

The Impact Of E-Learning During Covid-19 On Physical Education & Sports Science In Universities

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Abstract:

The main purpose of the research study has E-learning quickly became a crucial tool for universities and other higher education institutions during the global COVID-19 pandemic. The field of sport and physical education (PE) was no exception. However, though there is considerable growth in digital technologies in sport or physical education, we have very little evidence about the use and outcomes of these technologies. Thus, this study aims to document how e-learning technologies and pedagogical approaches were employed in the field of sport, the challenges and successes associated with these approaches, and potential avenues for improvement. To do so, a total of 27 responses were collected with two online qualitative surveys, one respectively for students (n = 15) and one for teachers (n = 12). Structured follow-up interviews with four students and one additional teacher were conducted to verify and deepen the responses. The findings show that interaction and variety were critical components of successful online learning. However, teachers reported difficulties motivating students, especially if no visual connection was present. Ultimately, even with innovation, variety, and interaction, sport and physical education's practical and social nature does not fully translate to the online setting. Thus, we conclude by proposing potential avenues for practice and research to respond to the challenges documented here.

Keywords: e-learning; online learning; sport; physical education; qualitative research; COVID-19; coronavirus

Introduction:

Physical education is a very important aspect of the training of children, acting through multilateral development and physical and educational contents. The development of physical education and sports activity has brought to the fore the application of modern science and technology in the field of computers, which can achieve a close connection with the quality of teaching and the perception of information by students.

E-learning can be defined as self-paced or real-time online internet learning in relation to the end user [1]. Additionally known as distance learning, e-learning became the primary method of instruction for universities and other higher education institutions during the global COVID-19 pandemic with one global survey indicating that 85% of universities used e-learning as their teaching model during the pandemic [2]. Though we recognize that there are debates around the exact definition and scope of e-learning [3], for our purposes, we understand e-learning as a having a broad scope focusing specifically on systems of delivery. More precisely, we adopt a definition “whereby e-learning is an on-line education defined as the self-paced or real-time delivery of training and education over the internet to an end-user device” [4].

Despite what felt like a sudden transition for many, online teaching and learning literature is rich and longstanding. Existing good practices for face-to-face teaching have been adapted to online teaching [5]. As online teaching has become more prevalent, further good practices and theoretical models have also been elaborated [6–10]. These include dividing good practices into three categories: (1) course design, (2) interaction among course participants, and (3) instructor preparation and support [6] as well as creating a sense of online learning community while supporting rapid advancement of technology [11].

Elsewhere, the Multimodal Model contends that teachers should seek to use multiple approaches that meet the needs of a broad spectrum of students and thus recognizes that learners have different backgrounds and learning styles. For instance, self-study, reflection, community building, or student-generated content are integrated into the model. Ultimately, this mixture allows students to experience learning in ways they are most comfortable while also challenging them to learn in other ways [7].

However, there are numerous challenges in fully adopting such good practices or models even under normal circumstances. E-learning is generally more time-consuming for the instructor due to, for instance, increased preparation time, managing questions outside of the online course setting, and the grading of online material [6,12,13]. Furthermore, the lack of adequate training in delivering e-learning makes the development and implementation of courses difficult for the instructors and students. Instructors, for example, often receive no or only little training before being asked to deliver an online course [6].

Further challenges can include the lack of measurable strategic goals, the need to license expensive software, and the potential risks for disruption connected to the increasing dependency on technology as a medium (e.g., power outages, natural disasters, hacking, etc.) [14]. The sudden and jarring shift to e-learning caused by the COVID-19 pandemic only served to reinforce these

challenges. For instance, the lack of technological resources, poor internet quality, and a lack of information communication technology (ICT) knowledge have been important barriers, especially in developing countries [15].

Such technical problems have been only one component of the challenges faced by students and teachers related to e-learning during the pandemic. The emerging literature on the topic also identifies a number of health-related problems and interaction-related challenges. Students' physical and mental health were affected due to the sudden physical isolation, health concerns, and the difficulties posed by the asynchronous nature of online learning [16,17]. For instance, a recent study showed that 71% experienced increased stress and anxiety since the start of the online learning period [16].

