



The coach competence questionnaire: measuring sport coaches' functional competencies

El cuestionario de competencias para entrenadores: medición de las competencias funcionales de los entrenadores deportivos

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Abstract

Introduction: The role of the sports coach goes beyond technical expertise, involving cognitive, emotional, and social competencies that promote the comprehensive development of athletes. Given the current scenario, with a lack of standardization in the educational process and professional recognition of coaching, the development of a tool to assess coaches' competencies could contribute to guiding coach education programs and continuously improving professional practice.

Objective: This study aimed to analyze coaches' functional competencies in relation to their individual, educational, and sport-related characteristics.

Methodology: First, we developed and validated the Coach Functional Competency Questionnaire, an 18-item instrument organized into six dimensions. Using this tool, we collected responses from 332 coaches across the country. Data were analyzed using Bayesian multilevel regression analysis.

Results: The results indicated that type of higher education, age group, and competitive level influenced coaches' functional competencies. No substantial effects were observed for gender or previous athletic experience.

Discussion: The study showed that coaches' functional competencies are influenced by age, academic background, and competitive level, with older coaches and those with degrees in Physical Education or Sports Science exhibiting higher levels of competency. Although gender and experience as an athlete did not have significant effects, maturity, practical experience, and continuing education proved to be essential for the development of expertise in sports coaching.

Conclusions: These findings can support coach education programs by providing a framework for evaluating competencies, identifying areas for improvement, and guiding the design of learning structures and monitoring competency development over time.

Keywords

Coach competence; coach education; coaching knowledge; sport coaching; tool.

Resumen

Introducción: El entrenador deportivo trasciende la técnica, integrando competencias cognitivas, emocionales y sociales que impulsan el desarrollo integral del atleta. Ante la falta de estandarización en el proceso educativo y el reconocimiento profesional del entrenador, una herramienta de evaluación de las competencias puede orientar la formación y mejorar la práctica del coaching.

Objetivo: El objetivo de este estudio era analizar las competencias funcionales de los entrenadores en relación con sus características individuales, educativas y deportivas.

Metodología: En primer lugar, desarrollamos y validamos el Cuestionario de Competencias Funcionales del Entrenador, un instrumento de 18 ítems organizado en seis dimensiones. Utilizando esta herramienta, recopilamos las respuestas de 332 entrenadores de todo el país. Los datos se analizaron mediante un análisis de regresión bayesiano multinivel.

Resultados: Los resultados indicaron que el tipo de educación superior, el grupo de edad y el nivel competitivo influían en las competencias funcionales de los entrenadores. No se observaron efectos sustanciales en cuanto al género o la experiencia deportiva previa.

Discusión: El estudio mostró que las competencias funcionales de los entrenadores dependen de la edad, el nivel académico y el nivel competitivo. Los entrenadores mayores y con formación en Educación Física o Ciencias del Deporte demostraron mayores competencias, mientras que la madurez, la experiencia práctica y la formación continua resultaron claves para su desarrollo profesional.

Conclusiones: Estos hallazgos pueden apoyar la formación de entrenadores al ofrecer un marco para evaluar competencias, identificar áreas de mejora y orientar el diseño de programas educativos que favorezcan el desarrollo y seguimiento continuo de las competencias profesionales.

Palabras clave

Competencia de los entrenadores; formación de entrenadores; entrenamiento; herramienta;

Introduction

The role of the sports coach is essential for the success of athletes and teams, requiring not only technical knowledge but also interpersonal and reflective skills (Abraham, et al., 2006; Demers, et al., 2006; Lyle, 2016). In addition to technical improvement, coaches need to manage the psychological and social aspects of athletes, creating an environment conducive to both sporting and personal growth (Chiu, et al., 2014; Cortela, et al., 2017; Farah, et al., 2019). The evolution of coaching has broadened the view of the coach, who is no longer seen merely as a transmitter of technical knowledge, but rather as a facilitator of human and social development, with an emphasis on cognitive, emotional, and social competencies such as leadership and evidence-based decision-making (Cassidy, et al., 2023; Côté & Gilbert, 2009; Lyle, 2007).

