Original Article

OLYMPISM IN THE METAVERSE: PERSPECTIVES FOR BUILDING A MORE INCLUSIVE WORLD

Abstract - The current evolution of technology that has already made the internet possible could soon make fully usable a persistent multidimensional universe capable of providing its users with further ways to meet, play, socialize and work. It is legitimate to question the possible implications for the future of sport. As a social phenomenon, sport will remain connected to the transformation that is taking place and there will reasonably be new ways both for athletes and for fans. The openness to innovation that is characteristic of sport and Olympism gives impetus to the debate on how the internal good of sport must be preserved and how the objectives of the Olympic Charter must be achieved. An at least partial transfer of sport is expected from a context of sociality and practice that provides for a traditional physical contact and therefore in the presence, to that of a universe characterized using digital artefacts which should, according to a desirable orientation, amplify the connections between individuals even in virtual reality. On the other hand, this transformation could deviate into an alienating posthuman experience, with damaging effects on the weakest individuals, because they are in the development phase of their identity, in training or because they are socially disadvantaged. This article will try to provide some food for thought in the debate that is opening and regarding the appropriateness of this further digital revolution which, through a process that seems unstoppable, is already affecting the whole of society.

Keywords: Olympism; metaverse; ethics.

OLIMPISMO NO METAVERSO: PERSPECTIVAS PARA A CONSTRUÇÃO DE UM MUNDO MAIS INCLUSIVO

Resumo - A atual evolução da tecnologia que já tornou possível a internet poderá em breve tornar plenamente utilizável um universo multidimensional persistente capaz de fornecer aos seus usuarios novas formas de conhecer, jogar, socializar e trabalhar. É legítimo questionar as possíveis implicações para o futuro do desporto. Como fenômeno social, o esporte continuará ligado às transformações que estão ocorrendo e razoavelmente haverá novos caminhos tanto para os atletas quanto para os torcedores. A abertura à inovação que caracteriza o esporte e o Olimpismo impulsiona o debate sobre como o bem interno do esporte deve ser preservado e como os objetivos da Carta Olímpica devem ser alcançados. Espera-se uma transferência, pelo menos parcial, do desporto de um contexto de sociabilidade e prática que prevê um contacto físico tradicional e, portanto, presencial, para um universo caracterizado pela utilização de artefatos digitais que deverão, segundo uma orientação desejável, amplificar as conexões entre os indivíduos mesmo em realidade virtual. Por outro lado, esta transformação pode desviar-se para uma experiência pós-humana alienante, com efeitos nefastos em particular sobre os indivíduos mais débeis, por se encontrarem em fase de desenvolvimento da sua identidade, em formação ou por serem socialmente desfavorecidos. Este artigo tentará dar alguma reflexão sobre o debate que se abre e sobre a pertinência desta nova revolução digital que, através de um processo que parece imparável, já atinge toda a sociedade.

Palavras-chave: Olimpismo; metaverso; ética.

OLIMPISMO EN EL METAVERSO: PERSPECTIVAS PARA CONSTRUIR UN MUNDO MÁS INCLUSIVO

Resumen - La evolución actual de la tecnología que ya ha hecho posible Internet pronto podría hacer completamente utilizable un universo multidimensional persistente capaz de proporcionar a sus usuarios más formas de reunirse, jugar, socializar y trabajar. Es legítimo cuestionar las posibles implicaciones para el futuro del deporte. Como fenómeno social, el deporte seguirá ligado a la transformación que se está produciendo y habrá razonablemente nuevos caminos tanto para los deportistas como para los aficionados. La apertura a la innovación que es característica del deporte y del Olimpismo da impulso al debate sobre cómo se debe preservar el bien interno del deporte y cómo se deben lograr los objetivos de la Carta Olímpica. Se espera un traslado al menos parcial del deporte desde un contexto de sociabilidad y práctica que prevé un contacto físico tradicional y por tanto presencial, al de un universo caracterizado por el uso de artefactos digitales que deberían, según una orientación deseable, amplificar las conexiones entre individuos incluso en realidad virtual. Por otra parte, esta transformación podría desviarse hacia una experiencia posthumana alienante, con efectos perjudiciales en particular sobre los individuos más débiles, porque se encuentran en fase de desarrollo de su identidad, en formación o porque se encuentran en desventaja social. Este artículo intentará aportar algo de reflexión sobre el debate que se abre sobre la pertinencia de esta nueva revolución digital que, en un proceso que parece imparable, ya está afectando a toda la sociedad.

Palabras-clave: Olimpismo; metaverso; ética.

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Introduction - The metaverse: definition

Social media allow interactions between users through written messages, photos, audio and video contributions accessible via PC, tablet or smartphone. They are a vehicle for the communication and dissemination of news of both private and public interest. The level of interaction is mostly limited to sharing the contributions of individual users and for this reason social platforms are more containers than co-built environments.

The functioning of social networks allows the emergence of real data about the people who share them spontaneously. Fake profiles are generally counterproductive for users (except for illegal purposes) who build their own profile to which they entrust their credibility according to their authentic preferences. Therefore, the profiles adhere to the characteristics of the respective users who have the purpose of establishing or maintaining relationships with other people and, to remain active and updated, require the commitment of part of their time. So social media are in effect real meeting places[1].

The applications of computer technology in fields such as medicine, engineering, biochemistry, crime investigation, video games and others, have made available two-dimensional and then three-dimensional models of biological objects and beings. These models adhere to the nature of the physical environment in a manner consistent with our spontaneous experience. The bodies/objects are associated with their extension. Furthermore, the other properties of space deriving from force fields, electromagnetic fields, thermal gradients and chemical reactions can complement geometric modeling. The development of accelerometers, geo-positioning devices, thermometers, tactile sensors and other systems capable of acquiring movement data, physical and physiological parameters of users and exchanging them with the model, have made it possible to generate stimuli consistent with the activity of the 'user until obtaining interactive and immersive experiences. Special interfaces (for example a pointer, a viewer and a display), make it possible for the user to explore the model and carry out simulations consistent with the laws of physics, such as driving a Ferrari F1 in the Monza circuit, driving an F14 aircraft or prepare for surgery. The personification of the user in a digital equivalent, the avatar, is a perspective that increases his or her opportunities for user-friendly interaction with the environment and with other users. All this made available the so-called virtual reality, one of the aspects of the metaverse. The metaverse blurs the

already approximate distinction between real and virtual, making new environments usable whose specific methods of use also make it urgent to solve legal problems.

Digital technologies guarantee a continuum between the real and the virtual with the metaverse corresponding to a meeting point between automation and the intelligent society by integrating the social, economic and cultural levels through the flow of data that converge to form a spatial structure - permanent thunderstorm.

The metaverse can be defined as the network of persistent multi-user environments on the web in which users can immerse themselves using devices capable of producing sensory stimuli that mimic those we experience in our physical experience and that can add new ones. It allows interactive experiences in an artifact with a prevalent digital connotation. It is possible to enter and exit, move, create or participate in events, have discretion to interact with other users and with the co-constructed context, impersonate avatars with physical characteristics distinct from the user, overcoming potential obstacles due to pathologies, dysfunctions, judgments aesthetic and valuable.