In addition, challenges concerning adequate online interaction between the students as well as between them and their instructors represent a significant issue for online learning during the pandemic. The distant nature of e-learning, combined with the new negotiation of (self) identity presented by videoconferencing software, further magnifies these interaction-related challenges [18]. The sport and physical education field, arguably, faced an even more significant challenge than other more theoretical disciplines. Sport, after all, is an inherently physical, practical, and interactive subject, and these features do not always easily translate to the online setting [19]. As with other subjects, of course, there is first a need for easy-to-understand "organizational and technical resources", good internet connections, user-friendly e-learning tools, and a positive learning environment for all the students and instructors [19–21].

However, creating these conditions may be easier in more theoretical subjects as opposed to in sport disciplines or other areas that require practical or hands-on learning. For instance, students' living or working space may limit their ability to implement or practice certain sport activities, and there are limitations to the levels of individualized feedback teachers can deliver [22]. To minimize the impact of such limitations, the growing literature around the topic suggests several good practices related to sport and physical education. These include designing inclusive learning spaces, fostering peer interaction, building a community, developing innovative assessment designs, providing clear structure, and ensuring instructors have adequate non-technical skills [23–25]. Often, the tools used for sport-focused e-learning are similar to those in other fields, and include conferencing tools such as Zoom or Teams, learning management tools such as Moodle, as well as interactive tools such as forums or quizzes [19,25].

Overall, both before and during the pandemic, there has been an increasing volume of studies looking at sport and physical education at the university level [17,23–25] and many studies concerned with physical education delivery at the primary or secondary school levels, e.g., [22,26,27]. However, though there is considerable growth in digital technologies in sport or physical education, there is little evidence about how these technologies are used and whether they optimize student learning [28].

To do so, we explore the experiences of university teachers and students through the use of qualitative online surveys and structured interviews. In particular, here, we focus on the experiences of teachers and students regarding the transition to e-learning and attempt to understand the challenges, successes, and recommendations associated with these experiences. In doing so, we can propose potential avenues for further development and improvement. Moving forward, we will first present an overview of the overall methodology of the paper. Then, we will present the main themes that were identified from our results. Finally, to conclude, we will discuss these results against the existing body of literature and present perspectives on the future usage of e-learning in tertiary sport and physical education.

1.1 Objective of the study:

To find out **the impact of E-learning during Covid-19 on physical education & Sports science at university Level.**

1.2 Research question:

This research study hypothesized that how the athlete improves their focus **“The impact of E-learning during Covid-19 on physical education & Sports science at university Level”**.

There is significance impact on the performance of e-learning on physical education students, at university level.

2. Literature review:

The literature review defined the any type of e-learning in physical education that has been systematically manipulated regards the technical interaction demands of the physical education student's task.

2.1 Early process testing so that it can be learned quickly:

Izzo, R.; Giovannelli, M.; Cejudo, (2021), The quick response to change is more important in many cases than over-planning down to the last detail. In this context, PES teachers and coaches have decided to embrace the advantages brought by technology: they have adopted online video classes and PES-dedicated software applications such as Go Noodle, Orienteering, VR/AR sports games, etc. In higher education institutions (HEIs), the theoretical background was offered to students through e-learning platforms such as Blackboard, Moodle, etc. MOOCs also offer a good perspective, especially for autodidact students and athletes that decide to take supplementary courses and extra-specialization. Early process testing requires a culture that allows mistakes.

Thus, teachers and coaches are stimulated to adopt learning by doing and through problem-solving methodology, allowing students and athletes to learn from their own mistakes. Agile quality management is transforming from a zero-flawed culture into a new culture of error (“Fail Fast - Learn Fast”). Virtual simulation in VR/AR environments allows athletes to take part in intensive

training and get real-time feedback from the application, which can be set for each sportsperson's particularities.

2.2 Real-time information and openness:

Swarnakar, V.; Tiwari, A.K.; Singh, (2020), The globalization and facilities brought by the IoT have prompted managers to solve difficult problems in a short time. HEIs' rectors can access a huge amount of data regarding students' evolution, different types of courses, new methodologies, and policies regarding education at the European level, as well as specific assets for PES, new mobile applications dedicated to PES, etc. Clubs juggle with information regarding competitions calendars, participants, different types of training with more efficient results, hygienic regime, etc.

The leader must make the decision based on the specific requirements of the institution (sports club, school, university, league, etc.) and its state of affairs. The volume and complexity of data to be analyzed, the speed of response to market requirements, the high quality and identity of athletes and training methods, fierce competition, complex restrictions on resources, and the regulation of the circular economy are all factors that have led managers to base their decisions on complex analyses, using Business Intelligence solutions that offer interactive dashboards and a complex panorama on the current situation.

