

Effectiveness of online teaching in physical education during COVID-19 school closures: a survey study of frontline physical education teachers in Hong Kong

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Abstract

Introduction: The COVID-19 pandemic has caused massive school closures worldwide and many schools were forced to adopt online teaching mode. **Purpose:** This survey study aims to examine the effectiveness of online teaching in physical education (PE) and support needed from the teachers' perspective. **Methods:** Responses from 294 frontline PE teachers were collected via an online survey between 4 and 29 January 2021. **Results:** Four major findings were highlighted in our study. First, most teachers reported that online PE lessons were not effective to improve motor skill acquisition and physical activity level, the major reasons for which were “lack of practical training”, “students’ lack of learning motivation/interest”, and “limited interpersonal interactions”. Second, most teachers encountered difficulties in online teaching, with major difficulties comprising “limited interpersonal interactions’ and “difficult to retain students’ learning motivation/interest”. Third, most teachers felt that online teaching was stressful due to the increased workload in preparation and safety concerns of the home-exercise programme. Fourth, many teachers suggested that schools or governments should provide online teaching kits, such as suggested online lesson plans or home activity recommendations, for their reference. **Conclusions:** In summary, the effectiveness of online teaching in PE during COVID-19 school closures was generally perceived to be low and difficult by the frontline PE teachers. Schools and governments should provide sufficient support, such as online teaching kits and concrete teaching guidelines, for PE teachers to develop creative and interactive online lessons, which will in turn benefit students in motor skill acquisition and physical activity level.

Keywords: Covid-19; physical education; survey; online teaching.

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) has resulted in school closures globally. It is estimated that more than 1.2 billion children in 186 countries were not in their classrooms during the peak periods between April and May 2020 (UNESCO, 2021). While countries are still fighting to lower their COVID-19 infection rates, there are still approximately 33 country-wide school closures, with over 23 million children being affected across the world (UNESCO, 2021). In Hong Kong, schools are currently shut with the fourth wave of infection striking the city. To minimize the impact of COVID-19 on students’ academic development and to ensure continuity of learning, most schools have rapidly adopted online teaching and learning modes (e.g., live streaming, recorded videos, online assignments) (Dhawan, 2020; Lau & Lee, 2020; Adedoyin & Soykan, 2020; Bender, 2020; Stein, 2020; Zhang, 2020). As a result, a large amount of resources has been allocated to teachers’ and parents’ education related to e-learning (Education Bureau, 2021a; Ferdig, Baumgartner, Hartshorne, Kaplan-Rakowski, & Mouza, 2020; Scull, Phillips, Sharma, & Garnier, 2020). Technologically, many online platforms, such as Zoom[®], Blackboard[®], Canvas[®], Google Meet[®], and Microsoft Teams[®], have also been quickly developed and modified to support online learning in a user-friendly manner (O’Brien et al., 2020; Quezada, Talbot, & Quezada-Parker, 2020).

Similar to many subject areas (e.g., language, science), delivery of physical education (PE) was also shifted to online teaching mode (Filiz & Konukman, 2020; Varea & González-Calvo, 2020). This sudden shift is particularly significant in PE, since it is a subject that traditionally comprises physical body movements (Varea & González-Calvo, 2020, Yu & Jee, 2020). During the school shutdowns, PE teachers needed to re-design the PE classes and restructure the PE curriculum of their schools. Moreover, they may have also needed to develop innovative ways to keep students active, particularly when there are no sports facilities (e.g., equipment, field) and when their health is paramount during the pandemic (Jones, 2020). To support PE teachers, different guidelines and suggestions have been proposed for designing home PE activities to foster motor skill acquisition and to enhance physical activity level (e.g., Education Bureau, 2021b; Iowa Department of Education, 2020; SHAPE America, 2020). Recently, a growing body of research has been conducted to elucidate the effectiveness of different teaching strategies and pedagogies in PE during the pandemic (Backman & Barker, 2020; Ferdig et

al., 2020; Filiz & Konukman, 2020; Varea & González-Calvo, 2020). However, most research focused on pre-service teacher education (e.g., Ferdig et al., 2020; O'Brien et al., 2020). To the best of our knowledge, none of them has examined the effectiveness of online teaching in PE from the perspective of frontline in-service teachers during COVID-19 school closures. Without such investigation, it is not possible to assess the effectiveness of online teaching in PE and identify the precise difficulties that the frontline teachers are encountering, which in turn may jeopardize school curriculum planning and pedagogical development during the prolonged school suspension. Therefore, the objectives of the present survey study were to ascertain the observations of in-service teachers regarding the effectiveness of online teaching in PE on motor skill acquisition and physical activity level, as well as to collect comments and suggestions from the frontline in-service teachers on how to improve the effectiveness of online teaching in PE.