The limit of the structure and functioning of the digital artifact is given by the perceptive and cognitive faculties of the user in the same way in which our knowledge of the physical world depends on our biological limits and on the extension of them that derives from technology, as will be exemplified further on.

Reality or perception

The understanding and definition of "reality" is the object of metaphysics between two main perspectives: objective and subjective. The second implies that "reality" does not exist but is a consequence of the perceptive and cognitive abilities (including that of abstraction and consciousness) of every sentient being. According to some authors, this contrast is responsible for determining consequences on the individual and his individual ability to see and think about the world[2]. The definition of 'virtual', since we want to understand it as opposed to 'real', has the same ontological implications.

This paper will use the following convention: the term 'virtual' will refer to any artifact characterized by a technological component that refers to the computer world. The term 'reality' will be reserved for everything that differs from 'virtual' according to the definition just given. Therefore, I will use a minimal metaphysical approach, giving up looking for explanations that have irrelevant consequences for the purpose of this

article. The term virtual reality (VR) will refer to the computer-generated environment in which the user can perceive, feel and interact in a manner similar to the physical place[3]. These definitions determine a continuum between reality and virtual reality, in relation to the degree of stimuli that come from the two extremes, ranging from real, to augmented reality, to mixed reality, up to virtual reality[4]. This continuum is the preferred option here with respect to the effort to identify possible discriminators between contiguous situations.

The concept of 'presence' will be used to describe the subjective feeling of 'being there', even if referable to a virtual environment[3], with levels of immersion that can vary in relation to technology and availability and attitude of the user to overcome any psychological difficulties in projecting oneself into an avatar, that is, a digital representation of the self[5]. Appropriate virtual experiences could constitute an effective training ground for life while others could determine maladaptive effects of the person[6]. Feeling present in a context implies experiencing it and contributes to the construction of individual reality.

Although the usability of these technologies is becoming more and more immediate, spontaneous and engaging, it raises questions of an ethical and philosophical nature. Since there is no continuity break, for example an insult is always morally relevant. Avatars can be traced back to their users and therefore are subject to the General Consistency Principle (GCP) understood as the "universal moral principle of human rights (p. 5)"[7,8]. Virtual reality and the metaverse broaden the scope of our life together with its opportunities and problems, as is already the case with social networks.

The metaverse, although it must be understood as an environment designed through suitable algorithms to function according to the aims of its creator, from the moment it is the site of social interactions, assumes the characteristics of a complex system. Complexity is a characteristic of a system that cannot be completely governed[9] and that is typical of natural/biological systems. The latter, as they are not subject to finalistic laws (if we exclude the adoption of a religious vision of the world), are unpredictable.

The use of a digital artifact, adding to the places and experiences that are part of the user's experience, modifies the 'I'. Psychological changes of the person can take place both for projecting oneself into different environments and for identifying oneself in an

avatar that has differences from the self[5] starting from the appearance, from the physical, behavioral and cognitive abilities but above all from the motivations to act. The Italian writer Luigi Pirandello theorized that identity and self are two distinct concepts, with all human beings using a mask for every circumstance and with boundaries between appearance and reality overlapping[10]. The possibility of having additional environments and of impersonating oneself in an avatar could enrich the identity understood as the union of all the manifestations of the self, in a perspective in which illusion is part of the opportunities. The contemporary advancement of cybernetics, that is the mathematical modeling of living organisms and natural systems, is a prelude to the future separation of the mind from the body, where until today, "All the natural minds that we know are embedded in a body (p. 8)"[11] and therefore no biological presuppositions are known so far to justify a distinct conception between mind, will and body. If this became possible, there would be the separation of matter from information and the transition to a view that until now is posthuman, in which the incarnation of our consciousness in a biological substratum would be one of the possibilities of life with the inevitable fall. any demarcation between cybernetic and biological mechanisms. Both would in fact be characterized by a code capable of ensuring autonomous replication, a presupposition so far considered proper to living matter alone. The cybernetic and biological 'mechanisms' may already have reciprocal relationships in the continuum between real and virtual. For example, a tennis player using a game console, when he sees on the screen a ball whose motion is determined by an algorithm, moves a special racket. The algorithm, as a result of the dynamics recorded by the sensors placed in the racket, determines the behavior of the virtual ball and the subsequent play of the computer, and so on[12*].

Each experience involves the involvement of the perception system and attentional skills and can be immersive in relation to the level of the specific stimulus and the overcoming of any disturbances. Algorithms capable of generating effects consistent with those of the physical world can enhance user behavior detected with dedicated sensors. Specific limitations of the sensory organs and the body can be overcome according to the user's purposes and the characteristics of the virtual environment. An example of an extension of our perceptive sensitivity is the scale that allows us to evaluate

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* This corresponds to the distinction between domain of execution and a domain of application mentioned by Parry, which does not occur in what he counts as sport.

the weight of bodies. The 'weight' property of the bodies, of which we are aware through the muscular tension necessary to lift them, is subsequently evaluated more precisely with a scale. The overcoming/widening of our perception and the addition of objects and information helps to define an augmented reality: the use of a telescope allows us to observe the sky and that of an aortic probe to visit a patient in ways that go beyond the limits of our natural sight but which are based on it or on the cognitive effects that the vision system can procure on our mind, even in the absence of the natural organ responsible for sight.

Technological devices can also determine new interactions between the user and the environment. A printed newspaper has limited possibility of generating differentiated stimuli for two readers who respectively stop or skip an article. On the other hand, a smart phone application, in relation to the time of use, facial expressions and other user behaviors that can be recorded by specific sensors, can produce stimuli that attract the user's attention and can also become persuasive[13]. These stimuli can cause responses in a short time as a result of simplifying and accelerating the user's mental processes. The saving of time and the taking without delay of relevant decisions can result in incomplete experiences, not respectful of learning times and lacking the appropriate neurophysiological effects typical of brain plasticity[14]. It is still not sufficiently clear how digital technologies can impact memory and attentional processes[15]. Studies by the Wake Forest Montessori[16] indicate that the use of devices such as computers and tablets in preschool children can lead to a reduced development of neural skills due to an unnatural link between actions and consequences. The act of drawing allows a spontaneous understanding of how the movement of the hand and the color of the marker determine the result on the sheet of paper, minimizing the disturbances in the practical implementation of the components of the motor gesture. On the other hand, the processes underlying the production of a graphic symbol on a touch screen are not immediately understandable.