The International Council for Coaching Excellence (ICCE, 2013) recommends that coaches possess a solid foundation of knowledge and competencies to perform their roles effectively. These are organized into six primary functions: a) Set the Vision and Strategy, which involves a clear vision on the part of the coach, with the definition of long-term goals and strategies; b) Shape the Environment, which refers to creating an environment conducive to learning and performance; c) Build Relationships, which deals with building healthy relationships with athletes; d) Conduct Practices and Prepare to Manage Competitions, which involves planning and conducting training, monitoring progress and managing competitions; e) Read and React to the Field, which concerns the coach's ability to analyze, react and adapt to training conditions and competitions; and f) Learn and Reflect, which emphasizes continuous evolution and reflection on one's own practice.

Although the terms knowledge and competences are often used interchangeably, it is essential to distinguish and define both concepts to establish structured processes for coach education (Baumgartner, 2022; Möhrle, 2024; Tul, et al., 2019). In this regard, Möhrle (2024), in his scoping review, highlights that the concept of competence in coach education and sports research is diverse and multifaceted, posing significant challenges for the design of education and evaluation programs for coaches. While adopting a single, universal definition of competence may seem practical, it can also be limiting. A more flexible interpretation, adaptable to various contexts, is often more effective. Accordingly, Möhrle (2024) proposes a definition of competence that encompasses the knowledge, skills, and abilities necessary to influence athletes' learning and performance across different coaching contexts. This includes aspects such as motivation, strategy, technique, and character development, and is subject to continuous learning and improvement. Therefore, a clear understanding of the competence concept must be followed by effective measurement, aiming to enhance both coach education and research in the field (Valenzuela Mendoza, et al., 2025).

Despite conceptual and theoretical advances in recent decades, there remains a significant gap in the literature on the professionalization of sports coaching careers in different sociocultural contexts. There is marked heterogeneity between countries, with some nations having made progress in regulating and institutionalizing the profession, such as Brazil and Colombia (Brazil, 1998; Colombia, 2022), while others still lack structured policies. In much of the world, coaching is not formally recognized as a regulated profession, resulting in diverse educational trajectories, a lack of minimum certification standards, and limited opportunities for continuing professional development (Lawrason et al., 2019; Quinaud et al., 2022). This lack of structure compromises the consolidation of evidence-based practices, hinders the implementation of consistent and sustainable educational models, and restricts the formulation of policies and programs aligned with the International Sport Coaching Framework (Lara-Bercial et al., 2022; Avner et al., 2017; ICCE, 2013).

In recent years, various frameworks have been introduced to enhance coaching practices and outcomes, including *The Coaching Model* (Côté, et al., 1995) and *The Coaching Schematic Model* (Abraham et al., 2006). These models aim to improve coaches' performance, increase athlete satisfaction, and refine coaches' adaptive strategies. The concept of *Coaching Effectiveness*, initially articulated by Côté and Gilbert (2009) and later expanded by Gilbert and Côté (2013), provides a foundational perspective on what constitutes effective coaching. This conceptual approach has significantly influenced global coach education programs (Berntsen & Kristiansen, 2019; Lawrason, et al., 2019; Macdonald & Allen, 2019), aligning closely with the *International Sport Coaching Framework* (ICCE, 2013). Furthermore, the work of Quinaud et al. (2022) makes a valuable contribution by incorporating the principles of the *International*



Sport Coaching Framework into a comprehensive questionnaire. This tool supports both the assessment and ongoing development of coaching knowledge, helping to identify targeted areas for improvement in coaching practices.

To contribute to the existing literature, the objective of this study is to analyze coaches' functional competences in relation to their individual, educational, and sporting characteristics. To achieve this, the development of a specific assessment tool was first required. The results derived from this instrument can serve as a valuable resource for coach education programs, offering insights into coaches' competencies and informing the design of educational content aimed at professional development. Ultimately, this study seeks to support the establishment of effective learning frameworks and facilitate the longitudinal monitoring of coaches' competency development over time.

Method

The present study is characterized as a descriptive and cross-sectional with a quantitative approach. Ethical approval was obtained from the University's Ethics Committee, and all participants signed an informed consent form. Considering the absence of an existing questionnaire to measure coaches' functional competences, based on international recommendations (Côté & Gilbert, 2009; Gilbert & Côté, 2013; ICCE, 2013), we first developed and validated a new instrument and subsequently analyzed variations in coaches' functional competences.