Methodology

Participants

A convenience sample of 298 primary and secondary school PE teachers was recruited through emails and a mobile app (i.e., WhatsApp). They were asked to fill out an anonymous online survey via Googleform from 4 to 29 January 2021, at which time all of the schools were closed during the fourth wave of infection in Hong Kong. Prior to filling in the survey, participants were asked to read the instructions of the study. Written informed consent was obtained from all participants through the online survey. The study was approved by the university ethics committee. Demographic variables of participants are shown in Table 1.

Table 1. Demographic variables of study population (N = 298)

Variables	n	%
<i>Gender</i>		
Males	155	52
Females	143	48
Total	298	100
<i>Age</i>		
21-30	93	31.2
31-40	119	39.9
41-50	71	23.8
51-60	15	5.0
Total	298	100
<i>Type of school for teaching</i>		
Primary School	179	60.1
Secondary School	119	39.9
Total	298	100
<i>Years of teaching experience</i>		
< 5 years	89	29.9
5-10 years	66	22.1
11-15 years	50	16.8
> 15 years	93	31.2
Total	298	100

Measures and data analysis

The online survey consisted of 24 items in two sections: general experience of online teaching in PE, and suggestions for improvement. A total of 17 PE teachers (12 primary school teachers and 5 secondary school teachers) were invited to complete a pilot survey and to provide suggestions for improving clarity of items. Appropriate revisions were made based on their comments and suggestions. The survey was finalized by the first author. The data obtained from the online survey were analyzed by the frequency of common participants' responses and were stated in percentages.

Results

General experience of online teaching in PE

Frequency and duration in online teaching in PE

92.3% of participants reported that they were required to deliver PE lessons online during school closures, with the mean frequency and duration being 1.59 ($SD = .87$) per week and 27.16 ($SD = 11.57$) minutes per lesson. Prior to the pandemic, the mean frequency and duration of face-to-face PE lessons was 1.84 ($SD = .98$) per week and 34.28 (18.07) minutes.

Effectiveness of online teaching in PE in fostering motor skill acquisition

In terms of motor skill acquisition, only 1.8% of participants indicated that online teaching was effective. 32.4% of participants were neutral to the issue (i.e., neither effective nor ineffective). 61.1% of participants indicated

that online teaching was ineffective. 4.7% of them reported that online teaching was completely ineffective (see Table 2). The three main reasons given for the ineffectiveness were: “limited interpersonal interactions” (82.6%), “students’ lack of learning motivation/interest” (73.7%), and “lack of practical training” (71.1%) (see Table 2).

Table 2. Teachers’ rating on effectiveness of online PE lesson in fostering motor skill acquisition and reasons of ineffectiveness.

Effectiveness of online PE lesson in fostering motor skill acquisition	n	%
Very ineffective	13	4.7
Ineffective	168	61.1
Neutral	89	32.4
Effective	5	1.8
Very effective	0	0
Total	275	100
Reasons of ineffectiveness	n	%
Insufficient time for teaching	15	5.6
Lack of practical training	192	71.1
Limited space for movement	42	15.6
Limited interpersonal interactions	223	82.6
Limited teaching resources (e.g., equipment, suggested teaching activities)	52	19.3
Students’ lack of learning motivation/interest	199	73.7
Others	3	1.1

Note: For reasons of ineffectiveness, participants could choose more than one option, and therefore the total percentages exceeded 100%.

Effectiveness of online teaching in PE in enhancing physical activity level

Concerning physical activity level, only 12.4% of participants indicated that online teaching was effective to enhance physical activity level. 10.9% of participants were neutral to the issue (i.e., neither effective nor ineffective). 71.6% of participants indicated that online teaching was ineffective. 5.19% of them reported that online teaching was completely ineffective (see Table 3). The three main reasons given for the ineffectiveness were: “lack of practical training” (71.8%), “students’ lack of learning motivation/interest” (63.1%), and “limited interpersonal interactions” (55.6%) (see Table 3).

Table 3. Teachers’ rating on effectiveness of online PE lesson in enhancing physical activity level and reasons of ineffectiveness.

