

PHYSICAL EDUCATION TEACHERS' PERCEPTIONS OF THE TEACHING-LEARNING PROCESS OF PHYSICAL EDUCATION IN SCHOOLS WORLDWIDE DURING THE PANDEMIC: A SYSTEMATIC REVIEW OF THE SCIENTIFIC LITERATURE

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ABSTRACT. Introduction: In the context of the COVID-19 pandemic, physical education has undergone major changes in terms of the way it is taught in schools. This subject's teachers have faced numerous problems in the process of implementing physical education, and their experiences are explored in numerous studies. **Aim:** The aim of this study is to review research on the teaching-learning process of physical education in schools during the pandemic, from the perspective of physical education teachers. **Methods:** The research is a study of scientific literature. The research was performed using keywords in seven electronic databases. **Results:** The analysis carried out indicates a selection of 57 scientific articles that fit with the chosen eligibility criteria. The articles include research on the physical education teachers' perceptions regarding the teaching-learning process of physical education lessons taught in schools during the pandemic. **Conclusions:** The study synthesizes the experiences of physical education teachers in teaching physical education during the pandemic. The evidence obtained indicates that the common option in carrying out physical education lessons during the pandemic was the online method, although teachers prefer teaching physical education in the traditional way.

Keywords: *physical education during the pandemic, online teaching, physical education teachers' experiences, physical education online*

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REZUMAT. *Percepțiile profesorilor de educație fizică cu privire la procesul de predare-învățare a educației fizice în școlile din întreaga lume, în perioada pandemiei: o analiză sistematică a literaturii științifice.* **Introducere:** În contextul pandemiei de COVID-19, educația fizică a suferit schimbări majore în ceea ce privește modul de predare în școli. Profesorii de educație fizică s-au confruntat cu numeroase probleme în procesul de implementare a educației fizice, iar experiențele acestora sunt cercetate în numeroase studii. **Scop:** Acest studiu are ca scop trecerea în revistă a cercetărilor cu privire la desfășurare procesului de predare-învățare a educației fizice în școli, în perioada pandemiei, din perspectiva profesorilor de educație fizică. **Metode:** Cercetarea este un studiu de literatură științifică. S-a efectuat o căutare în șapte baze de date electronice folosind cuvinte cheie. **Rezultate:** Analiza realizată indică o selecție de 57 de articole științifice care au îndeplinit criteriile de eligibilitate alese. Articolele cuprind cercetări privind percepțiile profesorilor de educație fizică cu privire la procesul de predare-învățare a educației fizice în școli, în perioada pandemiei. **Concluzii:** Studiul realizează o sintetizare a experiențelor profesorilor de educație fizică în predarea educației fizice în perioada pandemiei. Dovezile obținute indică faptul că varianta cea mai utilizată în realizarea lecțiilor de educație fizică în pandemie a fost metoda online, deși profesorii preferă predarea educației fizice în mod tradițional.

Cuvinte-cheie: educația fizică în pandemie, predare online, experiențe ale profesorilor de educație fizică, educația fizică online

INTRODUCTION

The COVID-19 coronavirus outbreak has created general chaos across the globe. One of the characteristics of this virus was the speed with which it spread, causing a global pandemic. The pandemic has had a significant impact on human life, with strict rules and restrictions imposed on people. They were required to use and get accustomed to wearing protective masks, in both indoor and outdoor spaces, wash their hands very often and maintain social distance. The emergence of this coronavirus implicitly led to the closure of schools globally. Education is an ongoing process that aims at the development of future generations. In order to ensure the continuity of the education of pupils, the teaching-learning process in most schools and educational institutions has shifted to the virtual environment. Many schools quickly adapted to online learning methods. Teachers and students could no longer interact directly, which led to the disruption of the learning process during the pandemic. This disruption in the learning process can potentially lead to a decline in the quality of human resources in the future, both cognitively and affectively (Christian, McCarty, & Brown, 2021).

Thus, during the pandemic, three scenarios which can be applied for the return to learning physical education in schools were discussed (Filiz, & Konukman, 2020). These three scenarios were:

- face-to-face education with strict protocols that must be respected;
- online education;
- hybrid education (traditional and online).

The first alternative of the teaching-learning process of physical education lessons is the one in which the social distance between students and teachers had to be maintained and contact between them should be completely avoided in order to control the risks of virus transmission. This version was quite difficult to achieve in the gyms and on the school sports grounds. A high degree of hygiene and disinfection of people, equipment and sports materials had to be maintained. Traditional physical education lessons were carried out mostly outdoors, respecting social distancing and wearing protective masks (Ihbour, Boumadi, Najimi, & Chigr, 2021; Schembri, Coppola, Tortella, & Lipoma, 2021; Tagare, 2023). The study carried out by Ihbour, et al. (2021) is a guide for physical education teachers who resume teaching their traditional classes. It indicates the measures they must take to prevent the spread of the virus and to carry out the teaching of physical education safely for both teachers and students.

Online teaching was one of the learning alternatives that was used to overcome the problems during the pandemic (Filiz, & Konukman, 2020; Goad, Killian, & Daum, 2021). The learning system has changed, interactively with the help of digital platforms that can connect with digital communication devices (Kucera, do Vale Gomes, Ovens, & Bennett, 2022). During the pandemic, physical education teachers could use these methods in order to guide and stimulate students to do physical exercises at home and to maintain and improve their health. Teacher's use of technology can guide students during online physical education classes (Silva-Filho, et al., 2020).

Researchers Varea, González-Calvo, & García-Monge (2022) analyzed how the teaching-learning process of physical education lessons changed during the pandemic, relying more on digital technologies and individual activities during this period. Thus, some research aims to increase the awareness of physical education teachers when it comes to searching and finding new physical activity programs on different online platforms (Google) (Kutlay, Gönkek, & Köksal, 2022). These exercise programs can be adapted and used by teachers in order to make educational programs more engaging.

Learning physical education is largely based on physical activity, conditioned by movement, being a practical discipline. This subject encountered numerous obstacles during the COVID-19 pandemic. In the teaching-learning

process of physical education, the teachers had to think about the most favorable model of the learning process in such a way that they could help students learn as much as possible, and be active and healthy. This should happen with the right methods and techniques. Teachers must be creative and find the most engaging methods. The creativity of physical education teachers improves their performance in the physical education teaching process (Muzakki, Muammal, & Prakoso, 2021). Thus, the effectiveness of an online program that provides quality physical education for all students is considered. This program is designed based on standard physical education programs, and can be used successfully during the pandemic (Webster, et al., 2021). Using active themes expands and improves physical education, so teachers manage to promote physical activity and students can learn different movement skills even during a pandemic (Bailey & Scheuer, 2022).

At the same time, teachers encountered many obstacles and challenges in carrying out physical education classes. Teachers were overworked because they spend a lot of time to create interesting lessons for this period, they encountered internet connection problems and thought that the implementation of physical education during the pandemic is not effective (Silva, et al., 2021).

The pandemic has produced changes in terms of working conditions and lifestyle of physical education teachers. The majority of them indicate an increase in the volume of work performed, which leads to health, sleep, physical exhaustion and fatigue problems (Bastos, et al., 2022). Teachers are dissatisfied with the amount of work they have to do, with the use of communication tools and with the entire process of online teaching.

According to Varea, & González-Calvo, (2021) there are difficulties in teaching physical education during the pandemic related to teachers' personal feelings, which include low motivation for work, feelings of sadness and depression. Physical education teachers lack physical activity and direct contact with students. In the same context of the pandemic, Temel, et al., (2023) carry out a study that follows the feeling of alienation of physical education teachers in Turkey, during this period.

This pandemic has had a significant impact on the health and physical well-being of physical education teachers. Despite the restrictions imposed by the pandemic, there were some teachers who continued their active lives. Thus, following the physical activity carried out, they maintained a certain mobility and a certain level of health (Aydoğmuş, Yüksel, & Revan, 2022).

Although measures have been taken by the authorities, there is a concern of both students and teachers in the implementation of physical education classes, which can cause their behavior to be more bizarre. Feelings

of anxiety, fear, insecurity were perceived by physical education teachers who are obliged to conduct traditional lessons, i.e. face to face during certain periods of the pandemic. Physical education teachers' feelings of anxiety and stress can negatively affect the education they provide (Dalbudak, & Özkan, 2021; Tagare, 2023).

Physical education teachers were under increasing pressure and workload to cope with online or hybrid physical education during the pandemic (Aperribai, Cortabarría, Aguirre, Verche, & Borges, 2020).

There are numerous studies that were carried out during the pandemic which follow the dramatic effects that the pandemic had on the stress and burnout of physical education teachers. (Feroz, Kundra, Alam, & Alam, 2021; Karakoç, Karakoç, Aktaş, & Arslan, 2021). In their article, Karakoç, Karakoç, Aktaş, & Arslan, (2021) show that physical education teachers have a low level of burnout. The most significant negative effect, however, is the emotional exhaustion they had during the pandemic, when online teaching. They want the resumption of face-to-face physical education learning.

The aim of this study is to provide an overview of the research carried out during the pandemic, related to the teaching of physical education in schools, from the perspectives of physical education teachers.

The **objectives** of this study are:

- to present an updated analysis of the scientific literature regarding the physical education teachers' perceptions of the teaching-learning process of their subject in schools during the pandemic;
- to pursue the identification of research trends, especially the advantages and disadvantages of the process of teaching physical education online.

METHODS AND MATERIALS

Data collection

This review uses a systematic analysis of the majority of literature concerning physical education lessons in schools during the pandemic. For this study, the data is based on: Scopus Database, Web of Science, Springer, Research Gate, Elsevier, ProQuest, Google Scholar. The aim of this study is to provide insights into physical education teachers' perceptions of the physical education teaching-learning process during the COVID-19 pandemic.

