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Knowledge and Competences of Racket Sports Coaches: What do They Think and Know?

Conocimientos y competencias de los entrenadores de deportes de raqueta: ¿qué piensan y qué saben?

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Abstract

This study analyzed the professional, interpersonal, and intrapersonal knowledge as well as the most important competences to Brazilian coaches who work with four different racket sports (badminton, squash, tennis, and table tennis). A total of 150 coaches (122 men and 28 women) participated in this study, most of whom were tennis coaches (n=68), followed by badminton (n=39), table tennis (n=21), squash (n=17), and more than one racket sport (n=5). For data collection, a socio-demographic questionnaire and the Coaches' Knowledge and Competence Questionnaire (CKCQ) (Quinaud et. al., 2018) were applied. The Wilcoxon test was used to compare the importance and domain attributed by the coaches to the items. In general, knowledge and competences had high scores of attributed importance and perceived domain. However, knowledge of program implementation and evaluation, professional development of coaches and competence to develop the coaching philosophy had the lowest values of perceived domain.

Keywords: *coaches, knowledge, competences, racket sports.*

Resumen

Este estudio analizó los conocimientos profesionales, interpersonales e intrapersonales, así como las competencias consideradas más importantes para los entrenadores brasileños que trabajan con cuatro deportes de raqueta diferentes (bádminton, *squash*, tenis y tenis de mesa). Un total de 150 entrenadores (122 hombres y 28 mujeres) participaron en este estudio, la mayoría de ellos eran entrenadores de tenis (47 %), seguidos de bádminton (28 %), tenis de mesa (16 %) y *squash* (12 %). Los datos se recolectaron mediante un cuestionario sociodemográfico y el cuestionario de conocimientos y competencias de los entrenadores (CKCQ, por su sigla en inglés) (Quinaud et. al, 2018). Se utilizó la prueba de Wilcoxon para comparar la importancia y el ámbito atribuidos por los entrenadores a los ítems. En general, los conocimientos y las competencias tuvieron altas puntuaciones de importancia atribuida y ámbito percibido; sin embargo, los conocimientos de implementación y evaluación de programas, desarrollo profesional de los entrenadores y la competencia para desarrollar la filosofía del entrenamiento tuvieron los valores más bajos de ámbito percibido.

Palabras clave: *entrenadores, conocimientos, competencias, deportes de raqueta.*

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Introduction

The four main types of racket sports, namely badminton, squash, table tennis, and tennis, have gained popularity in different countries worldwide and have received increasing attention from the scientific literature (Lees, 2003; O'Donoghue, Girard & Reid, 2013). Researchers from different areas seek to identify factors that make it possible to promote the improvement of sports performance, with most of the research being developed in the fields of physiology, nutrition, biomechanics, and medicine (Lees, 2003). Coaches, who play a central role in athletes' development, have been little explored in racket sports literature. Their knowledge and competences are decisive for professional success and should be constantly addressed by research to indirectly improve athletes' development process.

The scientific literature on sports coaches reveals the diverse roles and responsibilities played by professionals in this position, such as developing youth positive development, athletic performance and promoting health (Côté & Gilbert, 2009; International Council for Coaching Excellence [ICCE], 2013; Galatti, Cortela, Silva, Misuta & Belli, 2017). In their various roles, coaches need to develop the necessary knowledge for their practice, which according to the ICCE (2013) can be summarized into (i) professional knowledge, which is the specific knowledge of the sport, in addition to knowledge within the sports sciences (Abraham, Collins, & Martindale, 2006); (ii) interpersonal knowledge, which is the knowledge obtained through bonding with athletes, coaching staff, parents, and other professionals; and (iii) intrapersonal knowledge, which is the understanding of oneself along with the process of reflection and introspection (Côté & Gilbert 2009).

Coaches must also develop basic competences to be more effective (ICCE, 2013). The competences suggested by the ICCE were based on the three types of knowledge of sports coaches and are described as: defining the vision and strategy; shaping the environment; building relationships; conducting training sessions and preparing and managing competitions; reading and reacting to the "field"; learning to reflect.