Questionnaire Development and Validation

Items generation is described in the paper Quinaud et al (2018). Summary, the items generation were based on the conceptual model proposed by Côté and Gilbert (2009) and Gilbert and Côté (2013) as well as in the frameworks (version 1.1 and 1.2) of the International Council for Coaching Excellence (ICCE, 2012, 2013). To performance the content validity, was five experts in sports coaching from public higher education institutions from different regions of Brazil in this task. The inclusion criteria to select the experts was to have a PhD for at least 10 years, academic experience with the theme and periodicity of publications in national and international journals of impact in the area (Balbinotti, et al., 2006).

Following the guidelines proposed by Balbinotti et al. (2006) for the content validity, five specialists assigned a score on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree) to classify each of the following criteria: language clarity (language used in items), practical pertinence (considers whether each item was elaborated in order to evaluate the concept of interest of a certain population) and theoretical relevance (relevance between items and theory). Those specialists were also able to make additional comments about each item of the questionnaire analyzed. Based on the responses, data analyses were performed based on the calculation of the content validity coefficient (CVC). The cut-off point adopted for language clarity, practical pertinence and theoretical relevance were $CVC \geq 0.81$ for the complete instrument, levels considered almost perfect (Hernández-Nieto, 2002).

The results from the content validity analysis demonstrated that the questionnaire items and dimensions had clarity of language, practical relevance and theoretical relevance with coefficients of $CVCT = 0,93$, $CVCT = 0,98$ and $CVCT = 0,97$, respectively (supplementary table 1). This finding suggests that the questionnaire presents clear language to the coaches, whilst also being relevant and pertinent to the sporting context. Based on the first version of the questionnaire, 332 coaches responded to it on a Likert scale ranging from one (do not domain) to five (high domain). Based on the responses, we conducted a confirmatory factor analysis and internal consistency.

To perform the confirmatory factor analysis (CFA), the "lavaan" package (Rosseel, 2012) in the R statistical language (R Core Team, 2018) was used. Factor loadings above 0.5 were used as cutoff points to retain items (Kline, 2016). The covariances between measure error items were also analyzed. In the case of high covariances between measure errors that could disturb the model, decisions were taken by analyzing both factor loadings and by verifying an item's theoretical construct, meaning, and interpretation. Lastly, model adequacy was tested through the most recommended fit indices (Jackson, et al., 2009): Chi-square (X^2), Degrees of Freedom (DF), Chi-square Ratio (X^2/df), Tucker Lewis Index (TLI), Relative Noncentrality Index (RNI), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Standardized Root Mean Square (SRMS), and Expected Cross-validation Index (ECVI).



Internal reliability was measured using the Cronbach alpha with a cutoff point of 0.7 or near to it. Overall, all items presented factorial loadings above 0.5 (Supplementary table 2), all covariances between measure errors were less than 30 and presented adequate fit indexes: $\chi^2 = 302.56$; $DF = 120$; $\chi^2/df = 2.52$; $TLI = 0.94$; $RNI = 0.95$; $RMSEA = 0.6$; $CFI = 0.95$; $SRMS = 0.04$; and $ECVI = 1.03$. In relation to the internal consistence (Supplementary table 2), all factors present values over 0.7 or very near to it (e.g., 0.67).

The Portuguese and English version of the questionnaire are presented in Supplementary document.

Participants and Data Collection

Data was collected using an online platform, and coaches were recruited through WhatsApp groups. Thus, coaches were all over Brazilian regions. As inclusion criteria, coaches had to be at least 18 years old and possess Brazilian nationality. Coaches who did not sign the informed consent form or did not complete all items of the questionnaire were excluded. Participants completed the 18-item Coaches' Functional Competence Questionnaire, which employed a Likert scale ranging from 1 (no domain) to 5 (high domain). The final sample consisted of 332 coaches of both gender (female = 67, male = 265), with a mean age of 37.63 years (± 10.17). Most held a degree in Physical Education or Sports Science ($n = 275$) and coached either individual ($n = 207$; e.g., table tennis, athletics, tennis, swimming, karate, gymnastics, and judo) or team ($n = 125$; e.g., basketball, soccer, volleyball, and handball) sports. Additionally, 145 coaches had less than 10 years of coaching experience, 249 did not have prior athletic experience, and participants were involved at various competitive levels: 125 at the state level, 98 at the national level, and 109 at the international level.

