

The COVID-19 pandemic impact on the Portuguese Physical Education classes El impacto de la pandemia del COVID-19 en las clases de Educación Física portuguesas

*Pedro Cabral Mendes, *Miguel Fachada, **Ricardo Melo, **Francisco Campos, *Paulo Nobre, *Aristides M. Machado-Rodrigues

*University of Coimbra (Portugal), **Polytechnic Institute of Coimbra (Portugal)

Abstract. The restrictions “imposed” to avoid the spread of Covid-19 disease have strongly conditioned the school life of millions of children and youth. However, little is known about the impact of the pandemic on PE classes in Portugal. The purpose of the present study is to describe the perception of secondary and high school students about the impact of the pandemic on PE classes, after the first wave of the COVID-19 outbreak. The sample comprised 1419 students aged from 12 to 16 years from the Portuguese Midlands (53% females, mean age 14,4 years-old); participants responded in person to an anonymous and self-report questionnaire. The results revealed that restrictive measures imposed on PE classes at the end of 2020 had a strong influence on selection of PE curricular contents. Physical condition of students has assumed a major role in PE enrolment. It should be also highlighted that participants revealed the school as a safe space to avoid the risks of SARS-CoV2 contagion. The surveyed students expressed greater satisfaction with the face-to-face than virtual PE classes. It should be noted that the pandemic context did not change the appreciation attributed to this subject by students.

Keywords: Covid-19; Physical Education; Secondary School.

Resumen. Las restricciones inducidas por la Covid-19 condicionaron, de manera muy significativa, la vida escolar de millones de niños y jóvenes. Sin embargo, se sabe poco sobre el impacto de la pandemia en las clases de Educación Física (EF) en Portugal. El objetivo del presente estudio es describir la percepción de alumnos de Primaria Superior y Secundaria Obligatoria sobre el impacto de la pandemia en las clases de EF en Portugal. Participaron un total de 1419 alumnos de la región Centro (53,3/46,7% chicas/os, edad media 14,4 años), que respondieron presencialmente a un cuestionario anónimo. Los resultados indican que las medidas restrictivas impuestas a las clases de EF en el primer trimestre de 2020/21 acabaron teniendo un fuerte impacto en la programación de contenidos curriculares. La condición física asumió un papel importante en las clases de EF. Los participantes consideraron la escuela un espacio seguro que les protegió de posibles riesgos de contagio; expresaron una mayor satisfacción con las clases presenciales. Los niveles de satisfacción con la EF se mantuvieron el línea con los de estudios anteriores.

Palabras clave: Covid-19; Educación Física; Escuela Secundaria.

Fecha recepción: 05-02-23. Fecha de aceptación: 24-05-23

Pedro Cabral Mendes

pcabralmendes@gmail.com

Introduction

The World Health Organization declared on March 11 2020 the coronavirus disease (Covid-19) pandemic which has clearly affected the people lifestyles worldwide, as well as their social interactions. Among pediatric people, the influence of social distancing measures such as school closures on their psychological health and wellbeing have been studied. Evidence suggests that children and adolescents have experienced increased levels of anxiety, irritability and inattention due to school closures (Magson et al., 2020; Singh et al., 2020), and their online behaviours have been impacted, with young people engaging in more screen time for both educational and social purposes (Chen et al., 2020). Furthermore, connectedness with friends and school can influence children and adolescents' life satisfaction, though to date it is unclear how these factors have mediated the influence of COVID-19 which need to be studied. In fact, three quarters of schools globally have experienced closures in 2020 (UNESCO, 2021) and the negative effects of school closures include an increase in social and economic inequality, and adverse long term educational, social, and health-related physical fitness and physical activity of children (Christakis, Cleve, & Zimmerman 2020).

Health authorities (CDC, 2021; Government Canada, 2021; DGS, 2020) have provided guidelines to maintain physical activity safely, including engaging with people

from the same household or small groups, while maintaining physical distancing. Options for physical activity included in-home exercise programs (e.g., yoga, online fitness classes), outside activity during non-peak hours, and appropriate hand hygiene practices before and after activity (CDC, 2021; UK Health Security Agency, 2020).

Furthermore, reopening schools has brought unquestionable benefits to young people (Schleicher, 2020). Practical PE is linked to generic competences' development (Jones-Jofré, 2022) and enhanced self-esteem (Delgado-Floody, 2019) demanding also eminently procedural competences which are related to corporality of the students. This is precisely the aspect that has been limited by virtual teaching as a result of lockdown (Almonacid-Fierro et al., 2021).

Before the lockdown, PE classes were mandatorily practical for 150 minutes/week, and its contents comprised a diverse set of curricular matters (sports and other physical activities), aiming its effective learning, physical conditioning, learning of social values and promoting active lifestyles. After the lockdown (in Portugal, between March and July 2020), the great challenge of the school is to allow children the practice of physical and sports activities and also to assess the learning loss. This fact was particularly sensitive in remote learning in PE, due to the impossibility of the teacher to intervene effectively in the child's motor behavior. Indeed, according to the imple-

mented safety condition, several steps has been taken to manage the risks and tradeoffs at the PE classes such as develop clear protocols on physical distancing measures, including avoiding activities that require large gatherings, staggering the start and end of the school day, moving classes to temporary spaces or outdoors, among others; equally important were the protocols and practice on hygiene measures including handwashing, respiratory etiquette and use of protective equipment (Direção Geral de Saúde and Direção Geral da Educação, 2020).

Restrictive social distancing measures potentially ended up influencing students' motivation to practice and the quality of learning in PE (Hortigüela-Alcalá et al., 2021).

PE teachers needed to adapt their teaching decisions and practices, choosing activities that avoided physical contact and material sharing (Sanz-Remacha et al., 2022). These modifications ended up causing changes in PE planning and the adoption of more authoritarian and less challenging teaching styles (Diloy-Peña et al., 2021).

Several scientific contributions approach the issue of physical activity and physical education during lockdown and the impact it had on children, young people, adults and the elderly (e.g. Almonacid-Fierro et al., 2021; Cheval et al., 2021; Deng et al., 2020; Gobbi et al., 2020; Shepherd et al., 2021; Tejerina, & Río, 2022; Tran et al., 2020; Varea et al., 2022).

