WHAT DO FOOTBALL COACHES WANT FROM SPORT SCIENCE?

Michel S. Brink[1], Jurian P. Kuyvenhoven[1], Tynke Toering[2,3], Geir Jordet[2], and Wouter G.P. Frencken[1,4]

[1]Center for Human Movement Sciences, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands
[2]Norwegian School of Sport Sciences, Oslo, Norway
[3]Institute of Coaching and Performance, University of Central Lancashire, Preston, UK
[4]Football Club Groningen, The Netherlands

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Abstract:

Sport science can contribute to the body of knowledge that influences practice and performance. Despite this, knowledge transfer from sport science to football coaches needs further improvement. The present study's purpose is to gain insight in current sport science needs and perceived barriers among professional football coaches. A 29-question digital survey was sent to a database of professional football coaches. Answering options were: check boxes, open fields, and 5-point Likert scales. 75 football coaches (mean ± SD age: 50.0±10.1 years) completed the survey. Coaches had 24.3±7.0 years of experience as a player and 25.5±13.7 years as a coach, and five had a university degree. The coaches evaluated their technical and tactical knowledge as good. Knowledge on physical skills was rated slightly lower and knowledge on mental skills lowest, but still fair. Top five of domains that the coaches wanted to know more about were Mental skills, Physical skills, Group dynamics, Monitoring load and capacity, and Talent development. The top five perceived barriers for using sport science in daily football practice was Conservatism in clubs, Lack of money, Lack of specific football knowledge of scientists, Poor applicability of sports science in practice, and Lack of time. Personal contact with sport scientists was most preferred to gain knowledge in sport science. Results suggest that there is an interest in applying sport scientific knowledge into football practice. An overview of coaches' sport science knowledge gaps and perceived implementation barriers could improve the integration of sport science and practical knowledge in work environments.

Key words: *facilitators, barriers, education, soccer*

Introduction

The ultimate goal in football is to achieve greatness based on performance. The performance of a football team affects many people over the world and therefore has great social influence (Kunz, 2007; FIFA, 2014). From a financial standpoint, it is also important that a professional team performs well. High performing teams typically have a higher income from, e.g., match attendance, sponsorships, TV rights, visitors, merchandise and performance bonuses, which is important for maintenance and growth of clubs (Szymanski, 2001).

Football coaches are directly responsible for the team and have the major objective of enhancing both individual and team performance (Martens, 2001). Football coaches are therefore involved with players on a daily basis, where a major part of the job is to conduct training sessions to get the most out of the team. Sport scientists share similar interests of increasing individual and team performance by conducting scientific research. Sport science can contribute to the body of knowledge that influences athletic practice and performance, which could have a significant and positive effect on the sports environment (Bishop, 2006; Reid, Stewart, & Thorne 2004). Despite the potential benefit from research, the transfer of knowledge from sport-related scientific research to sports coaches needs further improvement (Martens, 2001; Coutts, 2016).

Lack of collaboration between science and practice is frequently mentioned in the literature (Goldsmith, 2000). Science is often criticized for not asking relevant questions for practical environments (Goldsmith, 2000; Reade, Rodgers, & Spriggs

2008). This likely originates from times when scientists were used to solve problems within their own research discipline such as physiology, psychology, or biomechanics. Research questions were therefore not always in line with the complexity of problems coaches faced in reality (Sands, 1998; Sarmento, et al., 2017). The second reason is that scientists follow strict procedures of standardisation in, for example, lab settings, and often select specific target groups (Coutts, 2016). This approach limits practical applicability and generalizability (Bishop, 2006; Pain, & Harwood, 2004; Reid, et al., 2004). Finally, coaches and scientists have different educational backgrounds and use different terminology. As a consequence of speaking different languages, coaches may find it hard to interpret results from scientific literature and apply them in the practical environment. Thus, a variety of reasons could be underlying the gap between sport science and football practice.

