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Ribeiro, T., Correia, A., Figueiredo, C. & Biscaia, R

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**The Olympic Games' impact on the development of teachers: the case of Rio 2016 Official
Olympic Education Programme**

Tiago Ribeiro, University of Lisbon, Portugal

Abel Correia, University of Lisbon, Portugal

Rui Biscaia, Coventry University, UK

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Please address correspondence to:

Rui Biscaia

Jaguar Building, School of Marketing and Management, Coventry University

Priory Street, CV1 5FB, Coventry, United Kingdom

Email: ac4231@coventry.ac.uk

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The Olympic Games' impact on the development of teachers: the case of Rio 2016 Official Olympic Education Programme

The Rio 2016 Official Olympic Education Programme (ROEP), called *Transforma*, began in 2013 and was one of the actions to take the Olympic Games into schools and promote new education-based opportunities. The current study examines its effects by exploring the Olympic Games' impact on the development of skills, knowledge, and experiences of teachers. Data were collected through an online questionnaire (n=702) with physical education teachers who attended the *Transforma* Programme. The results of a structural equation model indicate that the educational impact measured through experiences, knowledge, and skills-development, contributed positively to the human development of teachers as well as to their knowledge about teaching Olympism. These findings provide event managers with useful insights on the role of teachers in their Olympic programmes, as well as ways to engage them in a wide range of initiatives both inside and outside the school context.

Keywords: Physical Education Teachers; Educational Practitioners; Olympics Impacts; Stakeholder Theory; Social Capital; Rio Official 2016 Education Programme.

Introduction

The Olympic Games are considered as a great opportunity to “inspire a generation” and to have impacts on the culture, economy, technology, and education of the host countries (Kolotouchkin, 2018; Kohe & Chatziefstathiou, 2017). In recent decades, the bidding cities of these events have systematically included Education pillars within their tangible and intangible aims (e.g., “Generation 16 initiative” in Madrid or “Yoi Don” in Tokyo; Bason & Grix, 2018). In tandem, Education and educators are directly implicated in the Olympic legacy aspirations given that host cities are expected to prepare an Olympic education strategy with multiple stakeholders (Armour

& Dagkas, 2012). Teachers are among the most important stakeholders of the Olympic Games because of their role in Educational initiatives (Chatziefstathiou, 2012; Naul *et al.*, 2017).

Previous studies noted that South African intervention programmes led teachers to connect Olympic values such as fair play and respect for others with ethical concepts from their own cultural traditions (Naul *et al.*, 2017). In Greece, Grammatikopoulos *et al.* (2004) noted that teachers were positively impacted by the event as a result of their training on the Olympic education programmes. Similarly, in Brazil, DaCosta *et al.* (2017) highlighted that the “Olympiad and Citizenship” initiative saw 12,500 registrations of teachers from the school system, suggesting that the Rio 2016 positively influenced the Olympic Education development. Nevertheless, although prior studies have discussed theoretical issues related to Olympism (Armour & Dagkas, 2012; Teetzel, 2012) and have analysed the experiences of applying different education programmes (Monnin, 2012), there is a lack of empirical research assessing the [effectiveness](#) of Olympic education programmes (Sukys, Majauskiene & Dumciene, 2017).

Given that the Olympic Games offer a unique opportunity in teachers’ lives (i.e., a motivation for learning activities, skills development, and community commitment; Binder, 2012), three key issues are critical in developing the current research. First, teachers provide an important link between the school community and the event itself, becoming knowledge disseminators and influencing future generations (Kohe & Chatziefstathiou, 2017). Second, with their own ideals, values, and Olympic knowledge, teachers have the ability to influence individuals both inside and outside schools (Silva, Santos & Tavares, 2016; Girginov, 2018), disseminating Olympic Education. Third, their perceptions of the Olympic Games are crucial for determining the educational outcomes, allowing to understand [allowing to understand if an Olympic education programme can act as an example for future host countries.](#)

Thus, the following issues are presented in the current study: How do teachers assess the educational programmes and their potential impacts? How has the Rio 2016 Official Olympic Education Programme influenced the development of skills, knowledge, and experiences of the educational practitioners? Is it possible to state that the ROEP has had a positive effect on the teachers' knowledge about Olympism? Even though there have been attempts to analyse the educational programmes' effects after the event was staged (Schnitzer *et al.*, 2018; Nordhagen & Fauske, 2018), previous studies pointed that educational projects often lack theoretical unity and subsequent evaluation (Kohe & Bowen-Jones, 2016; Grammatikopoulos *et al.*, 2004). Problematically, there is no clearly articulated framework for understanding the Olympic Games' impact on the human development of teachers. Therefore, the purpose of this study is to explore the Olympic Games' impact on the development of skills, knowledge, and experiences of the teachers who delivered the ROEP.

Brazil's education initiatives and Rio 2016

Historically, the relationships between the sport sector and the different levels of the Brazilian government have always entailed a high level of government interference in sports and its educational structures (Knijnik & Tavares, 2012). However, the key problem facing Olympic Education in Brazil resides in the area of theory transfer to teaching and learning practices (DaCosta *et al.*, 2017). Despite the increased investments in education programmes derived from hosting sport mega-events (e.g., "Second Half": R\$ 460 million; "Sport and City Leisure": R\$ 730 million), the public funding dependence for Olympic Education provision and lack of a sport and leisure national policy in Brazil has been suggested to compromise the sustainability of learning for future generations (Almeida & Marchi, 2010).