For the selection of scientific articles included in this review, the considered topic is physical education during the pandemic. The keywords used for the initial search are: "physical education", "pandemic", "COVID-19", "online teaching", physical

education teachers”, “experiences of physical education teachers”. Subsequently, a combined search was conducted using these keywords, along with the option to search for them in the abstract. The search period includes publications from January 2020 to October 2023.

Eligibility criteria

The research was conducted through the analysis of titles, followed by abstract analysis, with only articles meeting the eligibility criteria being selected. The eligibility criteria are presented in Table 1.

Table 1. Eligibility criteria

No.	Eligibility criteria
1.	Articles published in academic journals or conference papers
2.	The teaching and learning of physical education for students during the COVID-19 pandemic
3.	Physical education lessons to be conducted traditionally, online, or in hybrid format
4.	Articles published between 01.01.2020 and 30.10.2023
5.	Participants to include primary and/or secondary school physical education teachers and/or high school teachers
6.	To be written in English

Exclusion criteria

The exclusion criteria used in the article selection are presented in Table 2.

Table 2. Exclusion Criteria

No.	Exclusion criteria
1.	Review articles, editorials, books, dissertations, theses, commentaries, letters, abstracts
2.	What is not included in the teaching-learning of physical education during the pandemic
3.	Research related to physical education teachers in colleges or universities
4.	Articles not written for research purposes
5.	Participants do not include physical education teachers

RESULTS

An overview of the selection process can be found in the PRISMA diagram in Figure 1. The PRISMA flow diagram is designed for systematic reviews that have involved searches solely in database sources.

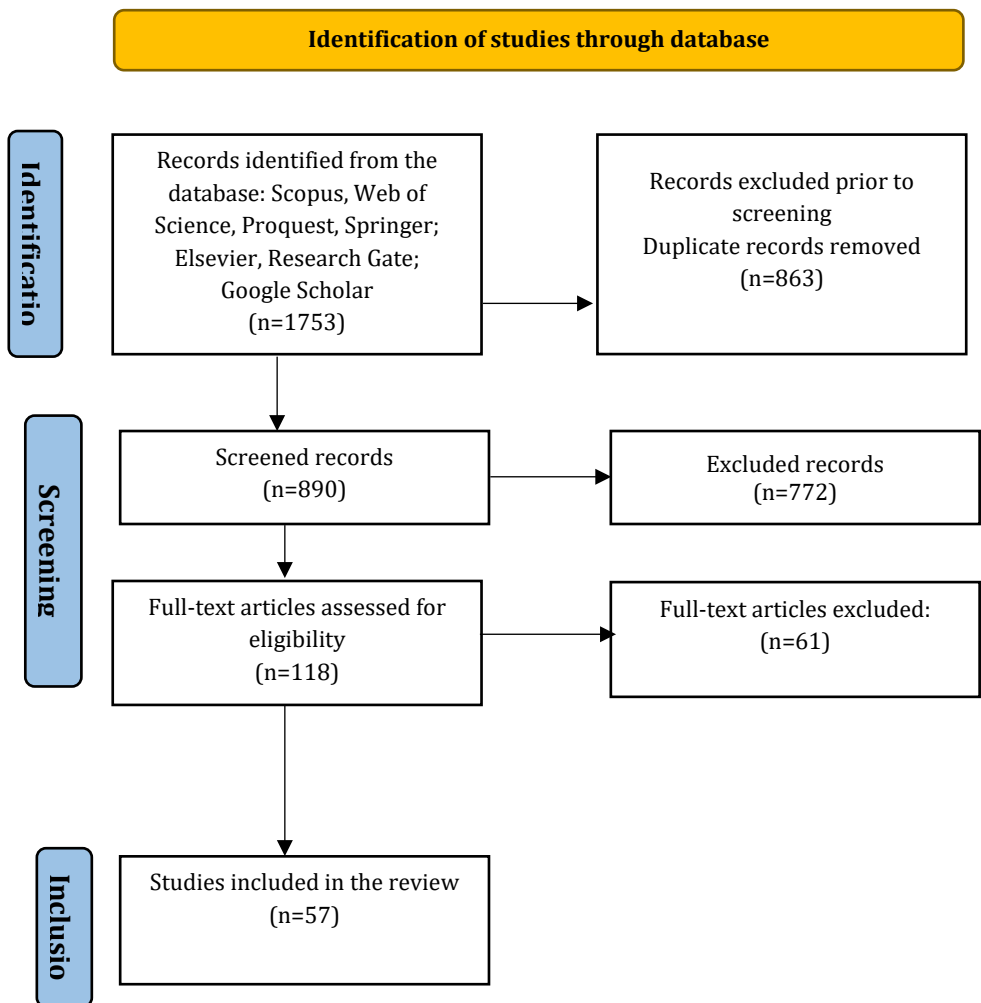


Figure 1. PRISMA diagram

We identified a total of 1753 articles through searches in electronic databases. Out of these, 863 duplicate articles were eliminated. We analyzed the titles and abstracts of the remaining 890 articles, excluding 772 articles that did not meet the eligibility criteria. Additionally, 118 full-text articles were examined, leading to the exclusion of a further 61 articles. Only 57 articles met the eligibility criteria and were included in this review.

Most of the selected articles were published in the year 2021, accounting for 34 scientific publications (59.65%). In 2020, only 2 articles met the eligibility criteria (3.51%). In 2022, 16 articles met the eligibility criteria (28.07%). By the end of October 2023, 5 articles (8.77%) were identified as eligible. The distribution based on the year of publication is illustrated in Figure 2.

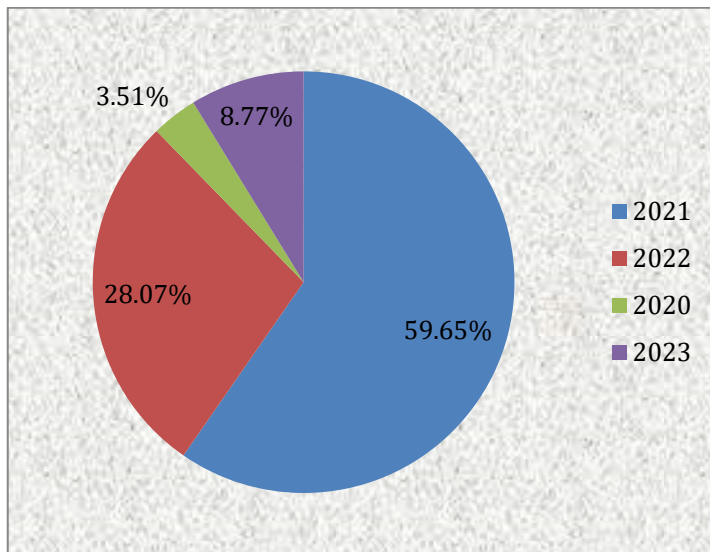


Figure 2. Representation based on the year of publication

Most of the studies were conducted in Asian countries, comprising 22 articles (38.60%). These were then followed by studies conducted in European countries, totaling 19 articles (33.33%). Research from the Americas contributed to 13 studies included in the review (22.81%), with 11 studies conducted in the United States. The review also includes 3 articles, one of them conducted in Australia (1.75%), and the other two conducted in African countries (3.51%). The graphical representation is presented in Figure 3.

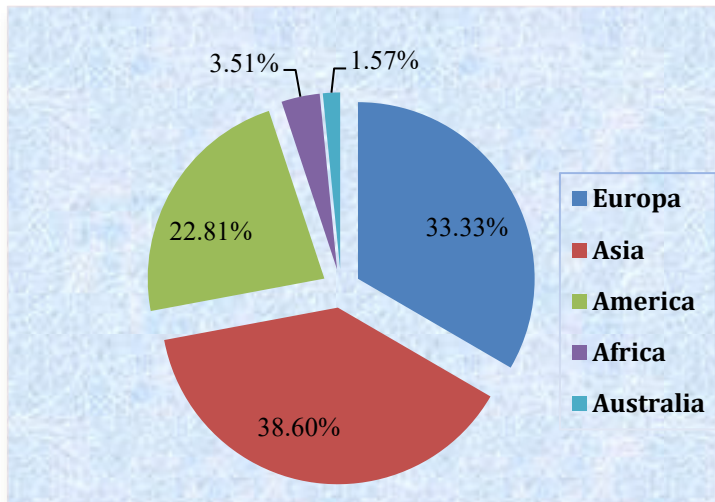


Figure 3. Representation based on the continent where the research was conducted

The period during which the research in the selected studies was conducted can be represented as follows:

- January-August 2020: 20 articles (35.09%)
- September 2020-August 2021: 20 articles (35.09%)
- 2021-2022: 3 articles (5.26%)

Additionally, 14 articles (24.56%) only indicate that the research was conducted during the COVID-19 pandemic.

Information regarding sample sizes, participants, age, gender, teaching experience, and methods varied significantly. Some analyzed research studies provided detailed information on all these aspects, while others only superficially presented the specific information.

In some studies, all these details related to sample size (3 articles, 5.26%), the age of teachers (31 articles, 54.39%), their gender (18 articles, 31.58%), teaching experience of teachers (24 articles, 42.11%), and research methods (11 articles, 19.30%) were overlooked.

The sample sizes in the reviewed studies varied from 3 physical education teachers to 4326. Among them, 30 scientific articles (52.63%) had a sample size of 1-100 participating teachers. A sample size of 101-500 physical education teachers was presented in 16 articles (28.07%). More than 501 participating physical education teachers were found in 8 articles (14.04%), while 3 articles did not specify the number of research participants (5.26%).