Data Analysis

Based on the final version of the questionnaire, coaches' competences were analyzed by Bayesian multilevel regression analysis. Coaches' competences responses were estimated by multilevel regression analysis aggregated by gender (female and male), age group (≤ 37 or ≥ 38), higher education (Physical Education/Sports Science or other/no degree), former athlete (no or yes), competitive level (state, national and international). Multilevel regression allows a more precise estimate by considering the data organized in a hierarchy model, in which units of analysis at one level are nested within units of analysis at higher levels (Gelman & Hill, 2007). Additionally, Bayesian modelling enable the integration of prior knowledge, represented as a probability distribution reflecting uncertainty about a parameter or hypothesis, with information derived from observed data, expressed through the likelihood function. This combination yields an updated understanding, known as the posterior distribution (Kennedy & Gelman, 2020; Lee & Wagenmakers, 2013).

We used weakly informative prior distributions, normal prior (0, 5) for population-level effects, and normal prior (0, 1) for group-level effects to regularize our varying intercept multilevel models' estimations. We run two chains for 4,000 iterations with a warm-up length of 1,000 iterations to ensure convergence of the Markov chains. Models were fitted with the "brms" package (Bürkner, 2017) in R (R Core Team, 2018). Trace plots and posterior predictive were used to check models' convergence (Markov chains) and validate models' estimations (Gelman et al., 2013).

Results

Figures 1 to 6 display the estimated values and 90% confidence intervals for coaches' competence responses. The full set of estimates and confidence intervals is available in the Supplementary table 3. As shown in Figure 1, regarding the Set the Vision and Strategy dimension, coaches with a degree in Physical Education or Sports Science exhibited higher scores compared to those without this academic background. Additionally, coaches involved at higher competitive levels reported greater values than those working at lower levels of competition. Although other variables showed some variation between groups, these differences were not substantial.



Figure 1. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Set Vision and Strategy dimension, in relation to gender, age group, higher education type, athlete experience and competitive level.

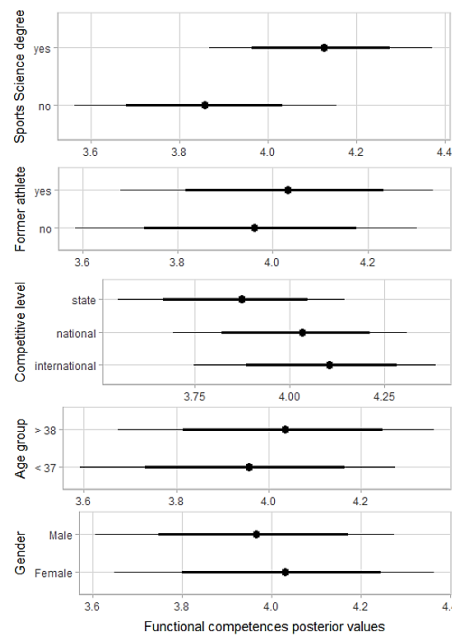


Figure 2 presents the estimated values and 90% confidence intervals for the Shape the Environment dimension. In this dimension, coaches with a degree in Physical Education or Sports Science demonstrated higher scores compared to those without such qualifications. Additionally, older coaches showed higher values than their younger counterparts. A trend of higher scores was also observed among former athletes compared to non-former athletes, coaches at higher competitive levels compared to those at lower levels, and female coaches compared to male coaches.

Figure 2. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Shape the Environment dimension, in relation to gender, age group, higher education type, athletic experience and competitive level.

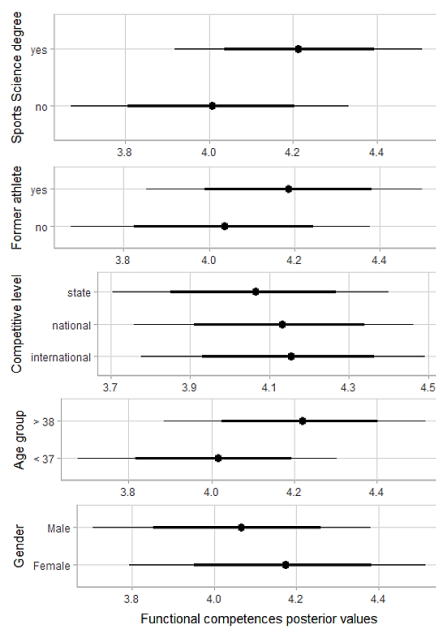


Figure 3 displays the estimates and 90% confidence intervals for the Build Relationships dimension. Coaches with a higher education degree in Physical Education or Sports Science, as well as older coaches, demonstrated higher competence scores in this dimension. Additionally, there was a tendency for female coaches and those working at higher competitive levels to report higher values.



