

Sources of knowledge perceived by coaches: a study with handball coaches of Portugal's 1st league male teams

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Abstract: The core purpose of this study was to identify the sources of knowledge perceived by elite coaches of the 1st Portuguese handball league. Ten semi-structured interviews were conducted and subjected to content analysis. Data revealed that unmediated knowledge sources play a core role in the construction and reconstruction of coaches' knowledge, namely interaction with other coaches, influence of mentors, and experience as a coach.

Keywords: Knowledge. Physical education and training. Training of coaches. Handball.

1 INTRODUCTION

Coaches are considered central to the process of sports development, especially in the elite context where the pressure to achieve high performance levels is extremely high. Indeed, the demands on coaches are not limited to technical and tactical

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issues. In addition to giving extreme complexity to the coaching process, this assumption requires them to master a highly diverse set of skills that are gradually acquired in different spaces and in a wide range of learning situations (MALLETT *et al.*, 2009; NORTH, 2010).

The literature suggests several situations within the panoply experienced by coaches and that work as sources of knowledge, including experience as an athlete (LYNCH; MALLETT, 2006; WIMAN *et al.*, 2010), experience as a coach (ABRAHAM *et al.*, 2006; ERICKSON *et al.*, 2008), attending coaching courses (WRIGHT *et al.*, 2007; WERTHNER; TRUDEL, 2009), influence of mentors (IRWIN *et al.* 2004) and interaction between coaches (JONES *et al.*, 2003; READE *et al.*, 2008).

Alongside this evidence, coaches and the scientific community attribute the success of a coach to much more than a collection of personal attributes (OLLIS; SPROULE, 2007) or mere accumulation of knowledge. Under that view, a reflective practice emerges as key to professional development (NASH; SPROULE, 2009) and has been mentioned in the literature increasingly often (DORGO, 2009; STEPHENSON; JOWETT).

The recognition of the value of developing coaches' knowledge, coupled with the idea that any learning situation is conditioned by reflectivity, caused the emergence of concerns in building coaching courses that encourage reflective practice (KNOWLES *et al.*, 2001; KNOWLES *et al.*, 2006) as well as the search for strategies to facilitate the reflection process (CARSON, 2008).

However, the information produced on the subject of building coaches' knowledge is mostly a result of US sports reality (TRUDEL; GILBERT, 2006). Therefore, it is directly applicable to Portuguese reality.

Indeed, the results of the several studies lack a comparison

with other realities, since the individual and social aspects inherent in the coaching process cannot be ignored (CUSHION *et al.*, 2003). As advocated by Côté *et al.* (1995), the coaching process focuses on the following components: competition; practicing and organization, conditioned by contextual variables – coaches' characteristics; athletes' characteristics and development levels.

Given that background, a foray into Portugal's reality is important for us to gain a better understanding of the process of building coaching knowledge. The concrete reality of coaches in Portugal has to be examined to situate their knowledge acquisition process.

In this context, the main purpose of this study was to identify the sources of knowledge perceived by handball coaches in Portugal at three different moments of their sports careers: those they have used in the past, those they use in the present and those they would like to use in the future.

2 METHODOLOGY

2.1 PARTICIPANTS

Ten handball head coaches of male teams of the 1st Portuguese league in the 2009/2010 season took part in the study. They are considered successful, because they have attained the highest level of practice in the country as coaches. However, in the light of the literature, four out of ten are not considered experts since they do not meet the criterion of professional experience (<10 years) defined by Lemyre *et al.* (2007) and considered by Saury *et al.* (1998) and Valleé and Bloom (2005) in their studies (Table 1).

Table 1 – Characteristics of coaches interviewed.

Criterion	Coaches									
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Age	44	55	30	43	47	37	55	38	42	35
Academic degree	D	M	12nd	12nd	M	M	G	G	M	G
Years of experience as an athlete	8	18	20	10	16	23	7	21	15	12
Years of experience as a coach	25	30	7	20	23	5	39	7	22	7

Key: C=Coach; 12th=12th year; G=Graduation; M=Master's degree; D=Doctor's Degree

Source: Data provided by the authors

All subjects were male, nine of them were Portuguese nationals and one was Serbian, aged between 30 and 55 years (mean=42.6±8.2). Their coaching experience ranged from 5 to 39 years (mean=18.5±11.6) and their experience as federated handball players varied between 7 and 23 years (mean=15.0±5.6). Six coaches were involved in the work of regional teams as athletes, four of whom came to compete for national teams, three in the Portuguese squad and one in the Yugoslav squad. With regard to academic degree, most have higher education, and only one does not come from the area of Sports Sciences. All of them hold the maximum coach level (grade IV) assigned by the Portuguese Handball Federation.

