IMMERSIVE DIDACTIC APPROACH: TEACHING WITH VIRTUAL REALITY AS INTEGRATED LEARNING ENVIRONMENTS

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Abstract

Recently, the term immersive is commonly used. Or perhaps it would be more accurate to say that it has become a hot word, used-sometimes abused- in different areas, including educational one, and often associated with another word: experience. In a typical perception, an immersive experience is a simulation in some forms of virtual reality, supported by particular technologies.

Since it has been introduced in some school lessons, it has certainly represented a great challenge for teachers. But...what is exactly the Immersive approach? It is a didactic methodology, a project for primary and secondary schools, that includes the study of a subject through Virtual worlds. These are online simulated 3D domains from the computer on which users – mediated by an avatar – can explore environments, realize them, participate and create activities, communicate with other users. In Italy it is experienced by INDIRE. Its goal is to explore and consolidate the educational potential of so-called "virtual worlds". The article is aimed at describing the most important steps of this innovation, with its implications for teachers and students. After a brief overview of the main theoretical frameworks, we will try to describe the current status of this methodology, its characteristics, its objectives and the roles of the actors involved.

This work is an exploratory paper that used the qualitative research techniques, a random and non-participant observation, to critically evaluate and verify how, through a constant and widespread use of technologies in daily teaching practice, the environment and the way of learning can be transformed. It attempted to "live in person the situation" to critically consider advantages and disadvantages of this new didactic approach.

Keywords: Immersive; learning; virtual environments; teacher; training needs; training objectives.

1 INTRODUCTION

The introduction of computers and the Internet has brought significant changes to education. Though computer-aided education and computer-assisted training have been around a long time, the tools were confined to more or less advanced multi-choice solutions. One of this could be considered the immersive approach.

Recently, the term immersive is commonly used. Or perhaps it would be more accurate to say that it has become a hot word, used-sometimes abused- in different areas, including educational one, and often associated with another word: experience. In a typical perception, an immersive experience is a simulation in some forms of virtual reality, supported by particular technologies. Since it has been introduced in some school lessons, it has certainly represented a great challenge for teachers.

The Immersive approach is a didactic methodology, a project for primary and secondary schools, that includes the study of a subject through Virtual worlds. These are online simulated 3D domains from the computer on which users – mediated by an avatar – can explore environments, realize them, participate and create activities, communicate with other users. Building this kind of world provides next generation possibilities for students to explore and contribute to a virtual world which got a vast amount of similarities with the real world. A virtual world represents a set of new rules, abilities and possibilities. All these are an invitation to explore, experiment and create together. Given the right conditions, a student can enter the world with a purpose and a goal. The Scenario is a set of premises for the world or basically the narrative that students become a part of. The virtual space also presents a canvas for free fantasy, letting students encounter massive structures and dramatic events at very close quarters. The ability to experience and experiment with a virtual environment are key to create an immersive and thereby a memorable learning experience.
Before getting into the educational implications of immersive, it is useful to try to clarify its meaning, by retrieving some definitions and, at the same time, eliminating misleading interpretations.

Janet Murray was the first who used the term immersion related to the use of media: “In every medium, an engaging narrative can be lived as a virtual reality, because our brains are programmed to enter the stories with an intensity that can make the world disappear around us. We refer to this experience as an immersion. In a psychologically immersive experience we look for the same feelings that we perceive diving into the ocean. The sensation of being surrounded by a reality totally different that captures all our attention, our whole perceptive apparatus.” (Murray, 1997).

From Murray’s point of view, the traditional narrative can also be considered an immersive experience. In this sense, there are many media with immersive potential, from books to cinema, from theatre to music. All media cannot be considered immersive.

According to J.C. Herz, a particular condition is necessary: “An environment can be seen immersive when our actions have consequences”. (Herz, 1997) The thought immediately goes to a particular type of media: video games. There is no video game where the player's actions have no consequences. So all the video games are immersive? No, there is still something missing. An environment is immersive when it can deceive a person's cognitive and perceptual system, making him believe that he is in a place different from the one in which he physically find himself. (Patrick et al, 2000).