In a review on coaching studies, Gilbert and Trudel (2004) identified a focus on coaching behavior research, and a primary emphasis on team sports in school contexts. More recently, Griffo et al. (2019) verified that approximately one-third of international publications on coaching refer to coaching methods related to developing competences and knowledge. A similar scenario was found in the Brazilian literature, revealing an increase in publications about coaches from 2000 to 2015 related to thinking (perception, belief, emotions, philosophy, knowledge), which is the most researched topic (Galatti et al., 2016). From these reviews, few refer to racket sports.

In the international context, a recent review identified only 10 papers focused on racket sports coaches, published in English in Europe, North America and Brazil (Cardoso, Motta, Belli, Cortela & Galatti, 2019). In the Brazilian context, we only found studies on tennis, led by the same group of authors (Corrêa Cortela et al., 2019; Corrêa Cortela, Balbinotti, Tozetto, Both, & Milistetd, 2017; Corrêa Cortela, Milistetd, Galatti, Crespo, & Balbinotti, 2016, 2017). Therefore, Brazil has become one of the pioneer countries in developing research on the knowledge and competences of racket sports coaches, but mainly focused on tennis (Corrêa Cortela et al., 2019; Corrêa Cortela, Balbinotti, Tozetto, Both, & Milistetd, 2017; Corrêa Cortela, Milistetd, Galatti, Crespo, & Balbinotti, 2016, 2017).

In addition to its literature, Brazil has emerged as a power within international competitions, with international top-100 athletes in several sports and expressive results in the continent, as in the Pan-American and Parapan-American games of Lima, 2019. In the Pan-American, Brazilian racket sports athletes won four gold, six silver, and four bronze medals. In the Parapan American Games, the results were even more expressive, with 13 gold, 10 silver, and 12 bronze medals (https://wrsd.lima2019.pe/).

This study aimed to identify the most important types of knowledge and competences declared by racket sports coaches for coaching in the Brazilian context. When investigating and understanding the coaches' perceptions about what matters for their professional practice, we seek to contribute with valuable information for the improvement of coaching education programs in racket sports. The study hypothesizes that racket coaches attribute higher importance to knowledge and competencies that they master, along with a higher domain of professional knowledge compared to interpersonal and intrapersonal knowledge.

Materials and methods

This quantitative research has a descriptive character (Thomas, Nelson, & Silverman, 2012) using the survey method by a questionnaire, aiming to investigate the knowledge and competences of racket sports coaches.

A total of 150 coaches from four racket sports participated in the study from 19 states of Brazil. The mean age was 37.15 years (standard deviation = 10.52 years). Table 1 presents the information of the participants concerning the sport which they act as a coach, if they have already experienced a racket sport or not, and the last academic education. The inclusion criteria for the participants in this study were: adults aged over 18 years and acting as a coach of one of the following four racket modalities: badminton, squash, tennis, or table tennis. Participants included only coaches who showed interest and voluntarily

accepted to participate. This research was approved by the University Research Ethics Committee (CAAE number: 02627418.0.0000.5404).

Table 1.
Participants' information.

	Men	Women	Total
	122	**28**	**150**
Sport			
Badminton	30	9	39
Squash	15	2	17
Tennis	56	12	68
Table Tennis	17	4	21
More than one racket sport	4	1	5
Sports Experience			
Racket sports	116	26	142
Did not experience racket sports	6	2	8
Latest academic education			
Complete High School	3	0	3
Incomplete High School	1	0	1
Complete Higher Education	13	3	16
Higher Education in Physical Education	41	14	55
Incomplete Higher Education	14	0	14
Master's degree/ PhD degree/ MBA	18	2	20
Specialization	31	9	40
Others	1	0	1

Design and procedures

Instruments

A questionnaire made up of two parts was applied:

- A socio-demographic questionnaire, created and refined via evaluation of researchers from a sports pedagogy laboratory located in the state of São Paulo, presenting questions (n = 21) that provided a detailed profile of racket sports coaches. The socio-demographic questionnaire covered topics such as age, sex, context of activity, target audience, competitive level, time of activity, weekly working hours as a coach, time of completion of the latest course taken related to coaching and source income. The questionnaire consisted of open and closed questions.
- The "Coaches' Knowledge and Competence Questionnaire" (CKCQ,Quinaud et al., 2018). CKCQ is a validated instrument that allows researchers to understand the different dimensions of knowledge and competences (Côté & Gilbert, 2009; ICCE, 2013) of sports coaches (Quinaud et al., 2018). CKCQ contains 38 questions divided into "knowledge" (20 questions) and "Competences" (18 questions). "Knowledge" addresses professional (n = 10), interpersonal (n = 5) and intrapersonal (n = 5) knowledge, while "Competences" contains questions about defining vision and strategy (n = 3), shaping the environment (n = 3), building relationships (n = 3), performing practices (n = 3), reading and reacting to the "field" (n = 3), and learning and reflecting (n = 3). The participants answered the questions of CKCQ through a Likert scale referring to the importance (from 1 = "not important" to 5 = "very important") and the perceived domain (from 1 = "I do not know" to 5 = "I know a lot") attributed to a given subject.

Attributed importance refers to the level of importance the participant attributes to a given theme (in our study certain knowledge or competence) regarding the performance of the coach of racket sports. Perceived domain in turn is the perception of how much knowledge or competence the participant has as a coach.

Procedures

The existing groups on Facebook® that address the four racket modalities were identified based on their posts and objectives. Sixteen groups that could reach the coaches of the chosen modalities were selected. Within each group, a brief description of the research objectives and the questionnaire URL was posted, in addition to the main researcher's contact information, in snowball sampling (Baltar & Brunet, 2012). The period for accepting responses ranged from 02/19/2019 to 04/29/2019, totaling 70 days.

Upon entering the questionnaire link, the participant had access and was asked to confirm awareness of the Free and Informed Consent Term. For this study, in addition to the socio-demographic questionnaire, the CKCQ knowledge questionnaire was mandatory for all participants, leaving the CKCQ competences questionnaire as non-mandatory. Out of the total participants, 137 accepted and answered the CKCQ competences questionnaire (91.3%).

Data analysis

Descriptive statistics were used to summarize and present data. For such, we used measures of position (mean) and dispersion (standard deviation). The normality of the data was assessed with histograms and by the statistical test of Shapiro Wilk. The Wilcoxon test was used to compare the values attributed by the participants to the importance and domain in each knowledge and competence evaluated. The test was chosen for being

a non-parametric statistical analysis for paired data. Cohen's d Effect Size (ES) was adopted to analyze the magnitude of the effect. For the interpretation of magnitude, ES < 0.20 was considered a small effect, from 0.20 to 0.50 was considered a medium effect and above 0.50 was considered a large effect (Cohen, 1977). To compare the scores in importance and domain for knowledge and competence we used Friedman test paired with Dunn's post-hoc test. The level of significance was set at 0.05. All analyses were performed using the statistical software MATLAB (The MathWorks Inc., Natick, MA, USA).

Results

Table 2 presents the scores regarding the attributed importance and perceived domain about professional, interpersonal, and intrapersonal knowledge.

The results presented in Table 2 show that although racket sports coaches attributed high values of importance and domain to professional, interpersonal and intrapersonal knowledge, the coaches attributed more importance than ability to the items investigated.

Table 2.
Attributed importance and perceived domain about the knowledge of racket sports coaches.