The graphics tablet emulates the effects of the experience that relates to the sheet of paper and the child remains unaware of what exactly happens while using it. The transduction implemented by the device could modify some graphic strokes that would not actually be a consequence of the gesture, for example allowing to change color after having already drawn a line, or canceling it without affecting the rest of the drawing. In

the phase of exploring, one's own body and the world, the lack of understanding of the effects of one's actions can favor the development of a dangerous sense of omnipotence[17]. Simple toys and those of Professor Montessori[16] in particular can be taken apart by children. These, if intrigued, can make use of the specific construction method aimed at making the whole understandable in relation to its parts that are separable and often distinguished by shape, color, weight, position, surface finish, texture and other physical aspects. It would be very different for a 2-year-old to take apart a tablet to understand what makes it possible to reproduce a sound or an image. Therefore, technological objects do not perform the same functions as simpler games. Furthermore, at the same time, developers of digital devices are striving to perfect user-friendly hardware and software interfaces, that is, capable of using and reinforcing the spontaneous behavior of users. In this way, while they reduce the difficulties arising from gestures and reduce the information for use by simplifying the user experience (UX), they further mask the differences with natural objects. In the previous example, the mode required to write on a latest generation graphics tablet mimics handwriting on paper. On the one hand, user-friendly approaches are useful for facilitating personalized experiences consistent with the user's skills, on the other hand they can determine paradoxical effects such as the failure to develop the sensitivity to discriminate the effect of one's actions which is an essential element of knowing how to do. Furthermore, the neurophysiological sciences argue that learning is more effective if it involves the sensorimotor system and the mirror neurons responsible for activating empathic relationships with others[18], which should lead to continue to privilege, especially during the sensitive cognitive development, interpersonal relationships in presence.

With reference to education, the contents and approaches hitherto suggested by the United Nations are reported in Sustainable Goal no. 4 which has been detailed by UNESCO

> Education for Sustainable development empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education(w/p)[19]

Olympic education makes use of various strategies, such as the dilemma and the approach to complexity and is oriented to experience[20,21]. The experience considered up

to now contemplates immersion in the natural context[20] whose relevance has been further enhanced following the pandemic. The natural context is 'a slow approach', that is opposed to the 'fast' logic. The 'slow' allows you to live experiences that do not simply aim to confirm your ideas, but that predispose you to understand the complexity and ideas of others, for which more time and dedication are needed[22]. The 'slow sport', facilitated by practicing in a natural context, becomes a tool that stimulates listening and self-knowledge, with an experience of relationship and immersion in the environment on which to base relationships and spontaneous reactions. Educators dealing with children and adolescents from disadvantaged communities have used and are using social projects for the transmission of Olympic values through the experience of sport as a means of transferring new learning into practical life, in order to influence their behavior in the relational life by providing them with the means to free themselves from the context in which they grew up[23]. The use of technology for sports participation, like any educational tool, must consider the particular needs of practitioners, safeguarding the most suitable solutions, particularly in difficult conditions.

As evident from many studies, the possibility of immersion in a natural environment facilitates the balance between control and relaxation[24] and produces an improvement in our attentional resources taxed by the urban and technological environment[25]. Virtual reality reproducibility conditions have been verified capable of inducing in the user, at least in part, those same beneficial effects[26]. Therefore, considering that the world population is progressively concentrating in urban areas that do not ensure the proper natural experience[27], technology could give a further option to recover the desirable effects of life in spontaneous environments. The use of technological devices should be consistent with a variety of other user experiences and an effective use of his/her attention skills, considering his/her prerogatives in relation to age and leisure.

Although young children easily learn two or more languages by interacting with people, this does not happen by watching television[28,29] but it could be the same in a functional way with a device capable of interacting with the user. Other skills (musical and motor skills) are also best learned at an early age. All this does not mean that the skills acquired, including those of the early use of electronic devices, correspond to cognitive advantages and in practical life[30]. Caution is needed to verify the quality and quantity of learning in the digital world, adequately structured and gradual, and to protect

children by ensuring experience in the physical world, using new educational opportunities only if supported by evidence of better efficacy that is not yet available[31]. Researchers found risks associated with excessive use of digital devices. These include depression, poor education, bad sleep, anxiety[32], and daytime fatigue[34]. However, these risks are lower than those associated with exposure and abuse of non-interactive systems such as television[34].

A further requirement for effective education is the 'educators' ability to gear instruction and supports to the needs and interests of individual children[35]. Finally, education, as reported above, should be a process that continues throughout life, as established by SDG 4[36].

The pandemic situation of Covid 19 has given an impetus to the development of digital platforms. They have been used more intensively and extensively than in the past to hold meetings, study and work effectively in shared environments that add to what we used to define as 'real' or 'in person'. On the other hand, the new and increasingly widespread opportunities, especially in asynchronous applications, can lead to the user's emotional isolation, loss of motivation and an increase in abandonment[4].

In addition, since before the Covid 19 pandemic, people have been progressively replacing many of their face-to-face relationships with digital interactions and devices equipped with Artificial Intelligence (AI) and anthropomorphs are spreading. AI refers to systems that implement intelligent behaviors by analyzing the stimuli of the environment and taking actions with a certain degree of autonomy, to achieve specific objectives. AI-based systems can be purely software, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and facial recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, self-driving cars, drones, Internet of Things applications)[37].

We are witnessing a growing investment by giants like Google and Amazon in AI. In this context, singular and curious situations occur, such as the choice of a Japanese boy to get married with a hologram[38]. These situations, in the absence of adequate studies and specific analyzes, should not be labeled as pathological behaviors of escape from reality and 'unnatural' as they were previously impossible. However, the correct use of technology and therefore the prevention of the damage it can cause to users is one of the options on which self-realization, health and well-being can be pursued, consistently with

the achievement of the happiness of each individual and with the interest of the community[39].

In conclusion, augmented reality, life recording, the mirror world and virtual reality are part of the metaverse[40]. Virtual reality is added to physical reality by projecting the user into a context other than the one in which he physically finds himself. In augmented reality, on the other hand, information from the physical world is modified, introduced and simplified in line with specific purposes. For example, the car windshield will be able to provide "[…] deliver safety alerts and navigation information via digital images in the driver's line of sight (w/p)"[41] and improve visibility in the event of adverse weather conditions and poor lighting.

Evolution of technology in sport and new questions

The use of digital technologies characterizes the diffusion of sporting events through the media. Examples of augmented reality are digital advertising, Digitally Enhanced Dasherboards[42], the projection of advertising writings on the sports field.

The ability to report on the screen in real time the speed of an America's Cup boat and the positions relative to competitors[43], 3D shooting, the use of sky cams, helicopters and drones, as well as hologrammatic reproductions, are all means capable of modifying the way spectators participate and which have effects on the practical development of the competitions and on the sporting regulations. Think about how the introduction of technology leads to new provisions for play facilities and equipment[†], whether it is to continue to apply existing rules or to introduce new ones. For example, the Serie A football regulations recently banned green jerseys[44]. By avoiding the chromatic overlap between the players and the lawn, it is possible to improve the visual experience both from the stands and on television and the exclusion of colors that "disturb the technology of virtual overlays (w/p)"[45] prepares the conditions for their introduction, even if the introduced rule does not refer to either of the two circumstances.