2.2 COLLECTION PROCEDURES

This study used the qualitative methodology because it was considered the most appropriate for the complexity of the coaching

process (CUSHION, 2007). More specifically, we decided to collect data based on a semi-structured interview because of the degree of flexibility it allows (CULVER *et al.*, 2003). Instrument validation was performed in two stages. First, content was validated with reference to the goals of the study and the theoretical framework for knowledge sources and development stages of coaches' competence. Then the script was subjected to two experts in the field of Sports Sciences, who attested to its suitability for the study's goals and its respective theoretical framework.

Secondly, face validity was tested through a pilot interview with a coach with the same profile of participants. The purpose was to verify if the questions were understandable and appropriate as well as whether the information collected responded to the goals that had been set. It should also be noted that at the end of interviews, respondents were asked to speak about the interview content, taking the goals previously presented into account. He was also asked whether the interview was conducted appropriately. In terms of structure, the interview includes four thematic groups of open questions: 1) sports career as an athlete; 2) career as a coach; 3) work as a coach; 4) professional competence.

Each interview was conducted in a place and date convenient to coaches and recorded, with due permission, by a WS-110 digital voice recorder. Interviews lasted 24-87 minutes.

All head coaches of teams competing in the 1st league male national championship during the time studied were invited by e-mail or telephone to participate in the study. Almost all (11 out of 12) agreed to participate. However, one of the interviews was used only as a pilot for refining the instrument.

2.3 ANALYTICAL PROCEDURES

Responses obtained during interviews were fully transcribed and subjected to content analysis procedures between the deductive and the inductive poles, using the NVivo 7 software.

A priori categories and subcategories were defined based on literature review, as well as three a posteriori subcategories derived from information provided by interviews.

2.3.1 KNOWLEDGE SOURCES

The categories were established in advance according to the classification of learning situations proposed by Werthner and Trudel (2006): (A) mediated; (B) unmediated; and (C) internal.

Subcategories were also defined a priori: (A1) coaching courses; (A2) academic education; (A3) workshops/clinics; (B1) interaction with coaches; (B2) interaction with athletes; (B3) experience as an athlete; (B4); coaching experience (B5); influence of mentors; (B6) observing competitions; (B7) observing coaches; (B8) research and investigation; (C1) reflection.

However, during the analysis it was necessary to include new – a posteriori – subcategories to deal with the information from interviews: (B9) interaction with sports agents; (B10) technological material; (B11) competition.

In addition, we proceeded to a time-based analysis (past, present or future) according to coaches' perception about the time of learning.

2.3.2 MEDIATED CATEGORY

In mediated learning situations, contents are partitioned into modules and conveyed by the voice of an instructor who is considered an expert. They are usually associated with a certification for incorporating the knowledge that government structures have established as essential for good professional performance (Table 2).

Table 2 – Subcategories under the mediated category

Subcategories	Excerpts
Coaching courses	“The courses are very comprehensive and give us the possibility to balance our knowledge a little more” (C10, ref. 20)
Academic education	“In college I was given scientific knowledge” (C8, ref. 2)
Workshops/ Clinics	“At the club we used to do internal training, there was something I don’t know if it’s still there, they got young people who were initiated, youth or juniors and did training sessions, then I started learning”. (C7, ref. 9)

Source: Data provided by the authors

2.3.3 UNMEDIATED CATEGORY

Unmediated learning situations can occur anywhere and anytime, without the action of an instructor. Coaches choose stimuli to focus on, taking responsibility for what they intend to learn. However, these learning situations are limited to their own ability to learn, since one cannot find information on a subject one is unaware of (Table 3).