To better understand the research needs of sports coaches, a few studies have been conducted to identify the areas coaches are interested in and want to know more about in order to be a better coach (Starling & Lambert, 2017; Stoszkowski & Collins, 2015; Williams & Kendall, 2007). While coaches do believe that sport science can contribute to their coaching, they usually get new ideas from other coaches (Reade, et al., 2008). The interest, perceived relevance, and preference for delivery of sport science knowledge might be different between coaches depending on their performance level, experience, open mindedness, education, previous experiences with sport scientists, and how sport science is defined (Erickson, Bruner, MacDonald, & Côté, 2008; Martindale, & Nash, 2013; Reade, et al., 2008; Young, Jemczyk, Brophy, & Côté, 2009). Although some studies have included football coaches as participants, research focused specifically on this group of subjects can probably better capture the research needs for this particular sport. This is especially relevant for professional coaches, since they are known to be aware of skills and knowledge they need (Collins & Collins, 2015). Therefore, the aim of the present study is to gain insight into professional football coaches' current needs for sport science and perceived barriers to scientific findings application. The insights gained in this study could be used to narrow the gap between sport science and practice in football.

Methods

Instrument

A survey was specifically designed for the aim of the present study and constructed through elaborate inspection of available coaching literature. The survey was evaluated subjectively by the authors as to whether the content was adequate for the purpose of the study and whether the questions were properly formulated. This process resulted in the exclusion of twelve questions and inclusion of three new questions. The revised survey was pilot-tested on one coach to check for clarity and comprehensibility, which resulted in adjustments of the formulation of multiple questions, but no further adjustments were made to the contents of questions. The final version of the survey contained 29 questions.

The first part of the survey included nine questions about subject characteristics such as age, gender, and academic level. The second part contained nine questions on coaching knowledge and previous football experience. The third part consisted of eleven questions regarding the coaches' perceptions of sport science, the perceived transfer of knowledge between sport science and football practice, and the perceived barriers between sport science and football practice. Answering options were: check boxes (N=14), open fields (N=6), and 5-point Likert scales (N=9).

Procedure

The ethical committee of the Center for Human Movement Sciences at the University of Groningen approved the study. Before completing the survey, coaches received information about the purpose of the study and gave their consent for participation. The survey was conducted online using Qualtrics (qualtrics.com). The survey was sent to a database of coaches who were allowed to coach at the professional level and were members of the Union of Professional Coaches in The Netherlands (Coaches Betaald Voetbal).

Data analysis

Means and standard deviations were calculated for multiple choice questions. The responses to open-field questions were categorized into several themes in order to compare between responses of participants.

Results

Background of coaches

Seventy-five participants (mean ± SD age: 50.0±10.1 years, N gender: 75 men, 0 women) completed the survey. In Table 1, an overview of the coaches' playing and coaching experience is presented.

Out of the 75 coaches, two coaches had a bachelor's degree and three a master's degree in addition to their UEFA Pro license. Coaches rated their knowledge about technical and tactical skills as highest, and physical and mental as lower (Figure 1).

The five most often mentioned activities that coaches undertook to gain knowledge were: 1) conversation with players, 2) observation of players, 3)

Table 1. Player and coach experience (in years)

	Youth amateur	Youth professional	Senior amateur	Senior professional	Total
Player (years)	9.0 ± 2.9	2.0 ± 4.5	6.1 ± 6.2	7.1 ± 7.6	24.3 ± 7.0
Coach (years)	3.9 ± 4.6	9.4 ± 8.0	4.6 ± 6.3	7.2 ± 8.1	25.5 ± 13.7

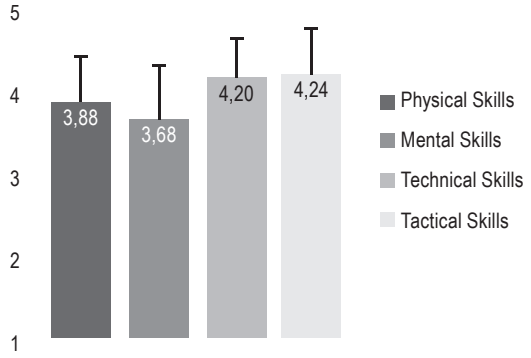

Figure 1. Coaches' knowledge of physical, mental, technical and tactical skills. Participants rated their knowledge of these topics on a 5-point Likert scale (1: very poor – 5: very good).

conversation with other coaches, 4) self-reflection, 5) observation of other coaches.

