Original Article

Augmented reality for learning in distance education: the case of e-sports

ILARIA VISCIONE[1], FRANCESCA D'ELIA[2]
[1,2] Department of human, philosophical and education sciences, University of Salerno, ITALY

Abstract:
Training activities in the field of motor and sports sciences have had a remarkable evolution in the last decades in which they have gone from purely technical approaches to more theoretical approaches. Moreover, the advent of telematic universities has expanded these opportunities. In particular, in the degree courses in Motor Sciences it is possible to use virtual reality platforms, inspired by modern video games and able to simulate physical and sports situations with all the possible variables. The present study aims to hypothesize the realization of educational activities using online activities with the application of new technologies through augmented, virtual and robotics reality, with the aim of involving new technological theories in compliance with the law and offer an optimal educational offer for students.
Key words: video games, virtual reality, online universities, physical and sports sciences.

Introduction
Until the end of the twentieth century, in Italy the highest level of physical education and sports education was managed by the Higher Institute of Physical Education (ISEF) where the teaching-learning process focused mainly on the practice of various sports disciplines (Altavilla et al.,2018, Raiola 2017, 2015, 2013)). The main purpose of the ISEF was to promote the progress of the sciences applied to physical education and to provide the scientific culture and basic techniques for the preparation and improvement of those who wished to dedicate themselves to teaching physical education (D'Isanto, 2019), as well as to technical uses in a purely sports environment. With the legislative decree 8 May 1998, n. 178 we have the "Transformation of higher education institutions of physical education and establishment of faculties and degree courses in physical sciences", in accordance with Article 17, paragraph 115 of the law 15 May 1997, n. 127 (GU General Series n.131 dated 08-06-1998) (Entry into force of the decree: 23-6-1998). Therefore, currently in Italy the degree courses in physical education are structured with lessons and seminars, in particular of a theoretical nature. This transformation has led to the creation of new professional profiles. Not by chance, nowadays the degree courses in physical sciences are not limited simply to the training of the teacher of physical and sports sciences but they offer study programs aimed at the formation of various profiles and job positions (Raiola et al.,2018). The University of Guglielmo Marconi is the first "open" University of Italy (Open University), recognized by the Miur with D.M. 1 March 2004 (Official Journal No. 65 of 8/03/2004).
The Open Universities offer a flexible part-time study, an adequate distance support and an open learning situations for university and post-graduate courses and qualifications.
The learning methods of the Open Universities develop research strategies for the most advanced technological solutions and integrate communication tools such as e-learning and videoconferences. These online activities replaced all the disciplines necessary for the achievement of the academic qualification and do not require any obligation of activity in the presence. To improve the current vision of online education, it is possible to trace this research back to the theoretical references related to virtual and robotic knowledge and the theme of augmented reality. In this way, technologies could be used to expand educational opportunities.
The online and traditional degree courses present substantial differences due to the didactic organization (D'Elia, Cassese & D'Isanto, 2019, D'Isanto, 2019). Today the challenge is to carry out online activities to replace those of presence. In particular, the aim of this study is to hypothesize the realization of educational activities using online activities with the application of new technologies through augmented, virtual and robotic reality, with the aim of involving new technological theories in respect of the law and offer an optimal training to students.

Distance learning with new technologies
Distance learning is constantly evolving. In fact, throughout the world it is currently possible to trace training courses to allow students to participate in online activities to replace those in attendance. Over time, five generations of distance learning can be highlighted:

Corresponding Author: ILARIA VISCIONE, E-mail: iviscione@unisa.it

----

- Generation 1: correspondence model, based on paper documents. It dates back to the early nineteenth century and used the postal service to exchange paper documents even over long distances. The interaction between teacher and student was contained in the compilation, correction and return of the evaluation tests. The first distance courses to be traced have been identified in Sweden and England. The learning paradigm is attributable to behaviourism.

- Second generation: multimedia model, which uses audio and video technologies (television, radio, telephone, fax). It develops in the sixties and, starting in 1976, it also uses the video recorder which introduces the asynchronous teaching method. The teaching methods are unidirectional and based on self-learning; the scientific reference paradigm is behaviourism.

- Third generation: remote learning model, which uses telecommunications technologies to create a synchronous interchange. It has spread since the nineties and the most innovative one is represented by the teleconference and the use of personal computers.

- Fourth generation: flexible learning model, which provides for the exchange of educational material via internet. The reference paradigm is constructivism. It allows a significant increase in opportunities for social interaction (collaborative learning and co-construction of knowledge within the learning communities that are progressively created with teachers, tutors and students).