Table 3 – Subcategories of the unmediated category

Subcategories	Excerpts
Interaction with coaches	“[...] what marked me more and made me grow more was the contact with fellow coaches”. (C4, ref. 2)

Interaction with athletes	“[...] we are always learning, we learn from players [...]” (C7, ref. 2)
Experience as an athlete	“[...] I think that one of the things I gained from being a player was experience, because being a player is the same as having practical lessons for 20 years”. (C6, ref. 7)
Coaching experience	“Not everything we think works out and that’s also a way to acquire knowledge; if I had not put that into practice I would never have reached conclusions”. (C8, ref. 36)
Influence of mentors	“My first coach was a role model to me, because of his attitude towards practice, competition, the responsibility with which he used to face things”. (C1, ref. 6)
Observing competitions	“I can watch two handball matches a day, of my team and of opponents, and that is where I go get content”. (C10, ref. 17)
Observing coaches	“[...] where I sometimes go for information is when I visit the gym and to watch, for example, a practice session of the initiated or youth, if I see some exercise I like, I’ll do it regardless of who the coach is”. (C10, ref. 19)
Research and investigation	“I’d read, research a lot, I was interested in every literature on handball”. (C5, ref. 8)
Interaction with sports agents	“Right now my priority to improve my level of competence is to continue sharing knowledge with fellow teachers”. (C8, ref. 30)
Technological material	“To improve my competence as a coach I’d like to get video treatment software, because afterwards we just press a button and see the whole information of this or that athlete”. (C3, ref. 23)
Competition	“This positive win/lose confrontation makes us grow as coaches [...]” (C10, ref. 25)

SOURCE: PROVIDED BY THE AUTHORS

2.3.4 INTERNAL CATEGORY

Internal learning situations are the result of reconsidering ideas already existing in the coach's cognitive structure through a reflection process (Table 4).

Table 4 – Subcategories of the internal category

Subcategories	Excerpts
Reflection	“The most important was the lived experience and the analysis of that experience”. (C10, ref. 26)

3 RESULTS

Data show that the several sources of learning are perceived by coaches as influencing the construction of their knowledge. The most often mentioned category is related to the sources afforded by situations of *unmediated learning*, with 196 references by all coaches, followed *mediated* situations with 43 references associated to eight coaches. The least often mentioned category is *internal*, with only six references by three coaches (Table 5).

Table 5 - Distribution of references by categories sources of knowledge

	Categories	Subcategories	Cases	References			T
				Ps	Pr	F	
Knowledge		Coach courses	4	7	0	0	7
	Mediated	Academic education	4	8	2	3	13
		Workshops/clinics	7	17	3	3	23
			8 cases - 43 references				
		Interaction with coaches	8	19	4	15	38
		Interaction with athletes	2	2	2	0	4
		Experience as an athlete	8	21	0	0	21
		Coaching experience	8	18	6	5	29
		Influence of mentors	9	33	0	0	33
	Unmediated	Observing competitions	4	4	4	4	12
		Observing coaches	7	8	7	5	20
		Research and investigation	7	9	9	2	20
		Interaction with sports agents	5	9	1	2	12
		Technological material	1	0	0	1	1
		Competition	4	3	1	2	6
			10 cases – 196 references				
	Internal	Reflection	3	2	1	3	6
			3 cases – 6 references				

Key: Ps=Past; Pr=Present; F=Future; T=Total

Source: Data provided by the authors

Still in this global analysis, it is clear that the three sources for construction and reconstruction of their knowledge that are most referenced by coaches are derived from the *unmediated* category, represented by the following subcategories: interaction with coaches (38 ref.); influence of mentors (33 ref.); and coaching experience (29 ref.). However, those that are referenced by a larger number of coaches are: influence of mentors; interaction with coaches; experience as an athlete; and coaching experience.

By individually examining each category, *workshops/clinics*

appear in the *mediated* category as the most referenced sources of knowledge and *coaching courses* come as the least referenced sources. Interview excerpts illustrate the low relevance coaches attribute to the subcategory of *coaching courses*: “I learned nothing new” (T8); “They have lower relevance” (T4); “Honestly, the quality of those courses is poor” (T5).

In the *unmediated* category, in addition to the results already stated, there is a larger number of sources of knowledge represented by 11 subcategories, compared to only three in the *mediated* category.