The five most used resources of information were: 1) applied journals, 2) books, 3) television, 4) online social networks, 5) YouTube.

Sport science needs

The areas of interest that were mentioned most often are presented in Table 2.

Table 2. Areas of interest (absolute N, mentioned with a maximum of 3 per coach)

1. Mental skills	32
2. Physical skills	27
3. Group dynamics	24
4. Monitoring load and players' capacity	23
5. Talent development	17

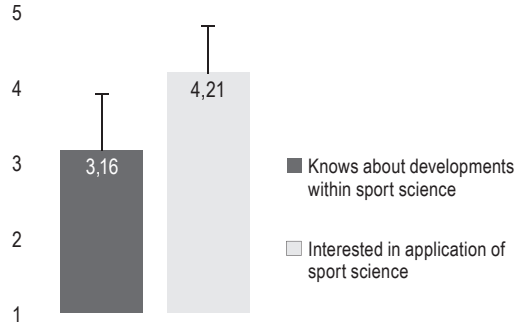

Figure 2. Perceived knowledge of developments within sport science (1: very poor – 5: very good) and interest in application of sport science (1: very uninterested – 5: very interested).

Coaches indicated that they had reasonable knowledge about developments within sport science and they expressed to be interested in the application of sport science to practice (Figure 2).

Barriers for sport science application

The perceived barriers that were mentioned most often are presented in Table 3. Five coaches reported no barriers.

Table 3. Perceived barriers

1. Conservatism in clubs	21
2. Lack of money	17
3. Scientists' lack of specific football knowledge	13
4. Poor applicability of science in practice	10
5. Lack of time	9

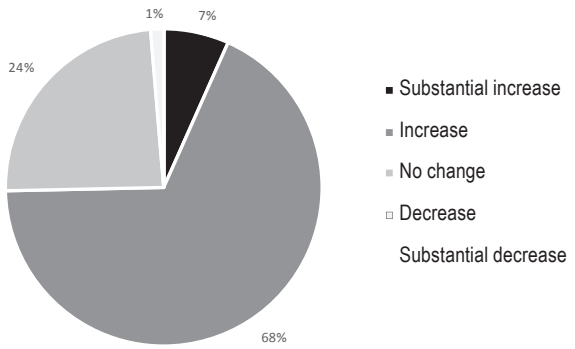

Figure 3. Need for sport science budget change within clubs according to the coaches' opinion.

To gain sport science knowledge, 67% of the coaches preferred personal contact with a sport scientist, 19% used websites, 8% read scientific journals, and 6% visited scientific conferences. Figure 3 presents an overview of the extent to which coaches felt that the budget for sport science within clubs needed to change.

Discussion and conclusions

The aim of the present study was to gain insight into professional football coaches' current needs for sport science and perceived barriers to scientific findings application. The results indicate that professional football coaches have a rich playing and coaching experience, but a minimal academic background. Technical and tactical skills were per-

ceived as coaches' expert domains. Coaches felt that they had less knowledge about mental and physical skills. These were also the domains that they wanted to know more about. Coaches indicated that they had reasonable knowledge about developments within sport science and they expressed their interest in the application of sport science to football practice. The main barriers to sport science were conservatism within clubs and lack of money. Almost 75% of the participants indicated a need to expand budgets for sport science, which mostly referred to the inclusion of sport scientists within the coaching staff to provide personal contacts. The insights gained in this study can be used to narrow the gap between sports science and practice in football.

