Physical Education and Sports Supported by IoT

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Contributor: Rocsana Tonis Bucea - Manea, Anca Jianu, Adin-Marian Cojocaru, Mihail-Alexandru Dumangiu, Marilena Cojocaru

The COVID-19 pandemic in recent years and the massive presence of information technology generate one of the biggest challenges facing humanity, namely the technological challenge. Educational technologies have a positive impact on the correct and effective teaching and learning of physical education and sports (PES), with a great positive impact on future sustainable higher education (HE). Various innovative techniques could be of interest, such as the use of social networks and fitness sites, e-learning platforms, computer games, and telephone applications involving video analysis and age-specific images of students and the skills taught.

Keywords: physical education and sports (PES) ; Internet of Things (IoT)

1. Introduction

Technological education is always changing in the age of digitalization, due to IoT extinction. The purpose of this technological education is to form a technological culture based on the development of technologies. This approach stimulates the development of students' creative skills based on the use of active teaching–learning methods [1].

Technological education is an important factor for both high school and university students to achieve the mastery of the technological culture developed by mankind through a process ascending from technological literacy, to technological education and competence, up to the general vision of the technological world, with major influences on the life and health of the individual living in a modern and constantly changing society. Given that education and technology are two inseparable concepts that feed each other, the outcome of the implementation of technical education should be a young adult capable to participate efficiently in modern technological processes, acting independently and safely in the field for which he was trained. Physical education and sports (PES) are one of the areas where technology is increasingly integrated [2] due to its positive effects on human health, along with a further positive impact on a sustainable economy. It was also emphasizes a growing demand for PES in recent years, for both young people as well as seniors [3][4][5].

Education in the field of PES using technology has become increasingly attractive for the younger generation. Sport is currently a favorite activity for people of all age categories, professions, and social groups; it is a profession for some, and a great passion for others [6][7]. Moreover, physical activity is recommended, in any form, in a world where a sedentary lifestyle is increasingly common. Cultivating a sedentary lifestyle favors obesity, diabetes, cardiovascular, cerebrovascular, neurodegenerative diseases, cancer, and osteoporosis, in addition to accelerating the process of aging.

Technology can be used to stimulate interest in physical education, transmit and disseminate knowledge to young people, examine movements during physical exercise to identify possible mistakes, improve the skills of the physical education and sports practitioner, and also to assess the learning efficiency optimized by all these technologies. Thus, the use of social networks and fitness sites, e-learning platforms, computer games, and telephone applications involving video analysis and age-specific images of students, and the skills taught, can all be used to stimulate interest in physical education, to transmit and disseminate knowledge to young people, to examine movements during physical exercise to identify possible execution mistakes, to improve the skills of the physical education and sports practitioner, and also to assess the learning efficiency optimized by the above-mentioned technologies. The use of mobile digital applications and health-related portable devices by an increasing number of young people is guiding towards new opportunities offered by technology to maintain and improve health in the long run, not just for a particular period of time.

The contemporary man has become addicted to a collection of risk factors, including sedentarism, smoking, alcohol, drugs, the exaggerated consumption of carbohydrates, fried foods, pastries, juices with sugar, etc., leading to a series of health problems. Research has experimentally shown that information technology can also produce addiction, through the synthesis of endorphins, which together with oxytocin, vasopressin, and serotonin contribute to the release of the pleasure hormone dopamine. Dopamine secretion may explain internet, social media, mobile phone, computer game, or tablet

addictions. These addictions influence more and more young people. The development of technology, responsible for all of these addictions, has driven the way that people communicate with each other [8].

Online communication creates barriers in interpersonal relationships and isolates the individual from the outside world, even more so when individuals are shy and have low self-esteem. This situation is becoming more and more frequent among young people, who, by using social media, can easily hide behind the computer and create a completely different personality. Although technology brings many advantages, its excessive use could be a major threat. Addiction to technology can lead to the loss of communication skills, the inability of young people to express their feelings, as well as the development of impulsive, irascible, antisocial behavior, attention deficit disorder, anxiety, depression, poor motivation, and inefficient work habits [9].

It was mentioned that young people become more and more addicted to applications and turn to them as their preferred source of information, communication, and entertainment [10][11]. The addiction to virtual networking to the point where virtual friends become more important than real-life family and friends can become particularly dangerous. On the other hand, through the correct use of technology, students could become much more creative, develop their spatial vision, increase their speed reaction, and become better anchored in reality. Thus, technology has opened the door to various methods of communication and learning. Preferred by the younger generations, these methods that have evolved in recent years can majorly affect face-to-face communication, if they are used in a fair and disciplined way [10][11].

2. The Activity of Logging on to Fitness Sites and Participating in Computer Games

Lack of physical activity among young people can have adverse effects on their development, exposing them to increased risks for several medical conditions [12]. In this regard, any health promotion initiative is welcome. The use of technology by adolescents can have a positive influence on their behavior regarding their choices for general health care [13]. In the context of the use of modern technologies in the field of education, each country must find the right technological means for a better endowment of the educational sector [14]. According to other [15], many electronic devices have been developed in recent years to help tennis coaches and players. These devices are used to provide feedback to coaches and players during training sessions and competitions. They are helping the players to see their technical mistakes, along with their strengths, and to improve their game.

Physical education and sports are increasingly practiced, and this demand from people of all ages creates many opportunities [16]. An appropriate means by which to stimulate the practice of physical education and sports is represented by computer games. These can be a solution for sports when the weather conditions do not allow it outdoors. Interactive video games such as Dance Revolution, Wii Fit, and Wii Sports have been introduced in many physical education classrooms, and their practice has led to results similar to those seen in physical exercise and outdoor sports [17].