2.3 Systematic prevention, risk management, and improvement:

According to Cheung, S.Y.; Huang, (2020), This principle concerns risk management and continuous improvement. The higher the speed and complexity, the greater the risk of making errors. The key to active risk management is trust and ownership. Teachers, coaches, and associated personnel can address risks openly and proactively and, if necessary, receive support to avoid or mitigate them. People are more creative when they are relaxed and have a mindful state of mind. Neuroscience highlights the importance of employee (teachers, coaches, and associated personnel) involvement in the planning process, providing a high degree of assertion. The habit of learning through reflection, i.e., from one's own mistakes or those of colleagues, is specific to the agile paradigm. Leaders need to be patient and know that achieving a change of mindset in their employees (reshaping the brain to create new habits) requires compensatory pathways and creates a safe environment that fosters change.

2.4 Pedometers:

According to Beighle (2001), Today, it can be said that the pedometer has become a recognized acceptable tool for measuring physical activity. Students can wear a pedometer and receive immediate and continuous feedback regarding their activity level. Using pedometers at university can also demonstrate to parents that students are achieving a certain level of physical activity. Using the pedometers, students will be able to see progress toward set goal and consequently will be more motivated in the classes.

2.5 Heart Rate Monitors:

Kirkwood and Manon (2002), The heart rate monitor will also provide real-time data that will allow students to see how different exercises and activities affect the heart rate. Hence, the heart rate monitor is a convenient apparatus that allows students to use up to date technology. Charts of maximum heart rate can be made for each student and track increase or decrease in their heart rate.

2.6 Digital Video Camera and Visual Analysis Software:

Carter, D.R.; Cullen-Lester (2020), Using digital video camera to record pupils' performance can be a useful tool to help students improve their techniques. With the addition of motion analysis software, pupils have a professional supportive tool. The PE teacher can then use the digital video camera to analyze the actions more closely. This is done with a view to improve the teaching and learning of table tennis. In the Mauritian context, some state colleges which are actually working on a pilot project set up by the ministry of education are presenting candidates for the Cambridge O level Examination. Teachers involved in this project will have to make use of video cameras during the practical examination to record students' performance and then send them to Cambridge University. Each college involved in the pilot project has already received a laptop, an overhead projector, and its respective screen. Digital video cameras and internet connection facilities will soon be available in these universities.

2.7 Simulation and Games:

Di Giorgio (2004), Games such as Dance, Dance revolution, FX cycles, and Nintendo Wii Fit provide opportunities for students to be physically active and simultaneously enjoying themselves. These games can also be combined to other technologies to enhance the experience. Concerning the Nintendo Wii Fit, work outs are done on a small balanced board that gamers stand on. The players receive instructions from screen and mimic the stretching and muscle building exercises. The Wii Fit tracking feature shows progress using the system. Therefore, it can be a valuable PE tool. However, teachers should not consider gaming system equivalent to traditional exercises. It should be considered as a supplement and not a replacement of traditional exercises.

2.8 Quality competence for all staff members:

Tang, D (2020) Quality is ensured by students, athletes, teachers, coaches, associated personnel, and management teams at the same time on different levels. The quality itself is seen in the transversal skill, competencies, and especially the performances of each individual, in the desire to cooperate and in the ability to work as a team.

3. Methodology

3.1 Survey Design

In this research study, we opted for an online qualitative survey design. Here, we understand qualitative surveys as self-administered surveys consisting "of a series of open-ended questions" that are "presented in a fixed and standard order to all participants" [29]. Though there are

misplaced notions about the depth of such research, this design offers a flexible approach that allows researchers to reach larger samples than is typically feasible with traditional interviews [29].

Such qualitative surveys are also advantageous for participants, as they are an unobtrusive, less burdensome form of data collection than traditional interviews. Finally, online qualitative surveys are especially appropriate for sample populations that are actively engaged in digital life and are comfortable with communicating online. Given the nature and topic of the survey, this was deemed to be the case here. In addition, to obtain additional background and depth, we conducted a handful of follow-ups, face-to-face interviews to expand on the findings obtained from the survey. In the following sections, we describe the overall methodology in more detail. To design the survey, we followed existing recommendations [29].