In Brazil, it is possible to identify three tendencies in relation to the dissemination of Olympic Education (DaCosta *et al.*, 2017): (1) isolated initiatives through university experiences such as forums, meetings, and conferences; (2) organisation of extra-curricular school projects focusing on social-educational areas as a result of the 2016 Olympic Games; and (3) organisation of socio-educational projects by companies, NGOs, and government agencies as pedagogical support practices. These tendencies have promoted the discussion of Olympism during the Rio 2016 Olympic Games hosting process (Perez *et al.*, 2016). During the pre-Games time, some initiatives provided a generation of key players in the Olympic Movement, equipping them with knowledge and concepts and guiding them towards a reflection about the Olympic values. Table 1 provides an overview of the Olympic education initiatives in hosting Games-time.

[Insert Table 1 around here]

Rio's initiative was an ideal opportunity to give visibility to and strengthen Brazil's education programmes (Rio 2016, 2012). In 2009, when Rio de Janeiro was declared an Olympic City, the ROEP was highlighted through several educational initiatives across the host city and State. The ROEP worked with key sustainable stakeholders such as government, sponsors, the Brazilian Olympic and Paralympic Committees, and schools to design and implement a number of educational activities and ensure their continuance beyond 2016. In addition, it is important to note four initiatives related to teachers: (1) Olympic Values Education Programme (OVEP) manual; (2) Paralympic School Day (PSD) manual; (3) CPB Teacher Training module; and (4) online course for teachers related to the OVEP (Rio 2016, 2012).

It is noteworthy that the Rio's initiative for the Olympic and Paralympic Education had a congruent view with other world education programmes such as London or Singapore (Rio 2016, 2012), providing similar inspiration, learning, and experimentation opportunities for school

communities. For example, city and state schools in Brazil were linked to ‘Get Set’ schools (London Olympic Programme). Students from the UK exchanged information with students in Brazil about what it is like to host the Games and share their enthusiasm and excitement (Globo, 2013). The Rio 2016 Education Programme was one of the most effective tools for the organizing committee of the Olympic Games to pass on messages to Brazilian youngsters and teachers (Kirst & Silva, 2017). To this respect, the digital resources have been downloaded 63,350 times and 18 sports courses were offered to 2,003 teachers in 180 cities (Kirst & Silva, 2018). Thus, the knowledge of the Olympic values and symbols, as well as new sports, probably reached a level that was never seen before in Brazil (DaCosta *et al.*, 2017).

The Transforma Programme was developed by the Rio 2016 Organizing Committee, between 2013 and 2016, and aimed to promote the Olympic values for the integral development of individuals. Although the partnership between Rio 2016 and the Ministry of Education made it possible to continue training teachers and develop education programmes after the Olympic Games (Globo, 2016), this agreement has ended. The BOC is the “owner” of *Transforma* that took place in schools, NGOs, social projects, and Olympic events (BOC, 2019). These actions included school meetings (*Transforma* training), sport activities (*Transforma* festival), and exchanging cultural experiences between athletes, students, and teachers (*Transforma* at schools). This programme also offers two free e-learning courses to educators (Olympic Values for Life) and Physical Education teachers (Sports Start and Values) (BOC, 2019). Moreover, *Transforma* was aligned with the national curriculum base rules¹ allowing to [develop](#) Olympic themes and values with teachers and students from municipal schools (Carvalho, 2019).

¹ In 2017, a new national sports education programme financed by Brazilian *Peninsula* Institute was created, called “*Impulsiona* Programme”, which focused on teachers’ training and includes Olympic themes and values within the national curriculum (Diniz, 2017).

Social capital as a legacy

The social capital derived from participating in Olympic programmes and extended community involvement is an important benefit for human development (Naul *et al.*, 2017). As noted by Bourdieu (1986), social capital refers to the resources that flow to individuals from them being a part of social networks. Coleman (1988) highlights the importance of increased social capital as part of educational outcomes, referring to a set of attributes (education, skills, knowledge, and personal experiences) as ways to enhancing the productivity and competitive advantages. The social capital of individuals is enhanced when using and transferring Olympic knowledge (Prüschenk & Kurscheidt, 2020).

The social capital generated by the Olympic Games can be explored on the basis of three attributes (Prüschenk & Kurscheidt, 2017): bonding, bridging, and linking capital. Bonding is typically found in smaller, strongly interconnected, and homogeneous communities (Prüschenk & Kurscheidt, 2020), which may apply to the teachers of the Olympic education programmes because they have shared the same experiences, have met the same requirements, and have pursued the same objectives of teaching the Olympic values. Bridging is linked to the interrelations that stem from the Olympic Games and associated social ties driven by delivering the Olympic education programmes. In turn, linking capital is directly influenced by stakeholder groups such as the government, sponsors, and the local organising committee (LOC) (Parent, 2008). At the intersection of these dimensions, the education programmes stem of the Olympic Games may help leverage the Olympic legacy.

However, the ability of the Olympic Games to generate social capital may be quite different from longer programmes and other initiatives due to the temporal nature of this mega-

event (Prüschenk & Kurscheidt, 2020). Prior studies consider social capital as an outcome that is typically limited to the period of the Olympic Games unless social strategies are incorporated and remain after the Games (Koenigstorfer *et al.*, 2019). Despite the intuitive appeal of the link proposed between the Olympic Games and social benefits, it is important to note there remains a lack of empirical evidence to support a causal relationship. Moreover, the lack of long-term evaluation programmes (Preuss, 2019) and the difficulty of examining the impact of education programmes (Sukys, *et al.*, 2017) are still issues to be addressed. Thus, the social capital theory may contribute to help understand the ROEP's potential to provide and/or reinforce positive consequences in the development of social and other forms of capital for teachers.

