Keys to learning Physical Education during confinement
Claves para aprender Educación Física durante el confinamiento

*Sagrario Del Valle Díaz, **Esther Cabanillas Cruz, ***Eduardo Villamil Cabello, ****Ricardo de la Vega Marcos
Universidad de Castilla-La Mancha (Spain), **Superior Center Don Bosco (Spain), ***Universidad Autónoma de Madrid (Spain)

Abstract. The purpose of this study was to identify the relationship between learning physical education competence, teachers’ competence and students’ motivation in quarantine. A primary goal of physical education is to develop competence in physically literate individuals with the knowledge, skills, and confidence necessary for a physically active lifestyle. Guided by the teachers’ competence and expectancy-value and interest motivation theories. Method: 686 high school students (297 male and 390 women) from 17 Spanish regions of different social classes and level of instruction, provided data on expectancy beliefs and perceived knowledge of learning competence of physical education, intrinsic motivation, and teachers’ competence. Data were analyzed using descriptive statistics and a simultaneous multiple regression model. To determine the best predictor of each subscale of the learning competence of physical education four parallel mediation models were examined. The mediation models were conducted to test «simultaneous mediation by multiple variables» Results: It was found that teacher competence was a significant predictor of knowledge transference (b = .42, s.e = .02, p < .001), mediated by psychological needs competence, autonomy, and relatedness. The standardized regression coefficient for this path is .42. The total indirect effect was significant (.17, CI [.13, .21]). Conclusion: This study demonstrates that teacher competence was a significant predictor of learning physical education competence mediated by psychological needs competence. Students’ beliefs about success in physical education have a limited influence on the teachers’ competence and knowing how to attend to the basic psychological needs of the students, in confinement.

Keywords: Physical Education, Sport, high school students, COVID-19, teachers’ competence, psychological needs competence, confinement.

Introduction

2019 will be recall in history books as the year of coronavirus disease (COVID-19) pandemic. On March 18, 2020, the UN Educational, Scientific and Cultural Organization estimated that 107 countries had implemented national school closures related to COVID-19, affecting 862 million children and young people, roughly half the global student population (Viner et al., 2020). One among all these countries is Spain who declared the state of alarm on March 14, 2020 (BOE, 2020).

The COVID-19 pandemic interrupted schooling in most countries of the world. Confinement measure change learning. Students in high school had seen their academic progress interrupted or at least modified in several ways. Different studies explore the effects that this measure have on the educational system (UNESCO,
by (SDT). These are the needs for autonomy, the fulfilment of three basic psychological needs described by (SDT). These are the needs for autonomy, interest and is truly self-determined. It is dependent on one's actions emanate from oneself and are one's own (Burton et al., 2006). Giving students time to work on a problem in their own way is an autonomy-supportive behavior because the teacher allows students' interests and preferences to guide their classroom activity. Overall, autonomy support revolves around finding ways to nurture, support, and increase students’ inner endorsement of their classroom activity (Patall, 2013; Patall, Cooper & Wynn, 2010; Vansteenkiste & Ryan, 2013) and fostering dependent relationships between themselves and the students (Haerens et al., 2019). In parallel, the interpersonal styles of the teacher who participate in the motivational regulations of the students can be conceptualized as autonomy support (Reeve, 2016). Moreno-Murcia et al., (2018), in a study with adolescents (13 to 19 years old) checked the prediction capacity of teacher’s autonomy support in physical education and its results revealed positive and significant relationships between support for autonomy that positively predicted the satisfaction of needs. basic psychological, and this, in turn, predicted self-determined motivation, which predicted fun. The fun predicted the importance given to physical education, and it the intention to be physically active, which finally predicted the usual physical activity rate (Moreno-Murcia et al., 2018). In this sense, the classroom climate generated by the teacher through a certain methodology can have great relevance regarding the intention of being physically active (Cabello, Moyano & Tabernero, 2018;
The characteristics of the subject of physical education, defined by the National Association for Sport and Physical Education (NASPE) make it a remarkable subject, provided that adequate didactic conditions are ensured. «A high-quality physical education program enables students to develop motor skills, understand movement concepts, participate in regular physical activity, maintain healthy fitness levels, develop responsible personal and social behavior, and value physical activity». Physical education learning, as a subject where its contents are mainly practical, may have seen their student’s progress, in terms of skill execution and overall sport performance, compromised. Learning competence, defined by The European Commission in 2005 as «the disposition and ability to initiate and continue one’s own learning, to regulate this learning, and to manage one’s time and information effectively, both individually and within a group», refers to the acquisition, selection and integrated mobilization of the knowledge, attitudes and skills. It requires for continuous learning, and it is essential for people who must function effectively and manage these days (Villardón-Gallego et al. 2013). Several studies have deep in the way to measure learning competence such as learning styles (López-Aguado, 2010), the self-management of learning (Solzbacher, 2006), learning strategies (Gargallo, Suárez-Rodríguez & Pérez-Pérez, 2009) and performance (García-Ros & Pérez- González, 2011). However, all of them showed certain confusion in relation to the concept. The Learning Competence Scale (LCS) proposed by Villardón-Gallego et al. (2013) explains a general dimension that would refer to the construct named learning competence, may be an ideal tool for that matter.

