

Introduction of Technology in Physical Education During and After the Pandemic

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Abstract

Physical education is seen as an essential subject for the development of healthy habits and well-being, in line with Sustainable Development Goal. Furthermore, the impact of technology on all aspects of life is now an undeniable reality. The field of education is no exception, and digitalisation has undoubtedly been accelerated by the emergency situation resulting from the COVID-19 pandemic. This paper aims to analyse the scientific production related to the field of physical education, technology, and the pandemic from a double perspective. A bibliometric approach was used to identify the variables of impact, collaboration, production, and dissemination. While the content analysis allowed us to delve deeper into the topics most frequently chosen by researchers, we found that the articles focused both on the circumstances experienced by practising teachers and on the adaptations made in the teaching/learning process with trainee teachers and students at different stages of education. Thus, technology has emerged as a fundamental tool in physical education during the pandemic, making it possible to develop or maintain better health and learning.

Keywords: Technology; Pandemic; Physical Education

1. Introduction

In recent years, there have been several issues that have shaped the education policies of different education systems.

On the one hand, the Sustainable Development Goals (SDGs) propose a framework of recommendations that can help governments set their policies in different areas to respond to current global needs. Based on a comprehensive approach, this proposal includes issues such as climate change and limited natural resources, reducing inequalities and achieving social inclusion, or promoting and ensuring healthy habits for a better life. Thus, physical activity is seen as a resource for achieving health and well-being, and in the field of education, physical education will play a fundamental role in achieving these healthy habits.

On the other hand, the pandemic has caused an abrupt disruption in our lives, changing the way we develop academically, professionally, and socially. In the field of education, after the shutdown of educational institutions, professionals had to adapt their practice to the new reality and implement strategies to continue teaching and learning through technology. Thus, regardless of educational level or subject, tools for designing online learning scenarios began to be implemented, materialising in the use of different devices, platforms, and software.

An unresolved question, however, is how has the subject of physical education been affected by this phenomenon? In this article, we try to answer this question by analysing the specific role that technology has played in the teaching of physical education during and after the pandemic.

1.2. The Impact of the Pandemic on the Learning and Teaching of Physical Education

This scenario, characterised by a technological component in the training process that has become both compulsory and urgent, has led to the emergence of different pedagogical responses on the part of teachers in different disciplines, depending on issues such as the subject area, the educational stage, the personal characteristics of each teacher, their methodological and digital skills, or the policies prescribed by public administrations or educational institutions.

However, physical education is a particularly relevant subject to study, both in terms of its curricular content and the methods and resources commonly used to implement it. This discipline is usually associated with practical content, sometimes involving the use of specific physical materials, the use of which requires face-to-face supervision. In addition, confinement policies have often led to an increase in sedentary lifestyles and a deterioration in the physical condition of students, an aspect that is clearly detrimental to the discipline itself.

We can therefore see that there has been some concern, at both academic and social levels, to promote habits that maintain physical fitness, strengthen the respiratory and immune systems, and have a positive effect on mental health, as well as the development of protocols to adapt the teaching of the discipline to the so-called “new normal”, working on health promotion and care during class time, and creating healthy habits and a more consistent adherence to exercise.

The point is that, despite these handicaps, physical education has had to adapt its principles and practical application to a context of confinement, incorporating methodologies such as gamification or the flipped classroom [16], which harness the potential of technology to develop training activities with a more dynamic and participatory approach. In other disciplines, these tools have shown very positive results in adapting the training process to different modalities, promoting student motivation due to the interactivity of the teaching and learning processes involved, and improving attention (due to the visual component of the resources), performance, and the development of different skills for the range of possibilities offered by technology.

Thus, studies such as highlight the benefits that these methods can bring to learning, concluding that they can improve student performance and competence development, and provide critical, meaningful, ubiquitous, transformative, and motivating experiences. This provides further evidence of their positive impact on educational processes, in line with previous studies, which supported mobile technology; [26], which analysed video tutorials as a teaching tool; and which showed the impact of video games in physical education. These studies also confirmed that technology promotes the development of physical and psychological skills, enhances creativity and personal involvement, and facilitates an individualised pace of learning.

Based on this approach, the aim of this article is to analyse, from a bibliometric and content analysis point of view, the impact of technology on learning in physical education during and after the COVID-19 pandemic.