Teachers as stakeholders of Olympic education programmes

Teachers play an important role in implementing the Olympic programmes (Culpan & Stevens, 2017) due to their ability to influence the Education of youngsters (Silva *et al.*, 2016) and their contribution to help school communities develop values associated with the concept of Olympism (Binder & Naul, 2017). Meghdadi *et al.* (2018) further refer that teachers influence student knowledge and intellectual development, while Kohe and Bowen-Jones (2016) mention that teacher adoption of Olympic programmes may contribute to long-term educational changes, potentially leading to an Olympic educational legacy.

The stakeholder theory provides a useful lens to detail how legacy processes identify, balance, and manage the diverse interests of stakeholder groups (Koenigstorfer *et al.*, 2019). Mitchell *et al.*'s (1997) framework is a seminal contribution to the study of stakeholders suggesting identifying stakeholder groups based on their salience to an organisation, event, or initiative (e.g. LOC, sponsors, and teachers). However, there remains limited synthesis of how stakeholder perspectives and evaluations of legacy processes have been incorporated into

empirical studies about the Olympic Games (Koenigstorfer *et al.*, 2019). In the current study, we focus on a stakeholder perspective to provide a comprehensive empirical examination of the Olympics impacts on the development of teachers.

According to Mitchell *et al.* (1997), power, urgency, and legitimacy are the three vital attributes of stakeholders, with power being the degree to which a stakeholder is capable of influencing the organisation (Biscaia *et al.*, 2018). In schools, teachers have the power to remake student notions of Olympic sports (Meghdadi *et al.*, 2018), make decisions about teaching content, while also being community leaders at the many grassroots level (Binder, 2017). In some cases, power is seen in a top-down configuration such as that between the government and teachers. For example, Rio de Janeiro state government defined an evaluation system (SAERJ) to measure the effectiveness of teachers and the education programme (Rio 2016, 2012). In other cases, the power dynamics is mutual such as when teachers participate in working groups of the *Transforma* Programme, which allows them to act as multipliers, create networks, and influence other teachers (Rio 2016, 2012). Other examples of teacher power related to Olympic programmes include their exerted pressure over the organizing committee to develop the new pedagogical tools about Olympic Education (Perez *et al.*, 2018). Therefore, teachers can exert a powerful sway over the way in which the education programmes are imagined, designed, negotiated, and implemented in order to take advantage of the Olympic Games.

The attribute of urgency reflects the extent to which a stakeholder has a claim for immediate attention by the organisation (Mainardes *et al.*, 2012). Physical education teachers often complain about the methods applied to continuous Olympic Education (Makris & Georgiadis, 2017) or the access to information technologies in the Olympic Education system (Stolyarov & Rodichenko, 2017). For example, before the Vancouver Olympic Games, teachers

did not know about the opportunities and did not understand the link between the Olympic Games and Education claiming the lack of encouragement from their ministries, school districts, and managers (Binder, 2017). Teacher urgency towards their schools, NOCs, or LOCs may also be evidenced through their regular engagement with education programmes via teaching resources (e.g., textbooks), e-learning courses (e.g., “Educopedia” - Rio 2016 platform), and their presence in working groups (Rio 2016, 2012).

In turn, a legitimate stakeholder is one whose claims are considered appropriate according to social norms and values (Xue & Mason, 2011). Teachers obtain legitimacy when their actions mirror accepted practices (Dowling & Pfeffer, 1975) and align with the expectations of the organizing committee and/or state government about Olympic Education. Exerting the social right to attend Olympic Games-related working groups or to participate regularly in conversations about the Olympic Education are examples of how teachers try to legitimise their role as stakeholders of educational programmes. The acceptance of Olympic programmes by teachers depends on their perception that the organising committees are promoting what was promised (Naul *et al.*, 2017). Therefore, it is important that LOCs and organisers consider the teacher's legitimacy when exploring the Olympics impact because they are pivotal stakeholders in the implementation of Olympic education programmes.

Research methods

While tangible and intangible outcomes of the Olympic Games should be considered (Preuss, 2019), several scholars have pointed out that intangible aspects are more complex to measure (Masumoto & Homma, 2014; Preuss, 2015) and recent studies have called for new ways capture them (Preuss, 2019). Furthermore, the IOC highlights the importance of measuring intangible benefits of hosting the Olympic Games (Preuss, 2015; IOC, 2018). Therefore, this study explores

the Olympic impacts related to Rio 2016 Education Programme through a scale development process (Clark & Watson, 1995). Firstly, we conducted a literature review and developed construct definitions to create content domains. Secondly, qualitative interviews were carried out to generate items. Thirdly, a process of expert review was completed to refine the items followed by a pilot study. Finally, the scale validation was accomplished through data collection with two distinct samples allowing to conduct an exploratory factor analysis and subsequent confirmatory analysis.

Construct definition and content domain

Educational impacts that stem from the Olympic Games are usually intangible, short-time, and directly connected to [Education](#) projects that stem from the staging of the event (Preuss, 2019). These impacts are presented through new ideas and cultural values, intercultural and non-exclusionary experiences, sport participation, skills development, and know-how (Leopkey & Parent, 2012; Masumoto & Homma, 2014). Their effects [may lead to structural changes](#) and create new opportunities for local communities (Preuss, 2019). Olympic educational impacts act as a driving force and contribute to a long-term legacy within the local communities (Naul *et al.*, 2017). Griffiths and Armour (2013) noted that the Games provide the perfect platform for generate a positive impact on people's lifestyle choices, values and aspirations. In the context of Rio 2016, the proposed Education aims were extensive in scope, seeking to secure a positive impact on lifestyles, integration and humanism aspirations for host community (Rio 2016, 2012). Table 2 provides an overview of [the](#) impact of education initiatives related to Olympic Games; and Table 1 shows the Olympic education initiatives as a well- established field in Brazil. An in-depth examination of these initiatives contributes to the conceptual clarification of the Olympics impact on Education.