Teachers need to develop various facets of classroom competence and wider professional competence in order to perform professional tasks in right situations of learning (Van Dinther, Dochy, Segers & Bracken, 2013; Fernández-Villarino, Toja-Reboredo & González-Valeiro, 2021; Furlong et al., 1988; Pantic & Wubbels, 2010; Rodriguez, DelValle & De la Vega, 2018; Struyven & De Meyst, 2010). Professional competence as a broadly conceived integrated set of knowledge and understanding, skills and abilities, and teachers’ beliefs and values. To teach encompasses learning how to deal with social and cultural working conditions in schools plus the technical endeavor of acquiring professional knowledge and developing effective teaching skills (Rots, Kelchtermans & Aelterman, 2012). In addition, competence and autonomy need satisfaction is associated with greater job satisfaction and commitment to their school of employment (Lee and Nie, 2014).

We focus on the role of the teacher generating intrinsic motivation in students and the methodology as a key element of the organizational dimension of the teacher’s work in student learning (Krech, Kulinna, Cothran, 2010). In contrast with university field, where educative excellence through diverse ways is sought, high school teachers are not commonly evaluated by the students through questionnaires that guarantee a good internal consistency of the teaching-learning process (Baena-Extremera, Granero-Gallegos & Martínez-Molina, 2015). This is even lesser common in physical education lessons, which has a quite different educative process compared with other areas of knowledge carried into the classrooms. In addition, it is necessary to remark the importance that area has in the integral formation of the students, even more in the promotion of physical activity and healthy lifestyle beyond the scholar schedule among teenagers (Cádiz et al., 2021; Stratton, Fairclough & Ridgers, 2008). Considering all of that, it seems to be primordial to analyze teacher’s role (the relationship that the teacher generates with the students) and methodology as a key element of the learning in quarantine.

In the sections to follow, we outline the methods used to guide our study, including detailed discussion of our analytic process and how we worked to ensure trustworthiness of these analyses. We then share a model of learning and a detailed discussion of our findings in quarantine. Finally, we examine how our findings support and advance current literature regarding how physical education learning can be modulate by (SDT) experiences and the teacher’s competence and their implications for education.

Methods

Design

The present study is a quick, large cross-sectional online survey realized through Google Forms web survey platform (Google LLC, Mountain View, CA, United States). The online survey was communicated as via official channels of the Education high school. Via e-mails, it was shared to personal contacts of the research group members and of the high school students. Before starting the questionnaire, the online survey, totally anonymous and not traceable to identity of participants,
including a brief description of the study, its aim, and began in Spain by 17 regions at 15th of June 2020:

https://docs.google.com/forms/d/e/1FAIpQLScKidVkmPo6mghcxX2PaWacjbq-Pufo0_52Cp_ge9tiMGYElg/viewform?usp=sf_link

Anonymity and confidentiality as follow: «The data of this survey are anonymous, confidential and their confidentiality will be guaranteed. We remind you that participation is voluntary and therefore, can withdraw or renounce at any time. The participant, informed according to the methods and purposes of the research described above, expresses his/her consent to his/her participation, having the guarantee that his/her personal data will be processed anonymously. All subjects participating in the online survey gave their informed consent before participation. The study was approved by the ethics committee of the Autonomous University of Madrid (registration No. CEI-106-2060), and it was conducted in accordance with the Declaration of Helsinki.