We created two versions of the survey, one for students and one for teachers. We focused on a limited set of six open-ended questions, asked a minimal amount of demographic/background questions, and first piloted the surveys with a group of teachers and students. In both surveys, the open-ended questions focused on the set-up/preparation for e-learning, structures and tools used, challenges, successes and avenues for improvement. Broadly speaking, the chosen questions reflect themes present in other literature that address issues around satisfaction and engagement with e-learning tools in sport [23,30,31]. Furthermore, these questions directly relate to the research questions outlined above and help us identify the impact of the switch to e-learning, challenges, successes, and potential avenues for improvement. Students and teachers received quite different versions of the question related to challenges or successes. This was done in order to ensure that student responses focused on their pedagogical experience as opposed to other facets of the pandemic. In the end, space was also given for respondents to provide unstructured, additional thoughts on the topic. The main questions for each survey are presented in Table 1 below. At the beginning of the survey, the purpose of the study was explained to participants, they were given an overview of the questions and provided with information on how the data would be used. Responses were kept anonymous, and all participants provided informed consent before starting the survey.

Table 1. Overview of qualitative survey questions.

Topic	Teacher Questions	Students Questions
Preparation/Set-Up	Please explain how you prepared for the shift to delivering online classes	Please tell us about how you were set-up to participate in online classes
Structure and Tools	How did you structure your online classes (e.g. pre-recorded podcasts/videos, online meetings)	What kind of approaches (e.g., pre-recorded podcasts/videos, online meetings) and tools (e.g.,

	and which tools did you use (e.g., PowerPoint, surveys, videos)?	PowerPoint, surveys, videos) did you experience in your online courses?
Challenges/Successes	Did you face any challenges in giving online courses and, if so, how did you try to overcome them?	Which online tools or approaches worked particularly well, and why? Which online tools or approaches did not work so well, and why?
Improvement	What could be done to improve your online teaching delivery?	What could be done to improve your online learning experience in the future?
Future	Are you considering staying with an e-learning model (e.g., fully or hybrid) once face-to-face teaching is possible again? Please explain your opinion	Do you plan on using with online learning opportunities in the future? Why or why not?

Based on the initial survey responses, we then designed a short, semi-structured follow-up interview guideline to explore some of the emerging themes from this survey. These interviews aimed to obtain additional depth and feedback on responses obtained in the online survey [29], especially related to the experience and structure of online courses and the future use of e-learning tools. In particular, these questions focused on how e-learning preparation could be better supported, how certain course types (e.g., lectures, practical courses, or field trips) were affected by the shift to e-learning and how they expect e-learning to develop in the future. Both students and teachers were asked about the same topics, and the researchers asked probes or follow-up questions based on responses.

3.2 Participants of the study:

Sampling for each survey was done in to target teachers and students engaged in various academic fields related to sport. For the teacher survey, teachers working for members of the Network of department sports Education in university were contacted via e-mail and further encouraged to respond via social media. Thus, this provided us with access to educators working across multiple disciplines associated with sport and helped us obtain 12 survey responses from educators from 11 different institutions.

On the student side, students from two English-language Master degree programs at the Pakistani University were approached via e-mail and Moodle, leading to another 15 responses (7 male, 8 female). As this is our home institution, we had direct access to these students. Furthermore, these

students—by the nature of their academic programs— participate in a range of theoretical, research-based (e.g., research projects), and practical courses (e.g., field trips and practical lessons on sport for development methods).

3.3. Data Analysis:

The process of the analysis was used to analysis the data, and survey re-sponce and interview notes were analyzed together. This process includes familiarizing oneself with the data, generating initial codes, searching for themes, reviewing themes, and defining themes. First, both authors independently read through the responses and interview notes, took extensive notes and formulated a first list of preliminary codes to describe the approaches, challenges, and successes associated with e-learning in sport and physical education.

At this stage, we also began noting potential, preliminary themes. Author coded the responses from each survey and interview in MaxQDA2020 using this list of codes. Generally speaking, codes reflected how individuals prepared for e-learning, the tools or approaches used, perceived challenges, and opportunity. Throughout the coding process, memos and notes were taken. Both authors then reviewed the codes, and data together.

Results:

In the following, we present results from both the online qualitative survey and face-to-face interviews together. This presentation is divided according to the three main themes identified: ‘a sudden shift’, ‘striving for interaction’, and ‘lack of resources and support’. Throughout, quotations and external literature are used to support the presentation and contextualization of our results.