As for the time factor, considered as a complementary form of content analysis, it appears that coaches understand *influence of mentors*, *experience as an athlete*, and *interaction with coaches* as the most important sources for the construction of their knowledge. In the reconstruction of that very knowledge, coaches indicate *research and investigation*, *observation of coaches* and *coaching experience* as their main sources of knowledge.

For the future, coaches indicate the sources of knowledge they would like to have available to improve their levels of knowledge as: interaction with coaches, observation of coaches, coaching experience and observing competitions. However, they point out lack of time and the competitive nature of the activity they develop as conditioning elements. The excerpts of the interviews betray the constraints that coaches perceive: “I’d like to participate in preparatory work for high-level teams, preparatory stages, but unfortunately as long as I’m connected to practice I can’t do it for lack of time” (C5, ref. 15), “[...] whether we like it or not, coaches like to keep some of their things for themselves because they believe that there lie the keys to their success” (C1, ref. 21).

At the level of knowledge sources perceived by each of the coaches, the *unmediated* category is referenced in all cases, taking on a prominent place in relation to the number of references, followed by the *mediated* category and – last – by the *internal* category (Table 6). The excerpt of the interview

reveals the relevance of the *unmediated* category in coaches' perception about the construction of knowledge: "I'm practical and my reference is the game and what happens at the game; then I transform everything for the practice field; I don't go after anything that is not practical experience" (C10, ref. 14).

Table 6 – Distribution of each coach's references over categories

Knowledge sources		Coaches									
	References	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Mediated	10	0	4	0	2	6	5	8	5	3	
Unmediated	17	5	25	14	14	27	21	43	8	22	
Internal	0	0	0	0	3	0	0	1	0	2	

Key: C=Coach

For each of the coaches, the three sub greater number of references, there is at least one of the highest values in subcategories associated with unmediated learning knowledge sources (Table 7).

Table 7 – Distribution of references of each coach by subcategories

	Coaches									
Knowledge sources	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Coach courses	0	0	2	0	0	0	1	2	0	2
Academic education	2	0	0	0	0	3	0	6	2	0
Workshops/clinics	8	0	2	0	2	3	4	0	3	1
Interaction with coaches	3	0	5	5	5	9	2	8	1	0
Interaction with athletes	0	1	0	0	0	0	3	0	0	0
Experience as an athlete	1	3	0	1	0	5	1	6	1	3
Coaching experience	1	1	5	3	3	2	0	8	0	6
Influence of mentors	2	0	1	1	2	3	4	5	6	9
Observing competitions	0	0	0	0	1	0	2	8	0	1
Observing coaches	4	0	1	3	0	7	3	1	0	1
Research and investigation	3	0	6	1	2	1	3	4	0	0
Interaction with sports agents	2	0	6	0	1	0	1	2	0	0

Technological material	0	0	1	0	0	0	0	0	0	0
Competition	1	0	0	0	0	0	2	1	0	2
Reflection	0	0	0	0	3	0	0	1	0	2

Key: C=Coach; no. of higher References

Source: Data provided by the authors

Only coaches 1, 7 and 9 show the highest values in subcategories belonging to mediated knowledge sources and coach 5 shows them in the subcategory reflection.

By directing attention to each of the subcategories, we could also see that *reflection* is valued only by coaches 5, 8 and 10 and that *experience as a player* has higher values for coaches 2, 6, 8 and 10.

The interview excerpt illustrates the relevance that experience as an athlete takes on for coaches' knowledge:

The experience I was fortunate enough to have at my level of playing gave me the chance to know several realities, Nordic handball, that from the Iberian Peninsula, which are different philosophies, and I learned a little of each to define my personality as a coach. (C8, ref. 9).

Interaction with athletes is present only for coaches 2 and 7. By way of illustration, we show the excerpt of the interview that reveals the construction of knowledge through interaction with athletes:

We are responsible for 20% on what players do, the rest is related to peoples' qualities, their value, with the commitment they have to the task, then they evolve and they are the ones to teach us, because they appear doing things we only helped to enhance. (C7, ref. 25).

Another aspect that should be highlighted is the reference to the subcategory *coaching courses* only by coaches 3, 7, 8 and 10.