The return to face-to-face PE classes, after lockdown, was also a reason for analysis the impact of restrictive measures on PE, taking into account the opinion of teachers (Sierra-Díaz et al., 2021), of students (Tejerina, & Río, 2022) and parents (Cordovil et al., 2021).

Therefore, taking into account the above-mentioned gap in the recent literature as well as the most of the existing studies just provide the perspective of teachers and very few stress the experience of students during the first post-lockdown period (from September 17th to December 18th, 2020), the present study had the following goals: i) according to the perceptions of the students, it is intended to characterize PE classes' development; ii) to analyse the students perception of their performance and motivation in PE classes; iii) to analyze students sports practice outside school before and after the COVID-19-related confinement; iv) to analyse the students' perception of the quality of the lessons learned, as well as their degree of satisfaction with the PE classes.

Methods

Study Design and Sample

The study is a quantitative enquiry, cross-sectional, collecting data by questionnaire.

The sample comprised 1419 participants (53% females; aged 13-18 years-old, 14,4 average; 67.2% attended 7th to 9th grades, 32.7% attended higher grades). The majority of students (64.5%) were not organized sport participants. Students who were attending secondary and high school in schools in the district of Coimbra were defined as a criterion

for inclusion of participants in the study.

Data collection was carried out in the Portuguese Midlands from December 2020 to January 2021.

This study was approved by the Monitoring System for School Surveys (MIME) of the Portuguese Ministry of Education and also by the Ethics Committee of the Faculty of Sport Sciences and Physical Education of the University of Coimbra (CE/FCDEF-UC/00712021). The security and confidentiality of the processing of collected data was guaranteed following the European Regulation (EU) 2016/679 of and the recommendations of the National Data Protection Commission (CNPD). Informed written assent was obtained from students and informed consent was obtained from parents or guardians.

Procedures

The conditions of deconfinement temporarily allowed a direct application of the questionnaire, which was tapped to ensure a better response rate. Thereby, the questionnaire was filled out directly and in person by the participants.

Trained teachers from each authorized school, administered the questionnaire to participants from the secondary and/ or high school.

The teachers responsible for applying the questionnaires to participants respected the following procedures:

- 1) Each teacher delivered the questionnaires to the students in the class, each questionnaire being accompanied by the Informed Consent form;
- 2) students took the questionnaire so that parents could analyze the instrument and decide about the authorization, signing the respective Informed consent form;
- 3) the students who were authorized by their parents completed the questionnaire in the following class;
- 4) questionnaires were locked in an A3 envelope, sealed by the teacher himself and returned, by hand, to the team of researchers.

Instrument

A structured questionnaire [The impact of the pandemic on PE classes Questionnaire (IPPEC)], self-completed and anonymous, was used to understand the elementary and secondary students' perceptions about the impact of Covid-19 pandemic at PE classes.

The process of constructing the questionnaire had the collaboration of a panel of experts made up of 4 elements with a PhD in the area of Physical Education and Sport and 1 element with a PhD in Education sciences to guarantee its content validity.

The researchers' team prepared the first version of the questionnaire (addressed to the students, which included the 12 variables that were intended to be studied, based on the literature review carried out; that initial version was submitted to the group of experts for subsequent analysis. The corrections led to a new version of the questionnaire (2nd version). This version was submitted to the final appreciation of the panel of experts (3rd version).

From this 3rd version of the questionnaire, a pilot study was carried out with 50 secondary school students to test its facial validity. Some suggestions from the inquired students were included into a new version of the questionnaire (4th version). This pilot study made it possible to verify that there was agreement, on the part of these students who integrated it, with the readability and purpose of this instrument. Finally, a fifth and final version of the questionnaire was prepared, resulting from the final rectifications proposed by the panel of experts.

With a 5 points Likert scale (*Totally Disagree* - ... - *Totally Agree* – to items concerned with subjective agreement degree; *Never* - ... - *Always* or *5 times or more per week* – to items concerned with frequency measures), there were 75 items included in the final version of the questionnaire, and approximately 15 minutes were required to complete it. These items were organized into 11 blocks: 1) Demographic data included sex, age, grade, and organized sport practice (4 items); 2) motivation for organized sports (2 items); 3) motivation for PE (2 items); 4) frequency of organized sports outside school (2 items); 5) Organization and safety in PE classes (12 items); 6) Typology of PE classes (3 items); 7) PE curricular subjects (16 items); 8) PE assessment (6 items); 9) satisfaction with practical and face-to-face PE classes (15 items); 10) PE valuation (7 items from the Questionnaire of Students' Attitudes towards Physical Education by Pereira et al., 2009); 11) Importance of PE (3 items from the questionnaire of Students' Attitudes towards Physical Education by Pereira et al., 2009). The instrument allows the participants to objectively understand what is intended to be asked, using, for this purpose, neutral formulation and avoiding ambiguities.

Data Analysis

Descriptive statistics were presented using categorical

variables. Each categorical variable was presented as percentage. The scores of the likert scales of the five points (evaluative and agreement scales), and its subscales were expressed as mean (X) as well standard deviation (SD) and Coefficient of variation (CV).

The assumption of normality was tested by the Kolmogorov-Smirnov. Levene's test was used to verify the assumption of homogeneity of the t Student. The effect size, η^2 , was also estimated; i.e., the proportion of variation of the independent variable which is explained by the dependent variable (Pallant, 2011). The significance level was set at 5%. Statistical analysis was performed using SPSS 25.0 (IBM Corporation).

Results

This section intends to present the main results of the study, organized as follows: development of PE classes (typology of PE classes; curricular matters taught; teaching-learning conditions; assessment process; safety in PE classes); students' perception of their performance and motivation in PE classes (student perceived performance in PE; motivation practice of sports outside school and to PE practice); students' sports practice before and after the COVID-19-related confinement (frequency of sports practice outside school); students' perception of quality of lessons and satisfaction with PE classes (satisfaction about face-to-face PE classes; value and importance of PE).

Development of PE classes

The results presented in Table 1 indicate that, after the first lockdown, PE classes tended to be practical and face-to-face. In general, the duration of the sessions respected the curricular plan of the pre-lockdown period.