Technology is constitutive of sport and progresses with it: think of electronic time and distance measurement systems; to miniaturized and wearable devices for georeferencing and surveying physiological parameters of athletes (for example power

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[†] For example, the goal line technology of football involves the installation of cameras and a specific control system in the stadium while the VAR requires a room dedicated to further referees who analyze the videos from different angles and can intervene or support the referee on the pitch on some decisions.

meters in cycling and accelerometers for detecting concussions in the NFL). Other examples are telemetry, video analysis and related methods to determine specific team or individual scores. The hawk eye in tennis, Goal Line Technology and VAR in football, TMO in rugby and video check in volleyball support the referees' judgment. These are solutions resulting from technological development aimed at improving the evaluation of the game and increasing the understanding of what happens in the field with respect to the perception not only of the technicians and sportsmen but also of the fans and commentators, enriching their experiences with further contents and information. These contributions could be limited to supporting the decisions of the referees, or even replacing them[46], with consequences that should also be evaluated on the ethical and philosophical level of sport, given the importance so far recognized to the human component in sports decision.

The examples above mainly concern augmented reality which is one of the declinations of the metaverse. Further perspectives in this area are those of experiential marketing based on the interactive relationship in which digital improvements add new points of interaction to the customer journey and activate his cognitive, affective and motor domain[47]. The possibility of sports applications such as Zwift[20] and of accessing other digital platforms to share experiences and adventures with friends online, can foster positive emotions thanks to otherwise impossible experiences[47].

Olympic athletes develop uncommon physical and mental skills. Technology is constitutive of performance and its improvement, so much so that it represents an essential aspect. In some cases, it helps to promote fairness, as in the examples cited above (precision measurement systems of performance and those to aid in arbitration evaluation). In other cases, the equipment and the playing field made with ever higher standards increase safety and comfort. As athletes continue to focus more and more on performance, technology progressively reduces measurement errors. In this case there is no change in the specific sporting practice, in terms of the quality of the performance, except for what derives from the accuracy of the measurement itself. Other times the technology directly affects the improvement of performance, both through equipment and machinery that reduce inefficiencies, and with tools for monitoring the athlete's parameters that allow you to optimize training and recovery. The introduction of technology in a way that is fair and accessible to all does not at all mean that athletes can

reduce their level of application. Technology should better target their training and engagement in a way that is geared to the nature of performance while reducing efforts to eliminate disturbances/inefficiencies and address secondary issues or issues they cannot control (such as low quality or dangerous equipment. health). The development of training programs relevant to the specific characteristics of the sport practiced also helps to reduce any overloads and allows a better investment of time and quality of effort: a sensor used in training can contribute to the optimization of effort and therefore better adhere to the requirement of the race. In fact, the concept of "no pain no gain"[48, 49] could be overcome for both physical and cognitive tasks, once it is verified that excessive fatigue and lack of fun can have as a consequence the need to reduce the overall workload that the athlete can tolerate, under penalty of increasing injuries.

Each aid in managing one's performance potential opens up further perspectives and ways to improve and compete at a higher level with competitors that are themselves more performing, as long as they have the same opportunities for access to technology. Competing at a higher level is in fact a constitutive characteristic of sport, summarized in the Olympic motto (Citius, Altius, Fortius - Communiter[50]) and that it also depends on the collaboration between the contenders who improve their level of performance which is reflected in the increased difficulty of the challenges. The level of competition must remain functional to the stated objectives of Olympism to pursue the balance between body and mind and realize human potential. The sustainability of sport understood as the possibility that the practice leaves intact the opportunities of future athletes[51] would be threatened when the overall benefit for athletes is drastically reduced and they are subjected to stress with the sole purpose of improving sports performance up to an obsessive and inhuman level[20].

From the point of view of application in the life of non-athletes, in the context of physical exercise, technology can provide control over health, levels of physical activity (quantity and intensity) and motivation. For example, by purchasing a wearable device, many parameters can be easily and accurately measured. With reference to swimming in open water it is possible to keep under control in a very simple way the distance covered, the time, the average and instantaneous speed, the strokes, the heart rate and the SWOLF[‡].

[‡] SWOLF is the sum of the time to swim a given distance (usually the length of a pool lap) and the number of strokes and provides an individual indication of swimming efficiency.

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All this information helps the swimmer to better understand the efficiency of the effort in which she is engaging comparatively to previous results. For a bicycle enthusiast, the possibility of having an aid given by a small electric motor allows you to tackle climbs that otherwise would be too demanding and in this way it contributes to increasing the volume and intensity of the exercise[52]. But it will be good use that determines the result: the use of the e-bike for small transfers can allow a new opportunity for active life[53] but it can mask new forms of sedentary lifestyle to the point of realizing road infringements when the bicycle is illegally modified and becomes an electric motor vehicle[§]. In sport, the electric bicycle could allow new forms of training (for example it could replace training in the wake giving way to train a high pedaling frequency on flat ground), it could be admitted in a new type of competition or give rise to new methods of infringement of the regulations for races that provide for human propulsion only[54].

In technologically developed societies, physical activity is reduced by the availability of means of transport, household appliances, ready-to-eat food products and many other services that require low physical effort for users. Paradoxically, in this context, since it is unlikely that one can renounce the available services, the use of further technological strategies in order to reach the recommended level of physical exercise for health protection may be profitable[55]. The most modern technologies are developed taking into account both elite practice and the general population with purposes that can be intertwined, as in the cases described above. The technology cannot be considered harmful (except in cases of applications against the person and contrary to the law) or beneficial. Its effects depend on the skills and purposes of the user. It provides opportunities to develop new forms of practice, introduces new qualities and can improve the skills possessed.

The possibility that the practitioner is reduced to a 'mechanical engine' that works at an operating regime established by an algorithm does not differ from that which could derive from the advice and methods of instructors and doctors when they do not put growth at the center of their efforts of the athlete as a person, as Loland argues in his narrow theory[51]. The technology used in such a way as to circumvent one's inability and

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[§] In Italy there have been repeated infringements aimed at illegally transforming bicycles into electric vehicles, which was followed by the intervention of the legislator who introduced specific sanctions to protect the safety of road traffic.

which obstructs or ignores the awareness of the level of physical or psychological abilities possessed is in open contrast to the harmonious development of the body, will and mind.

Transcranial stimulation is a perspective to act on the control of the limits of the mind and the perception of fatigue, further extending the information deriving from the monitoring of heart rate, power delivered and other physiological parameters with existing systems[56]. In the future we may have physiological data from the brain similar to the physiological data of the heart, ventilation, oxygenation, blood glucose and blood. The availability and use of this data opens up new problems relating to the protection of individuals and privacy[57].