		Importance		Domain		ES	p-value
	Knowledge	**Mean**	**SD**	**Mean**	**SD**		
Professional	1.1 – Training planning (objectives, task structure and context progressions)	4.7	0.5	4.2	0.7	0.82	<0.01
	1.2 – Training management (time, physical space, equipment)	4.5	0.7	4.2	0.7	0.42	<0.01
	1.3 – Pedagogical intervention (instruction in training, correction, orientation, organization of tasks and progressions)	4.5	0.7	4.2	0.7	0.42	<0.01
	1.4 – Assessment of technical-tactical, physical and psychological aspects in the context of sports training	4.6	0.7	4.0	0.8	0.79	<0.01
	1.5 – Training and long-term development of athletes (initiation, specialization and improvement)	4.4	0.8	3.8	0.9	0.70	<0.01
	1.6 – Implementation and evaluation of training programs	4.1	1.0	3.2	1.1	0.85	<0.01
	1.7 – First-aid measures	3.9	1.0	3.4	1.0	0.5	<0.01
	1.8 – Legislation regulating the sports system (rules and regulations of specific confederations)	3.7	1.1	3.2	1.0	0.47	<0.01
	1.9 – Context of professional performance (recreation, development, performance)	4.0	0.9	3.9	0.8	0.11	0.03
	1.10 – Organization of sports competitions	4.3	0.8	4.2	0.9	0.11	0.30
Interpersonal	1.11 – Leadership and management of athletes and coaching staff	4.3	0.8	3.9	1.0	0.44	<0.01
	1.12 – Effective communication during training	4.7	0.6	4.4	0.7	0.46	<0.01
	1.13 – Professional development of coaches	4.3	0.9	3.5	1.1	0.79	<0.01
	1.14 – Communication with other actors in the sports context (parents, media, referees)	4.3	0.8	3.9	0.9	0.47	<0.01
	1.15 – Development of attitudes, values and behaviors of athletes	4.7	0.6	4.3	0.8	0.56	<0.01
Intrapersonal	1.16 – Personal strategies for self-learning	4.5	0.7	4.1	0.8	0.53	<0.01
	1.17 – Reflection about their own practice	4.4	0.7	4.1	0.8	0.39	<0.01
	1.18 – Their own emotion and emotion of others (athletes, parents, media, referees)	4.3	0.8	4.0	0.9	0.35	<0.01
	1.19 – The very training philosophy (principles, values, beliefs)	4.3	0.8	4.0	0.9	0.35	<0.01
	1.20 – Awareness and criticism of professional practice	4.3	0.8	4.1	0.9	0.23	<0.01

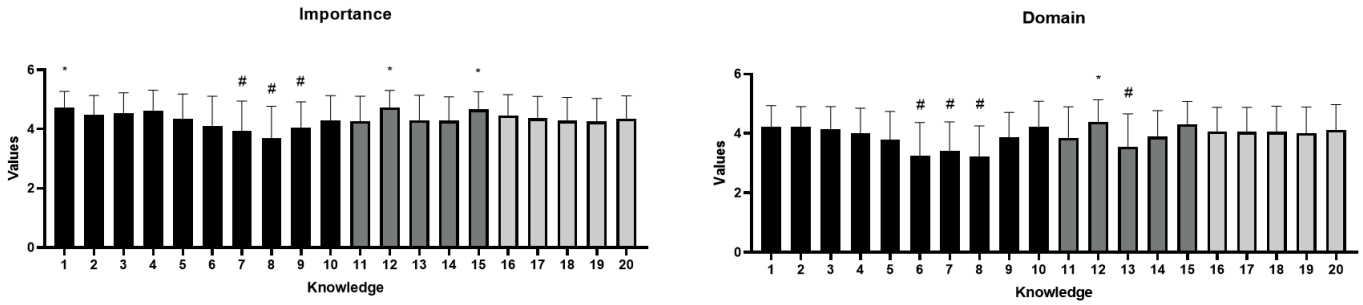

Figure 1. Comparison between the attributed importance and perceived domain about the knowledge of racket sports coaches. Legend: * significantly higher; # significant lower in Friedman test (p<0.001).

Figure 1 presents the comparison between the types of knowledge. The highest mean values on the importance attributed to knowledge were found for: training planning (1), effective communication during training (12) and development of attitudes, values and behaviors of athletes (15). The lowest values were: first aid (7), legislation regulating the sports system (8), and context of professional performance (9). Regarding perceived domain, the highest mean values were: effective communication during training (12). The lowest values presented regarding perceived domain were: implementation and evaluation of programs (6), first aid (7), legislation regulating the sports system (8), and professional development of coaches (13).

The mean score in each knowledge area is shown in Table 3.

Table 3.
Mean (and standard deviation) attributed importance and perceived domain about the dimensions of knowledge of racket sports coaches.