**Participants**

A total of 686 Spanish students’ high school of different social classes and level of instruction completed the online Google form questionnaire over a period of 16 days (from June 15-31, 2020) during COVID-19 emergency in Spain. To minimize the impact of errors, a cleaning process was adopted in order to remove ineligible cases identify meaningless data, representing invalid questionnaire responses due to the unwillingness of the participant to provide a valid response according to American Association for Public Opinion Research addressed in «Standard Definitions». Then, the sample comprised 686 high school students’ 297 (43.23%) male and 390 (56.67%) women. They averaged 12-18 years old. The men varied in age from 11.5 to 19.3 years old, and the women varied in age from 11.80 to 19.20 years old.

**Questionnaire**

The online questionnaire administered to the participants included a copy of the institutionally approved informed consent form prior to the scheduled questionnaire:

https://docs.google.com/forms/d/e/1FAIpQLScKidVkmPo6mghcxX2PaWacjbq-Pufo0_52Cp_ge9tiMGYElg/viewform?usp=sf_link

Upon our scheduled questionnaire, all participants reviewed the informed consent form and agreed to participate (respondents below the age of 16, according to APA guidelines, the parents of these participants approved the informed consent too). Participants were answer one time at the end of the month for <«15’. The questionnaire structure was based on Villardón-Gallego et al., (2013), Moreno-Murcia, González-Cutre, Chillón, y Parra (2008) and Baena-Extremera, Grane-ro-Gallegos & Martínez-Molina (2015). 38 questions focused on the participants’ experiences of learning on physical education program, (SDT) and teaching-learning process, during COVID-19 emergency (last three months of the academic course). The first scale Learning Competence Scale (LCS) Villardón-Gallego et al., (2013), centered around physical education learning program and experiences in the program (GFI=.94, RMSEA=.039). Four categories: Knowledge Transfer (KT); self-knowledge as apprenticeship (SKA); construction of Knowledge (CK); self-management of learning (SML). Participants reported 18 questions of different types of responses, i.e., 10. During confinement, I can recognize basic material for physical education on the Internet. 14. During confinement I keep trying when performing difficult or uninteresting tasks related to physical education. 17. During confinement I modify my learning strategies in physical education if they do not meet my expectations. Likert Scale 1-5 (strongly disagree-strongly agree). The second focused Basic Psychological Needs in Exercise Scale (BPNES) Moreno-Murcia et al. (2008), (GFI=.94; RMSEA=.07); Three categories: competence (C), autonomy (A) and relatedness (R). Participants reported 12 questions of different types of responses, i.e., 1. During confinement, the exercises that I have carried out have been adjusted to my interests; 3. During confinement I have felt very comfortable when I have done physical exercise like the other colleagues; 5. During confinement I have performed effective physical exercise; 7. During confinement, the way of performing the physical exercises has responded to my wishes. Likert Scale 1-5 (strongly disagree-strongly agree). The third on the teaching Competencies (ETCS) Baena-Extremera, et al. (2015) to support the physical education learning (GFI=.99, RMSEA=.023). Eight categories: Communication, Work awareness, creativity, Feedback, individual consideration to the teacher, professionalism, problem solving, social awareness, but we were interested in the total score. Participants reported 8 questions of different types of responses, i.e., 3. Has the physical education teacher been creative during confinement? 5. Had the physical education teacher been creative during the confinement individual
knowledge of you? 7. Has the physical education teacher resolved the problems during confinement? Likert Scale 1-7 (very little-a lot).