The enhancement of cognitive abilities[58] and the use of technology have ethical implications[59,60] as they can transform athletes into cyborgs[61], can constitute a form of technological doping and act on the athlete's identity. In fact, the cognitive qualities affect the perception of the self and their decay, together with that of physical performance, could add negative effects in the lives of athletes after their retirement. It is like when super-heroes lose their powers: they immediately fall prey of a dire identity crisis[61]

As mentioned above, the instrumental and deviant use of AI and wearable devices can lead to new forms of doping or the more effective use of existing methods, giving way to maintain the physiological parameters manipulated within the range of those admissible. At the same time, the same technologies can improve WADA's anti-doping capabilities[62] in a perspective that must reasonably avoid exasperating the monitoring of athletes even if for the purpose of protecting clean athletes.

The introduction of AI systems makes it necessary to redefine the responsibility of decisions, as could occur in the case of a robot trainer with respect to the protection of the athlete.

The assessment of the impact of technology on sport can be implemented from an ethical and pragmatic point of view. The ethical approach requires answering the question of whether and how technology affects the athlete and the internal goods of sport[60] and is necessarily intertwined with the pragmatic approach. The latter is more directly related to the examples previously cited, such as the possibility of better protecting the physical integrity of athletes, maintaining or changing the skills required in a specific sport, addressing the problem of costs and accessibility of sporting practice[63].

We are witnessing the paradox that despite the increase in the ways to practice physical exercise in tandem with technological development, especially in the most developing countries, pathologies linked to sedentary lifestyle are also increasing[64]. Physical education and sport are lacking precisely in achieving their main objective, which should be to safeguard the health of practitioners by inducing them to choose an active and responsible lifestyle. There is already evidence that access to technology, even if it can be used equally for all, can deepen social differences and therefore could also increase the differences in lifestyles between those who already practice physical exercise and those who do not reach the recommended level. Staying in the example shown, a wearable device is an additional aid for a regular practitioner but is of low utility and low incidence of use for sedentary people. The reasons for a sedentary lifestyle are in fact generally of social and cultural origin. Removing these barriers through technology is an option that still needs to be explored[65]. Since we are witnessing the growing diffusion of computers, tablets and smartphones with which users, especially minors, spend more and more time every day and that this represents a growing trend[66], every option must be carefully considered in order to have suitable and effective tools to stimulate physical exercise and that these are correctly used. One example is playing on a console which involves moving the player in a manner consistent with a tennis match. These solutions have proven to be useful but the actual potential to affect the long term in orienting the lifestyle in the desirable direction for health has not yet been clarified. The use of the aforementioned technological devices is higher in places where the perceived quality of life is lower[65]. For this reason, instead of acting as a push to encourage the commitment to improve the physical world and make it more similar to the desirable one experienced in virtual reality, the use of immersive technologies could become a form of evasion and subtraction of resources that could be better channeled by people to solve the problems of their community[67].

Sport, the metaverse and artificial intelligence

For the fans there is the prospect of participating in sporting events even if from places other than those hosting them, continuing to interact, supporting their favorites with choirs or banners that can still be heard and seen from the field[68]. The metaverse, adding to other media[69], makes possible new forms of communication and relationships

between athletes and their fans. To these possibilities are added those provided by specific digital artifacts capable of generating direct and indirect effects also on sports practice. Examples are Blockchain and other distributed ledger technologies (DLT) and Non Fungible Tokens (NFT).

DLT allows the recording and sharing of transactions across multiple data storage systems in packets that are part of chains, hence the name blockchain. The token represents a digital asset that can be linked to a real asset and have a corresponding value[70]. For example, a token can correspond to specific faculties such as, in the field of professional sport, the possibility of intervening on secondary aspects of the game (but which may have economic relevance) such as the choice of the game jerseys, the team anthem, the 'exultation for a goal. There may also be repercussions on sporting results if the rights relating to technical choices (for example the formation of the team), player engagements and corporate structures are marketed[71]. This will extend the modality of participation to already very complex processes that are connected to sport, which confirms itself as an area of economic affairs and is at the same time "[…] merchant and merchandise (p. 157)"[72] adding to the various existing corporate structures, including that of publicly traded companies. As in other productive economic entities, the holders of property rights, through organizational and technical choices, determine the corporate destiny.

Continuing their development, the new technologies will open up further horizons also for training. A curious example is the 'ghost pacer' viewer[73], a pair of glasses that allows you to run by viewing and chasing your avatar who acts as a pacer and coach.

Other digital applications in the future could ensure that each team stays in its own stadium and plays with the other team's athletes made up of hologrammatic reproductions, with big changes in competition[74,75]. With the development of robotics and artificial intelligence, it may be possible to see robots compete against human footballers[76]. Playing against avatars or robots could reduce injuries and the inefficiency with which athletes are called to measure. On the other hand, the reduction of the risk of physical damage could make the control of the motor gesture and the virtue of courage, peculiar aspects of sport, less significant[77,78]. Given that the reduction of inefficiency is a criterion for improving performance, these possible changes could nevertheless be similar to playing in a perfectly level playing field compared to a field with holes and the refusal

of this orientation would require to question the processes of sportification and standardization of the conditions of the practice that we have witnessed. As for the possibility of robots doing sports, this is a topic that is mostly debated by the philosophy which is oriented to the belief that even if intelligent machines appear to be doing something this does not imply that they are doing it[79]. Technology and specially the artificial intelligence can contribute to the monitoring of athletes' parameters and to the collection of data for the analysis of matches, allowing the qualitative improvement of the decisions of the medical staff to prevent injuries and of the coaches providing further technical information. Furthermore, artificial intelligence algorithms are improving the ability to predict sports results and are mainly used in team sports[80-83]. However, the ability to accurately predict the outcome of a sports match may require changes to the rules. The race is an opportunity to give space to the ability of the contenders to determine the winner, with the regulation that should remove any unfair advantage. If a simulator became able to appreciate the differences in the performance of the participants and the factors that contribute to the result up to predict it, a form of spoiler would materialize with reduced interest in the event and a possible loss of emotional content[84] that are central to the public and the contenders, to the point of assuming that it could become useless to play a race that has been deprived of the uncertainty that justified the expectation and passion of the fans.

The amendments to the sports regulations aim to eliminate unfair disparities and this also applies if they concern the introduction of a certain technology, especially if not justifiable for the greater physical and mental protection of practitioners[85]. A technology aimed at compensating for any cognitive and problem-solving gaps between the contenders, even if it could allow to give greater effectiveness to motor skills and performance, may not be acceptable[59]. Through it, athletes could become performers of predetermined motor tasks, in a post-human situation, from cyborg or robot. The argument for or against artificial intelligence could be divided between arguing that it can remove an unjust and influential difference on the result (technical and decision-making ability) or that would transfer the task that should be of athletes and technicians to a computer, with the result of an unfair or unnecessary cognitive doping or enhancement, equivalent to that of a bionic limb to perform a motor task. As a guide and reference should appeal to the fundamental principle nr. 1 of the Olympic Charter[86] which

establishes that sport must enhance and harmoniously combine the qualities of body and mind. The introduction of technology to support specifically sporting decision-making processes does not respond to the desirable development of Olympism when it jeopardizes the balance of the athlete's human qualities. An alternative to this approach that is centered on the athlete could be the adoption of a criterion aimed at the use of AI to the extent that it proves capable of involving more people in sporting practice or in achieving social, economic and environmental goals which are part of the ambition of Olympism. The centrality of the athlete in the Olympic movement, however, is a cornerstone that must be reconciled with the aim of involving the fans without being driven by an insane spectacularization process.