	Importance	Domain	p-value	ES
Professional	4.2 (0.5)	3.8 (0.6)	<0.001	0.72
Interpersonal	4.4 (0.5)	3.9 (0.7)	<0.001	0.82
Intrapersonal	4.3 (0.6)	4.0 (0.7)	<0.001	0.46

ES = effect size.

All kinds of knowledge had higher attributed importance value than perceived domain. As much as professional knowledge displays more themes than other kinds of knowledge, this specific type together with interpersonal knowledge showed larger difference between the attributed importance and perceived domain than intrapersonal knowledge, based on effect size (ES).

The results of the mean scores about the importance attributed and perceived domain of competencies presented in CKCQ are presented in Figures 2 and 3.

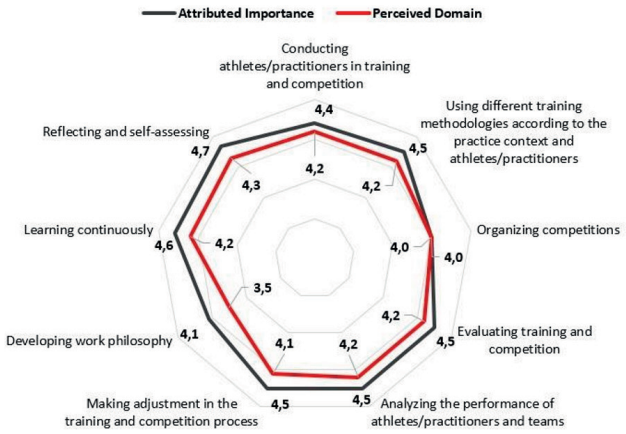

Figure 2. Attributed importance and perceived domain about the competences of racket sports coaches (part 1).

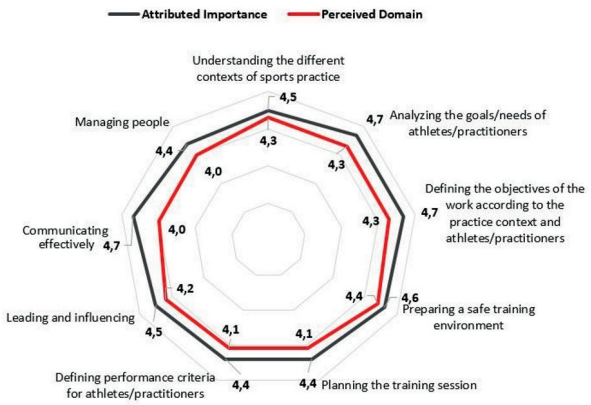

Figure 3. Attributed importance and perceived domain about the competences of racket sports coaches (part 2).

For the results of coaching competences (Figures 2, 3 and 4), there was also a significant difference between the values of attributed importance and perceived domain in almost all the analyzed items. The task of organizing competitions, a competency within the category of directing training sessions and preparing and managing competitions, was the only one that did not present significant difference, thus demonstrating that for coaches this competence receives the same degree of importance and domain.

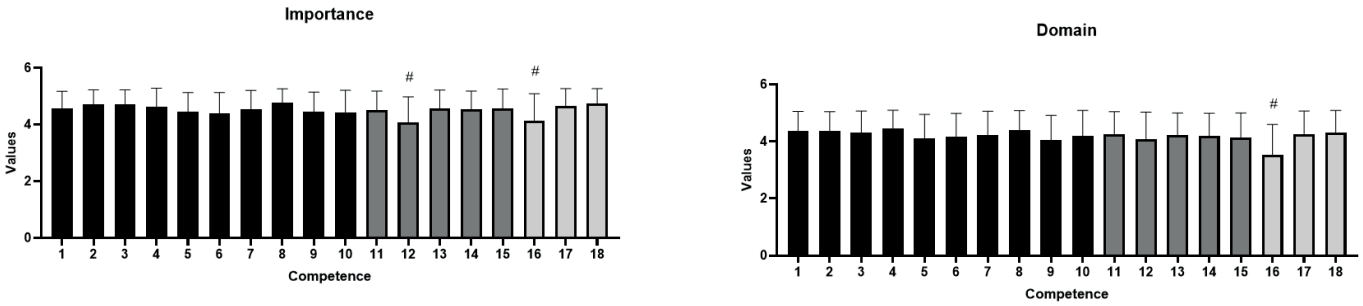

Figure 4. Comparison between the attributed importance and perceived domain about the competence of racket sports coaches. Legend: # significantly lower in Friedman test ($p<0.001$).