Bopp (2005) proposes an approach he terms immersive didactic: one which incorporates the tasks of learning within the gaming process. These computer games follow the immersive didactic approach; they are arranged as integrated learning environments intended to avoid awareness of the didactic design. The intention is to enable the learner to dive into the game (to immerse). The main intention is to avoid compromising the flow in the game based learning environment as well as the recognition of a didactic structure by the learner.

2 EDUCATIONAL IMPLICATIONS

Immersion can be a value if used to set up significant learning experiences. We are well aware of how experience is an effective way of learning, perhaps the most powerful. Francesco Antinucci distinguishes what is the way of learning on which the school is founded- the "Symbolic-reconstructive" style, based on speaking and writing from "Perceptual-Motor" style, based on repeated cycles of perception and action on the reality. According to Antinucci, this second way produces better results, because it is a natural way of learning, adapted into tens of millions of years of evolution against of thousands of years of symbolic-reconstructive way (which is a language-led).

But the problem is that perceptual-motor learning-or from experience-is very less convenient than the symbolic-reconstructive one: to experience something is necessary to be there where it happens; moreover, an experience can involve some form of risk, or of inconvenience; finally, some things could not be experienced (you cannot learn from the war of Two Roses...). Viceversa, "symbolic-reconstructive" learning depends only on a text which contains information we need to transfer.

In the last few years the computer has come to change things, making more effective to learn from experience, creating copies of reality which can be controlled, manipulated.

So as the press makes copies of a text useful to be read and television does copies of reality that can be perceived by human senses, the computer makes copies of the realities useful to act on.” (Antinucci, 2001) Antinucci mainly refers to video games, or better, to the video game medium.

Now we go back to diving: if to videoplay means to learn from experience, immersion greatly increases realism through feeling present and feeling agent. The question is how we can link the videogame to meaningful learning objectives, especially in formal education environments.

In the last decades we have seen the flourishing of a vast literature about this issue. From James Paul Gee to Mark Prensky and Antinucci. But it should also be considered that the video game, intended as a type of medium, can go beyond the game: for example, simulators, Multi User Virtual Environment (MUVE) Environments Multi-user digital (almost always online) characterized by the absence of gameplay. In MUVE there are no narrative structures, rules and roles, missions and pre-set goals. They are the same users who decide the use and the objectives they want to get to. A MUVE example is EdMondo the "virtual world for the school" of INDIRE, in which there are training courses for teachers and learning for and with students. Till now we have talked about the immersion as a predominantly
cognitive phenomenon where, even if our mind is transported elsewhere, our senses remain linked to the real world.

The perceptive immersion is obtained, instead, "by blocking as much as possible the stimuli coming from the outside world" (MacMahan, 2003). How? With masks that replace the real vision with the virtual one; with earphones that prevent listening to sounds from the physical environment and making you listen what happen digitally; with gloves or other clothes capable of producing tactile stimuli connected to the action in the virtual, etc. It is evident that the perceptual approach creates the conditions for an immersion even more powerful; so powerful that one day we may no longer be able to distinguish the real from the virtual. The enormous potential in terms of a virtual learning environment is impressive and significant, even if the technologies for perceptive immersion are still at the beginning.

3 AN ORIGINAL AND INNOVATIVE LEARNING EXPERIENCE

Immersive Didactic is a project for primary and secondary schools, that includes the study of a subject through Virtual worlds. These are online simulated 3D domains from the computer on which users – mediated by an avatar – can explore environments, realize them, participate and create activities, communicate with other users. In Italy it is experienced by INDIRE. Its goal is to explore and consolidate the educational potential of so-called "virtual worlds". There was a chance to visit an Institute and attend " virtual lessons" as well as observe both the educational and relational dynamics in a class which uses an immersive didactic approach. This was a random and non-participant observation since the main purpose of the visits was to "live in person the situation" to see if a well structured place and a teacher getting closer to the child are powerful tools to facilitate the teaching/learning process (Notti, 2008).