The identification of rules should be functional to the possibility of controlling what happens on the field, but it seems difficult to limit the introduction of AI in sports decision-making while technology makes available forecasting tools developed and used by the sport-industry and the world of betting. The advancement of result foresight could damage the integrity of sport intended as a concrete possibility for athletes to have a significant margin to determine the outcome of the competition despite existing or expected differences. While cognitive aspects are prevalent in situation sports, in record sports, removing unnecessary inefficiencies that can adversely affect athletes' performance, the strongest, tallest and fastest physically fastest is expected to win. The sustainability that characterizes sports based on open skills compared to 'record' sports described by Loland[87], would disappear when the cognitive aspects were to be replaced by AI technologies. These could have a coercive effect for all participants who, in order to aspire to success, should necessarily resort to them. Without setting any fixed points, it is extremely difficult to assess how this phenomenon can really evolve. But since an increasingly massive collection of data is allowed and is in progress, the development of a technology for exploitation and use during the race is unstoppable[88]. On the other hand, it can be observed that these systems can provide important information to develop new game strategies despite the loss of cognitive abilities, replaced by AI, and of the creative ones[89]. It could happen without guaranteeing a better understanding of the game[90] although opening up new possibilities to subvert the values that have emerged among the contenders up to a given moment.

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There are growing investments, as in the case of the Futbol Club Barcelona[91] which are aimed at improving sports strategy, training techniques and the search for talent, with further development of the use of cameras for video analyses. Another interesting example promoted by the FCB was to explore potential new sports disciplines with the help of AI, investigate the frontiers of sport with the participation of robots, plan the future availability of the model of their stadium, the Camp Nou, in the metaverse and ensure new forms of participation and interaction with their fans[92].

The sport industry is therefore investing in these activities and will have to face the consequent challenges, including that players are able to make informed decisions and that there is compatibility, where it is possible to enhance their cognitive abilities, with internal values of sport[59].

Up to now, not even the challenges with a limited chance of winning have prevented the contenders from putting their greatest effort into training and adopting every possible creative approach, raising the level of stamina because: "The opponent never conforms to abstract designs based upon responses foreseen in training (p. 153)"[72]. Similarly, those who study AI applied to sport conclude that:

> But it is important to understand that as long as human element is involved in sports, there will always be unpredictability and uncertainty that makes it fascinating and surprising for its viewers. As long as the element of surprise is there, the opportunity of profit will always be there for businesses to exploit and earn from. The industry will never die and keep on improving with time, making it highly competitive and dynamic in nature (p. 12)[89]

Finally, it should be noted that sport is both an engine of technological development and a field of application. For example, the need for the quality of video images, the study of materials, wearable devices, clothing and equipment needs, the construction of functional and ecological buildings, as well as other specific needs including the fight against doping, constitute an impetus for research with practical results that reverberate in other fields. So much of the technology is not intrusive, but it is an internal phenomenon and well rooted in sport and its development should be guided in the desirable direction. Also relevant are the technologies originating from other areas that can be introduced into sport after the relative evaluation by the national and

international federations, according to the criteria set by the IOC for the revision of the rules of the game.

Ethics in the metaverse

The possibility of extending the social space into the further dimension of the metaverse raises questions about how the collective good should be safeguarded, starting with what should be allowed and prohibited. Problems arise relating to the processing of personal data, new needs for democratic participation and the exercise of authority. It is necessary to ensure the protection of users against new risks deriving from work activities, the integrity and reliability of platforms and economic systems and any intellectual property rights that are created in the virtual world with relation to the physical world. The independence and correctness of the information that may be disseminated should also respect the criteria of other media areas, protecting users, especially the youngest or inexperienced, excluding any form of prevalent and unfair cultural, social, political and gender. The metaverse entails the possibility of new crimes and abuses that would be added to those already provided for by the civil and criminal codes of each State, with the need for further and adequate laws also at a global level, with systems of prevention, control and punishment also operating through AI algorithms whose effectiveness will have to be proven.

On the other hand, the possibility of coexistence of the virtual and of virtue could be the only viable option to survive in the future on this planet[93], in relation to the problems related to demographic megatrends, the phenomena of urbanization and depopulation of large areas, the climate change, the growing difficulty of accessing sufficient and safe resources for all. The expansion into the metaverse could become necessary and add to that of new cosmic spaces being explored with space programs and which may determine new forms of sporting practice and participation. Sport in space is already under the attention of some visionaries[94] and even of a research association[95] that highlighted how the physical component, in absence of gravity, can lose relevance compared to skills cognitive. Also in this case, sport could be socially required in the new spaces (real or virtual) made progressively usable by technology, determining the need for sports operators to implement coherent solutions.

Innovation also involves opportunities for new jobs, overcoming obstacles to social participation and new forms of remote cooperation, artistic expression and human ingenuity[96]. In particular, the potential advantages of this frontier are to be traced back to its accessibility, to overcoming physical, gender, social restrictions and with the potential to achieve greater equity[97], to celebrate diversity and humanity, as well as preserving and transmitting culture. An example is given by the possibility of preserving digital models of physical works which, as such, do not suffer the effects of collapses, do not suffer fires and the effects of aging or the consequences of changes in urban spaces. Accessible virtual models can protect and disseminate intangible heritage and can be useful for the restoration of physical heritage, as is happening in the case of Notre Dame of Paris[98]. Even cultural and sporting events could be better preserved with their digital copies to be relived in an immersive way in the metaverse, as is already the case for La Traviata, an opera by Verdi[99]. The visit to museums and archaeological sites is being enriched with augmented reality content, as already happens in the case of Ancient Olympia with the availability of the Virtual Reality Tour[100] and new ways of accessibility in the metaverse are being studied[101]. A rationalized activity that preserves the cultural objectives of museums will be able to avoid mere forms of gamification, while making use of the ideas of innovation that derive from the experiences of other areas[102] to be transferred into the processes that are starting their own specific path of digitization.

The possibility of watching a race in the metaverse is not a substantial novelty compared to other forms of diffusion (streaming video, audio, participation by live spectators, radio, social networks) with the public who can better interact and affect the emotional climate of the stadium, even from a distance, synchronously with the competition. The novelty aspect that may have repercussions to be examined in the context of acceptability also from the point of view of sport ethics may be given by the possibility that the competition is in the metaverse. Despite Parry's[81] rigorous approach and the application of conceptual analysis, e-sports are entering the Olympic stage and have also spread under the aegis of international federations.