The variation in the number of participating physical education teachers is illustrated in Figure 4.

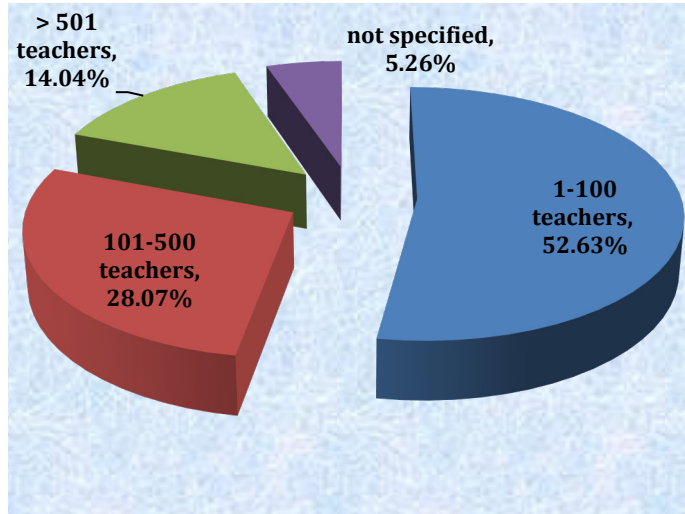


Figure 4. The sample size of the participants

The studied population included the physical education teachers from various educational levels: primary school teachers (8 articles, 14.04%), middle school teachers (3 articles, 5.08%), primary and middle school teachers (15 articles, 26.32%), high school teachers (9 articles, 15.79%), middle and high school teachers (4 articles, 7.02%), physical education teachers from all types of schools (primary, middle, and high school) in 11 articles (19.29%). Seven articles did not specify the type of school where the participating physical education teachers were employed (12.28%).

In the studies included in this review, the type of school where physical education teachers teach is also indicated: public school (22 articles, 38.60%), public and private school (12 articles, 21.05%). The type of school where physical education teachers teach is not specified in 23 scientific articles included in the review (40.35%).

In 26 of the articles included in the review, the age of physical education teachers participating in the research is specified (45.61%). The age of participating teachers ranges from 20 to 65 years old.

The gender of physical education teachers participating in the research is highlighted in 39 articles (68.42%), with female physical education teachers being the majority at 55.49%.

The teaching experience of participants in the research conducted and presented in 33 selected articles (57.89%) ranges from 2 to 35 years.

Qualitative methods (25 articles, 43.86%) are more commonly used than quantitative methods (14 articles, 24.56%), while mixed methods approaches are less frequently applied (4 articles, 7.02%). In 11 articles (19.30%), the research method used is not specified, and 3 studies are cross-sectional (5.26%). Regarding qualitative methods, interviews are the primary data collection tool in all 25 articles. Online semi-structured interviews are most used (16 articles, 64.00%), followed by interviews and focus group discussions (4 articles, 16.00%), interview and documentation (1 article, 4.00%), interview and observation (2 articles, 8.00%), and interview, observation, and documentation (2 articles, 8.00%).

Quantitative studies exclusively used questionnaires for data collection, which were evaluated and reported using descriptive statistics. The questionnaires were conducted online, with researchers utilizing the Google Forms platform. Studies employing both qualitative and quantitative methods use interviews and questionnaires as data collection instruments.

The aim of the studies used in this review is related to the type of teaching and learning physical education, from the perspective of physical education teachers in primary, middle, and high schools during the COVID-19 pandemic. The studies analyze traditional, hybrid, and online teaching of physical education during the pandemic. In the selected articles for this scientific review, the research primarily focuses on online learning of physical education in schools during this controversial period.

Thus, 45 articles (78.94%) focus exclusively on online physical education lessons conducted by physical education teachers, exploring their perceptions and experiences regarding this online teaching and learning process during the pandemic. In four articles (7.02%), traditional face-to-face physical education learning during the pandemic is examined. These articles present the challenges teachers face in ensuring social distancing among students, ensuring their own and students' health safety, and most teachers express feelings of uncertainty and stress. Another six articles (10.53%) investigate the effects of hybrid learning (both traditional and online) in physical education during the COVID-19 pandemic. Two articles (3.51%) address physical education learning in schools that remained open and those that closed during the pandemic. Open schools focus on traditional learning, while closed schools focus on online learning.

In the selected studies, the effectiveness of physical education lessons during the pandemic and the challenges faced by teachers throughout the teaching semesters are analyzed. A total of 17 articles (29.82%) examines the effectiveness of physical education lessons during the pandemic, and 11 articles (19.30%) among them indicate low effectiveness of physical education lessons. From the

perspective of physical education teachers, only studies in 6 articles (10.53%) indicate good effectiveness of lessons during the pandemic.

Most articles indicate that physical education teachers use online platforms for teaching physical education during the pandemic. Thus, 29 articles provide various examples of learning platforms and applications used to facilitate the teaching of physical education lessons. The most used platforms and applications include Google Classroom, Google Meet, YouTube, WhatsApp, etc. To create more engaging physical education lessons, teachers utilize videos, images, and tutorials, as mentioned in 18 articles (31.58%).

Some of the studied articles, the ones which investigate the teaching of physical education during the pandemic, analyze both the positive and negative effects of the teaching and learning process. Thus, 24 articles (42.11%) indicate positive effects such as the lack of time and space constraints, convenience, and program flexibility. One article considers it a positive effect that greater importance is given to the theoretical part of physical education in online teaching. The negative effects of the teaching and learning process of physical education during the pandemic are found in 31 articles (54.39%), representing more than half of the articles included in the review.

The most significant negative effect of the teaching and learning process of physical education, indicated in 15 articles (26.32%) in the review, is the increased workload for teachers in planning and conducting physical education lessons during the pandemic. Lack of motivation, both among students and teachers, is another negative effect of physical education lessons conducted during the pandemic, mentioned in 12 articles (21.05%), as found in the analyzed research studies.

A commonly reported limitation in the teaching and learning process of physical education during the pandemic is the assessment of students' physical activity. Thus, 14 articles (24.56%) in this review indicate either the absence of assessment or the difficulty experienced by teachers in conducting it.

The disadvantages and obstacles encountered in the process of teaching and learning physical education online during the pandemic are also highlighted. A significant disadvantage in using the online mode of physical education teaching is noted in 23 articles (40.35%) of the analyzed papers in this review, and it pertains to the lack of technological means, learning platforms, infrastructure problems, and internet network issues.

In 14 articles (24.56%), another obstacle encountered in the implementation and realization of online physical education learning is highlighted—the lack of knowledge in using technologies by physical education teachers.

Some research included in the articles of this review presents certain effects that the pandemic has had on students' physical education. The most significant effects include reduction in the number of physical education hours (10 articles, 17.54%); low physical activity or physical inactivity, which can lead to health problems for both students and teachers (16 articles, 28.07%). In 9 articles (15.79%) of the review, various strategies used by physical education teachers in online teaching during the pandemic are presented.

During the pandemic, teachers need support and assistance (15 articles, 26.32%). They require more professional development to enhance instructional practices and utilize modern technologies.

DISCUSSIONS

The aim of the study was to identify the most relevant articles investigating the experiences of physical education teachers in the process of teaching and learning physical education in schools during the COVID-19 pandemic. In addition to how they design their lessons and deliver physical education classes to students, the study also identifies the difficulties and obstacles faced by teachers in teaching physical education during the pandemic.

In most of the selected articles for this review, research focuses on the online teaching of physical education by teachers during the pandemic. (Aguinaldo, 2021; Akkaya, 2021; Aldababseh, et al., 2022; Almonacid-Fierro, Vargas-Vitoria, De Carvalho, & Almonacid Fierro, 2021; Alshammari, 2022; Ardiansyah, & Setiawan, 2023; Apriyanto, Fahrudi, & Arifia, 2022; Blegur, Lumba, & Ngongo, 2022; Ben Amotz, et al., 2022; Broto, & Sudardiyono, 2021; Centeio, et al., 2021; Chan, et al., 2021; Coulter, Britton, Manninen, McGrane, & Belton, 2021; Cruickshank, Pill, & Mainsbridge, 2021; D'Agostino, Urtel, Webster, McMullen, & Culp, 2021; Esentürk, Seçer, & İlhan, 2021; Fika, Soegiyanto, & Setyawati, 2021; Friskawati, Karisman, Supriadi, & Stephani, 2021; Foye, & Grenier, 2021; Gandasari, Anugrarista, & Yantiningasih, 2021; Gobbi, Bertollo, Colangelo, Carraro, & di Fronso, 2021; Gutierrez, Tabora, & Gama, 2023; Hartoto, et al., 2022; Ivanova, & Mileva, 2021; Jeong, & So, 2020; Johnson, Daum, & Norris, 2021; Kaya, 2021; Kızılkaya Namlı, & Yücekaya, 2021; Kim, Yu, Park, Ha, & Baek, 2021; Korcz, et al., 2021; Konukman, Filiz, & Ünlü, 2022; Mercier, et al., 2021; Murfay, Beighle, Erwin, Aiello, & Pyszczynski, 2022; Nopembri, Saryono, Listyarini, Muktiani, & Shahril, 2022; Phong, Suong, Bang, & Thuc, 2022; Purnomo, Pramono, & Hanani, 2022; Rahman, Prasetyo, & Mashuri, 2021; Restiana, Rahayu, & Wahyudi, 2021; Sopa, & Pomohaci, 2021; Şahin, 2021; Talaghir, Olaru, & Iconomescu, 2021; Varea, Riccetti, González-Calvo, Siracusa, & García-Monge, 2023; Vilchez, Kruse, Puffer, & Dudovitz, 2021; Wiguno, Heynoek, & Kurniawan, 2021; Williyanto, Masri., Santoso, & Wiyanto, 2020).