Both for importance and domain, item (16), developing a philosophy of coaching, appears as the lowest value. In terms of importance, item (12) regarding organizing competitions also appears as the lowest value.

Lastly, Figure 5 presents the mean scores for attributed importance and perceived domain of the dimensions of the competencies presented.

Regarding the dimensions of competencies, our results also showed high mean values in attributed importance and in perceived domain, even though the latter presents lower mean values compared to the values of importance attributed by racket sports coaches.

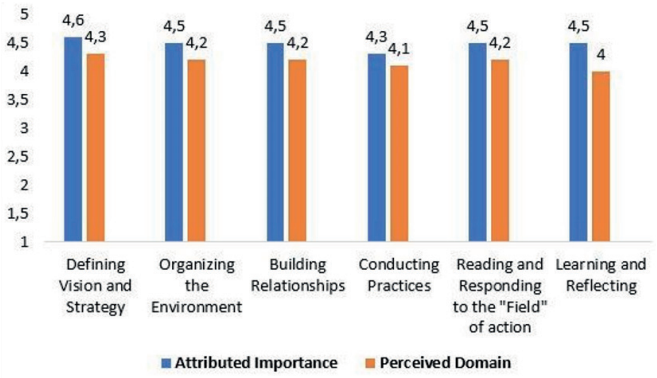

Figure 5. Attributed importance and perceived domain about the competences of racket sports coaches (part 2).

Discussion

This study analyzed the importance of the types of knowledge (professional, interpersonal and intrapersonal) and their respective competences, as well as the perceived domain of racket sports coaches. The results showed that, even though knowledge dimension presented higher values of attributed importance compared to perceived domain, professional and interpersonal knowledge showed a large difference when analyzing effect size (ES), differing from intrapersonal knowledge, which showed a medium effect size (ES). The hypotheses presented in the introduction were confirmed by the results obtained, which suggests that racket sports coaches perceive importance and domain of this knowledge within their professional performance.

Looking at these questions individually, we found that coaches attribute high mean values for the importance of knowledge and competences, which differs from the values of perceived domain of knowledge and competences that are essential to sports coaches. Some studies analyzing professional knowledge and competences also showed high values of self-perception of importance and domain (Corrêa Cortela, Balbinotti, et al., 2017; Corrêa Cortela, Milistetd, et al., 2016, 2017; Egerland, Nascimento, & Both, 2010; Egerland, Salles, Barroso, Baldi, & Nascimento, 2013).

The coaches as whole attributed high values of self-perception of professional knowledge, but when comparing coaches of collective sports and of individual sports, the latter group showed a lower perception mainly for the professional knowledge of the biomechanics of the sport and the professionals of communication and integration of the sport (Egerland, Nascimento, & Both, 2010). For university coaches, self-perceived competence values were also high, with a significant difference in competence related to sports management and legislation between coaches of team sports and individual sports, also showing that coaches of team sports perceive themselves as better at this competence (Egerland, Salles & Baldi, 2014). Despite using different instruments, the studies cited are in line with our main results, thus advancing legislation and sports management as a possible weakness of individual sports coaches and racket sports coaches. As for tennis coaches, the importance attributed to professional knowledge compared to self-inspection of their domain (Corrêa Cortela, Milistetd et al., 2017) showed high values, which was also reported in the present study with racket sports coaches.

The legislation that regulates the sports system showed one of the lowest mean values for both importance (3.7) and domain (3.2), which is also found for tennis and other types of coaches (Corrêa Cortela et al., 2019; Corrêa Cortela, et al., 2016; Egerland et al., 2010). In a study by Egerland et al. (2013), the

ability to provide some first-aid care was not shown to be important and was little acknowledged by coaches, corroborating the results found in this study for both perceptions (3.9 for importance and 3.4 for domain).