At the same time, virtual sports are emerging, which are an extension of disciplines that already exist but are practiced on electronic platforms and simulators. They engage the same physical and technical skills as practitioners but in competitions

that can be played at a distance. Some examples: Zwift for cycling, Rouvy for racing, Concept 2 for rowing, Virtual Regatta for sailing.

In recent years the IOC has expressed its intentions which can be summarized in two recommendations: the growth of digital involvement of people[103] with the encouragement of the development of virtual sports; the engagement of gaming communities[103]. As well the economic strategy has the aim to obtain greater revenues from e-commerce and gaming related to the Olympics. In fact, the stakeholders and main economic supporters of the Olympic movement are progressively starting to move towards new forms of connection with their public outside the traditional sales environments in order to protect their investments and their brand[104]. In these areas it is possible to market creative products through NFTs that can make digital and unique collections that celebrate the sporting event accessible[105].

In the Asian Games 2022 (whose date is not yet definitively confirmed for the COVID 19 pandemic) esports with the award of medals will be staged[106]. This decision follows the audience success of previous performances in which no medals were awarded.

Although the IOC appears to be oriented towards favoring the spread of virtual sports characterized by trainable physical qualities, it is likely that the same process of rapprochement will also affect eSports, as organizational problems are addressed with the birth of homogeneous and regulatory federations. At the Olympics scheduled in Paris in 2024, in demonstration form, there will probably be some e-sports related to gaming[107]. By applying criteria of physicality, meritocracy, competition, fair play, level playing field and inclusion, the supporters of the admission of esports to Olympic sports argue that only prejudices can preclude the opportunity for the new generations to benefit from the experiences offered by the digitalization[108]. In particular, by investigating Gentile's[109,110] physicality criteria of sport, esports have no relevant movement in the physical world and the simple act of pressing a button can have a complex effect on the movement of a character in the game, amplifying the effects of the player's movement in a similar way to what happens in motorsports, where speed is manageable by stepping on the accelerator. This lack of physicality also corresponds to the irrelevance of one's own physical integrity and that of the opponent due to the lack of use of the body and the ability to control movement, strength and aggression. The inclusion of these competitions in sport could on the one hand nullify one of the characteristics declared in the Olympic

charter (i.e., the balance of body, mind and will), and on the other hand facilitate the overcoming of barriers to participation. Even among Olympic sports there are considerable differences in the contribution of physical movement to performance and valid limits cannot be defined for either competition or training, with many forms of training that in themselves may not fall within the definition of sport, despite being functional to them. The movements and physical effort required for participation in competitions in virtual mode (Zwift etc.) play a predominant role. Therefore, in the absence of further specification by the IOC of criteria relating to physical activity for the purposes of eligibility among Olympic disciplines, the non-eligibility of these forms of practice among Olympic sports assumes the character of speculation[108].

A further critical issue could be linked to the decision of the political authorities: for reasons very different from those proposed so far, they could recognize export as a sport, extending the same facilities for entry visas to participants in competitions. This may affect of promote a wider social acceptance of eSports[111] which could then reverberate in the choices of Olympism, which needs to maintain the link with the culture and society that are emerging.

The continuity of education throughout the life span, which is a further indicator of its good quality, leads to reflect on how to maintain direct contact with all people and at all ages and requires the commitment of those who have responsibility in sports federations, given the educational role that has been recognized by the United Nations to sport and to all places where it is practiced[112,113]. This would help to reduce the paradoxical phenomenon of growing and unsustainable expectation placed in the traditional school. The school cannot receive further positions of responsibility for the education of the citizen of the future and other educational aids are needed, among which sport could be an even more active part. One way to carry out this task could therefore be to maintain contact with the greatest number of users and at all stages of life, respecting the paradigm of differentiation rather than that of uniformity[20,35].

Among the opportunities for new forms of education, there is the one offered by the metaverse of practicing many jobs and activities in a way that cancels out the dangers associated with traditional training[114].

A supportive community is the result of the strengthening of bonds between people, such as friendship, which is one of the founding values of Olympism[115]. Artificial

intelligence and interactions in a digital space could seal a new form of posthuman friendship, not linked exclusively to direct relationships between people but extended and integrated with robotic systems. The possibility of a mere substitution of genuine bonds between human beings carries the risk of an opportunistic and less demanding surrogate, even when it satisfies individuals. Artificial intelligence, if conceived to accommodate relationships according to the individual inclinations of each human being, for example by increasing cohesion only between those who already share certain ideas, could elude the broader search for the encounter between different perspectives. To enjoy friendship, it is often necessary to take a step back, have mutual understanding and willingness to face the pain of failure and then identify new solutions for coexistence. Artificial intelligence, if conceived to circumvent these obstacles and allow the well-being of the user, could lead to the arrest of the educational process and of individual and collective growth. Ultimately, while it could increase individual happiness, it would not be functional to the fundamental ambitions of Olympism to exalt humanity gathered in a single world based on solidarity. If, on the other hand, artificial intelligence is at the service of conflict management and reduction, it can facilitate the meeting of people who may have different opinions and positions and even prejudices, and thus become an ally of the cause of Olympism.

Can sport exist in the metaverse?

To extend sport in the metaverse we should find an agreement on what counts as a sport and if it is viable in this new environment. Parry[116], with reference to eSports, shares with other authors the idea that the distance between the domain of execution and the domain of application constitutes a criticality which, together with others, makes eSports different from what he defines 'sport'. This criticality does not concern virtual sports. In fact, it is possible to carry out activities with physical movement characteristics that fully correspond to traditional sports with computers capable of determining, for example, the distance that an athlete would cover by pedaling or rowing, in relation to the parameters detected with sensors on the bicycle or on the rowing machine. This data is shared with other athletes and judges. This possibility makes it irrelevant whether the athletes are all in the same place, whether they move physically or whether their muscular action simply involves the dissipation of energy on a brake. There is therefore a further

opportunity for athletes to participate, with remote methods that can cancel meteorological variables, environmental and technical factors and other unpredictability that cannot be managed by the contenders and whose persistence can affect participation and performance regardless of merit. Evidently the new technical solutions for participation in sport may also bring about new challenges and difficulties. It is conceivable, given the interest of the Olympic movement shown in the organization of events such as the Olympic Virtual Series[117], that there will be further opportunities to be seized in the metaverse with the prospect of creating an immersive interaction platform. For the economic aspects related to the equipment that the athletes must equip themselves with, a considerable reduction in the direct costs to be incurred can be hypothesized (the equipment is not particularly expensive, with a bicycle for SWIFT having no different costs compared to the purchase and maintenance of a bicycle used for road racing) and indirect ones, above all related to travel expenses, the safety of competitions and the necessary infrastructures, with concerns extended to the environmental footprint.

Despite the limitations that Parry[116] identifies in defining what counts as sport up to now, the current approach of the IOC and the International Federation by no means excludes a forthcoming greater openness of the Olympic Movement towards eSports.