Physical education taught in a traditional, face-to-face manner is addressed in four of the articles included in the review. (Kamoga, & Varea, 2022; Kustantri, Sukanti, & Nanda, 2022; Mncube, Uleanya, & Dube, 2021; Hortigüela-Alcalá, Hernando-Garijo, & Pérez-Pueyo, 2021). The research in the first article is conducted in Sweden, a country that chose to keep schools open during the pandemic (Kamoga, & Varea, 2022). Teaching physical education for these teachers was a real challenge as they had to manage physical contact both among students and between students and teachers. Physical education teachers had to ensure social distancing among students and significantly reduce physical contact during physical education classes during the pandemic. Due to the restrictions and rules implemented in schools, physical education teachers are stressed and feel uncertain about planning and conducting lessons.

The results of the research conducted by Kustantri et al. (2022) indicate that traditional learning, albeit limited during the pandemic, is advantageous, especially when using the individual learning model. Despite the significantly reduced number of hours, students manage to develop their skills much more efficiently compared to the online teaching and learning process of physical education.

The third article examines the experiences of primary school physical education teachers in resuming physical education classes (Mncube et al., 2021). Teachers are aware that the stress and traumas of the pandemic will adversely affect the long-term learning of physical education. Although teachers are instructed to take necessary safety measures, the primary schools they belong to are not prepared to implement social distancing and practice hygiene (due to a lack of water).

Hortigüela-Alcalá et al. (2021) present the difficulties faced by physical education teachers due to the strict conditions imposed by the COVID-19 pandemic, such as social distancing measures, wearing protective masks, and hygiene materials that alter their schedule and drastically reduce physical education hours.

Blended learning, which combines online learning and face-to-face learning, is an alternative to online physical education in the school year 2020-2021 and is analyzed in five articles included in this review (Cunha, Martins, Tomaz Luiz., Garibaldi, & Marinho, 2023; Kuhn et al., 2022; López-Fernández, Burgueño, & Gil-Espinosa, 2021; Monguillot, González-Arévalo, Tarragó, & Iglesias, 2022; Simonton, Layne, Brown, & Keith Loupe, 2022) and hybrid learning in the school year 2021-2022 in one article (Nicolosi, Pitrolo, & Alba, 2023).

Researchers López-Fernández et al. (2021) present in their article the perceptions of high school physical education teachers regarding the advantages and disadvantages of blended learning during the pandemic. The teachers, for

the most part, believe that blended learning in physical education does not lead to increased student motivation, results in lower physical activity among students, and causes increased workload for teachers.

In the article by researchers Monguillot et al. (2022), modifications made by physical education teachers in Spain, at the primary and secondary education levels, during the pandemic are presented. These modifications are related to the curriculum content to adhere to pandemic-specific protocols (social distancing, hygiene practices, use of materials, etc.). When utilizing online teaching methods, physical education teachers had to adjust teaching activities and communication with students, incorporating digital technology. Similar challenges were faced by physical education teachers in Brazil (Cunha et al., 2023).

The fifth article pertains to the perceptions of primary school physical education teachers who use the same hybrid learning approach in the teaching of physical education (Simonton, Layne, Brown, & Keith Loupe, 2022). The research indicated that teachers experienced various emotions and stress factors during teaching in the pandemic period. Nevertheless, many teachers reported positive effects of this teaching method, expressing satisfaction with using tailored instructional models, creating new strategies, and generating new lesson ideas.

Nicolosi et al. (2023) indicate that, despite physical education teachers adapting their teaching strategies to the requirements of the pandemic period, they faced difficulties, resulting in few online physical education hours. The lessons delivered were unattractive, and the implementation of motor activities in the virtual environment did not yield favorable results.

The other two articles included in the review address both teaching methods: traditional in open schools and online teaching in closed schools during the pandemic (D'Isanto & D'Elia, 2021; Pavlovic et al., 2021). Both studies indicate similar challenges faced by teachers in open schools, namely implementing social distancing and a drastic reduction in physical education hours. In closed schools, teachers grapple with students' limited access to online learning and a decrease in physical activity.

To conduct the process of online physical education teaching during the pandemic, teachers use numerous and diverse online learning platforms. The selected articles indicate a large and varied number of online environments, platforms, applications, social networks used by physical education teachers for online lesson delivery: Google Classroom, Google Meet, Google Forms, Zoom, WhatsApp, Facebook, Instagram, YouTube, GoNoodle, etc. (Almonacid-Fierro et al., 2021; Apriyanto et al., 2022; Blegur et al., 2022; Centeio et al., 2021; Chan et al., 2021; Cruickshank et al., 2021; Gandasari et al., 2021; Gutierrez et al., 2023;

Fika et al., 2021; Friskawati et al., 2021; Foye & Grenier, 2021; Johnson et al., 2021; Kamoga & Varea, 2022; Kaya, 2021; Kim et al., 2021; Korcz et al., 2021; Konukman et al., 2022; López-Fernández et al., 2021; Mercier et al., 2021; Nicolosi et al., 2023; Nopembri et al., 2022; Pavlovic et al., 2021; Phong et al., 2022; Purnomo et al., 2022; Rahman et al., 2021; Restiana et al., 2021; Vilchez et al., 2021; Wiguno et al., 2021; Williyanto et al., 2020).

Researchers Gandasari et al. (2021) show that primary school physical education teachers most commonly use the WhatsApp application, while elementary school teachers more frequently use Google Classroom. WhatsApp is one of the most used applications due to its ease of use. High school teachers equally use WhatsApp, Google Classroom, and manual methods.

Many physical education teachers use videos in the teaching-learning process, where they can post instructions, checklists, and exercise programs. Videos are employed as instructional material for learning (Aguinaldo, 2021; Almonacid-Fierro et al., 2021; Coulter et al., 2021; Cruickshank et al., 2021; D'Agostino et al., 2021; Fika et al., 2021; Friskawati et al., 2021; Foye & Grenier, 2021; Jeong & So, 2020; Johnson et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Mercier et al., 2021; Murfay et al., 2022; Nicolosi et al., 2023; Purnomo et al., 2022; Restiana et al., 2021; Wiguno et al., 2021; Williyanto et al., 2020). Some teachers assess students' performances using video presentations.

When it comes to online teaching of physical education during the pandemic, only six articles indicate that physical education lessons are effective (Fika et al., 2021; Gutierrez et al., 2023; Mercier et al., 2021; Monguillot et al., 2022; Purnomo et al., 2022; Restiana et al., 2021). In the study conducted by Fika et al. (2021), online teaching of physical education is effective in high schools. Teachers are active and creative, providing students with materials in the form of videos that are attractive and engaging, stimulating students' interest in learning physical education. Similarly, in online learning, physical education teachers need to plan their lessons well in terms of content, implementation, and assessment. Teachers must choose and use the best teaching methods, many utilizing videos and images (Purnomo et al., 2022; Restiana et al., 2021). Despite facing numerous difficulties, most physical education teachers who participated in the research considered the online lessons effective (Gutierrez et al., 2023).

The low efficiency or ineffectiveness of online physical education lessons is a result found in certain selected articles in the review (Aguinaldo, 2021; Alshammari, 2022; Chan et al., 2021; D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Kaya, 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman, Filiz, & Ünlü, 2022; Kuhn et al., 2022; Phong et al., 2022; Sopa & Pomohaci, 2021). In two articles, one by Chan et al. (2021) and the other presented by Phong et al.

(2022), it is noted that physical education teachers believe that online lessons during the pandemic were not effective in acquiring motor skills, in terms of teacher-student interaction, and in promoting physical activity. To increase the efficiency of online physical education teaching during the pandemic, it is necessary for physical education teachers to create lessons that are as simple, attractive, and engaging as possible to motivate students to actively participate in class (Almonacid-Fierro et al., 2021; Centeio et al., 2021; Chan et al., 2021; Esentürk et al., 2021; Foye & Grenier, 2021; Jeong & So, 2020; Kaya, 2021; Kim et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman et al., 2022; Vilchez et al., 2021). Teachers need to be equipped with modern digital technologies to conduct educational lessons (Aguinaldo, 2021).

The effects determined by the online teaching-learning process of physical education during the pandemic, both researched and analyzed in the articles included in the review, encompass both positive effects (Aguinaldo, 2021; Akkaya, 2021; Aldababseh, et al., 2022; Ardiansyah & Setiawan, 2023; Centeio, et al., 2021; Cruickshank, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Fika, et al., 2021; Foye & Grenier, 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kaya, 2021; Kim, et al., 2021; Korcz, et al., 2021; Konukman, et al., 2022; Kuhn, et al., 2022; Mercier, et al., 2021; Monguillot, et al., 2022; Purnomo, et al., 2022; Phong, et al., 2022; Sopa & Pomohaci, 2021; Rahman, et al., 2021; Varea, et al., 2023) and negative effects (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Alshammari, 2022; Ardiansyah & Setiawan, 2023; Blegur, et al., 2022; Centeio, et al., 2021; Chan, et al., 2021; Cruickshank, et al., 2021; Foye & Grenier, 2021; Cunha, et al., 2023; Gobbi, et al., 2021; Ivanova & Mileva, 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kaya, 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Monguillot, et al., 2022; Murfay, et al., 2022; Nicolosi, et al., 2023; Pavlovic, et al., 2021; Phong, et al., 2022; Purnomo, et al., 2022; Rahman, et al., 2021; Restiana, et al., 2021; Sopa & Pomohaci, 2021; Şahin, 2021; Varea, et al., 2023; Vilchez, et al., 2021; Wiguno, et al., 2021).