3.2.3. Assessment of the Result of the Different Studies

When analysing the outcomes of interventions using different technologies, studies reported benefits in different areas. According to, one of the areas that improved during the pandemic was students' digital literacy in information and communication technologies, learning how to use the Internet, email, and other online communication tools.

In terms of social and emotional aspects, it was observed during the COVID-19 pandemic that students with greater knowledge of ICTs were more satisfied and motivated with online teaching, but a lack of social and emotional support for students was also reported, in addition to a lack of teacher training in the use of technology in online teaching. In sport, the difficulties of teaching in a COVID-19 context led to an increase in burnout among coaches using a 100% online modality, which was lower among those using a blended modality.

Teaching difficulties affected teachers differently depending on their level of education. For example, ref [45], who analysed the teaching skills of physical education teachers, found that high school teachers had difficulties in initiating and organising learning and in implementing strategies to improve students' practice. On the other hand, primary school teachers had problems in finalising the syllabus and dividing the teaching tasks according to the students' abilities. In this line, other studies showed the problems of teachers' assessment of motor competence, but reported that an intervention and training in ICTs improved teachers' perception of competence.

Finally, regarding the health and motor skills of physical education students during the COVID-19 pandemic, the results are mixed. On the one hand, Paramitha et al. [1] pointed to the health benefits of online gymnastics for adults, but on the other hand, Rutkauskaite et al. [2] reported that students' physical activity decreased and their fitness deteriorated during the pandemic period. In particular, it was found that students with lower computer skills, those who spent more leisure time using ICTs, and older students were found to be less physically active and to have experienced the greatest decline in motor skills. A study by also showed conflicting results, indicating greater obesity, especially in boys, but an improvement in vital capacity—which is related to cardiorespiratory function—in girls. The same study showed improvements in both males and females in flexibility (sit and reach test), muscular strength (standing long jump test), and also muscular endurance (pull-up test for males and sit-up test for females).

4. Discussion and Conclusions

There is no doubt that the pandemic has had an impact on the way we teach and learn. More than ever, technology has become a tool that allows us to address issues such as the lack of face-to-face interaction or the importance of being able to rethink training processes from a methodological point of view. However, it should be stressed that in order to implement technology in an inclusive way, it is necessary

to work on those aspects that the pandemic has brought to light, such as the digital divide, the lack of equipment or connectivity, and the lack of training of agents in digital matters.

With regard to the bibliometric laws, firstly, it is not possible to assess the compliance with Price's law (on the growth of scientific information) with the available data, since the period analysed in this study was limited to three years, because the subject was linked to the COVID-19 pandemic. Secondly, based on Lotka's law, which focuses on the relationship between the number of documents and the number of authors writing on a topic, no major producers were identified in this study, as in previous investigations [3]. Thirdly, the distribution of publications in this study is observed in concentric zones of decreasing productivity, following Bradford's law and in line with previous work, such as that of. Other results obtained in this study are in line with previous work using this approach, such as the preponderance of publications belonging to the USA [4], the weight of the journal Sustainability [5], the predominance of works corresponding to the field of health sciences [6,7], or the high degree of collaboration between authors [8].

Finally, in order to ensure healthier lives and promote well-being at all ages (SDG 3), promoting physical activity habits in childhood has been linked to good physical activity habits in adulthood [9]. Physical activity is associated with a reduced likelihood of developing obesity and cardiovascular disease [10]. It is therefore advisable to create environments or spaces that are conducive to physical activity and have a good walkability index [11]. Following this line, physical education is presented as a key subject to create healthy physical activity habits [12], and for this reason many studies focus on improving students' motivation towards this subject [13].

However, the pandemic has had a major impact on distance learning methodologies, and this is true also in the case of physical education [14]. The digital literacy of teachers, trainers, students, and trainees has been key to the development of these processes during and after the COVID-19 crisis. For example, it is now commonplace to see a variety of programmes on television offering activities such as yoga, Pilates, or healthy exercise alternatives for all ages and fitness levels. In the case of physical education, there has also been an increase in the use of exer-games (video games in which physical exercises are performed to improve students' motivation and motor skills).

Finally, the work carried out allows us to analyse the usefulness and impact of the introduction of technology in physical education during and after the pandemic; however, there is a limitation, namely the use of only one database, in this case Scopus. In the future, we are considering the possibility of replicating this work using other databases and going a step further to carry out analyses linked to specific territories, since the digital divide exists and became even more evident during the pandemic. In addition, altmetrics can be introduced in future analyses for a more social approach to scientific production in this field.