This approach can find support in the extraordinary changes of recent years. The diffusion of esports has increased in conjunction with the COVID 19 pandemic[118]. Furthermore, virtually mediated sports competitions, carried out remotely and in virtual environments and with a marked resemblance to traditional ones, have spread, contributing to the emotional support of people and athletes isolated in their own homes[119]. This shifts the debate from esports to the perspective of virtual reality and the metaverse.

Rule 45 of the Olympic charter establishes the eligibility criteria for the Olympic Games programme: "Only sports which comply with the Olympic Charter, the World Anti-Doping Code and the Olympic Movement Code on the Prevention of the Manipulation of Competition are eligible to be in the programme (p. 85)"[86]. There are no indications of any ability or specificity of the practitioners, of the equipment, of the technology and therefore there is no other preclusion with respect to the three requirements indicated nor of satisfying a preconceived definition of sport, provided that the activities are carried out under the responsibility of the federations recognized by the

IOC and indicated in the OC (p. 86)[86]. As an example, it is cited that among the recognized international federations of the IOC[120] there is also that of chess, which is an activity that does not correspond to the definition of sport suggested by Parry[116]. The heterogeneity of the sports, some of which are more similar to those normally found in the Olympic programme, others very different, does not allow for the establishment of an eligibility criterion other than the general one indicated above, suspending the possibility of definitive judgements. Olympism wants to place sport at the service of the harmonious development of humanity[86] and its definition should not diminish the IOC's options for realizing the fundamental principles of the Olympic Charter.

Even if the definition of what counts as sport is an unresolved question, it is also true that all the activities that can maintain/strengthen the connection of the Olympic Games festival with the emerging society and with the common perception should be taken into consideration. For this reason, the IOC and Olympic Movement remain willing to leave the door open according to the rather broad criteria of Rule 45.

The introduction in the Olympic motto of the word 'Communiter' (together)[50] makes Jeu's words even more relevant.

> What is sport? It is a challenge taken on before the assembled crowd. A new kind of sociability arises. It is a festivity. It is the game of society in the noblest sense of the term. Yet, society in fact also plays with itself, introducing by subterfuge as it were the ruse of a two-fold sociability. On the one hand, each sport is a universe having its own population, administration, patterns and laws. It places its members in opposition to one another, but in order to oppose the one to the other systematically, it assembles and unites them. There are thus athletic societies within the society. An imaginary world which is better ordered than the real one is invented. On the other hand, sport plays a part in the life of the city. It expresses in its own way the creed of the place. It is also a diversion from violence. In short, it performs a catharsis, a purification. Individual passions are objictified by the transfer to symbolically performed death and voluntarily codified violence. Sport is, in every sense of the term, an encounter both between the protagonists and between the rest of the city. In a word, sport is a very powerful factor in social integration (p. 163)[72].

Sport is connected to the real world of which it is a representation. The study of sport requires an accurate study of society without which it is out of context[121]. The possibility that Olympism does not adopt any stringent definition that covers sport is in

line with the spirit of its charter, just as the assumptions for which the laws are promulgated should remain a priority, rather than their literal interpretation[122]. Any push to make changes that would not take place in the absence of stringent rules, for example distorting an eSport to make the result of competitions dependent on some specific quality of movement and therefore adhering to a possible corresponding definition of sport, could have the effect of lose some attractive prerogatives for practitioners, as happened with processes of sportification of sports in nature[123]. It is not intended to state that any competition or activity counts as a sport, but the main manifestation of the Olympic movement is called 'Olympic Games' and not 'Olympic Sports' and according to the fundamental principles of the Olympic Charter, sport is a means (along with culture and education) to achieve the goals of Olympism[86]. Therefore, the interest should focus on the purpose of the competitions and on the way to reach, engage and inspire a growing number of people.

While the pandemic has led to a moment of crisis with less sports content directed at users and fans, the latter have moved to digital fitness, eSports, virtual sports and online games. This has accelerated the challenge that sports federations must face to accompany the digital revolution, safeguard their brand and the cultural and community values of sport [118] while still being able to rely on the well-rooted affection of the public that has made them here resilient despite the growing speed of the digital age. While availability for the virtual experience is accentuated[124], the participation and behavior of those who are physically present at the events remains crucial for the well-being of remote fans[125].

The practice for pastime and for competition, in esports as in traditional sports, is a distinct and separate activity from the use of contents transmitted by the media[126]. The research confirmed that esports resemble conventional sports participation in terms of realism and have strengths, such as the ability to participate remotely and in unlimited virtual environments, but do not solve the traditional challenges of sport: the difference between practicing recreationally and participation in face-to-face vs online events[118] and commodification processes. Despite the resistance shown for a long time towards esports[127], the federations are accompanying the transformation and launching affiliate programs[128].

The metaverse could pave the way for the ultimate inclusion, allowing people with limited opportunities to connect with their favorite athletes and explore this new digital

space, without physical or geographic limitations[129]. Furthermore, the structure of the metaverse and the use of blockchains promise to contribute to sustainable development[130].

Excluding these opportunities could be a failure compared to exploring new forms of competition equally capable of promoting aggregation and diffusion of the value of equality. A closed approach, instead of exploiting the possibility of rooting the values shared by Olympism, could relegate from a prejudicial perspective disconnected from the society that is emerging, the metaverse and the new technologies under the label of counterculture phenomena[131] and therefore competitors rather than allies in an effort of common interest.

Conclusions and perspectives

This article examines some of the characteristics of the metaverse, considering the already known opportunities and undesirable effects. Among the undesirable effects are the danger of isolation of users, mental health disorders, sedentary lifestyle, new forms of crime and oppression. The metaverse is characterized as a further development of digital technology, which includes artificial intelligence, robots, new wearable devices, electronic gaming applications, blockchains and much more. All developments in digital technology act as transformative forces of both practical life and culture, through changes in the way people can meet and share content and experiences. The description of the metaverse, even if it has involved very large parts of this document, could be a purpose of greater interest in other fields than in the literature connected to sport. Nonetheless, the objective of this document was to show, in a context in which there are clear references to sport, a further frontier which Olympism will have to take into account. Although the IOC is already doing it in part, not all of the sports movement and the prevailing culture are willing to accept digital technologies as a suitable space for sporting practice and I have illustrated the benefits that can derive from the practical experience of the physical world and in especially the natural one. For this reason, in addition to having to hypothesize adaptations and even transformations, it is also necessary to think of completely new ways of competing, including the possibility of incorporating new meanings for sport and new ways to cultivate the Olympic ambition of a more equitable and supportive. For this reason, Olympism strives to stay in close contact with society and its cultural evolution, characterized by a marked transition towards digital platforms,

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so much so that they cannot be neglected or opposed. The challenge will therefore be to gradually welcome the transformation, guiding it through the dangers that are always present in changes, in order to advance on new terrains consistent with the spirit of Olympism and possibly by nourishing the ethical foundations, extending their effectiveness in every context where people choose to have their own experiences.

Studies need to be carried out to verify which solutions are more appropriate for the use of the metaverse by Olympism.

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