4 DISCUSSION OF RESULTS

Portugal's sports reality has peculiar characteristics that distinguish it from the realities experienced in other countries analyzed in most scientific studies. In fact, the characteristics of coaches themselves tend to reflect a heterogeneous nature of reality, with large variations in age and experience.

4.1 KNOWLEDGE SOURCES

In general, a sharp discrepancy is found in the amount of *unmediated* knowledge sources compared to *mediated* and *internal* ones, either by the number of sub-categories defined or by the number of references emerging from each of them. Regardless of the time factor, *unmediated* knowledge sources certainly appear as the core sources of coaches' knowledge, occupying a prominent place for all coaches.

In a more detailed analysis, in turn, it is clear that out of the three main sources of knowledge mentioned by coaches, those belonging to the *internal* and *mediated* categories are in evidence for only two coaches. The figure contrasts with the ten coaches that highlight the *unmediated* category. However, despite clear centralization of references in the *unmediated* category, there seems to be no common history between coaches. In fact, we see some convergent traits but variability prevails, denouncing the very complexity of the knowledge construction process. These data contrast with those advocated by Nash and Sproule (2009), who say that there is no list of personal characteristics or standard behaviors that can ensure coaches' success.

Alongside this element, the most referenced categories might merge with those appearing in most cases. On the one hand, there is *interaction with coaches*, *influence of mentors* and *experience as a coach*; on the other hand, only *experience as a player* is added. These data underscore the practical character of knowledge construction.

4.1.1 UNMEDIATED KNOWLEDGE SOURCES

Time seems to influence the nature of unmediated sources of choice. Thus, if we look at knowledge construction as a past process, coaches perceive *influence of mentors*, *experience as an athlete* and *interaction with coaches* as the main sources of knowledge. These are learning situations to which coaches are subject without a deliberate search for knowledge. In a way, they are receivers of information, of which they become aware years later when they understand the influences they were subjected to. Regarding the reconstruction of that very knowledge, sources of knowledge change, with greater participation by coaches who intentionally seek to increase their knowledge.

Consequently, action becomes more conscious and eventually leads to the observation of coaches, experience as a coach, and research and investigation as sources of knowledge used in the present.

For the future, coaches maintain the same options focusing their preferences on interaction with coaches, observation of coaches, experience as a coach, and observation of competitions. However, as shown by Gilbert and Trudel (2005), the competitive nature of the coaching process conditions knowledge sharing. Coaches end up not interacting regularly with their peers because they see them as opponents rather than partners (CULVER; TRUDEL, 2008).

4.1.2 EXPERIENCE AS AN ATHLETE

The subcategory *experience as an athlete* is ascribed higher values by coaches who have similar characteristics with regard to their sports practice. As athletes, those coaches worked with national teams, which points to the importance of *experience as an athlete* in the acquisition of knowledge for the coaching function. Nevertheless, it does not seem to be a necessary condition; it is rather a possibility to acquire knowledge that values coaches' actions. On the other hand, participation in international competitions seems to be a relevant source of knowledge for those who had the chance to experience it.

4.1.3 INTERACTION WITH ATHLETES

Still associated with the subcategories of *unmediated learning*, we found the only coaches to say they acquire knowledge by interacting with athletes were older ones who have more experience as coaches. This information refers to the need to understand the importance of experience and age as conditioning factors for the very process of knowledge construction, since, as suggested by Côté (2006), professional competence only arises after a certain level of experience is acquired. Experience allows coaches to reach professional maturity, freeing them from the need for social assertion, making them more flexible in their relationship with athletes and directing them to the personal development of each of those athletes. Coaches show firm stances and unquestionable leadership within the working group, giving them a greater chance of interacting with athletes and allowing learning to occur.

4.1.4 MEDIATED KNOWLEDGE SOURCES

All coaches who underscored the *mediated* category belong to the group with less experience as athletes. They include five coaches, and only two of them did not underscore mediated learning as one of their three main sources of knowledge. They refer to their participation in the work of national or regional teams. Thus, it appears that their references to the *mediated* category are conditioned by their experience as athletes and level of sports practice.