Immersive Didactic is a process that wants to create projects where innovation is not imposed from the top but grows within the school. The change must begin from the class designed to transmit knowledge according to the new model. The class has a different "skeleton" compared with a traditional classroom: the desks are arranged in a horseshoe and inside there are 3 files of 2 so as to encourage interaction among the students and make it easier when moving around. The use of virtual world, however, brings concentration and class ... silence, and the opportunity to work with open doors, which is often difficult to do. This solution offers children a greater self-control of voice levels during the various activities, as well as to show that the class is not an enclosed space, but is open to the world! Therefore, technology is now essential to the class group because it not only encourages moments of both personal and collective reflection but also self-assessment, making it possible to independently or in groups develop the topics covered during class (Cohen, 2001).

Virtual worlds enable you to activate specific tasks within modeled settings as scenarios aimed at learning goals. This means they learnt English in a virtual environment that simulates the experience of a check-in at the airport or an order in the restaurant, or learnt sciences by exploring a seabed or the inside of a volcano, they created their ideal city. But it also means the possibility for teachers and students to build those scenarios. Here then a class — but also more geographically distant classes – can use a virtual world to equip an exhibition space on a disciplinary theme, or to reconstruct a historical site of the past.

Teachers have used Minecraft to teach the 25 students observed valuable learning and social skills. Minecraft is a "sandbox" game where players explore, craft and build their own world which is based on real-world. It's one of the highest selling games in history.

At its core, Minecraft is about placing and mining blocks. The game world consists of 3D objects—mainly cubes—that represent materials such as dirt, stone, various ores, water and tree trunks. Players gather these material blocks and use them to form various constructions. When the game begins, players must work quickly, with friends or by themselves, to build shelter to survive the night (when all the monsters of the world come out). Once they finish a day (20 minutes in real time), users repeat the cycle, building more complex shelters and stocking up on vital resources in order to survive.

Available game modifications, called mods, add a variety of gameplay changes. One mod, Minecraft Edu, is designed to make the game more classroom-friendly. The mod allows educators to incorporate their own curricular content and run a custom server for each of their classes.

We noticed benefits of Minecraft in the classroom. Minecraft gave students the freedom to create, pushing their imaginations to the limit and allowing them to be creative in ways not possible in the real world. Inherently about problem-solving, the game inspired students’ higher-level and critical thinking. Being a very social game, students could rely on other players for help in the sometimes-unforgiving
Minecraft world. When students have worked together, it built positive classroom climate, thought the benefits of collaboration and facilitated teamwork in a way that’s more organic than, say, being assigned to work together on a project. Students who might not get along in the real world became allies in the Minecraft world. With the right imagination and creativity, teachers implemented any sort of lesson into the world of Minecraft using the endless possibilities.

4 IMMERSIVE LESSON. TEACHERS AND STUDENTS ROLE

The teacher is responsible for the relationships in the class, supporting students not only with words but also with caring behavior, considering them a key component of the teaching/learning process which takes place daily in the classroom. Thus, they promote the acquisition of social and interpersonal skills of the students and promote the success of the educational activities proposed. On an institutional level, the teacher is the undisputed leader of the class group. The teacher is a socially legitimized leader: everyone, including the students, expects the teacher to hold lessons, give tasks, keep discipline, administer rewards and punishments. The basic requirements for a good teacher are in fact the ability to manage the class, to keep order and respect. This does not mean that students appreciate the authoritarian teacher who upholds only the coercive power, but that they expect that they will manage the group confidently and propose an effective teaching.

The teacher should be, first of all, a facilitator of learning, establishing the climate or the initial atmosphere in which to develop the experience of group or class, identifies and clarifies the intentions of individuals of the class and more general ones of the group.