Figure 3. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Build relationships dimension, in relation to gender, age group, higher education type, athletic experience and competitive level.

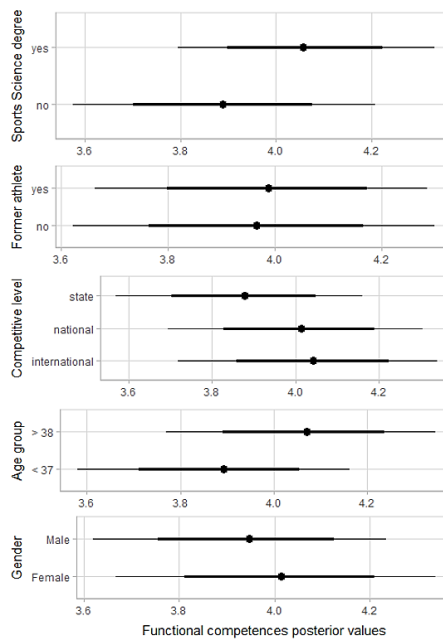


Figure 4 presents the estimates and 90% confidence intervals for the Conduct Practices and Prepare to Manage Competitions dimension. As observed in previous dimensions, coaches with a degree in Physical Education or Sports Science and those in the older age group demonstrated higher competence scores compared to their counterparts. Additionally, a tendency toward higher values was noted among former athletes and coaches operating at higher competitive levels.

Figure 4. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Conduct practices dimension, in relation to gender, age group, higher education type, athletic experience and competitive level.

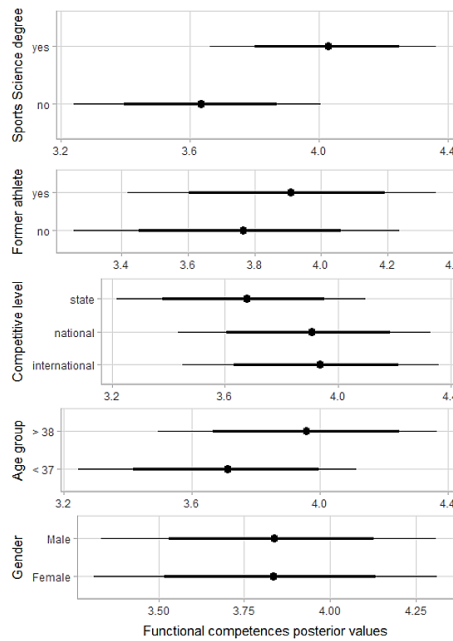
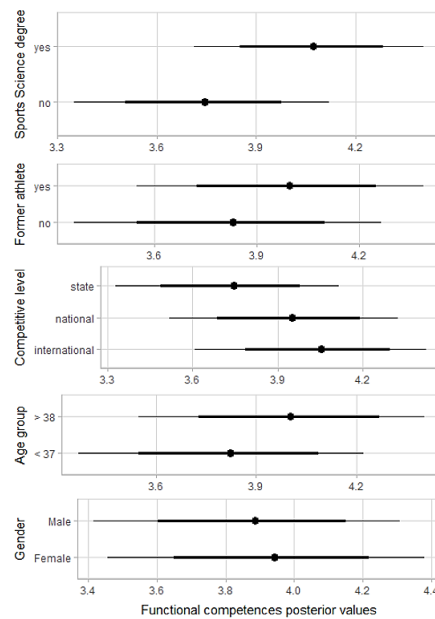


Figure 5 displays the estimates and 90% confidence intervals for the Read and React to the Field dimension. Coaches holding a degree in Physical Education or Sports Science showed higher competence scores compared to those without such a qualification. Similarly, coaches involved at higher competitive levels also demonstrated greater values than those coaching at lower levels.

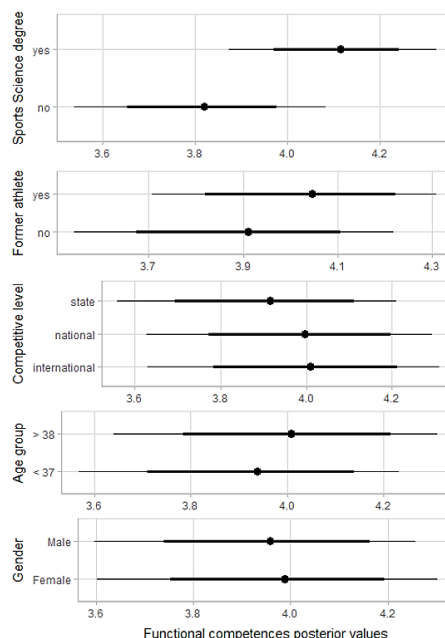


Figure 5. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Read and React to the "Field" dimension, in relation to gender, age group, higher education type, athletic experience and competitive level.