Statistical analysis

Statistical analysis was performed using IBM® SPSS Statistics version 21.0 software. To determine the best predictor of learning competence in physical education, mediated for teacher’s competencies and the basic psychological needs in exercise, four multiple linear regression were performed for each subscale of the LCS. The mediation models were conducted to test «simultaneous mediation by multiple variables» (Preacher & Hayes, 2008, p. 880). Four parallel mediation models were examined: First, the relationship between Knowledge Transfer (KT) and ETCS as mediated by (C), (A) and (R), second, the relationship between self-knowledge as apprenticeship (SKA) and ETCS as mediated by (A) and (R); third, the relationship between construction of Knowledge (CK) and ETCS as mediated by (A) and (R); fourth the relationship between self-management of learning (SML) and ETCS as mediated by (A) and (R). For all models, total and specific indirect effects were examined. Concerning conserving the greater statistical power for this test, without assuming multivariate normality in the sampling distribution, bootstrap analysis was used to test the significance of the indirect effects (Mallinckrodt, Abraham, Wei, & Russell, 2006; Preacher & Hayes, 2008).

Results

Baseline characteristics of the study subjects are displayed in Table 1. Overall, the study sample (n=686) comprised 297 (43.23%) male and 390 (56.77%) women. They averaged 12-18 years old. The men varied in age from 11.5 to 19.3 years old, and the women varied in age from 11.80 to 19.20 years old. A summary of descriptive statistics is provided in Table 1.

The Participants had to give information about the physical education learning program (during the COVID-19 quarantine), several variables like motivation because of fulfilling varying levels of psychological needs or the teaching-learning process were involved. Multiple linear regression explanatory variables to predict the outcome of a response variable. Results of Multiple linear regression is shown in Table 2.

ETC is a significant predictor of KT (b = .42, s.e.= .02, p < .001). This coefficient reflects the direct effect of ETC on KT, the c path in the model. ETC is a sign.

To delve into the topic, it is necessary to ask what relationship the variables have with each other to identify and explain the mechanism or process that underlies an observed relationship between an independent variable (LCS) and a dependent variable (ETCS) via the inclusion of a third hypothetical variable, known as a mediator variable (C, A, R). Rather than a direct causal relationship between the independent variable and the dependent variable, a mediation model proposes that the independent variable influences the (non-observable) mediator variable, which in turn influences the dependent variable. Thus, the mediator variable serves to clarify the nature of the relationship between the independent and dependent variables. Mediation analyses are employed to understand a known relationship by exploring the underlying mechanism or process by which one variable influences another variable through a mediator variable.

Four mediation models were performed. The difference among them is the outcome, so the initial relationships from ETCS to the mediators will only be described the first time. First model, the relationship between knowledge transfer (KT) and Evaluation of Teaching Competencies Scale (ETCS) as mediated by competence (C), autonomy (A) and relatedness (R), we observe ETC was a significant predictor of KT (b = .42, s.e.= .02, p < .001). This coefficient reflects the direct effect of ETC on KT, the c path in the model.
Regardless the three mediators: ETCS was a significant predictor of C, \( b = .28, \text{s.e.} = .02, p < .001 \). The standardized regression coefficient for this path is .42. ETCS was a significant predictor of R, \( b = .25, \text{s.e.} = .02, p < .001 \). The standardized regression coefficient for this path was .35. ETCS was a significant predictor of PNA \( b = .30, \text{s.e.} = .02, p < .001 \). The standardized regression coefficient for this path is .42. The total indirect effect was significant (.17, CI [.13, .21]). See Figure 1.

Second model, the relationship between self-knowledge as apprenticeship (SKA) and ETCS as mediated by (A) and (R). In the SKA mediation model ETC was a significant predictor of SKA \( b = .34, \text{s.e.} = .02, p < .001 \); also, the total indirect effect was significant (.09, CI [.06, .12]). See Figure 2.

Third model, the relationship between construction of Knowledge (CK) and ETCS as mediated by (A) and (R). In the CK mediation model ETC was a significant predictor of CK \( b = .36, \text{s.e.} = .02, p < .001 \); also, the total indirect effect was significant (.09, CI [.06, .13]). See Figure 3.

Fourth model, the relationship between self-management of learning (SML) and ETCS as mediated by (A) and (R). In the SML mediation model ETC was a significant predictor of SML \( b = .32, \text{s.e.} = .02, p < \).001); also, the total indirect effect was significant (.14, CI [.11, .18]). See Figure 4.

For all models, total and specific indirect effects were examined.