Table 1.
Relative frequency (%) of students' answers about the typology of PE classes (n = 1419)

Classroom typology indicators	Never	Sometimes	At half	Mostly	Always
In the 1st period, the classes I had were practical					
Secondary school	1,1	3,5	2,8	27,9	64,8
High School	0,2	1,7	3,7	27,9	66,4
Total	0,8	2,9	3,3	27,9	65,1
In the 1st period, the classes I had were face-to-face					
Secondary school	1,9	1,9	2,3	11,8	82,1
High School	0,7	1,8	0,9	9	87,7
Total	1,6	1,9	2	10,8	83,8
In the 1st period, the duration of each class was similar to last year (before the confinement)					
Secondary school	6,8	5,2	4,2	16,3	67,4
High School	3,5	5,9	2,2	18	70,3
Total	5,7	5,5	3,6	16,8	68,4

Table 2 presents the curricular subjects that were taught in the 1st academic period after the first lockdown. Physical condition, athletics, invasive team sports, volleyball and racket games were the subjects mostly taught on PE classes. On the other hand, the majority of students reported that they never practiced combat sports, skating, climbing, swimming, acrobatic gymnastics and orienteering.

The results presented in table 3 indicate that most par-

ticipants agree that there was a tendency towards repetition of exercises in PE classes. The possible lack of tasks with opposition in team sports, was felt by a substantial number of students (43% agree and/or totally agree). Regarding the perception that exercises became easier, a considerable number of students responded without agreeing or disagreeing (48%). Regarding the possibility that learning was going better, only a minority of participants disagreed (7,4% disagreed and/or totally disagreed), that

is, a considerable number of students who are in agreement. About half of the students consider that the climate between colleagues has changed in class, especially due to a greater distance advised by the health authorities.

Table 2.

Relative frequency (%) of students' answers about curricular subjects addressed in the PE classes (n = 1419)

Curricular subjects	Never	Sometimes	At half	Mostly	Always
Acrobatic gymnastics	87,3	4,8	3,5	2,9	1,5
Athletics	19,1	32	15,4	16,5	17
Dance	80,1	9	4,7	2,9	3,3
Combat sports	95,4	0,6	1	1,8	1,2
Climbing	91,5	2,9	1,5	2	2
Floor gymnastics	65,8	12,9	9,1	6,2	6
Gymnastics apparatus	67	12,7	8,1	6,4	5,8
Invasive team games	36,7	20,3	21,1	13,4	8,5
Orienteering	72	13,6	5,8	4,7	3,8
Physical fitness	3,6	34,9	14,3	23	24,2
Racket games	49,4	14,3	14,3	13,3	8,7
Traditional games	85,3	6,2	4,6	2,1	1,8
Swimming	90,8	2,7	1,8	2,3	2,3
Skating	93,6	2,9	0,8	1,3	1,4
Volley	45,4	14,7	13,9	15,2	10,9

Table 3.

Relative frequency (%) of students' answers about teaching-learning conditions in the PE classes (n = 1419)

Teaching-learning conditions	Totally disagree	Disagree	Neither agree or disagree	Agree	Totally agree
Repeat the same exercises over and over again					
Secondary school	1,9	6,6	31,4	44,5	15,6
High School	2,6	14,6	34	39,5	9,3
Total	2,2	9,1	32,4	42,7	13,6
In team sports, I felt the lack of exercises with opposition (attack/defense)					
Secondary school	7,9	13	35,4	27,7	16
High School	7,6	23,8	26,9	25,8	15,8
Total	7,8	16,7	32,6	27	15,9
I thought the exercises were easier					
Secondary school	4,5	12,9	48,1	25,7	8,8
High School	5,5	19,3	47,2	22,6	5,3
Total	4,9	15	47,8	24,7	7,6
My learning in PE classes is going better					
Secondary school	2,3	4,6	35,1	40,2	17,8
High School	0,9	6,9	47,1	30,7	14,4
Total	1,8	5,4	38,9	37,2	16,7
I felt that, in the PE class, the environment between colleagues has changed, as we are more distant and distant from each other					
Secondary school	9,6	14,4	25,6	31,4	18,9
High School	8,2	25,9	29,9	25,7	10,4
Total	9,1	18,3	27	29,4	16,2

The majority of students considered that evaluation in team sports had an analytical nature, that is, preferably technical, detached from the game; furthermore, they also considered that physical condition played an important role in the assessment of PE. Regarding to the frequency of self-assessment moments and the assessment having been mostly

in individual exercises, a substantial number of students responded in a somewhat evasive way, neither agreeing nor disagreeing (32% and 35%). However, only a minority of them, (18.9% and 19.8%) clearly stated that they did not have the opportunity to frequently self-assess and that assessment was not directed towards individual exercises (Table 4).

Table 4.

Relative frequency (%) of students' answers about assessment process in the PE classes (n = 1419)

Assessment process	Totally disagree	Disagree	Neither agree or disagree	Agree	Totally agree
In team sports, I was evaluated mainly in exercises for technique and less for the game					
Secondary school	1,8	3,7	26,9	46,9	20,7
High School	1,8	9,6	33,8	40,2	14,7
Total	1,8	5,5	29	44,9	18,8
What I did in physical fitness was important for my evaluation of the PE discipline					
Secondary school	1,1	2	12,4	48,8	35,7
High School	0,9	4	20,3	45,2	29,7
Total	1	2,7	14,9	47,5	33,9
I had the opportunity to self-evaluate frequently					
Secondary school	6,9	11	30,5	34,6	17
High School	6,6	14,2	35,2	30,4	13,7
Total	6,8	12,1	32,2	33,1	15,9
I was evaluated more times in individual exercises (one at a time)					
Secondary school	3,5	11,2	35,3	37,8	12,2
High School	6	21,5	35,3	28,6	8,6
Total	4,3	15,5	35,3	34,9	11,1

The majority of participants removed their masks while performing exercises in the PE class and only 6,6% of the students stated that they were always wearing a mask (Table 5). Regarding to material sharing in the class by students, only a minority, about 16%, said they never did it. For physical contact between students, a substantial

number of participants believe that it has occurred a few times and a smaller number say it in half or most of the classes. However, only 18% of students answered that they never had any physical contact with their peers. Most students stated that there was never physical contact with their PE teacher (70%).