Finally, Figure 6 presents the estimates and 90% confidence intervals for the Learn and Reflect dimension. Among all dimensions analyzed, this was the one with the most similar values across the different groups. The only variable showing a notable difference was higher education type. In this case, coaches with a degree in Physical Education or Sports Science reported higher competence scores compared to those without this academic background.

Figure 6. Estimates and confidence intervals (67% and 90%) of coaches' functional competences, based on the Learn and Reflect dimension, in relation to gender, age group, higher education type, athletic experience and competitive level.



Discussion

The aim of this study was to analyze coaches' functional competences in relation to their individual, educational, and sport-related characteristics. To achieve this, we developed and validated the Coach Functional Competence Questionnaire. Overall, the instrument demonstrated a high level of agreement

among experts, classified as “almost perfect” (Balbinotti et al., 2006; Landis & Koch, 1977), and showed satisfactory evidence of validity (Hair et al., 2014). Furthermore, it aligned with the theoretical framework proposed by the International Council for Coaching Excellence (ICCE, 2012, 2013). The questionnaire's psychometric properties were comparable to those of other validated instruments reported in sports psychology and coaching literature (Camiré et al., 2021; Contreira et al., 2019; Quinaud et al., 2022). Regarding the questionnaire's sensitivity in assessing coaches' functional competences based on individual characteristics, the findings indicated that age group, type of higher education, and competitive level were influential factors. Conversely, neither gender nor prior experience as an athlete substantially impacted the coaches' perceived functional competences.

Older coaches reported higher competence scores than their younger counterparts in the dimensions Shape the Environment, Build Relationships, and Conduct Practices. These findings align with previous studies by Mesquita et al. (2012) and Mesquita et al. (2011), which demonstrated that more experienced coaches tend to perceive themselves as more competent in aspects related to training planning and guidance. Similarly, Santos and Mesquita (2010) emphasized that experienced coaches report greater confidence not only in managing training and competition contexts but also in fulfilling broader educational and organizational demands, such as leading teams and coordinating the activities of athletes and support staff. This finding also suggests that maturity and accumulated practice time contribute to the development of expertise. According to Nash et al. (2023), experienced coaches tend to develop more efficient cognitive routines, recognize patterns in complex situations, and make decisions with greater confidence. This progression is supported by reflective experiences accumulated throughout their careers (Trudel et al., 2016).

Similarly, studies by Egerland et al. (2014) and Mitzel et al. (2020) highlight the correlation between maturity, experience, and the perception of competence among coaches. Egerland et al. (2014) indicate that age (associated with experience) is a relevant factor for self-perception of competence, especially in the dimensions of theoretical-methodological knowledge, sports biodynamics, as well as training planning and management. Mitzel et al. (2020), in turn, recognize the influence of age and experience in this process, but emphasize that the development of competencies requires pedagogical training at all stages of a coach's career. In this perspective, García et al. (2024) reinforce the importance of professional performance based on competencies by highlighting, in their review of the periodization of open water swimming training, that effective load management and the application of scientific principles require the coach to have theoretical and methodological mastery, analytical skills, and sound decision-making abilities. Thus, a coach education model that transcends technical mastery is advocated, promoting a competency-based approach capable of preparing coaches for the complex challenges of the contemporary sports context (Cortela et al., 2017; Mitzel et al., 2020).