[Insert Table 2 around here]

Semi-structured interviews were conducted with eight participants to enhance the comprehensiveness of the construct definition and to start the item generation process. All participants had direct involvement with the Rio 2016 Official Olympic Education Programme (ROEP). Access to the interviewees was made by the Rio's LOC in the event "Brazil Sports Meeting" provided by Brazilian Sports Ministry, allowing different stakeholders to be interviewed. Eight interviewees made up the sample: (3) board-members, (2) Olympic volunteers, and (3) school coordinators. The interviewees provided their informed consent and all interviews were conducted in February 2017. All interviewees were native Brazilians and therefore interviews were conducted in Portuguese. These interviews lasted 20 to 30 minutes and were transcribed verbatim. Member checking were applied to improve trustworthiness and credibility (Lincoln & Guba, 1985). Table 3 provides indicative quotes from the interviews with the participants. Their insights were combined with existing knowledge on Olympics educational impact to further clarify the construct and its domain.

[Insert Table 3 around here]

Synthesizing the literature and the data from the in-depth interviews, the educational impact was defined as an *intangible benefit provided by the opportunity of sports participation, Olympic knowledge and interest and involvement beyond the Games* (Binder & Naul, 2017; Kwauk, 2008). Following this stage, three dimensions and associated definitions were developed:

- *Experiences*: opportunity to meet new people, sharing emotional experience and develop new education-based leisure opportunities.
- *Knowledge*: opportunity for Olympic learning, sharing of information and Olympic education-based trainings.

- *Skills-development*: opportunity to strengthen personal skills, professional network, employment prospects and attain new talents.

Scale development and validation

Item generation and expert review

The definition of educational impact dimensions and delineation of its domain allows the development of scale items to measure the strength with which each dimension exists. To generate a pool of items the literature was reviewed (see Appendix) and the interview narratives analysed; this generated a total of 20 items. At this stage, several issues were taken into consideration, including wording clarity, redundancy and adaptation to Brazilian context (Ribeiro *et al.*, 2018). Following the initial item generation, content validity was established with 4 scholars to undertake the appraisal of those items in a 5-point evaluation scale in terms of representativeness, specificity and clarity (e.g. Haynes, Richard, & Kubany, 1995). Each scholar received an e-mail containing the purpose of this study, an explanation of the procedures, a detailed description of the **dimensions**, and the list of items proposed. These scholars have experience in sport-related research and were invited to judge all 20 items. After this step, suggestions for changing the wording in 9 items were provided and 4 items were excluded due to lack of clarity for the intended population. The result is a set of 16 items for the next step of scale development process.

Scale purification and item refinement

Following Clark and Watson (1995), once an item pool was thoroughly judged, modified and redefined by researchers and academics, a pilot test of the items took place with a sample of teachers from a local school in Rio de Janeiro. To guarantee representativeness, we intentionally chose a local school adopting the Rio 2016 Education Programme. An online questionnaire was

sent by email indicating the purpose of the [study](#) and asking teachers to access the link and fill out a questionnaire. To ensure that each teacher answered only once, the IP address was recorded in the database, and further access from these addresses was denied after submission. A total of 147 surveys were returned, and responses that were not fully completed were excluded, leaving 115 usable surveys.

To evaluate if the items were close enough to the normal distribution and could be used in factorial analysis, skewness and kurtosis were examined. Then, an exploratory factor analysis (EFA) with varimax rotation revealed a [three-factor](#) structure with eigenvalues >1 and explaining 74% of the total variance. After the deletion of 4 items that did not satisfy the loading criteria (>0.5), all items loaded predominantly on a single factor. Internal reliability of the three dimensions of educational impact was assessed by calculating the Cronbach's alpha. The values were found to be good (Experiences= 0.90; Knowledge = 0.92; Skills-development=0.92), exceeding the threshold of 0.70 (Nunnally & Bernstein, 1994). All individual items within each dimension average item-to-total correlations of 0.62, and all exceed 0.51. A final set of 12 items about education impact of Olympic Games were deemed for [further](#) analysis. All survey items were measured using 5-point Likert-type scale ranging from 1="Strongly Disagree" to 5="Strongly Agree".

Scale validation

Given that around 2.000 educational practitioners (from 180 cities) attended the Rio 2016 Education Programme, we explored its educational impact through a quantitative study using an online questionnaire to capture the perception of a greater number of teachers. Subsequently, a CFA was used to confirm or reject the proposed three factor model arising from the previous step. [This allows](#) to assess the fit between observed data and an a priori conceptualized model

(Schreiber *et al.* 2006) and construct validity (reliability, convergent and discriminant validity). An examination of skewness, kurtosis, and internal consistency of the measures was done via SPSS 23.0. The CFA was conducted through AMOS 23.0. The fit of the data to the model was examined using the ratio of chi-square (χ^2) to its degrees of freedom, Tucker-Lewis Index (TLI), comparative-of-fit-index (CFI), goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA). Internal consistency of the constructs was measured through composite reliability (Anderson & Gerbing, 1988; Hair *et al.*, 2009). Convergent validity was evaluated through the average variance extracted (AVE). Discriminant validity was assessed through the correlation coefficients and AVE tests of discriminant validity (Fornell & Larcker, 1981).

In assessing the nomological validity of the scale, this study relies on structural equation modelling and considers an outcome variable identified from the literature – Knowledge about teaching Olympism (KTO), which is defined as the “*teacher knowledge about the Olympic Values Education according to the IOC guidelines*” (Meghadadi et al, 2018; Binder, 2012). Three-items adopted from Meghadadi et al (2018) were selected to measure KTO (see Appendix).