**Discussion**

This study adds new knowledge to the field of physical education learning by providing empirical findings regarding two under-researched issues. First, it extends our understanding of the relationship between learn the Spanish high school-curriculum in physical education in quarantine, teachers’ competence and students’ motivation to perform tasks attending relationship with society’s demands. Second, the findings of four relationship models show how in quarantine, a significant predictor, in the relationship between learning physical education competence (knowledge transfer, knowledge as an apprentice, construction of Knowledge and learning self-management), is teachers’ competence mediated by students’ motivation (psychological needs: competence, autonomy and relatedness).

The findings of the study need to be interpreted in the light of the two major limitations of the study. First, the study examined students’ perceptual data without independent measures of teachers’ professional competence. Second, the study only examined perception of learning competence on Spanish high school curriculum of physical education. Caution is needed when generalizing findings to other settings. What follows is a discussion of the findings of this study and their implications for education.

**Teachers’ competence and students’ motivation**

Analyzing first issue, relationship between the learn, teachers’ competence and students’ motivation to perform tasks attending relationship with society’s demands. Scientific literature pays relatively less attention to the organizational dimension of teachers’ work in student’ learning as revealed in the qualitative findings of the study (Rodriguez et al., 2018; Tang, Wong & Cheng, 2016). This calls for more learning opportunities to be provided for student teachers to learn about the organizational dimension of teachers’ work plus relationships themselves and the students, which we shall discuss in greater detail in the next section.

Looking at the needs for competence (Lee and Nie, 2014) indicated that competence need satisfaction among
teach in ways that help to promote their well-being, job satisfaction, and organizational commitment. Notably, the different basic psychological needs played differing roles in predicting these outcomes. (SDT) is a relevant framework for helping to understand teachers’ experiences at work and how these can affect students. Teachers should adopt more flexible attitudes towards their students and be more open to understanding their feelings and desires (Patall, 2013), giving them more opportunities to perform tasks (Patall, Cooper & Wynn, 2010), using more positive language and inviting them to perform tasks (Vansteenkiste & Ryan, 2013), and fostering dependent relationships between themselves and the students (Haerens et al., 2016).

Higher teacher competence is also more likely to utilize teaching strategies that support students’ basic psychological need satisfaction (Taylor, Ntoumanis, & Standage, 2005). This is known as autonomy-supportive teaching, and it helps to create an optimal learning environment for students. When teachers are autonomy-supportive, they teach in ways that help to promote students’ volition and choice, and support students’ internalization of school and classroom values and norms, while also minimizing pressure or control from the teacher, applicable in physical education.

Reeve and Jang (2006) identified several teaching behaviors that are indicative of autonomy-supportive teaching. These include the time that teachers spend listening and allowing students to work in their own way and the time that students spend talking. In all cases, the more time teachers allowed students to work on their own and talk amongst themselves, the more autonomy-supportive this was for students. Teachers’ use of praise as informational feedback, encouragement, and hints to help students solve problems or complete their work are also autonomy supportive. Also being responsive to student generated questions and acknowledging students’ perspectives are teaching behaviors associated with autonomy-support. More precisely, autonomy-supportive teaching strategies help students to experience autonomy through, for example, the choice and control offered to students, the competence developed via effective teacher feedback, and the relatedness nurtured through a respectful classroom environment (Reeve, Bolt, & Cai, 1999; Reeve & Cheon, 2014). Teachers who report having low autonomy at work (i.e., those who report that they lack the autonomy to influence school policy and/or to choose how and what they teach, and/or those who perceive those administrative duties and paperwork interfere with their teaching) are less likely to support their students’ need for autonomy compared to teachers who report having higher autonomy at work (Marshick et al., 2016).