Coaches with a degree in Physical Education or Sports Science exhibited higher values across all dimensions of the questionnaire compared to coaches with other or no qualifications. These findings align with the existing literature regarding the relationship between coaches' qualifications and related competencies in coaching (Mesquita et al., 2012; Santos & Mesquita, 2010). Studies show that coaches with a degree in Physical Education perceive themselves to have greater competencies when it comes to planning, directing training sessions, developing sports projects and collaborating in the education of coaches, compared to coaches without the same level of degree (Belkadi, et al., 2019; Mesquita et al., 2012). The evidence highlights the importance of higher education qualifications, which encompass pedagogical, psychological, biomechanical, and sociocultural content, as well as supervised practical learning through internships. Milistetd et al. (2018) emphasize that this knowledge base supports effective practice, adaptation to different contexts, and a deeper understanding of athletes' needs. In addition, higher education encourages engagement in reflective learning processes, fostering the development of professional identity and metacognitive skills (Trudel et al., 2016). In this sense, Santos et al. (2025) demonstrate that the use of digital technologies in university coach education programs can favor learner-centered pedagogical practices, stimulating autonomy, critical reflection, and the development of integrated professional competencies.

According to ICCE (Lara-Bercial, et al., 2022), progress has been made in sport coaches' regulations. However, there is a necessity for improvement over time. Within the broader discussion of coach education, Brazil presents a distinctive case in the international landscape due to the legal regulation of the coaching profession. Since the enactment of Federal Law No. 9,696/1998, it has been mandatory for



individuals working as coaches to hold a bachelor's degree in Physical Education and to be registered with the national professional council. This legal requirement applies across all levels of sport, from youth development to elite performance (Milistetd et al., 2014; Milistetd et al., 2016; Santos, 2018). Despite this regulatory legislation, specific groups of coaches are allowed to operate without graduation (Cortela et al., 2020; Milistetd et al., 2016). These cases generally arise from two exceptions provided for by law: a) coaches who were already working in the field before the enactment of Law No. 9,696/1998 can obtain the title of "Provisional" as long as they legally prove their experience and participate in an instruction program offered by the Federal and/or Regional Physical Education Councils; b) soccer coaches, specifically, have their professional practice guaranteed by Law No. 8,650/1993, provided they prove practical experience in the field (Brazil, 1998; Milistetd et al., 2015; Cortela et al., 2020). In soccer, for example, a study of coaches in the Brazilian Championship Series A and B showed that only 35% (14 out of 40) had education in Physical Education, although all of them exercised the role professionally. Most were former athletes with practical experience but without formal academic qualifications (Furtado et al., 2019). A similar situation occurs in tennis: according to Cortela et al. (2019), among 60 coaches participating in the study, 72% had academic qualifications, while 26% were not educated and 2% had other types of qualifications. The study by Lima et al. (2016), also with tennis coaches, found that only 20% had academic qualification, 10% were specialists in the field, 15% had qualification in other areas, and 55% had no academic qualification.

These examples reinforce the need for regulatory legislation for the coaching profession, seeking to ensure minimum formation standards and promote the implementation of consistent and sustainable educational models (Quinaud et al., 2022; Lara-Bercial et al., 2022; Avner et al., 2017). Brazil stands out for having established legislation in this regard, while Colombia has more recently made progress in creating regulations aimed at professionalizing the field and improving the quality of training and performance of coaches, representing significant progress in the valorization and institutionalization of the profession in the Latin American context (Brazil, 1998; Colombia, 2022).

Lastly, the results showed substantially high values in relation to the competitive level of the coaches when compared in the dimensions: Set Vision and Strategy, Build Relationships, Conduct Practices and Prepare to Manage Competitions and Read and React to the Field. These results are congruent with what is shown in the literature, observing that coaches at higher competitive levels may have more learning opportunities than coaches at lower competitive levels, contributing to the improvement of their professional and interpersonal knowledge and competences (Mesquita et al., 2012; Mesquita et al., 2011; Rodrigues, et al., 2009). In the same vein, Cunha et al. (2025) highlight that the work of female coaches and technical assistants in the Brazilian Women's Basketball League constitutes a formative environment that can enhance situated learning, reflection on practice, and the strengthening of professional identity, emphasizing the influence of the competitive context on the development of professional competencies. Furthermore, it is observed that the competitive level has a direct influence on the nature of the knowledge and competence that the coach recognizes as essential to his practice. As the competitive level rises, the demand for strategic knowledge and management competences intensifies, while at the initial education levels, the need for a predominantly pedagogical, formative and communication approach stands out (González-Rivera et al., 2017; González-Rivera et al., 2023; Iswatiningsih & Setiawan, 2025).

