System representative fidelity based on Extended Reality or cross and Trans Reality (XR) is made possible by stereoscopic displays capable of conveying depth perception (Speicher, 2019). There are different types of stereoscopic systems, however, we essentially refer to a technology based on the juxtaposition of different high-resolution screens that replicate the typical view in physical environments (El Beheiry et al., 2019). The high-resolution XR displays enable a wide user field of view that can span 90 to 180 degrees, delivering superior auditory experiences over 2D systems. 3D, spatial or binaural audio allows for the construction of soundscapes that dramatically enhance immersion in Augmented Reality (AR) and Virtual Reality (VR). In addition to the forementioned passive sensory inputs, XR systems allow for active interaction with virtual elements through the use of motion controllers, which are handheld input devices with grips, buttons, triggers, and thumb sticks. Using controllers, users can touch, grasp, manipulate and use virtual objects, and this ability makes users active actors in every experience, including education. On this front, the development of full hand and eye tracking will further improve the user experience towards a more natural interface. Research into wearables such as haptic suits and gloves that respond to touch is also underway. More so, further sensory research efforts are focused on the direction of digitisation and simulation of smell (Cheok, 2018). In the field of VR, the metaverse, in its infancy, was conceived as Internet 3D or Web 3.0 in terms of interaction as a network of virtual worlds in which avatars would be able to travel seamlessly between each other. This vision was realised in Opensim's Hypergrid (Dioniso et al., 2013), where several autonomous and social virtual worlds based on Opensimulator open-source software were, and still are, reachable through the Hypergrid network that enables the movement of digital agents and their inventories on different plat-

forms via hyperlinks. However, Hypergrid is still not compatible with other popular proprietary virtual worlds such as Second Life.

The user's digital identity, which can be represented in the form of an avatar, should be a characterising element, usable within the various spaces of the metaverse. This is the great challenge we face, and which is being presented to us. Regarding the potential for educational innovation, laboratory simulations (e.g., safety training), procedural skills development (e.g., surgery) and STEM (Science, Technology, Engineering and Mathematics) education are among the prime application areas with spectacular results in terms of training speed, performance and retention with AR and VR. With the ability to capture 360-degree panoramic photos and volumetric spherical video, the metaverse can enable immersive journalism to accurately and objectively educate mass audiences about unknown circumstances and events in far-flung locations. Furthermore, new models of metaverse-powered distance learning may emerge to overcome the limitations of 2D platforms (Kraus et al., 2022). Meta-education can enable hybrid formal and informal active learning experiences in online and alternative 3D virtual campuses, where students are co-owners of the virtual spaces and co-creators of liquid and personalised curricula. However, we will have to wait a little longer. In fact, current initiatives are mainly focused on proprietary and limited Metaverse solutions that do not guarantee the hoped-for full immersive experience (Cai et al., 2022).

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