A Sudden Shift:

The first theme was related to the sudden shift from in-person teaching to online teaching. This shift was, of course, due to the unplanned outbreak of the COVID-19 virus, which forced many institutions to transition to partial or complete e-learning models. For many teachers, this sudden shift forced them to jump into online teaching with little or no preparation, essentially putting them into a trial-by-fire, learning-by-doing type of situation. Though some teachers reported already having some form of experience, knowledge, or support within their institutions, most felt that “there really was no time to prepare”, which led to “experimenting” (Survey) and “lots of mistakes” (Survey). Most strikingly, one respondent even admitted getting hired only a week before the start of classes. Despite this, the participants in our research appear to have made considerable efforts to prepare for this change. Not only did teachers experiment and try new things, but they proactively researched new tools and information, “talked with other teachers to share experiences” (Survey) or even “practiced the online course” beforehand (Survey).

Basically, the unexpected change in delivery format and uncertainty around it created numerous challenges for students and teachers, especially, as we will discuss next, in terms of generating and sustaining motivation and interaction.

Striving for Interaction:

The need for variety and interaction was a significant theme for the students in our survey. The feeling of distance created through pre-recorded lectures or slide-based presentations greatly limited student motivation, engagement, and satisfaction. For instance, one student observed that “lectures do not work online. You just cannot focus for 1.5 h when nothing else is happening.

Interaction is definitely needed in an online classroom” (Survey). Another student echoed this sentiment, adding that technical issues can further exacerbate these issues: “It was very hard to motivate myself to follow pre-recorded lectures, especially if they were accompanied by technical issues” (Survey). Additionally, even with interaction, it was seen as important to integrate variety. Using the same structure and tools every week, even if it includes interactive activities such as discussions or breakout rooms, did not create a satisfying learning environment for students. They instead wished for diversity in tools and approaches. Interestingly, these results demonstrate the immense perceived value of variety and interaction in even theoretical classes. Furthermore, these results reinforce the contention made within Picciano’s Multimodal Model [7], whereby various approaches are recommended to meet the needs of a diverse student body.

Additionally, though the teachers here attempted to integrate numerous approaches and online tools, the students did not always perceive this as adequate. For some, they felt that the “students were probably better than the teachers” (Interview) when it came to using or implementing online learning tools. Of course, newly hired or technologically inexperienced teachers may not communicate their personal situation to students, and students did not mention their awareness of teacher experience in the survey. Regardless of experienced levels, beyond the sudden disruption caused by the pandemic, it seems that these difficulties were due to a more general lack of training and support around e-learning.

Lack of Resources and Training:

Difficulties and challenges in delivering online learning were not solely due to the sudden shift to online learning caused by the COVID-19 pandemic but broader, pre-existing structural and organizational issues. After all, as we note in our introduction, literature and research around online learning is hardly a new topic, yet many institutions were caught unprepared. As one student interviewee noted, it seemed like “everything must come from the professor’s motivation”.

These gaps manifested themselves both in terms of resources and overall training or support. For many teachers, the lack of adequate technical equipment was a recurring challenge. This ranged from access to quality headsets, reliable internet connections, a second computer screen, and webcams, up to the availability of a unique and sufficiently equipped workstation at home or in the university setting. For example, one teacher reported challenges with their Moodle platform,

whereby “when there were many students simultaneously in Moodle, the platform could not support it” (Survey). Similarly, another teacher noted that they needed to adjust by using more “low bandwidth” activities that could accommodate participants with lower quality internet connections or technical set-ups. Students experienced similar struggles as they mostly took part in the online courses on their laptops with integrated webcams and microphones.

One student mentioned that “it has to be noticed that not everyone has the same access to online teaching. Some people do not have the best hard- or software to attend online classes” (Survey). The survey also illustrated how students predominantly work from informal spaces not explicitly conceived for work or learning, such as their student accommodations, dorms or shared flats, and, often, from their bedrooms. These irregular, sub-optimal learning situations led many students to express the wish for proper workstations provided by the university in order to complete their e-learning requirements in a safe, quiet, and technological suitable environment.