This difference also can be explained by the complexity of high-performance environments, which demand advanced competencies to manage pressure, lead multidisciplinary teams, and innovate in challenging contexts (Trudel, et al., 2021). Participation in international competitions enhances access to learning networks, evidence-based practices, and continuing education opportunities, thereby reinforcing professional development (Ramos, et al., 2023). In addition, the knowledge of elite coaches is shaped by practices and experiences at different levels of competition, being influenced by contextual factors that direct knowledge towards athletes' performance and interpersonal relationships, aiming at sporting success (Greenwood, et al., 2012; Quinaud et al., 2022).

Although no substantial variations were observed in relation to gender and previous experience as an athlete, we could verify some small tendencies on them, which is also important to reflect. The tendency for slightly higher scores among female coaches may be related to the predominantly male context of competitive sports, where women often face structural and cultural barriers to legitimizing their roles (Pill, et al., 2024). In addition, women report facing more sociocultural barriers (discrimination and



marginalization) than men, which is associated with the predominance of their work in recreational and youth contexts, to the detriment of the elite sports environment. Such conditions contribute to a reduction in their intention to remain in coaching careers (Petersen et al., 2024; Orban-Sebestyen & Gal, 2024). As a means of overcoming these challenges, many female coaches invest heavily in professional qualifications and continuous training, which may help explain the higher perception of their competencies (Taylor, et al., 2023).

Regarding previous experience as an athlete, although no significant differences were found, it is important to reflect on the role of athletic experience in coach development. Such experience provides practical knowledge, an understanding of sport-specific demands, and sensitivity to the competitive context. Evidence suggests that coaches with a personal sporting background tend to adopt more athlete-centered approaches and promote more positive motivational environments, with these practical experiences being factors significantly associated with competitive success, often surpassing the influence of formal qualifications (González-García et al., 2019; Kigoshi et al, 2025). However, as Trudel et al. (2021) emphasize, the transition from athlete to coach is not automatic. It requires a critical reorganization of prior knowledge and the development of pedagogical, communicative, and reflective competencies (Nash & Sproule, 2011).

Limitation and Future Directions

This study has several limitations that should be acknowledged. First, data were collected through self-reported measures, which limit the ability to verify coaches' responses regarding individual characteristics such as prior athletic experience and academic background. Second, due to the cross-sectional nature of research design, it is not possible to determine whether the questionnaire is sensitive to changes in functional competencies over time. Moreover, other potentially relevant variables, such as participation in coaching education programs were not assessed, which may have contributed to limitations in model fit and explanatory power. For future research, we recommend applying the questionnaire in different cultural contexts, conducting longitudinal studies to evaluate sensitivity over time, and employing the instrument as a tool within coaching education programs to assess the development of functional coaching competencies. Additionally, researchers should consider validating the questionnaire to their cultures, so we could have an international comparison and understating on coaches' functional competences.

Conclusions

This study aimed to analyze coaches' functional competences considering their individual, educational, and sport-related characteristics. First, we developed and validated the Coach Functional Competence Questionnaire, which proved to be a valuable tool for measuring these competences and identifying variations. Using this instrument, we examined differences in coaches' competencies through multilevel regression analysis, demonstrating the questionnaire's sensitivity in capturing variations linked to individual characteristics that influence competence development. Although the sample consisted exclusively of Brazilian coaches, the instrument's ability to detect differences across diverse variables highlights its potential for application in other countries.

The results indicated that older coaches had higher values in competencies like shaping the environment, building relationships, and conducting practices compared to younger coaches. Additionally, coaches with degrees in Physical Education or Sports Science scored higher in all dimensions than those with different or no degrees. It highlights the importance of this higher education in coaches' functional competences. Furthermore, there were significant differences in values related to competitive levels in dimensions such as Set Vision and Strategy, Build Relationships, Conduct Practices and Prepare to Manage, and Read and React to the Field.

The results derived from this instrument can serve as a valuable resource for coach education programs by offering detailed insights into coaches' strengths and areas for improvement across the six functional competence dimensions. These insights can inform the design of targeted educational content, ensuring that training programs address the specific needs of different coaching profiles (e.g., novice vs. experienced, grassroots vs. elite). In practice, the questionnaire can be integrated into periodic assessments to guide individual learning plans, support the establishment of effective learning frameworks, and enable



the longitudinal monitoring of coaches' competency development over time. Such systematic application sport organizations align coach development strategies with evidence-based priorities, ultimately enhancing both professional practice and athlete outcomes.

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Supplementary material

<https://drive.google.com/drive/folders/1pF1Pg8R2KuSxHlP4tHMG-HPNc0HJkqYy?usp=sharing>

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