The teacher tries to organize and make available the largest possible number of ways to learn. They offer every conceivable resource that the students want to use for their own intellectual development and purposes. The teacher becomes a member of the group, expressing his opinions like any other individual member. He is free to express his feelings, with the students, satisfaction and disappointments, constantly supervising the group, recognizing and accepting his limits.

Most times his attitudes will not be such as to facilitate learning. Moreover, the teacher must act as a listener/motivator, listening to the students’ stories, as they speak about themselves, understanding the narrative style and identifying with their world in order to offer opportunities to experience other ways to construct meanings about the personal, social and individual school experience. If each child is a storyteller in constructing his identities, the adult should therefore worry about being an attentive listener and good co-narrator (Antonietti, 1998).

Today, the new teacher must be three-dimensional, embracing not only the disciplinary and organizational skills but also, and especially, those attitudinal and relational. The teacher must enter the reality of children and identify with them, analyzing and understanding their issues and characteristics, through an empathetic listening.
A good teacher should try to promote a communicative structure that allows everyone to take part in a meaningful way. The teacher's task is to establish a cooperative class climate and an effective model of communication, regulate appropriate tasks in small groups, coordinate the organization of the class with the learning task planning, define the roles and responsibilities of students, observe the group interaction, intervene when necessary and help students learning development. Within the school of the 21st century, the teacher becomes an academic expert: reading the context in which he operates and its characteristics (students, space and time, the institution) and their influence on the teaching/learning process; reading students behaviours and contextualize them, putting them in relation to the conditions under which they occurred; Planning paths and educational activities, to choose aims, objectives, content, methods, tools and materials, testing and evaluation criteria that are consistent and appropriate to the context in which he teaches; adopting a communicative style more appropriate for the conduct of the various moments of school life.

Within a society aimed at research and experimentation, the teacher is different: he is a researcher who develops research activities according to the educational and formative process of his students. The teacher-researcher reflects on his style so as to make it more suitable to working conditions and analyze the styles of the students both in the field and cognitive behavioral therapy. He should also have leadership skills as well as be autonomous and flexibility. Among other things, the "social" dimension of research is in a natural daily school position because the teacher deals with issues that are not easy to solve. He looks for information relating to methodologies, approaches and tools to use. The teacher-researcher puts knowledge and abilities at the service of students, helps them to set, to conduct and to evaluate research progress in cooperation.

Proper teaching methodology should be moved by the student. This will make learning meaningful to students, because it starts from their interests, their training needs, socio-cultural reality in which they live, thus maintaining high motivation level and the interest and reward the application. The class is not a pure container, but a group whose dynamic influence the maturation of the individual, as well as didactic communication between teacher and child is structured in terms of a complex relationship of socio-educational and not only instructive element (Comoglio & Cardoso, 1996).
Students have changed and so have their development needs. The demand for education is very different from the past. It starts from understanding the students and responding to their needs. Teaching means building their knowledge with a teacher who does not replace but stimulates autonomy and encourages the student to explore. This kind of school converts its methods and instruments, becoming a student laboratory. The student thus goes from the passive condition of knowledge learner to the centre of the educational process and active builders of learning. The teaching/learning process does not translate into the transmission of knowledge from the minds of the teacher to that of individual pupils, in a one-to-one relationship, but becomes a process in which the teacher has the role of organizer of experiences that enable students, individually and as a group, to "manufacture their learning (knowledge, skills, competences).

Over the years, numerous studies have been carried out on the relationship between this new child, the educational institution and its educational and instructive objectives, indicating the fundamentals of an effective educational method, which considers the actual learner's competences: the student should have interesting experiences: casual situation, very similar to those activities which, in school life, children are involved and engaged in without adult pressure; the student must have the necessary in formation material and allowed to use it; the student must be able to develop in an orderly manner all the solutions he could think about; the student must have the opportunity to test his solutions applying them in practice and discovering the meaning and validity (Johnson & Holubec, 2001).

This is based on the idea that there should be a close and mutual relationship between school and the outside world: the latter, with all the natural experience situations that it may propose, is a source of inexhaustible inspiration for teachers, which should orientate to giving the students a chance to experiment in problematic, realistic and socially relevant situations and contexts. "The school is designed as a laboratory to learn through collaboration, discovering the essence of democracy" (Dewey, 1999).