Coaches with less experience as athletes and without sports participation at a high competitive level, in turn, tend to value mediated sources of knowledge as a way of acquiring knowledge, possibly because they did not have a wide range of experiences that a certain level of sports practice tends to provide.

This finding demonstrates that sports practice per se is not a relevant factor in building coaches' knowledge, but their participation in a particular context of practice is. Coaches

with less experience as athletes may need to resort to mediated knowledge sources as a way to address this lack of experiences in high competitive contexts. According to this view, Carter and Bloom (2009) state that a coach can become an expert without accumulating experiences as an athlete in elite contexts, but the absence of those experiences requires much more work to fill gaps in their knowledge.

4.1.5 COACHING COURSES AND ACADEMIC EDUCATION??

The subcategory of coaching courses was only mentioned by four coaches belonging to the group with lower academic degree. This suggests that the absence of high academic degrees causes coaches to ascribe higher value to coaching courses, possibly because they are the only source of conceptual knowledge needed for their work that is available to them. On the other hand, most coaches who refer to academic education have a college degree, suggesting that knowledge gained in higher education institutions eventually takes over that provided by coaching courses.

It should also be noted that the low reference to coaching courses can be linked to their mandatory nature. Indeed, as suggested by Côté (2006), these federally imposed courses are developed at specific times of the sports season and condition coaches' predisposition to acquire knowledge, ultimately proving ineffective in promoting behavioral changes.

4.1.6 INTERNAL KNOWLEDGE SOURCE

Within the *internal* category, we found that the subcategory *reflection* is referenced in only three cases, even though the scientific community is often pointing out its importance in construction of coaches' knowledge (WATSON; WILCOX, 2000; Jones, 2007). However, the three coaches that mention that kind of learning were influenced by the same mentor, which may be have conditioned the reflective nature of their practice. Having contact with and learning from a reflective coach may foster future reflection capacity. However, none of the coaches who

stress reflection relates their mentors to that ability. Nevertheless, the lack of impact of the *internal* category should be addressed. Thus, the presence of reflection may underlie all other unmediated knowledge sources since it is a condition for contact with the distinct learning situations that can result in knowledge acquisition (NORMAN, 2010). Learning will require a reflection that is often not perceived by the very people intervening in the cases, and it eventually translates as low reference to the category.

5 CONCLUSIONS

Unmediated knowledge sources play a leading role in the construction and reconstruction of coaches' knowledge, followed by mediated and the internal sources. However, the time factor seems to contribute some differences.

Among sources perceived by coaches in their past for the construction of knowledge, *influence of mentors*, *experience as an athlete*, and *interaction with coaches* had greater impact. For the reconstruction of that very knowledge, we found *research and investigation*, *observing coaches*, and *experience as a coach*. For the future, coaches expressed preference for *interaction with coaches*, *observing coaches*, *coaching experience* and *observing competitions*.

On the other hand, there appear to be associations between:

reference to the *mediated* category as well as *experience as an athlete* and *competitive level experienced*. The lower the *experience as an athlete* and the lower the *competitive level* in which coaches developed their sport, the higher their reference to *mediated* knowledge sources;

reference to sub-category *coaching courses* and *academic degree*. The lower *academic degree*, the higher the reference to the subcategory *coaching courses*;

reference to the sub-categories *academic education* and

academic degree. The higher the academic degree, the higher the reference to the subcategory *academic education*;

reference to the subcategory *experience as an athlete* and *competitive level experienced as an athlete*. The higher the competitive level coaches experienced as athletes, the higher their reference to the subcategory *experience as an athlete*;

reference to the subcategory *interaction with athletes* and *age* and *experience as a coach*. The higher the *age* and *experience as a coach*, the higher the reference to the subcategory *interaction with athletes*.

In short, high variability of results reflects the complexity of construction and reconstruction of coaches' knowledge. In effect, there is no single path for coaches to acquire and reconstruct knowledge. There are sources that coaches perceive as more relevant than others for their personal growth, which are closely related to their convictions. On the other hand, in the contact with the different knowledge sources, coaches carry a set of personal features and experiences that cause learnings to take individual meanings.

Regardless of any apparent individual variability, only a thorough understanding of each coach's process of construction and reconstruction of knowledge will allow setting courses that more appropriate to coaches' needs.

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