Table 5.
Relative frequency (%) of students' answers about safety in PE classes (n =1419)

Safety in PE classes	Never	Sometimes	At half	Mostly	Always
During the physical exercises I removed the mask					
Secondary school	6,2	20,2	10,7	22,7	40,2
High School	7,4	31,2	10,9	23,4	27,1
Total	6,6	23,6	10,8	22,9	36,1
I shared material during PE classes (balls, rackets, hoops, mattresses, etc.)					
Secondary school	16,4	32,1	15	23,2	13,3
High School	14,1	27	10,5	27,3	21,1
Total	15,5	30,5	13,5	24,5	16
In the activities I performed in PE classes, there was physical contact with my colleagues					
Secondary school	18,8	41,1	13,6	19,7	6,8
High School	16,4	37,1	12,9	22,6	11
Total	18	39,7	13,4	20,8	8,2
In the activities I did in PE classes, there was physical contact with my teacher					
Secondary school	69,6	18,8	5	4	1,8
High School	72,7	22	1,5	4,9	1,3
Total	70,5	19,8	3,9	2,4	1,7

Students' perception of their performance and motivation in PE classes

Children's perception about their physical performance was significantly higher in boys than in their female counterparts ($T = -5,865$; $p = 0,001$). Furthermore, sport participants had significantly higher perception of their physical performances in PE classes than their non-participants peers ($T = 11,35$; $p = 0,00$).

Taking into accounts the education level of participants, high-school adolescents reported better performance than their younger peers ($T = -4,414$; $p = 0,00$)

There were no significant differences in motivation for the practice of sports outside school between the pre-covid period (before the first lockdown) and the first academic period of 2021 (after the first lockdown). There were no differences in motivation for sports outside school between sex and between organized sport participants and non-organized sport participants.

According to the level of education, findings revealed that motivation to practice sports outside school decreased significantly (compared between the pre-lockdown, until March 2020, and the first post-lockdown, from September 2020) for the high school students ($T = 2,52$; $p = 0,012$).

Regarding to the motivation for the practice of PE, it was possible to observe significant differences between the pre-covid period (before the 1st confinement) and the 1st academic period of the school year (after the 1st confinement); thus, as expected, students were more motivated to practice PE after confinement ($T = -5,482$; $p = 0$).

Motivation to PE practice substantially increased in students of the secondary school ($T = -6.62$; $p = 0.00$) after confinement, but remained stable among the high school students.

After the lockdown, organized sport participants still revealed higher motivation to PE practice than their non-participants counterparts ($T = -5.40$; $p = 0.00$). The analysis also revealed greater motivation for the PE practice after lockdown, both in boys ($T = -4.41$; $p = 0.00$) and girls ($T = -3.39$; $p = 0.001$).

Table 6.
Students' perception of their motivation to PE practice (1 - very low ... 5 - very high), according on the level of education, if the practitioner is federated and non-federated and sex (n =1419)

Your motivation for PE	\bar{X}	SD	CV
During the pre-covid period (until March 2020), my motivation for PE classes was...			
Secondary school	3,74	0,91	0,24
High School	3,88	0,86	0,22
Organized sport participants	4,05	0,91	0,22
Non organized sport participants	3,65	0,89	0,24
female	3,70	0,88	0,24
male	3,90	0,89	0,23
In this 1st period, my motivation for PE classes is...			
Secondary school	3,91	0,811	0,20
High School	3,92	0,82	0,21
Organized sport participants	3,9	0,79	0,20
Non organized sport participants	4,12	0,82	0,20
female	3,80	0,79	0,21
male	3,80	0,80	0,21
male	4,06	0,79	0,26

Students' sports practice before and after the COVID-19-related confinement

According to the frequency of sports practice outside school before and after the 1st confinement, it was found that there was an increase in the number of practitioners who have never or rarely practiced and a decrease in the number of frequent and very frequent practitioners, that is, it reduced sports practice outside of school with the pandemic.

Table 7.

Relative frequencies (%) of students' responses to frequency of sports practice outside school (n = 1419)

Frequency of your sports practice outside school	Never	2 times or less per month	1 to 2 times a week	3 to 4 times a week	5 times or more per week
Before the pandemic, not counting PE classes, on average I practiced at least 60 minutes of sports:	9,1	12,8	34	29,2	14,9
	10,2	16	37,9	24	11,9
	7,8	9,3	29,4	34,9	18,5
Currently, not counting the PE classes, on average I practice at least 60 minutes of sport:	13,2	15,1	35,6	26,2	9,8
	14,5	18,3	37	21,3	8,9
	12,1	12,1	33,7	31,6	10,6

Students' perception of quality of lessons and satisfaction with PE classes.

Data reveals students' preference for face-to-face classes in comparison with videoconference classes. When asked whether students liked the face-to-face classes after confinement more than the face-to-face pre-confinement classes, they did not manifest a clear agreement or disagreement. Regarding the fear of removing the mask during the practice of physical education, the students also did not show an evident agreement or disagreement. However, there were significant differences between boys and girls - greater fear among girls to remove the mask in class than among boys' counterparts ($T = 3,321$; $p = 0,001$).

Table 8 also indicates that High school students expressed higher satisfaction than students of the secondary school with face-to-face PE classes ($T = -2,514$; $p=0,012$). In face-to-face post-lockdown classes comparison with face-to-face pre-lockdown classes, secondary students revealed more joy from post-lockdown classes. ($T = 3,415$; $p = 0,001$). High school students felt more afraid to remove the mask during class ($T = -2,36$; $p = 0,018$).

The Value of PE

Taking into account its relative value, utility or importance, the items correspond to the combined PE value and its importance. A reliability analysis was performed on the "Value of PE" scale, composed of 10 items. Cronbach's alpha showed that this scale has moderate to high reliability: $\alpha = 0.88$ (Marôco & Garcia-Marques, 2006). Most items proved to be retention-worthy, resulting in a de-

crease in alpha if excluded. For analysis items 11.5, 11.6 and 12.3 were removed, whose presence reduced scale reliability and their exclusion allowed increasing alpha to $\alpha = 0.88$.

In the following two tables is presented the perception of value assigned to Physical Education by students, globally with gender and federated and non-federated comparisons.

Globally, students do like PE classes ($4,29 \pm 0,860$), where time passes quickly ($4,22 \pm 0,940$) and they have fun ($4,21 \pm 0,800$). Students enjoy PE subjects and see PE as an important subject for their overall education. The item with the lowest score, although positive, refers to the consideration of Physical Education as a favorite subject.