Discussion and Future Recommendations:

Through a qualitative survey and structured follow-up interviews, the challenges and realities of e-learning during COVID-19 in university sport and physical education can be categorized into three major themes: a ‘sudden shift’, ‘striving for interaction’, and a ‘lack of resources and training’. These three major themes provide answers to the three research questions. ‘Sudden shift’ addresses how distance education has affected sport and physical education during COVID-19. ‘Striving for interaction’ discusses the few successes and the challenges that have accompanied the switch to online learning, while ‘lack of resources and training’ indicated the direction in which e-learning can be improved for sport and physical education during COVID-19.

However, there are limits to the present study. The use of convenience sampling and the fact that a multitude of sport (sub)disciplines are present may prevent broader generalization. Thus, though our sample represents a breadth of disciplines and experiences, we cannot necessarily detect differences or unique features within how specific disciplines experienced and integrated e-learning. Finally, the slightly different wording of the student and teacher questions hindered direct comparability. Nonetheless, the findings here do allow us to highlight some the realities and challenges faced by this field when it comes to e-learning.

Certainly, we recognize and support calls for innovation and implementation of online education good practices in sport and physical education and other contexts. However, we will end by encouraging educational institutions to devise and invest in ways to increase the capacity and resilience of their face-to-face tertiary education in sport and physical education. Many potential global shocks lurk around the corner, from future pandemics, new COVID-19 variants, and climate change.

Though technology and online learning have an immense role in addressing and working around these challenges, educational institutions must invest in ensuring the sustainable, safe, resilient provision of face-to-face teaching. Not only are some subjects, such as sport and physical

education, nearly impossible to faithfully deliver in an e-learning context, but in-person interaction remains a crucial component of effective learning and is intimately related to the wellbeing, health, and satisfaction of students.

Thus, the challenge ahead is to ensure that we are able to capitalize on the potential of technology while also investing in the quality, safety, health, and sustainability of our face-to-face teaching environments. After all, as one student succinctly put it, we have learned two things from COVID-19: “it is unreplaceable to be in class, and if being in class is not possible, online courses are a good option”.

Conclusions:

The present research emphasizes the need for the introduction of information technology by physical education and sports teachers in their teaching activity, to help students and athletes to achieve performance in learning and practicing physical education and sports. It can offer broad, technology-based approaches that can significantly involve students and athletes in physical activity. It can be considered a support element for an increased appreciation of students and athletes in the application of skills, which can lead to a positive transfer from one activity to another. The analysis of the items from the survey, in which respondents from the categories of teachers and PES trainers participated, highlights both the advantages of technology over the teaching of physical education and sports

The advantages would be the ability of students and athletes to create a new meaning for their training hours, where, in addition to implementing certain instructions, they can also have a visual image of what they are about to repeat and learn. The development of the ability to perceive at a deeper level what they have to put into practice is an impact that technology has (video analysis), which leads to the involvement and creation of new attitudes of students and athletes towards physical education and sports training.

References

1. Carter, D.R.; Cullen-Lester, K.L.; Jones, J.M.; Gerbasi, A.; Chrobot-Mason, D.; Young Nae, E. Functional leadership in interteam contexts: Understanding ‘what’ in the context of why? where? when? and who? *Leadersh. Q.* 2020, 31, 101378. [Cross Ref]
2. Suzuki, S.; O’Doherty, J.P. Breaking human social decision making into multiple components and then putting them together again. *Cortex* 2020, 127, 221–230. [Cross Ref]
3. Tang, D. 7 Steps Digital Leaders Can Take to Adapt to the New Normal after COVID-19. 2020. Available online: <https://flevy.com/download/covid-19-digital-leaders-7-steps-216> (accessed on 15 September 2021).
4. Swarnakar, V.; Tiwari, A.K.; Singh, A.R. Evaluating critical failure factors for implementing sustainable lean six sigma framework in manufacturing organization A case experience. *Int. J. Lean Six Sigma* 2020, 11, 1069–1104. [CrossRef]