The discovery of a child as an active knowledge constructor, allows the teacher to prepare more favourable conditions so that he can "produce" his learning as well as promote a positive growth. It is this "good adult" prophecy that allows the student to believe in his efforts to overcome difficulties and succeed, even when he feels incapable.

5 DISCUSSION

Some of the popular trends (EU Digital Agenda, March 2010, 2020 Vision-Report of the Teaching and Learning in 2020 Review Group) reveal that: pedagogical models, and constructivist and socio-constructivist, include ICT as tools to reinforce traditional teaching which prefer an active approach, open tasks and the personalization of learning paths. Structural constraints have been overcome in recent years by extending the class space with virtual learning environments (VLES) and content management systems, LMS (Learning Management System), which are associated with Web 3.0 tools. The prevalence of multimedia, interactive whiteboards and interactive surfaces in general will initiate the expansion of the number of technological devices (tablets, netbooks, e-books, responders ...) use within the classroom as well as for learning activities.

It is worth noting the effectiveness and benefits of the introduction of technologies in the educational world. The cognitive advantages include: greater degree of motivation; more attention and participation; self-esteem and autonomy; the virtual, immersive lessons are more engaging and allow students to understand more quickly (educational software available with simulations and interactive activities, students can be involved in the exploration of virtual environments); they have different learning channels that stimulate different intelligences (usually in a learning process, a normal individual is able to memorize the 25% of what he hears, the 45% of what he sees and hears, the 70% of what he sees, hears and has a chance to experience). Another benefit of adopting this new approach is to bridge the gap between what is taught in classroom and what students need in real-life; this is especially true for professional education. To prevail in today's and even more important in tomorrow's working environment, students have to be enabled to hone their skills in a real-life or at least realistic setting, that prepares them to transfer their skills easily into the working world.

6 CONCLUSION

When the lesson is supported by technology, the expectations of the students change. A simple diffusion of modern technological equipment should not be considered but rather a support for innovation of the learning environment. In this context, the risk of "isolation" can be very high when considering that
students are greatly attracted by the world of the media. Thus, the teacher must consider the emotional-affective factors of the educational relationship and should pay attention to the training as well as organization of the class, i.e. the way of working out the goals and the tasks, and of communicating student deliveries, predisposing the spaces, times, preparing and distributing materials, tests and evaluating processes and products.

The goal is to develop a multimedia communication according to a building of knowledge not necessarily sequential as a traditional book, to choose an online work environment for homework and to make sure that the class climate is relaxed, experiential and existential. The biggest challenge is to adopt a multimedia teaching approach since multimedia languages are a strategic resource, suitable to: creating excitement of learning; reinforcing skills already possessed; enhancing motivation in students. In this context, the teacher is no longer a mediator in communication. He should not only know his own subject well but also new technologies to teach it as best he can. Multimedia should be used every day in the classroom.

The experience of INDIRE project has shown that a new learning environment starting from the renewed classroom (which thus becomes a warm and well-structured space) as well as the preparation of the teacher to come closer to the child are powerful tools to facilitate the teaching/learning process. This work shows how, unlike what may be believed, in an immersive teaching class there are both cognitive and emotional perspectives. Regarding the first, consider that the all the members of the group class give its contribution to the elaboration of the final work: knowledge is built along with the others through the negotiating of meanings and confrontation of viewpoints, representations of cultural objects, experiences and beliefs. The second, on the other hand, is guaranteed by the fact that when working with other members of the group there is interaction with the others, creating a bond with them, if not immediately of affection, but of respect and empathy. The teacher, then, must observe, listen and support the knowledge processes of the student, providing meaningful and motivating teaching/learning situations. The valorization of informal learning is a key factor. The use of games, immersive environments and augmented reality will require further research in order to ensure that they are considered as potential learning scenarios.

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