References

1. Paramitha, S.T.; Fitri, M.; Anggraeni, L.; Ramadhan, M.G. Rethinking the Relationship between Technology and Health through Online Physical Education during the Pandemic. *Int. J. Educ. Math. Sci. Technol.* **2022**, *10*, 132–144. [[Google Scholar](#)] [[CrossRef](#)]

2. Rutkauskaitė, R.; Koreivaite, M.; Karanauskiene, D.; Mieziene, B. Students' Skills and Experiences using Information and Communication Technologies in Remote Physical Education Lessons. *Sustainability***2022**, *14*, 15949. [[Google Scholar](#)] [[CrossRef](#)]
3. Marín-Suelves, D.; Esnaola-Horacek, G.; Donato, D. Videojuegos y educación: Análisis de tendencias en investigación. *Rev. Colomb. Educ.***2022**, *1*, 1–17. [[Google Scholar](#)] [[CrossRef](#)]
4. Romero, L.C.E. Procesos de Enseñanza-Aprendizaje Virtual durante la COVID-19: Una revisión bibliométrica. *Rev. Cienc. Soc.***2022**, *3*, 345–361. [[Google Scholar](#)]
5. Toribio-López, A.; Palacios-Núñez, M.L.; Llaque, P.; Deroncel-Acosta, A. Competencia digital en tiempos de COVID-19: Un análisis bibliométrico. *Rev. Conrado***2023**, *19*, 15–24. [[Google Scholar](#)]
6. Díaz-Quesada, G.M.; García-Martínez, D.; Jimenez-Jimenez, J.F.; Luque, G.T. Análisis bibliométrico sobre los estudios de medición de la actividad física por medio de dispositivos inteligentes en edad escolar. *Retos Nuevas Tend. Educ. Física Deporte Recreación***2023**, *48*, 145–152. [[Google Scholar](#)]
7. Forero-Peña, D.A.; Carrión-Nessi, F.S.; Camejo-Ávila, N.A.; Forero-Peña, M.J. COVID-19 en Latinoamérica: Una revisión sistemática de la literatura y análisis bibliométrico. *Rev. Salud Pública***2023**, *22*, 246–252. [[Google Scholar](#)] [[CrossRef](#)] [[PubMed](#)]
8. Casa-Coila, M.D.; Mamani Vilca, P.S.; Alanoca Gutierrez, R.; Cervantes Alagón, S.L. Análisis bibliométrico de producción científica en el Perú sobre COVID-19. *Rev. San Gregor.***2022**, *1*, 144–160. [[Google Scholar](#)]
9. Baker, S.; Morawska, A.; Mitchell, A. Promoting children's healthy habits through self-regulation via parenting. *Clin. Child Fam. Psychol. Rev.***2019**, *22*, 52–62. [[Google Scholar](#)] [[CrossRef](#)]
10. Terrón-Pérez, M.; Molina-García, J.; Martínez-Bello, V.E.; Queralt, A. Relationship between the physical environment and physical activity levels in preschool children: A systematic review. *Curr. Environ. Health Rep.***2021**, *8*, 177–195. [[Google Scholar](#)] [[CrossRef](#)] [[PubMed](#)]
11. Manaugh, K.; El-Geneidy, A. Validating walkability indices: How do different households respond to the walkability of their neighborhood? *Transp. Res. Part D Transp. Environ.***2011**, *16*, 309–315. [[Google Scholar](#)] [[CrossRef](#)]
12. Gallotta, M.C.; Iazzoni, S.; Emerenziani, G.P.; Meucci, M.; Migliaccio, S.; Guidetti, L.; Baldari, C. Effects of combined physical education and nutritional programs on schoolchildren's healthy habits. *PeerJ***2016**, *4*, e1880. [[Google Scholar](#)] [[CrossRef](#)] [[PubMed](#)]
13. Trigueros, R.; Mínguez, L.A.; González-Bernal, J.J.; Jahouh, M.; Soto-Camara, R.; Aguilar-Parra, J.M. Influence of teaching style on physical education adolescents' motivation and health-related lifestyle. *Nutrients***2019**, *11*, 2594. [[Google Scholar](#)] [[CrossRef](#)]
14. Tarkar, P. Impact of COVID-19 pandemic on education system. *Int. J. Adv. Sci. Technol.***2020**, *29*, 3812–3814. [[Google Scholar](#)]