Data collection and sample

An online questionnaire was used to collect data among physical education teachers who attended the Rio 2016 Official Education Programme. Data were collected 8 months after the Olympic Games (between 1st and 30th March 2017). The online questionnaire, shared on an organisational database, was made available by the Rio 2016 Education Department. This allowed to collect data from a group of teachers (n=2003) who live in different regions of the country, mainly in Rio de Janeiro, Minas Gerais and Brasília States. The participants received an

email with the questionnaire link and an explanation of the purpose of the study was presented inviting them [to take part](#). The survey was available online during a month and a total of 783 visitors accessed the survey link, with 39% return rate (n=783). Afterwards, the data were examined and responses from individuals less than 18 years old, surveys not completely filled out, and those containing 10 or more consecutive answers on the same scale number were excluded from further analysis (Ribeiro *et al.*, 2018). After these data screening procedures, 702 surveys were deemed usable for data analysis.

Scale validity

Model assessment

The construct of educational impact is composed of three primary dimensions of experiences, knowledge and skills-development. For the measurement model, fit indices, standardised loadings (Hair *et al.*, 2009), the pattern of standardised residual correlation values and modification indices (Anderson & Gerbing, 1988) were considered. All 14 items were retained. Construct validity was evaluated by comparing the first-order measurement model with a second-order measurement model. The results of the CFA for the first-order measurement model indicated an acceptable fit to the data [$\chi^2(51)=158.21$ ($p<.001$), $\chi^2/df = 3.10$, TLI = .97, CFI = .98, GFI = .96, RMSEA = .05]. Although the χ^2 was significant and its ratio to the degrees of freedom was above the 3.0 criterion (Kline, 2005), the χ^2 is known to be sensitive to sample size (Hair *et al.*, 2009), so considering other fit indices is important. The TLI, CFI, and GFI were all greater than the recommended .90 criterion (Hair *et al.*, 2009). In addition, the RMSEA was below .06 indicating good fit (Byrne, 2000).

As shown in Table 4, all items had factor loadings ranging from .79 to .88, while the z-values ranged from 23.13 to 27.80, indicating that each item loaded significantly on its

respective construct (Anderson & Gerbing, 1988). The composite reliability ranged from .90 to .92 indicating the constructs were internally consistent (Hair *et al.*, 2009). Evidence of convergent validity was found because the AVE values ranged from .70 to .75, all greater than .50 (Fornell & Larcker, 1981). Discriminant validity was accepted since none of the squared correlations exceeded the AVE values for each associated construct (Fornell and Larcker, 1981), as displayed in Table 4.

[Insert Table 4 around here]

The fit indices for the second-order measurement model also indicated a good fit to the data [$\chi^2(51)=158.32$ ($p<.001$), $\chi^2/df = 3.12$, TLI = .97, CFI = .98, GFI = .96, RMSEA = .05]. The inspection of Akaike Information Criterion (AIC) and Expected Cross-Validation Index (ECVI) values for the first-order measurement model (AIC=212.21; ECVI=.34) and the second-order measurement model (AIC=212.22; ECVI=.35) indicates no differences between the models. Based on this evidence, the second-order measurement model was deemed more appropriate for further analysis as it allows to capture an overall perception of the educational impact. Inspection of the path coefficients between educational impact and their associated dimensions (experiences=.96; knowledge =.83; skills-development=.86) reveal that all paths were significant at $p<.01$.

Structural model

The results of the structural model indicated good fit to the data [$\chi^2(86)=304.44$ ($p<.001$), $\chi^2/df = 3.54$, TLI = .96, CFI = .97, GFI = .94, RMSEA = .06]. The skewness and kurtosis values for the KTO dimension were lower than 3.0 and 7.0, respectively. The correlations between this construct and the educational impact construct ($\phi = .75$) was lower than the criterion of .85 (Kline, 2005) suggesting evidence of discriminant validity. Our model shows that the impact of

Rio 2016 Education Programme had a significant positive effect on the KTO among teachers ($\beta = .87, p < .01$). The educational impact construct accounted for approximately 76% of the variance of KTO ($R^2 = 0.76$) (see Figure 1).

[Insert Figure 1 around here]

Discussion and managerial implications

This study identified three dimensions of Olympic educational impact among teachers and highlighted how an education programme can contribute positively to their knowledge about teaching Olympism.

Theoretical implications

The results offer three main theoretical implications. First, the Rio Olympic Games may have been a reference to social capital creation among teachers who attended the Olympic education programme. The findings suggest a positive perception in skills development, knowledge, and personal experiences as ways to contribute to the human development of teachers (Coleman, 1988). As noted by Bourdieu (1986), simultaneous experience and skills practice may be transformed from the individual level to a collective level and, thus, may create bonding and bridge social capital (Prüschenk & Kurscheidt, 2020). At that point, the social exchanges experienced by teachers via working groups, spokespeople, and committees leveraged bonding and bridged social capital. Through their participation, teachers built a community fulfilling the following criteria: same goal, experience, and simultaneity, allowing the strengthening of the Olympic intellect and formation of social capital. This is consistent with previous studies suggesting the Olympic Games' ability to shift perceptions of Olympic values (Schnitzer *et al.*, 2018) and create social capital (Prüschenk & Kurscheidt, 2020). Thus, one may argue that when

Olympism is embedded in pedagogical practices, social capital formation may occur, leading to a positive education impact.