5. Cheung, S.Y.; Huang, E.; Chang, S.; Wei, L. Does being mindful make people more creative at work? The role of creative process engagement and perceived leader humility. *Organ. Behav. Hum. Decis. Process.* 2020, 159, 39–48. [Cross Ref]
6. Izzo, R.; Giovannelli, M.; Cejudo, A.; Varde, C.H. Outdoor activity: Orienteering, one step towards an advanced scientific evaluation of game determinants using latest dedicated technologies combined with literature review. *J. Phys. Educ. Sport* 2021, 21 (Suppl. S1), 592–599. Available online: <https://efsupit.ro/images/stories/februarie2021/Art%2068.pdf> (accessed on 13 December 2021).
7. Lindberg, R.; Seo, J.; Laine, T.H. Enhancing physical education with exergames and wearable technology. *IEEE Trans. Learn. Technol.* 2016, 9, 328–341.
8. Liu, Y.; Liu, Y.L. The influence of the internet sports information on college physical education. *Educ. Sci. Theory Pract.* 2018, 18, 2949–2957.
9. Rhoades, J.L.; Woods, A. Repertoire networks among national board-certified physical education teachers. *Prof. Dev. Educ.* 2015, 41, 436–451.
10. Zhou, B. Smart classroom and multimedia network teaching platform application in college physical education teaching. *Int. J. Smart Home* 2016, 10, 145–156.
11. Anderson, K.A.; Crespi, M.; Sayre, E.C. Linking behavior in the physics education research coauthorship network. *Phys. Rev. Phys. Educ. Res.* 2017, 13, 010121.
12. Gunter, G.A.; Reeves, J.L. Online professional development embedded with mobile learning: An examination of teachers' attitudes, engagement, and dispositions. *Br. J. Educ. Technol.* 2017, 48, 1305–1317.
13. Sava, A. Online Education during the Coronavirus (COVID-19) Pandemic in Romania—Statistics & Facts. Statista. 2021. Available online: <https://www.statista.com/topics/7653/online-education-in-romania/> (accessed on 18 August 2021).
14. Souissi, M.; Ammar, A.; Trabelsi, O.; Glenn, J.; Boukhris, O.; Trabelsi, K.; Bouaziz, B.; Zmijewski, P.; Souissi, H.; Chikha, A.; et al. Distance motor learning during the COVID-19 induced confinement: Video feedback with a pedagogical activity improves the snatch technique in young athletes. *Int. J. Environ. Res. Public Health* 2021, 18, 3069.
15. Gupta, S.; McCarthy, P.J. Sporting resilience during COVID-19: What is the nature of this adversity and how are competitive elite athletes adapting? *Front. Psychol.* 2021, 12, 611261.
16. Malureanu, A.; Panisoara, G.; Lazar, I. The relationship between self-confidence, self-efficacy, grit, usefulness, and ease of use of e-learning platforms in corporate training during the COVID-19 pandemic. *Sustainability* 2021, 13, 6633.
17. Santi, G.; Quartiroli, A.; Costa, S.; di Fronso, S.; Montesano, C.; di Gruttola, F.; Ciofi, E.G.; Morgilli, L.; Bertollo, M. The impact of the COVID-19 lockdown on coaches' perception of stress and emotion regulation strategies. *Front. Psychol.* 2021, 11, 601743.
18. Teodorescu, S.; Bota, A.; Popescu, V.; Mezei, M.; Urzeala, C. Sports training during COVID-19 first lockdown—A romanian coaches' experience. *Sustainability* 2021, 13, 10275.