Physical education teachers who use the online method for delivering physical education lessons during the pandemic consider that the most significant advantages and positive effects of the online method include the absence of time and space limitations, convenience, and schedule flexibility (Aguinaldo, 2021; Gutierrez, et al., 2023; Kaya, 2021; Konukman, et al., 2022). Korcz, et al. (2021) argue that the positive effects of online teaching during the pandemic consist of an attractive way of demonstrating skills, a real-time view of students' performances, and greater independence for students. Some articles indicate that an additional positive effect of implementing online physical education in schools during the pandemic is the improved understanding of the use of digital technology by physical education teachers (Ardiansyah & Setiawan,

2023; Centeio, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Konukman, et al., 2022; Kuhn, et al., 2022; Rahman, et al., 2021). Esentürk, et al. (2021) note that the research analyzed indicates another positive aspect of physical education lessons conducted online during the pandemic: greater emphasis on the theoretical part of physical education. However, another article considers the development of the theoretical aspect of physical education lessons as a negative effect of the teaching-learning process during the pandemic (Rahman, et al., 2021).

One of the commonly encountered negative effects in the studies selected in this review is the significant workload imposed on physical education teachers in preparing online lessons (Akkaya, 2021; Alshammari, 2022; Ardiansyah & Setiawan, 2023; Chan, et al., 2021; Cruickshank, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman, et al., 2022; Monguillot, et al., 2022; Phong, et al., 2022; Varea, et al., 2023). In the study conducted by Kim, et al. (2021), teachers express negative feelings about online teaching and face difficulties in designing online physical education lessons. The uncertainty felt by physical education teachers during the pandemic regarding online teaching is explained by their inability to complete practical lessons (Akkaya, 2021; Esentürk, et al., 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021).

Other negative effects encountered in the articles included in the review regarding online physical education teaching during the pandemic are the teachers' low enthusiasm and reduced motivation to participate in classes or fulfil their duties during online teaching (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Ardiansyah & Setiawan, 2023; Blegur, et al., 2022; Phong, et al., 2022; Esentürk, et al., 2021; Ivanova & Mileva, 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Murfay, et al., 2022; Restiana, et al., 2021).

A negative effect of online physical education teaching during the pandemic is the challenge of conducting assessments, which cannot be done directly. The majority of physical education teachers have faced difficulties in implementing the assessment process during this pandemic period (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Alshammari, 2022; Blegur, et al., 2022; Centeio, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Jeong & So, 2020; Kaya, 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Purnomo, et al., 2022; Sopa & Pomohaci, 2021; Şahin, 2021). The lack of interpersonal relationships and interactions between teachers and students is also considered a negative effect of the online teaching model (Alshammari, 2022; Blegur, et al., 2022; Cunha, et al., 2023; Foye & Grenier, 2021; Gutierrez, et al., 2023; Kim, et al., 2021; Pavlovic, et al., 2021; Phong, et al., 2022).

The most significant barriers to the implementation and use of online physical education teaching during the pandemic, as indicated in the majority of articles included in the study, are: the lack of technological means, infrastructure, and services to facilitate online lessons; network difficulties, and the absence of necessary equipment (laptops, tablets, mobile phones, etc.) (Aguinaldo, 2021; Aldababseh, et al., 2022; Broto & Sudardiyono, 2021; Centeio, et al., 2021; Esentürk, et al., 2021; Fika, et al., 2021; Gandasari, et al., 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kızılkaya Namlı & Yücekaya, 2021; Konukman, et al., 2022; Korcz, et al., 2021; López-Fernández, et al., 2021; Mercier, et al., 2021; Nicolosi, et al., 2023; Pavlovic, et al., 2021; Purnomo, et al., 2022; Rahman, et al., 2021; Restiana, et al., 2021; Varea, et al., 2023; Vilchez, et al., 2021; Wiguno, et al., 2021; Williyanto, et al., 2020).

Physical education teachers in private schools reported difficulties due to the lack of adequate equipment at home. Those in public schools faced challenges because of students' absence during classes or limited internet access (Konukman, et al., 2022). Some physical education teachers encountered difficulties related to computer, tablet, or smartphone connectivity issues (Konukman, et al., 2022).

In some articles, difficulties in using online physical education teaching during the pandemic are attributed to the lack of technological skills and knowledge among physical education teachers (Ben Amotz et al., 2022; Blegur et al., 2022; Chan et al., 2021; Cunha et al., 2023; Gutierrez et al., 2023; Hartoto et al., 2022; Kaya, 2021; Kim et al., 2021; Konukman et al., 2022; Korcz et al., 2021; López-Fernández et al., 2021; Nicolosi et al., 2023; Phong et al., 2022; Wiguno et al., 2021). One of the included articles suggests that the lack of digital technology usage skills in the online teaching of physical education during the pandemic leads to negative emotions and stress among physical education teachers (Ben Amotz et al., 2022). Similar findings about negative emotions and stress among physical education teachers are reported in the research analysis conducted by Alshammari (2022). These feelings of stress arise from the fear of not being able to correctly implement various applications during the online teaching and learning process of physical education.

A limited number of articles analyze the attitude of physical education teachers based on their age and teaching experience towards the use of digital technologies in online teaching during the pandemic (Friskawati et al., 2021; Gobbi et al., 2021; Hartoto et al., 2022; Ivanova & Mileva, 2021; Nicolosi et al., 2023; Şahin, 2021). There is a relationship between the age of teachers, their teaching experience, and their attitude towards the use of digital technologies in online teaching during the pandemic. Older teachers (aged 41-50) tend to have a negative attitude compared to younger teachers, who exhibit a more positive attitude (Friskawati et al., 2021). Teachers with less experience have better skills in integrating technologies into the learning process and can more

easily develop learning using online platforms (Google Classroom) or other digital applications. Similar conclusions are reached by the researchers Hartoto et al. (2022), who consider that younger teachers perform better in online physical education teaching, experiencing fewer difficulties in using modern technologies. Gobbi et al. (2021) show that younger teachers have higher self-efficacy than those over 50, and self-efficacy decreases with increasing years of teaching experience. One article indicates that there are no differences in the responses of physical education teachers in Bulgaria based on seniority or age (Ivanova & Mileva, 2021). The same was found for physical education teachers in Italy. The research study conducted in this case indicates that there are no significant statistical differences in the online teaching process of physical education based on age groups or teaching experience of the teachers (Nicolosi et al., 2023).

Very few articles present research that analyzes teachers' attitudes toward online physical education teaching during the pandemic based on their gender (Aldababseh et al., 2022; Ben Amotz et al., 2022; D'Agostino et al., 2021; Friskawati et al., 2021; Hartoto et al., 2022; Ivanova & Mileva, 2021; Konukman et al., 2022; Şahin, 2021). Four articles state that there are no differences based on the gender of the teacher in online physical education teaching (Aldababseh et al., 2022; Hartoto et al., 2022; Ivanova & Mileva, 2021; Şahin, 2021). Female teachers have higher efficacy in online teaching in the study conducted by researchers Ben Amotz et al. (2022), while male teachers have a positive attitude towards the use of online learning during the pandemic, according to the research conducted by Friskawati et al. (2021). In the research presented by Konukman et al. (2022), female physical education teachers consider individualized student learning approaches and continuous monitoring as advantages of online lesson implementation. Male teachers see the greater independence of students as an advantage in online teaching. The rate of use of modern technologies was much higher among male teachers than female teachers. Female physical education teachers were less concerned about online teaching and more concerned about the materials used in lessons. Both male and female physical education teachers were concerned about their safety and that of their students.

Physical education during the pandemic poses a challenge that teachers must adapt to and generate strategies to improve the online teaching process (Akkaya, 2021; Almonacid-Fierro et al., 2021; Coulter et al., 2021; D'Agostino et al., 2021; Fika et al., 2021; Foye & Grenier, 2021; Kustantri et al., 2022; Vilchez et al., 2021; Williyanto et al., 2020). One strategy proposed by physical education teachers is the use of non-contact games in online physical education lessons, which encourages understanding of learning and, at the same time, helps students develop problem-solving skills (Akkaya, 2021).

Coulter et al. (2021) present the development of online physical education lessons at home, aiming to provide a source of physical education learning. There is also a good collaboration between teachers and students' parents to ensure the proper utilization of physical education lessons.

One of the articles presents a model for online physical education learning through the implementation of a strategy involving the publication of students' work (Williyanto et al., 2020). This strategy allows for better assessment of students by teachers and, at the same time, increases students' interest in online physical education lessons.

In the study conducted by Kustantri et al. (2022), physical education teachers used various learning models (flipped learning, project-based learning, problem-based learning, and individual learning). The most used method was flipped learning, and the most effective learning model for physical education was individual learning.

The COVID-19 pandemic has significantly impacted the process of teaching and learning physical education. It has led to the marginalization of this discipline, the reduction of physical education lessons due to imposed restrictions, or even the abandonment of physical education classes (Apriyanto et al., 2022; Cruickshank et al., 2021; D'Isanto & D'Elia, 2021; Fika et al., 2021; Foye & Grenier, 2021; Kustantri et al., 2022; Mncube et al., 2021; Nicolosi et al., 2023; Pavlovic et al., 2021; Purnomo et al., 2022). All of these factors have led to physical inactivity or reduced physical activity, both for teachers and students (Almonacid-Fierro et al., 2021; Ardiansyah & Setiawan, 2023; Chan et al., 2021; D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Foye & Grenier, 2021; Korcz et al., 2021; Kustantri et al., 2022; López-Fernández et al., 2021; Murfay et al., 2022; Mncube et al., 2021; Nicolosi et al., 2023; Pavlovic et al., 2021; Phong et al., 2022; Sopa & Pomohaci, 2021; Vilchez et al., 2021). Reduced physical activity and physical inactivity have implications for the health and well-being of both students and teachers (D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Mncube et al., 2021). Physical education teachers believe that the overall endurance levels and the functioning of cardiovascular and respiratory capacities of students have been affected by the inactivity during the pandemic (Sopa & Pomohaci, 2021).