Table 8.

Students' satisfaction about face-to-face PE classes (1 – totally disagree ... 5 – totally agree), on the level of education and gender (n = 1419)

I consider that in this 1st period:	\bar{X}	SD	CV
I liked these face-to-face classes more than the ones I had by videoconference, between March and June 2020	4,48	0,95	0,21
Female	4,5	0,95	0,21
Male	4,49	0,93	0,21
Secondary school	4,45	0,98	0,22
High School	4,58	0,86	0,19
I enjoyed these classes more than the ones I had before the pandemic (pre-confinement until March 2020);	3,31	1,28	0,39
Female	3,27	1,24	0,38
Male	3,34	1,34	0,40
Secondary school	3,39	1,27	0,37
High School	3,14	1,30	0,41
During PE classes, I was afraid of being infected because I wasn't always wearing a mask.	2,92	1,26	0,43
Female	3,02	1,24	0,41
Male	2,80	1,26	0,45
Secondary school	2,87	1,27	0,44
High School	3,04	1,21	0,40

Table 9.

Value of PE for students, by gender (N = 1419)

Item	Total (N = 1419)			Female (n = 756)			Male (n = 663)			T	p
	\bar{X}	SD	CV	\bar{X}	SD	CV	\bar{X}	SD	CV		
I usually have fun in PE classes	4,21	0,80	0,19	4,17	0,78	0,19	4,28	0,81	0,19	-2,55	0,011
I like the PE subject	4,29	0,86	0,20	4,15	0,90	0,22	4,45	0,78	0,18	-6,60	0,000
It seems that in PE classes time passes quickly	4,22	0,94	0,22	4,09	0,99	0,24	4,38	0,85	0,19	-5,87	0,000
I like the matters (Handball, Gymnastics, Football, etc.) of the PE subject	4,06	0,93	0,23	3,92	0,95	0,24	4,23	0,88	0,21	-6,26	0,000
PE is one of my favourite subjects	3,85	1,21	0,31	3,52	1,27	0,36	4,24	0,99	0,23	-11,84	0,000
PE is an important subject for my global education	3,93	0,96	0,24	3,85	0,97	0,25	4,03	0,96	0,24	-3,33	0,001
PE is as important as the other subjects	3,87	1,04	0,27	3,79	1,05	0,28	3,96	1,03	0,26	-2,88	0,004

In general, the results indicate that students value PE, and attach importance to their global education. Compared to girls, boys value this discipline more, as favorite, and consider it more important for their global education.

Among boys and girls, there are differences with statistical significance in all of the items analyzed. There were no gender differences between students in the secondary school and those in the high school.

In the following table is presented the perception of value assigned to PE by students as a organized sport participants and non-organized sport participants.

Table 10.
Value of PE for students, Organized sport participants and non-organized sport participants

Item	Total (N=1419)			Federated (n=504)			Non-federated (n=915)			T	p
	\bar{X}	SD	CV	\bar{X}	SD	CV	\bar{X}	SD	CV		
I usually have fun in PE classes	4,21	0,80	0,19	4,28	0,84	0,20	4,17	0,78	0,19	2,23	0,02*
I like the PE discipline	4,29	0,86	0,20	4,47	0,79	0,18	4,17	0,88	0,21	6,05	0,00*
It seems that in PE classes time passes quickly	4,22	0,94	0,22	4,42	0,85	0,19	4,10	0,96	0,23	5,95	0,00*
I like the subjects (Handball, Gymnastics, Football, etc.) of the PE discipline	4,06	0,93	0,23	4,34	0,81	0,19	3,90	0,95	0,24	8,36	0,00*
PE is one of my favourite disciplines	3,85	1,21	0,31	4,29	0,98	0,23	3,61	1,26	0,35	10,80	0,00*
PE is an important discipline for my global education	3,93	0,96	0,24	4,12	0,95	0,23	3,81	0,96	0,25	5,64	0,00*
PE is as important as the other disciplines	3,87	1,04	0,27	4,03	1,05	0,26	3,77	1,03	0,27	4,34	0,00*

* $p < 0,05$

Data from this study shows federated practitioners value and attach greater importance to PE, scoring above 4 all the items in the scale. There are differences between organized sport participants and non-organized sport participants with statistical significance in all the seven items analyzed.

Discussion

The purpose of this study is to describe the perception of secondary and high School students about the impact of the pandemic on PE classes, after the first wave of the COVID-19 outbreak. This section follows a close alignment of the previous one.

Development of PE classes

After the 1st confinement in 2020, As a practical subject, PE classes in the 1st period of the year 2020/21 (from September to December) were face-to-face, practical, and with a duration equal to the pre-lockdown period. Context specific measures were adopted by schools to guarantee the safety and well-being of students and to ensure the quality of PE classes, without the negative impact of teaching the discipline at a physical distance (Hortigüela-Alcalá et al., 2021).

The first quarter of the 2020/21 school year required many programmatic changes from teachers due to the restrictions imposed by the pandemic, as reported by Sanz-Remacha et al (2022). Findings of the present study show the physical condition, athletics, invasive team sports, volleyball and racket games were the curricular subject most worked confirming the PE teachers' concerns to keep safety of students by restricting physical contact. In fact, teachers opted analytical and technical approaches to Collective Sports Games emphasizing activities without physical contact, as well as the use of little material and especially outdoor spaces (Hortigüela-Alcalá et al., 2021), a methodological option identified by most of the Portuguese students which is also supported by the reported absence of sports with physical contact. Based on the previous statements, it is not surprising that these students

have also stated that physical condition has played an important role on PE classes during that first quarter of 2020/21.

Upon returning to face-to-face teaching, there was a greater repetition of the exercises in class, according to the students which may be related to the teachers' intention to recover losses perceived during the confinement period. Furthermore, the hygiene and distancing constraints that were "required" to teachers, contributed to the adoption of more reproductive teaching styles and with less student autonomy (Sanz-Remacha et al., 2022).

This restrictive condition adopted in face-to-face PE classes, after lockdown, also ended up having a relevant impact on the relationship between students, that is, on the classroom atmosphere (Tejerina & Ríó, 2022). In this sense, approximately half of the responding students consider that the classroom climate has changed due to distance and lack of physical contact, a result that enhances previous cautions concerned with teachers' influence and competence (Del Valle Díaz, 2022).