Standage, Taylor, and Ntoumanis (2005) conducted a study among UK school students and found that when teachers were perceived to be autonomy-supportive, students were more likely to experience a sense of autonomy, competence, and relatedness. In turn, they were also more likely to be autonomously motivated for their learning. Haerens et al., (2015) among a sample of Belgian secondary school students, they found that when students perceived their teacher to be autonomy-supportive, they felt a sense of autonomy, competence, and relatedness, and tended to be more autonomously motivated. If amotivation can be controlled or minimized by the teachers and, at the same time, intrinsic motivation is properly fostered, student commitment can lead to the desired learning of the contents proposed in the class (Aelterman et al., 2014; Den Berghe et al., 2012). The intrinsic motivation of the students should be positively channeled to meet their needs and to enhance them in a way that arouses their interest and curiosity for achieving a desired goal (Ryan & Deci, 2017).
Thus, the interrelationship between teachers’ and students’ experiences in the classroom. When classrooms and schools promote autonomy, competence, and relatedness among all members, this has the potential to yield beneficial outcomes for teaching and learning an implication relevant to researchers, teachers, and educational leaders looking to improve school effectiveness (Ashton & Webb, 1986; Collie & Martin, 2015; Goddard et al. 2000; Midgley et al. 1989; Woolfolk et al., 1990). Considerable research suggests that students work harder, feel more engaged and connected to school, are more intrinsically motivated, and achieve academically at higher levels when they believe that their teachers understand and care about them (Chang et al. 1981; Furrer and Skinner 2003; McAllister and Irvine 2002; Solomon et al., 2000). Moreover, children in classrooms with teachers who use autonomy-supportive strategies tend to have higher intrinsic motivation, perceived competence, engagement, and self-esteem than children in classrooms of teachers who use more controlling strategies (Cádiz et al., 2021; Cheon & Reeve 2015; Deci et al. 1981a, b; Guay &Vallerand 1996). These findings are important for physical education because the classroom climate generated by the teacher plus a certain methodology can have great relevance regarding the intention of being physically active (Cabello et al., 2018; Moreno-Murcia et al., 2018; Fierro-Suero et al., 2021), fundamental aspect in the pandemic because you are closed at home and the classes are not face-to-face.

**Physical education in confinement**

Analyzing second issue, scientific literature pays less attention to the organizational dimension of student’ learning competence, in physical education in quarantine. The qualitative findings of the study reveals are notably the different basic psychological needs played different roles in predicting learning competence mediated by teachers’. Learning competence in physical education requires for continuous learning and it is essential for people who must function effectively and manage the situations (Villardón-Gallego et al., 2013; Villaverde-Caramés et al., 2021), more in pandemic (Burgueño et al., 2021). Thus, the knowledge transfer in learning has a direct relationship with teacher’ competence mediated by three basic psychological needs: competence, autonomy, and relatedness (Ashton & Webb 1986; Collie & Martin, 2015; Goddard et al., 2000; Midgley et al., 1989; Woolfolk et al., 1990). Also, teachers’ competence was a significant predictor of the relationship between self-knowledge as apprenticeship, construction of Knowledge and learning self-management, mediated by autonomy and relatedness. This study shows the importance of autonomy (Reeve, Bolt, & Cai, 1999; Reeve & Cheon, 2014), and relatedness (Haerens et al., 2019) over competence in the students’ perception of learning competence in physical education in quarantine, mediated by teachers’ competence. If we analyze the models finding, knowledge transfer is the most significant indicator over the self-knowledge as apprenticeship, construction of Knowledge and self-management of learning directly related with teachers’ competence and mediated by three basic psychological needs (competence, autonomy, and relatedness). It seems that we must pay attention to how the transfer of knowledge occurs because it is the most significant indicator in the relationship established by the competent teacher as a long as the teacher develops the three basic needs of the students.

**Conclusion**

This study reveals that teacher competence is a significant predictor of learning physical education mediated by psychological needs during the pandemic. Students’ beliefs about success in physical education have a limited influence on the teachers’ competence and knowing how to attend to the basic psychological needs of the students.

The transfer of knowledge is a significant indicator over the self-knowledge as apprenticeship, construction of Knowledge and self-management of learning directly related with teachers’ competence and mediated by three basic psychological needs (competence, autonomy, and relatedness). The question we ask ourselves is if this would happen in attendance to face-to-face class in physical education.

**Data Availability Statement**

The datasets generated for this study are available on request to the corresponding author.

**Ethics Statement**

The studies involving human participants were reviewed and approved by Research Ethics Board of Autonomous University of Madrid. The patients/participants provided their written informed consent to participate in this study.
Conflict of interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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