Many articles indicate that physical education teachers need assistance during the pandemic to conduct physical education classes (Aguinaldo, 2021; Alshammari, 2022; Ben Amotz et al., 2022; Centeio et al., 2021; Chan et al., 2021; Cunha et al., 2023; Jeong & So, 2020; Johnson et al., 2021; Kaya, 2021; López-Fernández et al., 2021; Monguillot et al., 2022; Şahin, 2021; Phong et al., 2022; Talaghir et al., 2021; Vilchez et al., 2021).

In most cases, physical education teachers need support and assistance for integrating technologies into online teaching and improving their technological skills for implementing online physical education lessons (Aguinaldo, 2021;

Ben Amotz et al., 2022; Chan et al., 2021; Centeio et al., 2021; Jeong & So, 2020; Johnson et al., 2021; Monguillot et al., 2022; Şahin, 2021; Phong et al., 2022; Vilchez et al., 2021).

In the case of the research conducted by López-Fernández and colleagues (2021), physical education teachers need technical assistance to better manage the large workload required to create more engaging lessons. Results from some articles suggest that teachers require more professional development to improve their skills and knowledge in online physical education teaching, enhancing their effectiveness and helping to reduce stress and anxiety. Anxiety and stress among some teachers stem from their perception that they are not effectively utilizing technology in the online physical education teaching process during the pandemic (Ben Amotz et al., 2022; Kaya, 2021).

CONCLUSIONS

The review study presented provides an overview of research conducted on the delivery of physical education lessons in schools from the perspective of physical education teachers during the pandemic. It is evident that various teaching methods for physical education are employed, with online teaching being predominant. The evidence suggests that the COVID-19 pandemic has had a significant impact on the process of teaching and learning physical education. The studies examined delve into the perceptions of physical education teachers in schools regarding the delivery of physical education during the pandemic.

One primary conclusion drawn from the analyzed articles is that the process of online physical education teaching in schools is considered by teachers as the most suitable alternative during the pandemic. However, this review concludes that this mode of teaching is not always efficient. Another resulting conclusion is that physical education teachers strive to improve the quality of online teaching and learning processes by creating engaging and captivating lessons to attract and motivate students to participate in physical education classes. They make use of various learning platforms and applications, frequently employing videos for information transmission.

The teachers have identified the advantages (lack of time and space constraints, flexibility of the schedule) and disadvantages (significant workload for teachers in lesson preparation, difficulties in the evaluation process of students, diminished enthusiasm due to the lack of interaction between teachers and students, etc.) of the teaching-learning process of physical education during the pandemic.

The review also identifies the difficulties encountered due to the lack of infrastructure, issues arising from network connectivity problems and its improper functioning, as well as problems arising from the absence of adequate equipment. In the case of using the traditional or hybrid models of physical education teaching, challenges arise in ensuring social distancing and maintaining hygiene measures imposed by the pandemic situation.

We hope that this review can serve as a reference point for physical education teachers who can use this valuable information to enhance their teaching style in post-pandemic physical education, whether online or traditional. At the same time, the information can be utilized to refine the didactic process by incorporating more advanced use of digital technology, educational platforms, and modern teaching methods within the traditional physical education lesson.

REFERENCES

- Aguinaldo, J. C. (2021). Challenges Encountered by Physical Education Teachers in Online Learning. *DLSU Research Congress*, Manila, Philippines, July 7 to 9, 2021.
- Akkaya, S. (2021). A Study on Non-contact Games and their Applicability during the COVID-19 Pandemic. *Inonu University Journal of the Faculty of Education*, 22(2), 1806-1827. doi: 10.17679/inuefd.980224.
- Aldababseh, M. F., Jaber, O. H., Radwan, O. A. K., Touq, I. M. A., Alhammouri, W., & Dari, A. A. (2022). The Significance of using the Distance Education Mode in the Physical Education Course during the Curfew Period in the Light of the Coronavirus Pandemic from the Perspective of the Physical Education Teachers in the Capital City. *Journal of Positive School Psychology*, 6 (8), 4511-4524.
- Almonacid-Fierro, A., Vargas-Vitoria, R., De Carvalho, R. S., & Almonacid Fierro, M. (2021). Impact on Teaching in Times of COVID-19 Pandemic: A Qualitative Study. *International Journal of Evaluation and Research in Education*, 10(2), 432-440. doi:10.11591/ijere.v10i2.21129.
- Alshammari, M. S. (2022). Efficacy of teaching physical education online: A comparative study during COVID-19 school closures. *Sport TK-EuroAmerican Journal of Sport Sciences*, 11(2), art, 9, 1-16. <https://doi.org/10.6018/sportk.512771>.
- Ardiansyah, R., & Setiawan, C. (2023). Physical Education Teachers' Reflection about their Learning in Post-Pandemic Era: A Mixed-Method Study. *International Journal of Social Science Research and Review*, 6, (6), 279-286. <http://dx.doi.org/10.47814/ijssrr.v6i6.1363>.
- Aperribai, L, Cortabarria, L., Aguirre, T., Verche, E., & Borges, Á. (2020). Teacher's Physical Activity and Mental Health during Lockdown Due to the COVID-2019 Pandemic. *Front. Psychol.* 11, 577886. doi:10.3389/fpsyg.2020.577886.

- Apriyanto, R., Fahrudi, A., & Arifia, L. Z. (2022). The Effect of Pandemic on Physical Education Learning in Muhammadiyah 4 Balen Junior High School. *Widyagogik*, 9(2), 202-210. doi: <https://doi.org/10.21107/Widyagogik/v9i2.14074>.
- Aydoğmuş, M., Yüksel, Y., & Revan, S. (2022). Analysis of Physical Activity Levels of Physical Education Teachers during the COVID-19 Pandemic. *Education Quarterly Reviews*, 5(2), 507-517. doi:10.31014/aior.1993.05.02.509.
- Bailey, R., & Scheuer, C. (2022). The COVID-19 Pandemic as a Fortuitous Disruptor in Physical Education: The Case of Active Homework. *AIMS Public Health*, 9(2), 423-439. doi:10.3934/publichealth.2022029.
- Bastos, V. F., Silva, N. S. S., Haika, D. S. A., Silveira, M. F., de Pinho, L., Brito, M. F. S. F., & Silva, R. R. V. (2022). Physical Education Teachers of the Basic Public Education of Minas Gerais in the Pandemic of COVID-19: Working Conditions, Health and Lifestyle. *J. Phys. Educ.* 33, e3324, 1-12. doi:10.4025/jphyseduc.v33i1.3324.
- Ben Amotz, R., Green, G., Joseph, G., Levi, S., Manor, N., Ng, K., Barak, S., Hutzler, Y., & Tesler, R. (2022). Remote Teaching, Self-Resilience, Stress, Professional Efficacy, and Subjective Health among Israeli PE Teachers during the COVID-19 Pandemic. *Educ. Sci.*, 12, 405. <https://doi.org/10.3390/educsci12060405>.
- Blegur, J, Lumba, A. J. F., & Ngongo, M. (2022). Tracing Physical Education Teachers' Teaching Difficulties in Online Era using Teaching Skill Indicators. *Pegem Journal of Education and Instruction*, 13 (1), 125-134. DOI. 10.47750/pegegog.13.01.15.
- Broto, D. P., & Sudardiyono, S. (2021). Evaluation of Online Physical Education Learning in Elementary School. *Conference on Interdisciplinary Approach in Sports in conjunction with the 4th Yogyakarta International Seminar on Health, Physical Education, and Sport Science (COIS-YISHPESS 2021)*, *Advances in Health Sciences Research*, 4, 165-165. <https://doi.org/10.2991/ahsr.k.220106.031>.
- Centeio, E., Mercier, K., Garn, A., Erwin, H., Marttinen, R., & Foley, J. (2021). The Success and Struggles of Physical Education Teachers While Teaching Online During the COVID-19 Pandemic. *Journal of Teaching in Physical Education*, 40(4), 667-673. <https://doi.org/10.1123/jtpe.2020-0295>.
- Chan, W. K, Leung, K. I., Ho, C. C., Wu, C. W., Lam, K. Y., Wong, N. L, Chan, C. Y. R., Leing, K. M., & Tse, A. C. Y. (2021). Effectiveness of Online Teaching in Physical Education during COVID-19 School Closures: a Survey Study of Frontline Physical Education Teachers in Hong Kong. *Journal of Physical Education and Sport*, 21(4), Art 205, 1622-1628. doi:10.7752/jpes.2021.04205.
- Christian, D. D., McCarty, D. L., & Brown, C. L. (2021). Experiential Education during the COVID-19 Pandemic: A Reflective Process. *Journal of Constructivist Psychology*, 34(3). <https://doi.org/10.1080/10720537.2020.1813666>.
- Coulter, M., Britton, Ú. Mac Namara, Á., Manninen, M., McGrane, B., & Belton, S. (2021). PEatHome: Keeping the 'E' in PE while Home-schooling during a Pandemic. *Physical Education and Sport Pedagogy*, 28(2), 183-195: DOI: 10.1080/17408989.2021.1963425.