During the lockdown in 2020 (March to June), teachers found difficult to assess and classify students (Baena-Morales et al., 2020; Sierra-Díaz et al., 2021). However, the return to face-to-face teaching, from September 2020, allowed the resumption of some normality in the assessment process. Thus, the return to face-to-face teaching, starting in September 2020, allowed the re-establishment of some normality in the evaluation process with particular importance attributed to physical condition and individual practice settings.

The Portuguese DGS and DGE (2020) authorization for the removal of masks when exercising, has increased the quality of PE classes. Data reveal only a minority of the surveyed students never removed the mask in class with motor practice. However, in countries like Spain, restrictions were more expressive, allowing only to remove the mask in certain delimited areas of 5m², for a maximum of 60 seconds (Tejerina & Ríó, 2022).

Sharing material properly disinfected in PE classes was another restriction with a strong impact on the discipline's programming itself. According to most of the students

surveyed, the material was shared with other colleagues which indicates conditioning of the class dynamics, as PE teachers needed to readapt the programming contents in order to reduce the use of material and, consequently, the disinfection time (Sanz-Remacha et al, 2022).

In recent studies, constraints on the type of activities to be carried out in classes after lockdown were assumed (Hortigüela-Alcalá et al., 2021; Sierra-Díaz et al., 2021). In addition to the restrictions on the material to be used in class, the need to avoid physical contact in class ended up causing several adaptations and choices of curricular subjects to the detriment of others (Sanz-Remacha et al., 2022).

In the present study, only a minority of students stated that they had never made physical contact with other classmates, which seems to be a difficulty for PE teachers in complying with this restriction on physical contact in class. However, the physical interaction would be substantially lesser than on the pre-lockdown period.

Regarding to physical contact between teacher and student, most participants say that it never happened in the classroom which raises questions regarding the spectrum of feedback used. Rosado (2011) highlights the relevance of extrinsic pedagogical feedback in its different dimensions, namely tactile-kinesthetic. The teacher's unavailability to prescribe feedbacks of this nature with the students may have conditioned their pedagogical intervention in the classes.

Students' perception of their performance and motivation in PE classes

In the present study, sport participants and male students perceived a better performance in PE and show more positive attitudes towards this discipline; these findings are in line with previous studies (Carcamo-Oyarzun et al., 2022) who also found a better perception of motor competence among boys before and during the first confinement; furthermore, Pierón et al (2000) state that more skillful students revealed more positive attitude towards Physical Education than their less skilled peers.

The majority of the boys and girls of the present study were more motivated to practice PE after the lockdown in comparison with the previous period. Recent studies have shown children and adolescents have experienced increased levels of anxiety, irritability and inattention due to school closures (Magson et al., 2020; Singh et al., 2020), and their online behaviours have been impacted, with young people engaging in more screen time for both educational and social purposes (Chen, et al., 2020). The absence of significant reduction in the practice of physical and sports activity during a long period of lockdown may have motivated students to practice PE. Complementary research needs to be done to confirm or not the aforementioned trends.

Both elementary students and non-organized sport participants revealed greater motivation to practice PE after confinement. These students realized that the school is a

safe place and that it protects them from possible risks of contagion.

Students' sports practice before and after the COVID-19-related confinement

There was a reduction of sports participation outside of school with the pandemic. The constraints imposed by the Portuguese General Directorate of Education and Health (2020) on sports clubs and gyms as of July 2020 and the parents' own fear of a resumption of sports activities, may have contributed to a decrease of sport practice of students. As emphasized by Cordovil et al (2021), studies in different countries indicate that children's daily routines were more sedentary after the pandemic, with a decrease in PA behaviors (Moore et al., 2020; Pietrobelli et al., 2020), and an increase in screen time (Carroll et al., 2020).

Students' perception of quality of lessons and satisfaction with Physical Education classes.

Adolescents of the present study expressed greater satisfaction for the face-to-face classes than for the videoconference classes, as PE has been traditionally considered as a practical and 'hands-on' subject in schools, where close proximity and physical contact is common (Varea et al., 2022). Jeong and So (2020) alerts to the fact that PE focuses on physical activity and this is clearly different from most subjects that make up the PE curriculum. The latter authors show that on face-to-face physical education classes, the students can immediately receive feedback on their motor skills or their success completing physical activities. The same does not happen with online physical education classes, where students cannot modify their own activities by viewing a video of them. Indeed, students need immediate feedback to learn and strengthen their active class attitude. According to Almonacid-Fierro et al (2021), it has been difficult for physical Education teachers professionals to verify the learning of their students in times of pandemic. It should be noted that high school students were more affirmative in the valuation of face-to-face classes, which contrasts with previous concerns with physical activity in these population (Ortiz-Sánchez, 2021).

The students did not manifest clear agreement or disagreement for face-to-face classes before (until March 2020) and after (Between September and December 2020) lockdown. This is somewhat surprising taking into account the possible adaptations made by teachers in order to ensure greater security. However, when students from different levels of education are compared, the secondary school students did show more satisfaction with the face-to-face classes after confinement than the face-to-face classes before lockdown. Of note, the implementation of online teaching, subsequent to school closures, brought a significant disruption in PE teachers' habitual teaching behaviors, based upon face-to-face and body-centered teaching modalities (Gobbi et al., 2020). This remote

learning may have more affected younger students and therefore they probably valued more face-to-face classes after lockdown.

Portuguese students have a favorable attitude towards PE, although they sex-differences (Pereira et al, 2009). This trend was also observed in the present study in students from the secondary school and high school after the first lockdown (from March to June 2020). The recent pandemic context did not significantly change the attitudes of Portuguese students towards the PE discipline, as well as a greater appreciation of this discipline by boys (Stelzer et al., 2004) and by organized sport participants. Particular significance in the differences between boys and girls is found in the items, *Physical Education is one of my favorite subjects, I like the Physical Education subject, I like the subjects (Handball, Gymnastics, Football, etc.) of the Physical Education subject.*

It is interesting to note that there are no differences between junior high school students (secondary school) and high school students in the way they value and attach importance to PE. The same was not reported by Papla et al (2019) with Polish students from the elementary school, secondary school and high school, where there was more disinterest among older students in PE.