Computer games or exergames, defined as “video games that are also a form of exercise” [18] are a solution to the current trends towards insufficient physical activity among adolescents [19] and a way to promote physical activity among different populations, especially since people’s interest in games has increased due to their entertaining nature [20]. Although it [21] was emphasized that offering participants active video games does not increase the level of physical activity, they find that in certain circumstances, active video games can improve insufficient physical activity and thus, health status. The positive effects of computer games on health are also confirmed [22] it was included 60 students, divided into two groups: an group that used a mobile application-based bike exergame platform called Greedy Rabbit and a control group that played a placebo version of Greedy Rabbit; it was found increases in physical activity in students in the experimental group.

Logging on to fitness sites and social networks may become, in the future, a way to transmit and disseminate physical education to young people, and specialist teachers will play an important role in monitoring information [23] It was conducted by interviewing 1296 young people, aged 13–18, on the involvement of young people in social networks and the influences of social networks where they report on their health-related behaviors highlighted the lack of regulation in the use of social networks and the need for supervision of the latter by professionals [24].

3. Application of the Technology in PES

The implementation of the technology in the form of telephone applications and video games in the gym helps physical education and sports teachers to properly evaluate and manage the process of teaching sports and the physical and mental training of students and athletes.

Educational technologies have a positive impact on teaching and learning in physical education. A study of 14 participants in two physical education teacher training programs highlights the rapid development of new technologies and their use in planning, training, and evaluating physical education classes by physical education teachers [25]. The use of technology positively influences the development of physical education classes and creates an optimal learning environment for students and athletes, who are encouraged to be more active and to train effectively to achieve goals appropriate to their particularities.

One of the most effective educational devices that can be used by physical education teachers is the mobile phone with its applications. Using the mobile phone, athletes can improve their athletic activities, while students can track their movements and learn about nutrition [17]. At the same time, mobile phones can be a powerful tool in improving some teaching parameters in many fields, including physical education, due to the increased attractiveness of the physical education and sports students to digital technologies and the possibilities of movement, working in open spaces offered by smartphones, to the future specialists in physical education [26].

To maintain and improve their state of health, more and more young people are using mobile digital applications and portable health-related devices in the areas of physical activity, diet/nutrition, body image, and sleep. A study conducted in the UK on a sample of 235 respondents found that 35% of young people currently use either an application or a portable device that they associate with their health condition. Of the 35%, 27% of respondents said they use a health-related application and 9% reported using a portable health-related wearable device, while only 5% use both a health-related wearable device, as well as a portable device [27].

Technology tools, such as smartwatches, are used in physical education classes due to capabilities such as offering access to music to listen to while training, and the ability to record both the distance and the running speed of the students [28].

Applications that involve age-specific video analysis and imaging of students and the concepts taught can be used to stimulate interest in physical education, examine athletic movements, and to help improve skills. Moreover, in the context of fast and reliable internet, video games are much more accessible. The number of scientific ones on the need to introduce video games and their effects on the physical and mental health of practitioners has increased [29]. Most scientific ones have looked at the benefits of video games, such as improving concentration and memory, and multitasking, and have even suggested a therapeutic use of video games [30]. Another [31] confirms the positive effect of video games by providing the possibility to disconnect, distracting from everyday worries, but also highlights the problematic potential of video games, more likely among men than women, and more common among young gamers, since video game practitioners often spend many hours a day in front of a computer screen. Excessive video game use has been associated with poor school performance, a lower level of education and career attainment, and difficult social relationships. Differentiating between the short-term and long-term consequences of physical education technology can make it easier to understand the differential correlations of intensive video games.

One way to learn and teach sports is through e-learning platforms. It [32] reveals how to learn sports through e-learning platforms and what impact they have on the people who use them. Following the analysis of 30 academic papers, it was noticed an increase in the trend of using e-learning platforms in the context of COVID-19 worldwide, drawing attention to the need to implement e-learning platforms in sports and sports education, despite an insufficient analysis and possible negative implications.

4. Video Recording Applications

Coach My Video is one of many video recording applications that can help teachers and coaches incorporate technology. The topic of implementing learning in sports training, enhanced by technology-enhanced learning (TEL), and the topic of evaluating the efficiency of learning improved by technologies available to human movement educators have been addressed, in recent years, by many specialists in the field. Following the analysis, it [33] was stated that the evidence for the effectiveness of the use of technology in coaching is weak, and the use of TEL in coaching needs to be further researched, focusing on the learner and how to develop coaching for TEL. On the other hand, there are others who found [34] that students' perceptions of digital learning have not yet been fully understood, even though video coach (VC) technology used for distance training, stimulated their motivation and led to a better observation and correction of the technical behaviors of athletes. To establish the benefits and disadvantages of a video coach (VC), through which coaches and athletes connect regularly using the video recording application, it was conducted in 2020 used a phenomenon-graphic methodology to render the variety of concepts, or understanding, of high-performance athletes in New Zealand practicing kendō martial arts [34].

Video recording applications contribute to the training of young students. In sports training, video teaching can streamline the level of training by reducing the time required to learn technical sports. Moreover, after the action is completed by the athletes, they can immediately view the action video and perform a series of image analyses. Others [35] support video recordings as methods of teaching physical education through which athletes can better understand technical sports as a consequence of frequent visual stimulation and the ability to mutually compare images.

In the teaching of physical education and technical sports such as swimming, the inclusion of video applications plays a role in improving the technical movements and competence of students, optimizing teaching and shortening the educational process in the rapid and effective training of students/athletes, accelerating the understanding of technical sports through frequent visual stimulation [36]. The role of the video coach plays an important part in stimulating active thinking and memory, activating student learning [37].

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