- Fifth generation: intelligent flexible learning model, which aims to enhance the peculiarities of the fourth generation, using the web as a privileged channel. Course costs decrease due to the number of learners and increasingly automated systems (Fata, 2004).

Over the years, the construction of knowledge has been characterized by an increasingly constructivist approach, which is well suited to distance education. In fact, knowledge represents the result of the active construction by the learner and has situated character, that is anchored in the concrete context of reference (Kelly, 1955).

Therefore, the evolution of learning education allows the tools available to be indiscriminately implemented. In particular, in the Degree courses in Physical Sciences, it is possible to program distance learning activities by exploiting the potential of virtual reality. Starting from these assumptions, it is possible to proceed to a scrupulous analysis of the current scientific discoveries on perception and virtual reality, in order to apply them in the field of physical and sports sciences. The opportunities for innovation arise from the close collaboration between man and the active environment that increasingly characterizes modern society, with references to the phenomenology of perception. In this case, augmented reality requires the senses to be the interface for interaction with the external environment. However, the real transmission of information must be increased and, at the same time, new methods of communication must be developed, based on the human ability to transmit and receive physical signals such as gestures, strength and tactile stimulation (Raiola G.,2015). For this reason it is necessary to conceive and develop advanced interaction concepts and technologies to improve communication between man and the reactive environment, with particular attention to virtual environments and robotic systems.

The scientific objective is the research of advanced interaction methodologies and technologies, as well as their use in specific application domains (D'Elia & Raiola, 2019).

Analyzing the current scientific findings on the perception and virtual application of human movement it implies a reference to theories of perception phenomenology (Merleau Ponty, 1945) which recall the close interchange that takes place between man and the active environment. This combination becomes a duty to implement an authentic perceptive full immersion due to the practice of e-sports.

Electronic sports for distance learning
Among the virtual reality technologies for sports "practice", e-sports represent professional video game competitions. The higher the number of cyber-athletes within a community is the greater the organization of tournaments and challenges is; consequently the competition itself reaches levels comparable to that one present in many traditional sports. In most cases, e-sports are organized in championships and tournaments and end with great final events. E-sports tend to be multiplayer (ex multiplayer), but it is also possible to compete individually with the use of special platforms.

E-Sports are classified according to their typology:
- Real Time Strategy (RTS), that is Real-Time Strategic Video Games. In this case the action is not divided into shifts, but continuosly flows, allowing the player to formulate his own strategy at any moment through the use of troops or armies according to a management approach.
- Picchiaduro (in English "fighting game") are video games in which the aim is to fight each other in various kinds of fighting matches through specific fighting arts or using weapons.
- Shooter or First-person shooter (FPS) in which you have to face enemies and different environments with the typical direct subjective view (first person) that simulates the point of view of the main character.
- Massively online multiplayer (MMO) are a type of multi-player computer games with dedicated servers that allow thousands of users to compete online at the same time. They are set in a persistent virtual world where you have to challenge yourself to climb the world rankings.

2048---

JPES ®   www.efsupit.ro

- Sports video games, including driving simulators and sports disciplines. They are games with software that can faithfully replicate all the variables of the specific sporting competition on a virtual platform. In the last years, e-sports have been characterized by a great media following. They can be played at multiple levels: amateur, semi-professional and professional. The degree of the competition is gradually growing and regulated in special events or tournaments, both online and live. South Korea is unanimously considered the home of e-sports, the only nation to have an autonomous federation: the Korea e-Sports Association (KeSPA). This last one it protects and regulates the phenomenon. KeSPA is a member of the Korean Olympic Committee and the International e-Sports Federation. Starting from June 2012 it is the management body of 25 electronic sports in the country. KeSPA also hosts the KeSPA Cup, an annual tournament for some e-sports. The most famous electronic game platforms have rapidly involved all of East Asia, gradually extending into Europe and the United States to the point of recognizing pro-gamers (professional gamers) the status of professional atletes. As in sports, very often the pro-gamers, after finishing their careers, they dedicate themselves to coaching or to being coaches for the new generations. The International Federation of E-Sports (IESF) has created a dense network of collaboration with the most important sporting institutions worldwide, which has produced a remarkable media following. The IESF, which includes 46 nations, contributes to the promotion of e-sports with both educational and inclusive purposes (www.ie-sf.org). In fact, cyber athletes are often people who show skills that are not exclusively physical, but also logical-mathematical. Therefore among the frequent participants there are also those who cannot practice traditional sports for different reasons. Some large companies, many sports clubs and the betting market have been invested by the e-sport business, recognized as a global phenomenon that involves hundreds of thousands of on-line spectators, who follow live streaming, although in some cases tournaments are added to the program schedules of the main public broadcasting services, such as the British Broadcasting Corporation (BBC). In Italy the media follow-up is smaller than in the rest of the world. However, in 2017 the Italian Federation of E-Sports, Federesport, was set up with the main purpose of using sports video games to bring kids closer to the values of sport, and this fact traditionally brought the values of Italian Federations up. The introduction of sports rules and clear objectives contributes to the awareness that e-sports can be considered a discipline of body and mind. The Federesport aims to teach the rules of real sport through videogames, able to improve reflexes and create the bases on which to engage sports practice (www.federesports.it).