Several limitations of the study need to be recognized. Firstly, the study was cross-sectional so that cause-effect relationships cannot be assumed. Secondly, the results are limited to a specific sample of Coimbra schools.

Conclusions

In summary, it seems pupils faced a narrower PE curriculum in this period in addition to a longer previous period of no practical PE at all. This may justify, in future planning, conceptual and methodological options aiming the recovery of learning in those subject matters. Indeed, according to the students' opinion, PE teachers chose to teach subjects with less physical contact (physical conditioning, net games, athletics, and volleyball). There was practice of invasive team sports but in non-invasive tasks. Therefore, the physical conditioning assumed, in this period of time, a role of great relevance in PE.

Participants also considered that the distance imposed in classes changed the atmosphere of the class. It was also perceived by students a loss of autonomy in motor practice, suggesting that teachers have opted for more reproductive teaching styles. It is important to note that participants considered the school as a safe space that protects them from possible risks of contagion. However, possible concerns about the risk of contagion may justify a lower motivation of students to practice sports outside of school, particularly among females.

In general, Portuguese students were even more motivated to practice PE after the first lockdown. It is also interesting to see that the preference for face-to-face classes over online classes ends up reinforcing the relevance that students have attributed to the direct intervention of

the teacher and to the context of face-to-face practice of PE classes. The challenge of adapting face-to-face Physical Education with various constraints resulting from the distance imposed by the pandemic, influenced the planning and teaching of the curricular subjects, but without taking away its educational value.

References

- Almonacid-Fierro, A., Vargas-Vitoria, R., Carvalho, S., & 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), 432440. <https://doi.org/10.11591/ijere.v10i2.21129>.
- Baena-Morales, S., López-Morales, J., & García-Taibo, O. (2021). La intervención docente en educación física durante el periodo de cuarentena por COVID-19. *Retos*, 39, 388-395. <https://doi.org/10.47197/retos.v0i39.80089>.
- Carcamo-Oyarzun, J., Romero-Rojas, F., & Estevan, I. (2022). Impacto de la pandemia por COVID19 en la percepción de competencia motriz de escolares de la ciudad de Temuco, Chile. *Retos*, 43, 361-369. <https://doi.org/10.47197/retos.v43i0.87496>.
- Carroll, N., Sadowski, A., Laila, A., Hruska, V., Nixon, M., Ma, D., & Haines, J. (2020). The impact of COVID-19 on health behavior, stress, financial and food security among middle to high income Canadian families with young children. *Nutrients*, 12, 8. [doi:10.3390/nu12082352](https://doi.org/10.3390/nu12082352).
- Chen, I., Chen, C., Pakpour, A., Griffiths, M., & Lin, C. (2020). Internet-related behaviors and psychological distress among schoolchildren during COVID-19 school suspension. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59, 1099-1102. <https://doi.org/10.1016/j.jaac.2020.06.007>.
- Cheval, B., Sivaramakrishnan, H., Maltagliati, S., Fessler, L., Forestier, C., Sarrazin, P., Orsholits, D., Chalabaev, A., Sander, D., & Boisgontier, M. (2021). Relationships between changes in self-reported physical activity, sedentary behaviour and health during the coronavirus (COVID-19) pandemic in France and Switzerland. *Journal of Sports Sciences*, 39(6), 699-704. <https://doi.org/10.1080/02640414.2020.1841396>.
- Christakis, D., Cleve, V., & Zimmerman, F. (2020). Estimation of US children's educational attainment and years of life lost associated with primary school closures during the coronavirus disease 2019 pandemic. *Jama Network Open*, 3, e2028786. <https://doi.org/10.1001/jamanetworkopen.2020.28786>.
- Cordovil, R., Ribeiro, L., Moreira, M., Pombo, A., Rodrigues, L., Luz, C., Veiga, G., & Lopes, F. (2021). Effects of the COVID-19 pandemic on preschool children and preschools in Portugal. *Journal of Physical Education and Sport*, 21(1), 492-499. <https://doi.org/10.7752/jpes.2021.s1052>.
- Delgado-Floody, P., Carter-Thuillier, B., Jerez-Mayorga,