- Cruickshank, V. J, Pill, S., & Mainsbridge, C. (2021). 'Just do some Physical Activity': Exploring Experiences of Teaching Physical Education Online during Covid-19. *Issues in Educational Research*, 31(1), 76-93. <http://www.iier.org.au/iier31/cruickshank.pdf>.
- Cunha, B. F., Martins, S. E., Tomaz Luiz., E. M., Garibaldi, V. M., & Marinho, A. (2023). Perceptions of Physical Education Teachers from a Metropolitan Region of Southern Brazil about the Repercussions of the COVID-19 on their Pedagogical Practices. *Revista Actualidades Investigativas en Educación*, 23(1), 1-25. DOI: <https://doi.org/10.15517/aie.v23i1.51623>.
- D'Agostino, E. M., Urtel, M., Webster, C. A., McMullen, J., & Culp, B. (2021). Virtual Physical Education during COVID-19: Exploring Future Directions for Equitable Online Learning Tools. *Front. Sports Act. Living*, 3:716566. doi:10.3389/fspor.2021.716566.
- Dalbudak, I., & Özkan, P. (2021). The Relationship between Physical Education and other Branch Teachers' Stress and Anxiety during COVID-19. *Journal for Educators, Teachers and Trainers*, 12(2). 43-54. DOI:10.47750/jett.2021.12.02.007.
- D'Isanto, T., & D'Elia, F. (2021). Primary School Physical Education in Outdoor during COVID-19 Pandemic: The Perceptions of Teachers. *Journal of Human Sport and Exercise*, 16(Proc.3), S1521-S1535. <https://doi.org/10.14198/jhse.2021.16.Proc3.67>.
- Esentürk, O. K., Seçer, E., & İlhan, E. L. (2021). Distance Education Experiences of Physical Education and Sports Teachers: Covid-19 Pandemic. *Anatolia Sport Research*, 2(2): 11-25. DOI: <http://dx.doi.org/10.29228/anatoliasr.12>.
- Feroz Ali, M., Kundra, S., Alam, A. M., & Mumtaz Alam, M. (2021). Investigating Stress, Anxiety, Social Support and Sex Satisfaction on Physical Education and Sports Teachers during the COVID-19 Pandemic. *Heliyon*, 7(8), 1-8,e07860. <https://doi.org/10.1016/j.heliyon.2021.e07860>.
- Fika, M. A., Soegiyanto, S., & Setyawati, H. (2021). Evaluation of Physical Education Online Learning of Junior High School During the COVID-19 Pandemic in Cepiring, Kendal Regency. *Journal of Physical Education and Sports*, 10(3), 305-311 <https://journal.unnes.ac.id/sju/index.php/jpes>.
- Filiz, B., & Konukman, F. (2020). Teaching Strategies for Physical Education during the COVID-19 Pandemic. *Journal of Physical Education, Recreation & Dance*, 91(9), 48-50.doi: 10.1080/07303084.2020.1816099.
- Friskawati, G. F., Karisman, V. A., Supriadi, D., & Stephani, M. R. (2021). Elementary School Physical Education Teachers' Attitudes toward the Use of Mobile Learning during COVID-19 Pandemic. *International Journal of Human Movement and Sports Sciences*, 9(3), 488-494.doi: 10.13189/saj.2021.090314.
- Foye, B., & Grenier, M. (2021). Teaching during a Pandemic: Physical Educators' Reflections on Peaching Remotely. *Journal of Online Learning Research*, 7(2), 133-151.
- Gandasari, M. F., Anugrarista, E., & Yantiningasih, E. (2021). The Analysis of the Online Physical Education Learning during the Pandemic in the Outmost Area. *Conference: Proceedings of the 5th International Conference on Sports, Health, and Physical Education*, ISMINA 2021, 28-29 April 2021, Semarang, Central Java, Indonesia, doi:10.4108/eai.28-4-2021.2312250.

- Goad, T., Killian, C. M., & Daum, D. N. (2021). Distance Learning in Physical Education: Hindsight Is 2020 — Part 3. *Journal of Physical Education, Recreation and Dance*, 92 (4), 18-21 doi:10.1080/07303084.2021.1886843.
- Gobbi, E., Bertollo, M., Colangelo, A., Carraro, A., & di Fronso, S. (2021). Primary School Physical Education at the Time of the COVID-19 Pandemic: Could Online Teaching Undermine Teachers' Self-Efficacy and Work Engagement? *Sustainability*, 13(17), 1-9,9830. <https://doi.org/10.3390/su13179830>.
- Gutierrez, T. A., Tabora, R. A., & Gama, L. J. (2023). Physical Education Teachers in Times of Pandemic. *J. Phys. Educ.* 34, e3411, 1-14. DOI: 10.4025/jphyseduc.v34i1.3411.
- Hartoto, S., Nurhasan, Maksum, A., Al Ardha, M. A., Hidayat, T., Hamdani, & Yang, C. B. (2022). Physical Education Teacher Perception in Conducting Online Learning Activities during Covid-19 Pandemic. *Journal of Sport Science and Education*, 7(1) 42-49. <http://dx.doi.org/10.26740/jossae.v7n1.p42-49>.
- Hortigüela-Alcalá, D., Hernando-Garijo, A., & Pérez-Pueyo, Á. (2021). Physical Education in the COVID-19 Context. A Tale from Teachers of Different Educational Stages, *Retos*, 41, 764-774. <https://doi.org/10.47197/retos.v41i0.86368>.
- Ihbour, S., Boumadi, H., Najimi, M., & Chigr, F. (2021). Teaching Physical Education in the COVID-19 Context: Pedagogical Content, Organization, and Challenge of Health Education: (General Aspect and Illustration of the Case in Morocco). *Strategies*, 34(5), 3-7. doi. 10.1080/08924562.2021.1948475.
- Ivanova, V., & Mileva, E. (2021). Competences of Physical Education Teachers in Conducting Online Education International Conference on Innovations in Science and Education (Social Sciences) March17, 2021, Prague, Czech Republic, DOI: <https://doi.org/10.12955/pss.v2.217>.
- Jeong, H. C., & So, W. Y. (2020). Difficulties of Online Physical Education Classes in Middle and High School and an Efficient Operation Plan to Address Them. *Int. J. Environ. Res. Public Health*, 17, 7279. doi:10.3390/ijerph17197279.
- Johnson, J., Daum, D., & Norris, J. (2021). I Need Help! Physical Educators Transition to Distance Learning during COVID-19. *Physical Educator*, 78(2), 119-137. doi:10.18666/TPE-2021-V78-I2-10866.
- Kamoga, S., & Varea, V. (2022). Let them do PE! 'The 'Becoming' of Swedish Physical Education in the Age of COVID-19. *European Physical Education Review*, 28(1) 263-278. doi: 10.1177/1356336X211036574.
- Karakoç, B., Karakoç, Ö., Aktaş, Ö., & Arslan, M. (2021). Investigation of Burnout Levels of Physical Education and Sports Teachers during Covid-19 Period. *Journal of Educational*, 7(2), 159-177. doi:10.5296/jei.v7i2.18963.
- Kaya, H. B. (2021). Views of Physical Education Teachers on Distance Education during the Covid-19 Pandemic Period: A Qualitative Study. *International Education Studies*, 14(9). 77-89. doi:10.5539/ies.v14n9p77.
- Kim, M., Yu, H., Park, C. W., Ha, T., & Baek, J. H. (2021). Physical Education Teachers' Online Teaching Experiences and Perceptions during the COVID-19 Pandemic. *Journal of Physical Education and Sport*, 21 (3), Art 261, 2049-2056. doi:10.7752/jpes2021.s3261.

- Kızılkaya Namlı, A., & Yücekaya, M. A. (2021). Motivation and Job Satisfaction of Physical Education Teachers during Pandemic. *OPUS- International Journal of Society Researches*, 17, 3148-3172. doi:10.26466/opus.887856.
- Korcz, A., Krzysztozek, J., Łopatka, M., Popeska, B., Podnar, H., Filiz, B., Mileva, E., Kryeziu, A. R., & Bronikowski, M. (2021). Physical Education Teachers' Opinion about Online Teaching during the COVID-19 Pandemic—Comparative Study of European Countries. *Sustainability*, 13(21) 1-19, 11730. <https://doi.org/10.3390/su132111730>.
- Konukman, F., Filiz, B., & Ünlü, H. (2022). Teachers' Perceptions of Teaching Physical Education using Online Learning during the COVID- 19: A Quantitative Study in Turkey. *PLoS ONE*, 17(6), 1-17, e0269377. <https://doi.org/10.1371/journal.pone.0269377>.
- Kucera, C., do Vale Gomes, A. L., Ovens, A., & Bennett, B. (2022). Teaching Online Physical Education during Social Distancing using Google Sites: Pedagogy, Strategies, Reflections and Barriers of a Teacher. *Movimento*, 28, e28019. DOI: <https://doi.org/10.22456/1982-8918.122688>.
- Kuhn, P.A., Thompson, R. H., Webster, A. C., Burgeson, C., Chriqui, J., Okutoyi, T., & Hager, R. E. (2022). Physical Education Teachers' Perceived Effectiveness in Association with Student Attendance, Teacher Adaptability, External Educational Supports, and Teaching Format during the COVID-19 Pandemic, *Journal of Healthy Eating and Active Living*, 2(3), 97-112. <https://doi.org/10.51250/jheal.v2i3.50>.
- Kustantri, F. O., Sukamti, R. E., & Nanda, A. F. (2022). Implementation and indicator of limited face-to-face physical education in covid-19. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 7 (4), 1-14. https://doi.org/10.29407/js_unpgri.v7i4.17385.
- Kutlay, E., Gönkek, P., & Köksal, A. (2022). Google Trends during COVID-19: Raising Awareness among Physical Education Teachers. *Cypriot Journal of Educational Science*, 17(1), 217-227. <https://doi.org/10.18844/cjes.v17i1.6697>.
- López-Fernández, I., Burgueño, R., & Gil-Espinosa, F. J. (2021). High School Physical Education Teachers' Perceptions of Blended Learning One Year after the Onset of the COVID-19 Pandemic. *Int. J. Environ. Res. Public Health*, 18, 11146. <https://doi.org/10.3390/ijerph182111146>.
- Mercier, K., Centeio, E., Garn, A., Erwin, H., Mercier, K., & Foley, J. (2021). Physical Education Teachers' Experiences with Remote Instruction during the Initial Phase of the COVID-19 Pandemic. *Journal of Teaching in Physical Education*, 40(2), 337-342. <https://doi.org/10.1123/jtpe.2020-0272>.
- Mncube, D. W., Uleanya, C., & Dube, M. C. (2021). Challenges Primary School Teachers Face in the Resumption of Sports Events and Activities Amidst COVID-19 Pandemic. *Multicultural Education*, 7(6), 55-67. doi:10.5281/zenodo.4900063.
- Monguillot, M., González-Arévalo, C., Tarragó, R., & Iglesias, X. (2022). The Barometer of Physical Education in the COVID-19 Pandemic in Catalonia. *Apunts Educación Física y Deportes*, 150, 36-44. [https://doi.org/10.5672/apunts.2014-0983.es.\(2022/4\).150.05](https://doi.org/10.5672/apunts.2014-0983.es.(2022/4).150.05).