19. Pokhrel, S.; Chhetri, R. A literature review on impact of COVID-19 pandemic on teaching and learning. *High. Educ. Future* 2021, 8, 133–141.
20. Alonso-García, M.; Garrido-Letrán, T.; Sánchez-Alzola, A. Impact of COVID-19 on educational sustainability. Initial perceptions of the university community of the University of Cádiz. *Sustainability* 2021, 13, 5938.
21. Philippe, R.A.; Schiavio, A.; Biasutti, M. Adaptation and destabilization of interpersonal relationships in sport and music during the COVID-19 lockdown. *Heliyon* 2020, 6, e05212.
22. Hodges, N.J.; Chua, R.; Franks, I.M. The role of video in facilitating perception and action of a novel coordination movement. *J. Mot. Behav.* 2003, 35, 247–260.
23. Koekoek, J.; Van Der Mars, H.; van der Kamp, J.; Walinga, W.; van Hilvoorde, I. Aligning digital video technology with game pedagogy in physical education. *J. Phys. Educ. Recreat. Danc.* 2018, 89, 12–22.
24. Koh, K.T.; Li, C.X.; Swarup, M. Pre-service physical education teachers' perceptions of a flipped basketball course: Benefits, challenges, and recommendations. *J. Teach. Phys. Educ.* 2020, 40, 589–597. Available online: <https://journals.humankinetics.com/view/journals/jtpe/aop/article-10.1123-jtpe.2019-0195/article-10.1123-jtpe.2019-0195.xml> (accessed on 6 January 2021).
25. Ennis, C.D. Implications of exergaming for the physical education curriculum in the 21st century. *J. Sport Health Sci.* 2013, 2, 152–157.
26. Mildner, P.; Stamer, N.; Effelsberg, W. *From Game Characteristics to Effective Learning Games Serious Games*; Springer: Berlin/Heidelberg, Germany, 2015. 21. Sheehan, D.P.; Katz, L. The effects of a daily, 6-week exergaming curriculum on balance in fourth grade children. *J. Sports Health Sci.* 2013, 2, 131–137.
27. Gao, Z.; Zhang, T.; Stodden, D. Children's physical activity levels and psychological correlates in interactive dance versus aerobic dance. *J. Sports Health Sci.* 2013, 2, 146e51.
28. Maddison, R.; Foley, L.; Ni Mhurchu, C.; Jull, A.; Jiang, Y.; Prapavessis, H.; Rodgers, A.; Hoorn, S.V.; Hohepa, M.; Schaaf, D. Feasibility, design and conduct of a pragmatic randomized controlled trial to reduce overweight and obesity in children: The electronic games to aid motivation to exercise (eGAME) study. *BMC Public Health* 2009, 9, 146.
29. Eliöz, M.; Vedat, E.; Küçük, H.; Karakaş, F. The effect of motion detecting computer games on the skills training. *Beden Eğitimi Spor Bilimleri Dergisi* 2016, 10, 13–18. 25. Conner, C.; Poor, G.M. Correcting exercise form using body tracking. In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, San Jose, CA, USA, 7–12 May 2016; pp. 3028–3034.
30. Aldrich, C. *Learning by Doing: A Comprehensive Guide to Simulations, Computer Games, and Pedagogy in E-Learning and Other Educational Experiences*; Wiley: San Francisco, CA, USA, 2005.
31. Potdevin, F.; Vors, O.; Huchez, A.; Lamour, M.; Davids, K.; Schnitzler, C. How can video feedback be used in physical education to support novice learning in gymnastics? Effects on

- motor learning, self-assessment and motivation. In *Physical Education and Sport Pedagogy*; Taylor & Francis: London, UK, 2018; Volume 23, pp. 559–574.
32. Schmidt, R.A.; Lee, T.D. *Motor Control and Learning: A Behavioral Emphasis*; Human Kinetics: Champaign, IL, USA, 2005.
 33. Swinnen, S.P. Information feedback for motor skill learning: A review. In *Advances in Motor Learning and Control*; Zelaznik, H.N., Ed.; Human kinetics: Champaign, IL, USA, 2005; pp. 37–66.
 34. Stanescu, R. The role of video analysis method in tennis performance. In *European Proceedings of Social and Behavioural Sciences*; Future Academy: London, UK, 2018; Volume 36, pp. 277–282.
 35. Rucci, J.A.; Tomporowski, P.D. Three types of kinematic feedback and the execution of the hang power clean. *J. Strength Cond. Res.* 2010, 24, 771–778.
 36. Janelle, C.M.; Beard, D.A.; Frehlich, S.G.; Tennant, L.K.; Cauraugh, J.H. Maximising performance effectiveness through videotape replay and a self-controlled learning environment research quarterly exercise and sport. *Res. Q. Exerc. Sport* 1997, 68, 269–279.
 37. Stanescu, R. The new on-court tennis software—perspectives in training process. In *Proceedings of the 14th International Scientific Conference Elearning and Software for Education: Elearning Challenges and New*, Bucharest, Romania, April 19–20 2018; pp. 341–345.
 38. Zhang, D.; Liu, R. Application of intelligent orienteering based on Internet of things. *EURASIP J. Wirel. Commun. Netw.* 2020, 2020, 200. Available online: <https://jwcn-urasipjournals.springeropen.com/articles/10.1186/s13638-020-01814-1> (accessed on 6 December 2021). [Cross Ref]
35. Izzo, R.; Giovannelli, M.; Cejudo, A.; Varde, C.H. Outdoor activity: Orienteering, one step towards an advanced scientific evaluation of game determinants using latest dedicated technologies combined with literature review. *J. Phys. Educ. Sport*