- D., Cofré-Lizama, A., & Martínez-Salazar, C. (2019). Relación entre sobrepeso, obesidad y niveles de autoestima en escolares (Relation between overweight, obesity, and self-esteem levels in schoolchildren). *Retos*, 35, 67–70. <https://doi.org/10.47197/retos.v0i35.62313>.
- Del Valle Díaz, S., Cabanillas Cruz, E. C., Villamil Cabello, E., & de la Vega Marcos, R. (2022). Claves para aprender Educación Física durante el confinamiento (Keys to learning Physical Education during confinement). *Retos*, 43, 875–886. <https://doi.org/10.47197/retos.v43i0.89263>.
- Deng, C., Wang, J., Zhu, L., Liu, H., Guo, Y., Peng, X., Shao, J., & Xia, W. (2020). Association of web-based physical education with mental health of college students in Wuhan during the COVID-19 outbreak. *Journal of Medical Internet Research*, 22(10), e21301. <https://doi.org/10.2196/21301>.
- Diloy-Peña, S., García-González, L., Sevil-Serrano, J., Sanz-Remacha, M., & Abós, Á. (2021). Motivational Teaching Style in Physical Education: How does it affect students' experiences? *Apunts. Educación Física y Deportes*, 144, 44–51. [https://doi.org/10.5672/apunts.2014-0983.es.\(2021/2\).144.06](https://doi.org/10.5672/apunts.2014-0983.es.(2021/2).144.06)
- Direção Geral da Educação & Direção Geral de Saúde (2020). *Guidelines. Academic year 2020/2021*. DGE-MEC.
- Gobbi E., Maltagliati, S., Sarrazin, P., Fronso, S., Colanangelo, A., Cheval, B., Escriva-Boulley, G., Tessier, D., Giyasettin, D., Erturan, G., Yüksel, Y., Papaioannou, A., Bertollo, M., & Carraro, A. (2020). Promoting physical activity during school closures imposed by the first wave of the COVID-19 pandemic: Physical Education teachers' behaviors in France, Italy and Turkey. *International Journal Environmental Research Public Health*, 17, 9431. <https://doi.org/10.3390/ijerph17249431>.
- Government of Canada (2021, March 7). Taking care of your mental and physical health during the pandemic. <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/mental-health.html>
- Hortigüela-Alcalá, D., Hernando-Garijo, A., & Pérez-Pueyo, A. (2021). La Educación Física en el contexto COVID-19. Un relato de profesores de diferentes etapas educativas (Physical Education in the COVID-19 context). *Retos*, 41, 764–774. <https://doi.org/10.47197/retos.v41i0.86368>.
- Jeong, H., & So, W. (2020). Difficulties of online physical education classes in middle and high school and an efficient operation plan to address them. *International Journal of Environmental Research and Public Health*, 17, 7279. <https://doi.org/10.3390/ijerph17197279>.
- Jones-Jofré, J., Müller-Pérez, S., & Barraza-Gómez, F. (2022). Efecto de la asignatura de educación física en la percepción de los estudiantes frente al desarrollo de competencias genéricas (Effect of Physical Education on the students' perception regarding the development of generic competences). *Retos*, 44, 496–503. <https://doi.org/10.47197/retos.v44i0.90654>.
- Magson, N., Freeman, J., Rapee, R., Richardson, C., Oar, E., & Fardouly, J. (2020). Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth Adolescence*, 50, 44–57. <https://doi.org/10.1007/s10964-020-01332-9>.
- Moore, S., Faulkner, G., Rhodes, R., Brussoni, M., Chulak-Bozzer, T., Ferguson, L., Mitra, R., O'Reilly, N., Spence, J., Vanderloo, L., & Tremblay, M. (2020). Impact of the COVID-19 virus outbreak on movement and play behaviours of Canadian children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 17(1), 85. <https://doi.org/10.1186/s12966-020-00987-8>
- Ortiz Sánchez, J. A., del Pozo-Cruz, J., Alfonso-Rosa, R. M., Gallardo-Gómez, D., & Álvarez-Barbosa, F. (2021). Efectos del sedentarismo en niños en edad escolar: revisión sistemática de estudios longitudinales (Effects of sedentary school-age children: a systematic review of longitudinal studies). *Retos*, 40, 404–412. <https://doi.org/10.47197/retos.v0i40.83028>
- Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using the SPSS program*. Allen & Unwin.
- Papla, M., Wojdala, G., Rasek, J., Królikowska, P., Starzak, J., & Górna-Lukasik, K. (2019). Attitudes towards physical education lessons in students at different levels of education. *Journal of Education, Health and Sport*, 9(4), 301–316. <https://doi.org/10.5281/zenodo.2637417>.
- Pereira, P., Carreiro da Costa, F., & Diniz, J. (2009). As atitudes dos alunos face à disciplina de Educação Física: Um estudo plurimetodológico. *Boletim SPEF*, 34, 83–94. <https://boletim.spef.pt/index.php/spef/article/view/132>.
- Piéron, M., Ledent, M., Delfosse, C., & Cloes, M. (2000). Mieux connaître les élèves: Les motivations. *Revue de l'Éducation Physique*, 40(1), 35–43.
- Pietrobelli A, Pecoraro L, Ferruzzi A, Heo M, Faith M, Zoller T, Antoniazzi F, Piacentini G, Fearnbach SN, Heymsfield SB. (2020). Effects of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study. *Obesity (Silver Spring)*. Aug;28(8):1382-1385. <https://doi.org/10.1002/oby.22861>.
- Rosado, A. (2011). Melhorar a aprendizagem otimizando a instrução. In A. Rosado & I. Mesquita, I. (Eds.). *Pedagogia do desporto* (69-130). UTL-FMH.
- Sanz-Remacha, M., Abós, Ángel, Sevil-Serrano, J., Asín, D., & García-González, L. (2022). Cambios provocados por la Covid-19 en la enseñanza de la Educación Física presencial: Un estudio cualitativo en docentes de Educación Primaria y Secundaria (Covid-19's changes in the in-person physical education teaching: A qualita-

- tive study in Primary a: Un estudio cualitativo en docentes de Educación Primaria y Secundaria. *Retos*, 44, 1121–1131.
<https://doi.org/10.47197/retos.v44i0.91187>
- Sierra-Díaz, J., González-Víllora, S., Toledo-Guijarro, J. A., & Bermejo-Collada, C. (2021). Reflexiones sobre el proceso de enseñanza y aprendizaje en Educación Física durante la pandemia por COVID-19. Un caso real (Reflections on the teaching and learning process in Physical Education during the COVID-19 pandemic. A real case). *Retos*, 41, 866–878.
<https://doi.org/10.47197/retos.v41i0.85946>
- Schleicher, A. (2020). *The impact of COVID-19 on Education: Insights from Education at a Glance 2020*. OECD.
- Shepherd HA, Evans T, Gupta S, McDonough MH, Doyle-Baker P, Belton KL, Karmali S, Pawer S, Hadly G, Pike I, Adams SA, Babul S, Yeates KO, Kopala-Sibley DC, Schneider KJ, Cowle S, Fuselli P, Emery CA, Black AM. (2021). The Impact of COVID-19 on High School Student-Athlete Experiences with Physical Activity, Mental Health, and Social Connection. *Int J Environ Res Public Health*. Mar 29;18(7):3515.
<https://doi.org/10.3390/ijerph18073515>.
- Singh S, Roy D, Sinha K, Parveen S, Sharma G, Joshi G. I (2020). Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Res*. 2020 Nov; 293:113429.
<https://doi.org/10.1016/j.psychres.2020.113429>.
- Stelzer, J., Ernest, J., Fenster, M., & Langford, G. (2004). Attitudes toward physical education: A study of high school students from four countries - Austria, Czech Republic, England, and USA. *College Student Journal*, 38(2), 171-178.
- Tejerina, D., & Ríó, F. (2022). Educación Física y COVID-19: Percepciones de alumnado y lecciones de futuro. *Retos*, 45, 814-820.
<https://doi.org/10.47197/retos.v45i0.91751>.
- Tran, B., Ha, G., Nguyen, L., Vu, G., Hoang, M., Le, H., Latkin, C., Cyrus, S., & Ho, R. (2020). Studies of COVID-19 pandemic: A global analysis of literature. *International Journal of Environmental Research and Public Health*, 17, 1-16.
<https://doi.org/10.3390/ijerph17114095>.
- UNESCO (2021, March 21). *Education: From disruption to recovery*.
<https://en.unesco.org/covid19/educationresponse>