Second, this study's results suggest that the increase of skills, knowledge, and experiences among teachers may reinforce their power, urgency, and legitimacy in regard to Olympic Education. Teachers involved with the *Transforma* Programme established new networks and got more knowledge about the Olympic Movement and its culture (Binder, 2012). In comparison to education programmes hosted in the Global North, Nordhagen and Fauske (2018) observed teacher's increased awareness of the Olympic values in Physical Education classes, while Willimczik (2004) and Naul (2008) noted that a new generation of German teachers is more supportive of Olympic Education and values. The Rio Olympic education programme inspired teachers to actively participate in local organisations (e.g., regional education committees), award events (e.g. "Teacher of the Month"), and working groups with other teachers (Rio 2016, 2012), strengthening their power and legitimacy. This means that hosting the Olympic Games represented a fundamental condition to their human development. The stakeholder theory offers a suitable framework to explain why teachers [may benefit from engaging with](#) Olympic programmes. By examining teachers' perceived levels on the Olympic educational impact, this research contributes to better understand the effect of the Olympic Games for teachers and their human development.

Third, the results of the structural model suggest that the Rio 2016 Education Programme contributed to increase the knowledge of PE teachers towards teaching Olympism. Teachers with greater Olympic knowledge discuss more OE and Olympism in their classes/schools (Meghdadi et al 2018) providing an environment for social exchanges and contributing to increasing social capital (Prüschenk & Kurscheidt, 2020). The results of the current study revealed that the educational impact of the *Transforma* Programme accounted for 76% of the variance in the

knowledge about teaching Olympism among teachers, which is encouraging for its continuity in the post-Games (Globo, 2016). With Rio's educational toolkit initiative, an online system, Olympic and Paralympic sports modules were provided for the teachers in host regions (Rio 2016, 2012), further strengthening the social exchanges between stakeholder groups. As noted by Kirst and Silva (2018), teachers were the main drivers of the Rio 2016 Official Education Programme, contributing for a wider educational mission and the current study provides evidence that they improved their knowledge about Olympic values

Managerial implications

First, this study provides some potential benefits by helping organizing committees to identify the role of educational practitioners in their Olympic programmes and engage them in positive word-of-mouth communication for the pre-event. For instance, forming strategic alliances with Olympic sponsors, local companies, and teacher groups might be useful to promote the Olympic education programmes in host regions, while acknowledging their benefits may help school managers in the internal planning of extra-curricular activities (e.g., guided tours or workshops). In addition, it is important to consider that teachers' perceptions of education initiatives may vary over time. Therefore, it is recommended that LOCs and organisers use this scale pre- to post-Games in a longitudinal examination of the educational value of these programmes to further understand the continued impacts on school communities.

Second, our findings suggest practical implications regarding the application of each attribute. To encourage teachers to meet new people and share their experiences, the organisers may promote dialogue among teachers from different host regions through Olympic conferences, former athlete meetings, and sports events (e.g., Olympic Event Day or Sports week) within their community. To strengthen the teacher's knowledge, school coordinators should share the new

Olympic learnings with those included in the curriculum, generating new opportunities for long-term teaching and Education. In practice, this means to create an Olympic repository, encourage new research and working groups formation, provide Olympism-based tasks, and include the Olympic sports as part of the Physical Education curriculum. With regards to skills development, it is important that organisers create events to help teachers promote their new talents and leadership skills (e.g., Olympic courses, language workshops, personal coaching, local volunteer programmes). This might involve better use of skills developed and Olympic lessons learned by teachers as the basis for future professional network, employment prospects, and encouraging Olympic volunteering.

Third, great school communities and teacher groups are engaged in intra-curricular activities related to Olympic Games (Naul *et al.*, 2017), but there are few incentives for teachers to develop their experiences, knowledge, and skills out of the school system (Monnin, 2017). The active acquiescence of teachers to use Olympic Education [in supporting](#) activities out of school should be encouraged (Naul et al, 2017). For example, their participation in international meetings (e.g., International Olympic Forum), exchange visits, and scholarship programmes [may](#) contribute to the development of studies about the Olympic Games and Olympism. By pursuing these approaches, new opportunities to use Olympism to promote a social agenda for individual and collective human development may occur. In this sense, it is recommended that the IOC, NOC, and the Olympic Studies Centre (OSC) should disseminate academic scholarships and programmes focused specifically on the socio-cultural study of the Olympic Games and the Olympic Movement (Binder, 2017).

Limitations and future research

First, despite the validity of the scale proposed, further research should re-examine the scale in future Olympic host countries by considering the local context. This will allow drawing comparative results and better understand how Olympic educational impacts operate in different settings.

Second, within qualitative research, the researcher is often both data collector and data analyst, which offers potential for researcher bias (Miles & Huberman, 1994). Although member checking has applied to improve the results' trustworthiness and credibility (Lincoln & Guba, 1985), recent studies showed that this technique may be ineffective (Brett & McGannon, 2017). Future studies should re-examine and discuss this technique through the inclusion of new criteria, such as thick description, self-reflexivity about subjective biases, naturalistic generalizations, and relational ethics (Brett & McGannon, 2017). In addition, only interviewing those with direct involvement in the programme may have generated bias in the results, given that the stakeholders in the interviews cohort were those with a vested interest in ensuring the successful implementation of the programme. Future studies should gather opinions about this matter through other stakeholders to better identify potential benefits and outcomes of the education programmes for the organising committee.

Third, another limitation and research opportunity is related to the fact that Olympic educational impacts were measured at a single moment in time (i.e., cross-sectional research) and variability of teachers' perceptions was not controlled. A longitudinal research design (i.e. assess perceptions at different points in time) would provide valuable insight into the educational impact throughout time and whether Olympism-related knowledge remains after the event.