Effectiveness of online PE lesson in enhancing physical activity level	n	%
Very ineffective	14	5.1
Ineffective	197	71.6
Neutral	30	10.9
Effective	34	12.4
Very effective	0	0
Total	275	100
Reasons of ineffectiveness	n	%
Insufficient time for teaching	37	15.4
Lack of practical training	173	71.8
Limited space for movement	41	17.0
Limited interpersonal interactions	134	55.6
Limited teaching resources (e.g., equipment, suggested teaching activities)	7	2.9
Students’ lack of learning motivation/interest	152	63.1
Others	9	3.7

Note: For reasons of ineffectiveness, participants could choose more than one option, and therefore the total percentages exceeded 100%.

Difficulties of online teaching in PE

Participants were asked whether they had encountered any difficulties during online teaching in PE. Only 3.6% of participants did not encounter any difficulty during online teaching. The remaining participants reported that they had experienced various levels of difficulties (see Table 4). Among the participants who reported to have difficulties in online teaching in PE, “lack of practical skill training” (75.5%) and “difficult to retain students’ learning motivation/interest” (67.9%) were the two most frequently reported difficulties (see Table 4).

Table 4. Teachers' rating on the difficulty level of online teaching in PE and difficulties encountered

Difficulty level of online teaching in PE	n	%
Nil	10	3.6
Low	23	8.4
Medium	94	34.2
High	148	53.8
Total	275	100
Difficulties encountered during online teaching in PE	n	%
Insufficient time for teaching	11	4.2
Lack of practical skill training	200	75.5
Limited space for movement	7	2.6
Limited interaction with the students	5	1.9
Limited teaching resources (e.g., equipment, teaching activities)	18	6.8
Difficult to retain students' learning motivation/interest	180	67.9
Others	3	1.1

Note: For difficulties encountered, participants could choose more than one option, and therefore the total percentages exceeded 100%.

Teachers' stress in online teaching in PE

Most participants (88.7%) stated that they experienced stress in teaching PE online. Among them, "safety issues" (39.3%), "increased workload in preparation" (34.4%), and "expectations/concerns from students, parents, and principals" (28.7%) were the three most frequently reported stress sources (see Table 5).

Table 5. Teachers' stress in online teaching in PE and stress sources

Stressful in teaching PE online	n	%
Yes	244	88.7
No	31	11.3
Total	275	100
Stress sources	n	%
Expectations/concerns from students, parents and principals	70	28.7
Increased workload in preparation	84	34.4
Restriction on class activity	40	16.4
Self-expectation	43	17.6
School policy	7	2.9
Safety issues	96	39.3
Students' lack of learning motivation/interest	34	13.9
Lack of technical knowledge	39	16.0
Others	8	3.3

Note: For stress sources, participants could choose more than one option, and therefore the total percentages exceeded 100%.

Suggestions to peers for enhancing student' learning motivation/interest in online PE lessons

Participants were asked to make suggestions to enhance students' learning motivation and interest for online PE lessons. Most participants suggested "design creative online lessons" (69.8%), followed by "design interactive online PE lessons" (59.4%) and "provide more real-life examples related to teaching topics" (53.7%) (see Table 6).

Table 6. Teachers' suggestions to peers in enhancing students' learning motivation/interest for online PE lesson

Suggestions	n	%
Design creative online lesson	208	69.8
Design interactive online lesson	177	59.4
Provide more real-life examples related to teaching topic	160	53.7
Provide instructional video clips for students to follow/reference	71	23.8
Set a reachable goal for students to achieve	18	6.0
Others	39	13.1
None	10	3.4

Note: Participants could choose more than one option, and therefore the total percentages exceeded 100%.

Suggestions to schools/governments for assisting PE teachers for online teaching in PE

Regarding suggestions to schools/governments to assist PE teachers for online learning, "provision of teaching kits" (e.g., suggested lesson plans) (80.2%) and "provision of technical support" (68.5%) were the two most frequent suggestions (see Table 7).

Table 7. Suggestions to school/government in assisting PE teachers for online teaching in PE

Suggestions	n	%
Provision of a standardized and concrete guideline from school/ government	74	24.8
Provision of online teaching kits (e.g., suggested online lesson plans, home activities recommendation)	239	80.2
Provision of technical support	204	68.5
Provision of training/workshop for teachers on online teaching	22	7.4
Others	13	4.4
None	9	3.0

Note: Participants could choose more than one option, and therefore the total percentages exceeded 100%.