As indicated in previous studies, coaches predominantly gain information during informal activities with their peers, at coaching clinics and seminars (Erickson, 2008; Reade, et al., 2008; Stoszkowski & Collins, 2015). Sports science conferences are rarely visited and scientific articles seldom used. Only five coaches in this study had any academic background. Lack of academic background could hinder coaches in understanding methods and terms commonly used in science. A solution to this can come from different angles. One is to better integrate science into coach education. Federations could select academic staff based on the topics of interest (presented in this study) and integrate them in the formal coach education. The purpose of this should not be to develop academic skills that would enable coaches to become independent researchers, but to provide coaches with sport science knowledge that is relevant for and accessible to coaching practice. This can include literature search and review, i.e., finding relevant journals and articles, and understanding limitations and practical implications of results. An alternative approach would be to "translate" scientific research and disseminate findings via outlets preferred by coaches. This could be done by independent academics that are hired to review and translate new findings, and who are paid by both federations or clubs and universities. Finally, clubs and federations could embed staff or consultants with a specific research focus within their organisations to develop collaboration between football practice and research institutions (Coutts, 2016). Together, these approaches should lead to a mixture of experience-based and evidence-based education.

The coaches in the present study perceived technical and tactical skills as their expert domains. Coaches felt that they had less knowledge about mental and physical skills. These were also the domains that they wanted to know more about. It should be noted that only two coaches were interested in injury prevention. This is remarkable because injuries are known to be related to team success (Hägglund, et al., 2013). The apparent barriers between practice and sport science reported in previous research were time and interest in reading academic publications (Reade, et al., 2008), but also practical application, relevance, integration, access and language (Martindale & Nash, 2013). The current study confirmed these and added several barriers that were relevant to deal with successful narrowing of the gap between sport science and practice, such as conservatism, lack of money and lack of football-specific knowledge in sport scientists.

Working more closely together could improve scientists' understanding of practice, which may lead them to better connect with coaching staff and work on more relevant questions that exist in the field. This is also in line with the personal contact that most coaches prefer to gain scientific knowledge through (Reade, et al., 2008). A short-term benefit for coaches would be a direct access to scientific knowledge via a personal contact in an informal way. A long-term benefit may be that the collaboration may lead to scientific research that is better tailored to the real-world situation and, as such, easier to apply in practice. Since the scientific publication process is slow, coaches would have a first-hand access to new insights which may give them a winning edge (Coutts, 2016). The latter is in accordance with previous results stating that coaches are motivated to find and implement new ideas in their sports programs (Reade, et al., 2008).

This is the first study that evaluated professional football coaches' current needs for sport science and perceived barriers to scientific findings application. The fact that we included professional coaches in the survey contributed to quality of the study because these coaches were expected to know what types of knowledge and skills were needed to successfully do their job (Collins & Collins, 2015). Since the survey has only been conducted with Dutch coaches, it may have reduced applicability to other countries where, perhaps, other barriers may be at hand. Furthermore, the survey was sent to a database and therefore selection bias could not be ruled out. Because the coaches that participated in the survey were likely to be at different stages in their career, this could have influenced their preferred way of gaining knowledge (Erickson, 2008). Finally, this study focused on professional knowledge of coaches. Yet, coaching knowledge also involves interpersonal and intrapersonal knowledge (Côté, 2009), but this was ignored in the current study.

In conclusion, the results suggest that this sample of professional football coaches is interested in applying sport science knowledge into football practice. The topics and domains they want to know more about and removal of the perceived barriers could improve integrating sport science in football work environments.

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Correspondence to:
Michel S. Brink
Center for Human Movement Sciences
University Medical Center Groningen
P.O. Box 196, 9700 AD Groningen, the Netherlands
Phone: +31625646474
Fax: +31503633150
E-mail: m.s.brink@umcg.nl

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