Furthermore, e-sports will probably be included among the demonstration sports of the Olympic Games in Paris 2024. However, there is a turn on the definition of e-games that removes the prospect of recognizing an official sport at the Olympics.

Conclusions

Historically, in the field of physical and sports sciences we passed from an almost exclusively practical training to a gradually more theoretical one. The advent of electronic sports could help make today's reality more pragmatic. As foreseen by the Italian Federation of E-Sports, video games could help bring kids closer to traditional sport. In addition to spreading the values, in fact, the potential of e-sports also concerns the consolidation of oculo-manual coordination, the development of logical abilities and promptness of reflexes. For these reasons, it would be appropriate to enhance the characteristics of virtual reality in view of their use for training activities.

References
Altavilla, G., D'Elia, F., Raiola, G. (2018) A brief review of the effects of physical activity in subjects with cardiovascular disease: An interpretative key, Sport Mont, 16 (3), 103-106.
Fata, A. (2004). *Gli aspetti psicologici della formazione a distanza* (Vol. 8). Milano: Franco Angeli. pp.19-27
D'Elia, F., & Raiola, G. (2019). Sport and Exercise Sciences Degrees in Italy: Comparison Between Online and Traditional Teaching Models. In *International Workshop on Higher Education Learning Methodologies and Technologies Online* (pp. 209-216). Cham: Springer.
D'Elia, F., Cassese, F.P., & D'Isanto, T. (2019). Augmented, virtual and robotics reality for distance learning and internship in telematics Sport and Exercise Science degrees in Italy. *Journal of Human Sport and Exercise*, 14(4proc), S792-S796. doi:https://doi.org/10.14198/jhse.2019.14.Proc4.41
D'isanto, T. (2019) Physical and sport education between Italian academic system and European Research Council structure panel, Journal of Human Sport and Exercise, 14, pp. S66-S76.
D'Isanto, T. (2016) Pedagogical value of the body and physical activity in childhood, Sport Science, 9, pp. 13-18.
https://www.ie-sf.org/
http://www.federesports.it/index.htm
Decreto Legislativo 8 maggio 1998, n. 178 "Trasformazione degli Istituti superiori di educazione fisica e istituzione di facoltà e di corsi di laurea e di diploma in scienze motorie, a norma dell'articolo 17, comma 115, della legge 15 maggio 1997, n. 127" pubblicato nella Gazzetta Ufficiale n. 131 dell'8 giugno 1998.
Decreto Ministeriale 1° marzo 2004. "Istituzione dell'Università telematica non statale «Guglielmo Marconi»".
Merleau-Ponty, M. (1945). Phénoménologie de la perception. Paris: Librairie Gallimard.

--2049

Kelly G. (1955), The Psychology of Personal Constructs, 2 Vol., New York: Norton

Raiola, G., D'elia, F., Altavilla, G. (2018) Physical activity and sports sciences between European Research Council and academic disciplines in Italy, Journal of Human Sport and Exercise, 13, pp. S283-S295

Raiola, G. (2017) Motor learning and teaching method, Journal of Physical Education and Sport, 17, art. no. 236, pp. 2239-2243.

Raiola, G. (2015) Inclusion in sport dance and self perception Sport Science, 8, pp. 99-102.

Raiola, G. (2013) Body knowledge and motor skills, Knowledge Cultures, 1 (6), pp. 64-72.

Raiola, G. (2015)Basketball feint and non-verbal communication: Empirical framework, Journal of Human Sport and Exercise, 10 (Specialissue1), pp. 360-368

2050---

JPES ®   www.efsupit.ro