The data regarding the implementation and evaluation of programs also proved to be a topic of low domain on the part of coaches (3.2), contrasting with studies in which values of high or equal domain are reported (Corrêa Cortela, Balbinotti, et al., 2017; Egerland et al., 2010, 2013). One of the alternatives for coaches' development in this domain is offering a management topic in coaching education programs, since within the sports management field there is a sub-area called "legal aspects of sport" (Rocha & Bastos, 2011). Having a sports manager dealing with policies, developing planning and marketing actions would be expected (Mazzei & Júnior, 2017; Amaral & Bastos, 2015). On the other hand, offering basic knowledge on the subject in courses for coaches is relevant, especially in youth sport or less structured clubs, where it is usual for racket sports coaches to get involved in competitions of complex marketing and management structure, in addition to assisting the management of athlete contracts.

The coaches' professional development stood out within the interpersonal knowledge for having the lowest mean value of perceived domain. As most studies on the knowledge and competences of tennis coaches are focused on the professional area (Corrêa Cortela, Balbinotti, et al., 2017; Corrêa Cortela, Milistetd, et al., 2016, 2017), gaps concerning the interpersonal and intrapersonal knowledge of racket sports coaches become evident, since in order to achieve excellence as a coach these three kinds of knowledge are required (Côté & Gilbert, 2009). One possibility for improving the domain of coaches regarding the professional development of coaches would be a bigger investment on actions to incite relations between coaches in non-formal contexts (such as workshops and minicourses) (Galatti, Santos & Korsakas, 2019) and informal contexts (such as coaching place, talking to other coaches or even having one coach as a mentor for another) for their learning, especially since those are learning contexts that are broadly used by coaches (Corrêa Cortela, Milistetd, Both, Fuentes, Balbinotti, 2020; Walker, Thomas & Driska, 2018).

Among all competences, the lowest perceived domain value (3.5) was the competence related to developing a coaching philosophy. Although the concept of the coaching philosophy is still not well solidified (Cushion & Partington, 2016), the coach's philosophy, values and beliefs act as a basis for their intrapersonal knowledge in reflection and self-learning process, thus exerting a major role on the competences developed by trainers (Galatti et al., 2019; Milistetd, Galatti, Collet, Tozetto, & Nascimento, 2017).

Even though there are few studies that mention the development of coaching philosophy for racket sports coaches, some possibilities are offered to start the development of such philosophy. The first one is a mentoring action between coaches that can provide opportunities for exchanging experiences and acquiring knowledge (González-Rivera, Campos-Izquierdo, Villalba & Hall, 2017; Stoszkowski & Collins, 2016; Winfield, Williams & Dixon, 2013). Lastly, reflecting on their practice can help reinforce and expand knowledge, which can occur in several ways; here we highlight the use of reflective cards (Rodrigue & Trudel, 2018; Winfield, Williams & Dixon, 2013; Hughes, Lee & Chesterfield, 2009), a simple tool that allows coaches "to learn how to develop and improve their personal competences" (Hughes, Lee & Chesterfield, 2009, p. 371), among them competences related to coaching philosophy.

Conclusion

Based on the results of this study, most types of knowledge and competences are of high perceived importance and domain by the coaches of the four racket sports. However, for certain professional types of knowledge such as the implementation and evaluation of programs, first aid and legislation regulating the sports system, we note low domain presented by the coaches, demonstrating areas that can be addressed and explored within the training courses of coaches through federations or confederations. Despite this, the domain indicated by the coaches regarding professional development of coaches is also inferior compared to other topics within interpersonal knowledge; thus, the provision of activities in pairs within coaching courses can be an alternative in order to create a network between participants and enable development among coaches.

We reinforce the need for future studies that analyze the phenomenon from different perspectives, such as interviews with coaches or field work that allows to evaluate knowledge and competences they use within their routine as coaches. However, we believe that, from the same point, it is possible to create or reformulate training courses based on the exposed data, since actions based on the coaches' needs act more effectively than those that do not meet the essential demands of course participants, that is, coaches.

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