Discussion

The COVID-19 pandemic has required teaching to change in numerous ways. Physical education (PE), a subject that traditionally relies more on an experiential teaching approach, was forced to adopt an online teaching mode. The present study provides descriptive information on general online teaching environments in PE during school closures, as well as teachers' perceived difficulties and suggestions for improvement for online teaching. Considering that many academic subjects were competing for priority during shorter school days and more limited class schedules, and the fact that PE was not always perceived as a core subject area by parents and students, it was surprising to find that most teachers were still required to teach PE during school closures. However, the frequency and time of PE lessons were decreased compared to those prior to the pandemic. Indeed, it is likely that many schools allocated more times and classes for academic subjects (e.g., Chinese, English, mathematics, etc.) in order to compensate for the teaching time lost due to the pandemic.

Regarding the effectiveness of online teaching in PE, most teachers indicated that online teaching was not effective to foster motor skill acquisition or to enhance physical activity level. Consistent with extant literature (Lau & Lee, 2020; Zhang, 2020; Zhou & Li, 2020), students' lack of learning motivation and interest, and limited interpersonal interactions, were most frequently reported by the teachers. A previous study identified physical contact, group activities, and sporty attire as the key missing features when PE lessons were shifted to online teaching mode during the pandemic (Varea & González-Calvo, 2020). Without such features, it is difficult for students to engage in the PE lessons. In fact, this notion is also supported by our finding, in which most teachers reported that it was difficult to retain students' learning motivation and interest. Previously, a large-scale survey investigating parents' views on young children's online learning during COVID-19 class suspension also reported similar findings, in which children's lack of concentration and interest were most frequently reported by parents as difficulties during home-learning (Lau & Lee, 2020). The authors concluded that teachers might not be well equipped with requisite skills to sustain children's learning interest (Lau & Lee, 2020).

Despite the fact that online teaching has long been suggested in the field of PE (Daum & Buschner, 2014; Woods, Shimon, Karp, & Jensen, 2004), this is the very first time in history that online teaching has been implemented for such a long period of time and on such a large scale (Lau & Lee, 2020). This change of teaching mode has inevitably increased teachers' workload for lesson preparation and curriculum restructuring. With the increased workload, together with the expectations from parents and principals as revealed by the survey, teachers naturally experienced increased stress.

For effective online teaching, PE teachers should engage students with creative and effective implementation of synchronous online meetings, good time management skills, and provision of ample real-life examples and meaningful feedback (Daum & Buschner, 2014; Oliver, Osborne, & Brady, 2009; Williams, 2013). In line with these recommendations, our study revealed that over 50% of the teachers believed that designing creative and interactive online lessons would enhance students' learning motivation and interest. These findings suggested that creativity and interaction were critical elements for effective online teaching. Meanwhile, it is interesting to note that over 80% of teachers suggested that schools or governments should provide teaching kits (e.g., suggested lesson plans) for their reference for teaching PE online. Although the Education Bureau has developed online teaching resources (e.g., PowerPoint presentations, video clips) for home exercises of different purposes (e.g., fundamental movements, physical fitness) (Education Bureau, 2021c), the teaching resources were not sufficiently detailed for teachers to follow. Comparing the ample teaching resources for face-to-face teaching, which include comprehensive teaching kits (e.g., suggested lesson plans, suggested home activities) with detailed descriptions on many sports skills and exercise techniques (e.g., Education Bureau, 2021d; Education Bureau, 2016), the online teaching resources were markedly insufficient.

Despite the strengths of the present study, two limitations should be mentioned. First, the data were only collected in Hong Kong. It would be more comprehensive if similar surveys could also be conducted in other places in order to examine any culturally differences and their effects. Second, the present study only focused on online lessons in PE from the teachers' perspective and did not capture other perspectives, such as those of parents and students. It would thus be interesting to examine the effectiveness of online PE lessons from parents' and students' points of view.

Conclusion

This survey is a pioneer study in exploring online teaching in PE during COVID-19 school closures. It offers important insight into the effectiveness of current online teaching in physical education (PE) from the teachers' perspective. Although online teaching is essential for learning continuity of students during prolonged school closures, its effectiveness is a major concern among the teachers. Adequate support, such as provisions of comprehensive teaching resources and concrete guidelines, should be delivered to PE teachers. Further studies can be conducted to elucidate the effectiveness of online learning of PE from parents' and students' perspectives, as well as to examine the impact of online PE lessons on students' physical health.

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