Future research could also focus on both successful and failed initiatives by measuring the accountability of local and national organising committees, and governments in the

implementation and continued management of Olympic education programmes, as well as the overall sustainability of teachers' training. In addition, it would be worth exploring how Olympic branded educational programmes are perceived in schools by measuring the conditions for their implementation and the (dis)engagement levels of teachers and students.

Finally, while the Olympic education programmes afford ideal opportunities for corporate and external stakeholders to enter into the education field (Kohe & Collison, 2019), their continued presence in educational settings may raise concerns (Adams & Robinson, 2019). Future research could examine the implications of the intersection between corporate stakeholders, commercial agendas and educational development to better understand the role of sport mega-events on education.

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Table 1 – Olympic Education programmes and initiatives in Brazil.

Olympic education initiative's	Details
Olympic Week (<i>Brazilian Olympic Committee, 1998</i>)	<ul style="list-style-type: none"> The Olympic Week was created by the Brazilian Olympic Committee in 1998 and aims to offer artistic, cultural and sports activities in all schools in order to enable the children and teachers to discover the history of the Olympic Games, the Olympic values, sports activities, etc.
School Olympic Education (<i>Belem State Government, 1998-1999</i>)	<ul style="list-style-type: none"> Belem's project refers the creation of a website to offer teachers methods to apply and use Olympic values in their classes, highlighting the value of fair play.
Olympic Education for Elementary School (<i>Federal University of Paraná, 1999</i>)	<ul style="list-style-type: none"> Initially developed for graduation students from the Physical Education Degree course, with the purpose to provide the topics related to the Olympism and the Physical Education field for schools.
Athlete's Industrial Social Services Programme (<i>SESI-SP, 2002-2016</i>)	<ul style="list-style-type: none"> Aiming to promote social-sportive formation among children and young people (6 to 17 years old), its purpose is to foster the practice of sports and to disseminate their values, thus contributing to develop the future citizen.
Second Half Programme (<i>Federal Government, 2003</i>)	<ul style="list-style-type: none"> Second Half was officially pointed out as 'the social legacy of the Rio Olympic Games. Its main objective is to promote the children and young people development as a way of citizenship and improvement of the quality of life through the democratization of access to educational sport.
São Paulo Olympic Education Programme (<i>City hall of São Paulo, 2007</i>)	<ul style="list-style-type: none"> The sports competitions have started denominated "Student Olympics" of school nature; the "School Sports Forum" (2008) when it has been discussed several aspects of the sports related to education; and a proposal for pedagogic formation in Olympic Education was accomplished in 2012 and 2013 with the "Olympic Education Programme".
Training Camp (<i>The Brazilian Olympic Committee, 2008</i>)	<ul style="list-style-type: none"> An Olympic Education Programme was developed by the COB, looking to integrate the identification of sportive talents to a cultural schedule that comprised audio-visual materials such as movies, theatre, photograph, and literary exposition on the Olympic Games, as well as guiding lectures with nutritionists and psychologists
More Education Programme (<i>Federal Government, 2009</i>)	<ul style="list-style-type: none"> This is a "full-time integral education programme", which aims to promote the education of children and youngsters through socio-educational activities linked to the school's pedagogical project.
Olympic Memory (<i>Private funds, 2010-2012</i>)	<ul style="list-style-type: none"> An initiative which developed because of the Rio 2016 is the project "Olympic Memory" which happens around Brazil and produces pedagogical material on Olympic education for school support.
Olympics and Citizenship (<i>Democratic Rocha Foundation, 2011</i>)	<ul style="list-style-type: none"> This educational project aimed to qualify physical education teachers of the Ceara, Piaui and Maranhao States, because of the strategic importance of the staging of the Rio Olympic Games.
Rio Olympic Programme (<i>Rio State Government, 2013</i>)	<ul style="list-style-type: none"> This programme aims to promote the sports practice and to provide sports participation, school sports, social sports, recreational sports, physical activity and training of athlete's projects.
Athlete's School Programme (<i>Ministry of Education, 2013-2014</i>)	<ul style="list-style-type: none"> This programme aims to incentivize the sportive practice in schools; to democratize the access to the sports; to develop and spread the Olympic and Paralympics values among students from the elementary education; to stimulate the formation of the school athlete and to identify and guide new talents.
São Caetano Olympic Education Programme (<i>City hall of São Caetano do Sul, 2012 - 2016</i>)	<ul style="list-style-type: none"> The programme has begun in 2012, with the purpose to present the Olympism from its history, symbols and values of the Olympic Games to students from the elementary school. It was comprised by expository classes, supported by multimedia resources, added to group discussions and practical activities.
Official Olympic Education Programme of the RIO-2016 – Transforma (<i>Rio 2016 Organizing Committee, 2014-2016</i>)	<ul style="list-style-type: none"> Transforma is an educational programme which purpose is to use the Olympic values to strengthen the role of the young people as a transforming agent creating opportunities to living the sports. The Transforma offers formation courses for pedagogic coordinators, physical education professors and for students changed into agents and multiplier tutors in the participant schools.

Table 2. Related overview on Olympic education impacts.

Sources	Overview
Binder (2001, p. 15)	<i>“Fair play, friendship, peace and international goodwill” define the impact Olympic Education can have on individuals, communities and the globe.</i>
Kwauk (2008, p. 527)	<i>Olympic education had indeed found the place it deserved by re-focusing on long-lasting educational and cultural impacts that could sustain interest and involvement beyond the Games.</i>
Georgiadis (2010, p. 6716)	<i>Olympic education programs are growing into an important activity with a strong impact on a range of permanent aspects of global education.</i>
Nikolaus (2011, p. 153)	<i>The impact of some of the initiatives of Olympic Games organising committees, generated a very different picture emerged with regard to the communication of Olympic values. In the majority of Olympic educational programmes run by Olympic Games hosts, for instance, the communication of Olympic knowledge prevails over the imparting of Olympic values.</i>
Binder (2012, p. 288)	<i>An educational programme focused on the positive values of Olympism, and distributed to all the schools in the world, would eventually impacted the behaviours of human society.</i>
Santos (2019, p. 87)	<i>Education is a key element of the legacy narrative with the suggestion being that there is extensive impact on all individuals and entities who are inspired by the values of Olympism.</i>

Table 3. Indicative quotes from the qualitative study.