- Murfay, K., Beighle, A., Erwin, H. E., Aiello, E., & Pyszczyński, S. (2022) Examining Physical Education Teaching Practices During the Covid-19 Pandemic. *International Journal of Physical Activity and Health*, 1(3), Article 2. <https://doi.org/10.18122/ijpah.010302.boisestate>.
- Muzakki, A., Muammal, I., & Prakoso, B. B. (2021). The Role of Physical Education Teacher Creativity in Mediating the Influence of HRM Practices and Performance during the COVID-19 Pandemic. *Journal Sport Area*, 6(3), 349–357. [https://doi.org/10.25299/sportarea.2021.vol6\(3\).6570](https://doi.org/10.25299/sportarea.2021.vol6(3).6570).
- Nicolosi, S., Pitrolo, C., & Alba, M. (2023). Physical Education Teaching Strategies in Italian Primary School: Reflections for the Post-Pandemic Era, *Journal of Physical Education and Sport (JPES)*, 23 (8), Art 253, 2212-2219. doi: 10.7752/jpes.2023.08253.
- Nopembri, S., Saryono, S., Listyarini, A. E., Muktiani, N. R., & Shahril, M. I. B. (2022). Digital technology in physical education distance learning during pandemic: teachers' perspective. *Jurnal Keolahragaan*, 10(1), 71-82. doi: <https://doi.org/10.21831/jk.v10i1.48374>.
- Pavlovic, A., DeFina, L. F. R., Natale, B. L., Thiele, S. E., Walker, T. J., Craig, D. W., Vint, G. R., Leonard, D., Haskell, W. L., & Kohl, H. W. (2021). Keeping Children Healthy during and after COVID-19 Pandemic: Meeting Youth Physical Activity Needs. *BMC Public Health*, 21, 485, 2-8. <https://doi.org/10.1186/s12889-021-10545-x>.
- Phong, T. D., Suong, T. L., Bang, C. L., & Thuc, C. D. (2022). Teachers of Physical Educations Survey on the Effects of Online Learning on Physical Education during the Covid-19 Pandemic, *Res Militaris*, 12, (3), 905- 913.
- Purnomo, A., Pramono, H., & Hanani, E. S. (2022). Evaluation of Physical Education Learning during the Covid 19 Pandemic in Elementary Schools in Gayamsari District, Semarang. *Journal of Physical Education and Sports*, 11(1), 51-60. <https://journal.unnes.ac.id/sju/index.php/jpes>.
- Rahman, T, Prasetyo, A. D., & Mashuri, H. (2021). The Impact Of Online Learning During The Covid-19 Pandemic On Physical Education Teachers, *Jurnal Halaman Olahraga Nusantara*, 4 (2), 294-304. doi: 10.31851/honv4i2.5638.
- Restiana, D. K., Rahayu, S., & Wahyudi, A. (2021). Implementation of Physical Education, Sports and Health Learning during the Covid-19 Pandemic at Senior High School (SMA) 1 Banyumas. *Journal of Physical Education and Sports*, 10(4), 350-355 <https://journal.unnes.ac.id/sju/index.php/jpes>.
- Schembri, R., Coppola, R., Tortella, P., & Lipoma, M. (2021). Reflections that Know of “New normal”: the Complex Role of Physical Educators during the COVID-19 Pandemic. *Journal of Physical Education and Sport*, 21(1), Art 88, 714–718. DOI:10.7752/jpes.2021.s1088.
- Silva, A. J. F., da Silva, C. C., Tinôco, R. G., Araújo, A. C., Venâncio, L., Sanches Neto, L., Freire, E. dos S., & Lazaretti da Conceição, W. (2021). Dilemmas, Challenges and Strategies of Physical Education Teachers-Researchers to Combat COVID-19 (SARS-CoV-2) in Brazil. *Front. Educ.* 6,583952. DOI: 10.3389/educ.2021.583952.

- Silva-Filho, E., Teixeira, A. L. S., Xavier, J. R. S., Braz Júnior, D. S., Barbosa, R. A., & de Albuquerque, J. A. (2020). Physical Education Role during Coronavirus Disease 2019 (COVID-19) Pandemic. *Motriz, Rio Claro*, 26(2), e10200086. DOI: <http://dx.doi.org/10.1590/s1980-6574202000020086>.
- Simonton, K. L., Layne, T. W., Brown, B., & Loupe, K. (2023). Physical Education Teacher Experiences Through the Lens of a Pandemic: Putting a Spotlight on Teacher Beliefs, Practices, Emotional Fragility, and Well-Being. *Journal of Teaching in Physical Education*, 42(1), 123–134. <https://doi.org/10.1123/jtpe.2021-0216>.
- Sopa, I. S., & Pomohaci, M. (2021). Study Regarding the Development Process of Motor Qualities Endurance and Strength in Physical Education Lessons during the Pandemic Period. *Geosport for Society*, 15(2), 101-109. <https://doi.org/10.30892/gss.1504-076>.
- Şahin, T. (2021). Self-Evaluated Teacher Effectiveness in Physical Education and Sports during Schools Closedown and Emergency Distance Learning. *International Journal of Curriculum and Instruction (IJCI)*. 13(2), 1493-1507.
- Tagare, R. L. (2023). Back to in-person classes in the Philippine basic education: threading the opportunities and limitations in the teaching of Physical Education. *Retos*, 47, 986–993. DOI: 10.47197/RETOS.V47.95921.
- Talaghir, L.-G., Olaru, B. G., & Iconomescu, T. M. (2021). The Teachers' Approach to the Theoretical Knowledge Taught in Online Physical Education Classes during the COVID-19 Pandemic. *Revista Românească pentru Educație Multidimensională*, 13(4), 31-42. <https://doi.org/10.18662/rrem/13.4/469>.
- Temel, C., Gökduman, Ç., Uğraş, S., Sağın, A. E., Yücekaya, M. A., Kartal, M., & Toros, T. (2023). The Impact of COVID-19 Process on Sustainability in Education: Work Alienation of Physical Education and Sports Teachers. *Sustainability (Switzerland)*, 15(3), 2047. DOI: 10.3390/su15032047.
- Varea, V., & González-Calvo, G. (2021). Touchless Classes and Absent Bodies: Teaching Physical Education in Times of COVID-19. *Sport, Education and Society*, 26(8), 831-845. DOI: 10.1080/13573322.2020.1791814.
- Varea, V., González-Calvo, G., & García-Monge, A. (2022). Exploring the Changes of Physical Education in the Age of COVID-19. *Physical Education and Sport Pedagogy*, 27(1), 32-42. DOI: 10.1080/17408989.2020.1861233.
- Varea, V., Riccetti, A., González-Calvo, G., Siracusa, M., & García-Monge, A. (2023). Physical Education and COVID-19: What Have we Learned? *Curriculum Studies in Health and Physical Education*, <https://doi.org/10.1080/25742981.2023.2241443>.
- Vilchez, J. A., Kruse, J., Puffer, M., & Dudovitz, R. N. (2021). Teachers and School Health Leaders' Perspectives on Distance Learning Physical Education during the COVID-19 Pandemic. *J Sch Health*, 91(7), 541-549. DOI: 10.1111/josh.13030.
- Webster, C. A., D'Agostino, E., Urtel, M., McMullen, Culp, J. B., Loiacono, C. A. E., & Killian, C. (2021). Physical Education in the COVID Era: Considerations for Online Program Delivery using the Comprehensive School Physical Activity Program Framework. *Journal of Teaching in Physical Education*, 40(2), 327-336. <https://doi.org/10.1123/jtpe.2020-0182>.

- Wiguno, L. T. H., Heynoek, F. P., & Kurniawan, W. A. (2021). Identification of Problems in the Implementation of Online Physical Education Learning during the Covid-19 Pandemic in Indonesia. *Advances in Health Sciences Research*, 45, 179-183. <https://doi.org/10.2991/ahsr.k.220203.030>.
- Williyanto, S., Masri. Santoso, N., & Wiyanto, A. (2020). Physical Education Teacher Strategies to Improving Student Learning Outcomes through Publication of Work Results. *Journal of Physical Education, Health and Sport*, 7(1), 5-10. doi: 10.15294/jpehs.v7i1.25798