Dimensions	Quotes
Education and personal development	“...currently, the program cannot be replicated but should be an inspiration for the IOC. On the other hand, this project must be continue. Education and personal development were evidenced in our studies and actions.” – Director, ROGOC
Experiences	“...I understood that one of the main indicators that physical education teachers valued was the experience of living Olympic and Paralympic values.” – Volunteer, ROGOC
Teachers training	“...the lack of teacher' training was also evidenced. Initially, Rio de Janeiro lacked physical facilities, equipment and resources to host the Transforma programme.” – School coordinator

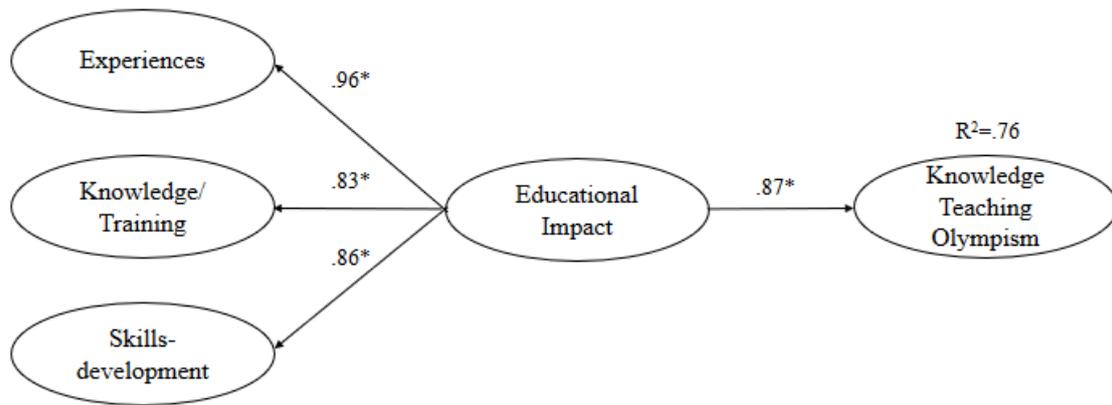
Table 4. Correlation matrix, Mean, Standard Deviation and AVE values.

Construct	M(SD)	Correlation matrix			Factor loadings	Z-Value	CR	AVE
		1	2	3				
1. Experiences	4.02(.94)	.72			.804-.881	23.95-27.71	.791	.72
2. Knowledge	3.60(1.10)	.66	.74		.846-.882	26.87-28.91	.92	.74
3. Skills-development	3.91(1.02)	.71	.52	.75	.823-.890	26.32-30.38	.92	.75

Note. No correlations failed the AVE test of discriminant validity.

Values on the diagonal refer to average variance extracted (AVE).

Figure 1 – Standardised estimates of the structural model.



Note: All path coefficients are standardized estimates.

$\chi^2(86)=304.44$ ($p<.001$), $\chi^2/df = 3.54$, TLI = .96, CFI = .97, GFI = .94, RMSEA = .06; * $p<.01$

Appendix. Factor Loadings, Z-Values, CFA item statistics and correlation matrix of the variables used in the structural model.

Variables	Factor loading	Z-value	CR	AVE
Educational impact			.92	.80
<i>Experiences</i>			.91	.72
Brought emotional experience in my life.	.835	25.78		
Created opportunities to practice Olympic sports.	.804	23.95		
Created new education-based leisure opportunities.	.864	26.85		
Provided teachers chance to meet new people.	.881	27.71		
<i>Knowledge</i>			.92	.74
Provided teachers new Olympic education-based trainings.	.858	27.22		
Contributed to teachers' sports knowledge.	.860	27.63		
Provided the information' exchange between teachers.	.846	26.87		
Encouraged new research projects.	.882	28.91		
<i>Skills-development</i>			.92	.75
Developed my own Olympic guidebook to teach students.	.823	26.32		
Recognized new personal skills to teach my lessons.	.872	29.25		
Led to my personal and professional development.	.890	30.38		
Courses/workshops were great ways to empower me.	.868	27.72		
Knowledge about teaching Olympism			.90	.76
I know the Olympic and Paralympic values.	.873	26.70		
I am encourage to teach the Olympic education at my school	.833	24.80		
I followed the IOC guidelines in my school.	.906	28.13		

Correlation matrix				
	1	2	3	4
1. Experiences	1.00			
2. Knowledge	.66	1.00		
3. Skills-development	.71	.52	1.00	
4. Knowledge about teaching Olympism	.69	.46	.65	1.00

Note. No correlations failed the AVE test of discriminant validity.

$p < .01$; $\chi^2(84) = 285.57$ ($p < .001$), $\chi^2/df = 3.40$, TLI = .97, CFI = .97, GFI = .94, RMSEA = .06

Correlation matrix		
	1	2
5. Educational impact (EI)	1.00	
6. Knowledge about teaching Olympism (KTO)	.75	1.00

Note. No correlations failed the AVE test of discriminant validity.

$p < .01$; $\chi^2(86) = 304.44$ ($p < .001$), $\chi^2/df = 3.54$, TLI = .96, CFI = .97, GFI = .94, RMSEA = .06