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Views about knowledge acquisition for coaching practice

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Abstract

Background: The constructivist epistemology highlights how optimal learning comes from active involvement with the society and the surroundings by gaining experience. To learn to coach can occur through an individual, relational and content knowledge level by using formal, informal and non-formal educational sources. The coaches' own subjective view on their knowledge acquisition and learning have been investigated in this research to understand their opinion on how they have gained the knowledge they use in their coaching practice.

Method: A Q method of 45 opinions has been presented to 45 coaches from different sports. The coaches considered and rank-ordered the statements through a set Q sorting procedure. Three factors were extracted from the centroid factor analysis, and those were further analysed through VariMax rotation.

Results: The three factors represent different viewpoints on the subject matter. Factor A emphasised informal educational sources as experience, reflection and communication as important for personal and content knowledge learning. Factor B emphasised informal knowledge sources as experience and communication and formal knowledge sources as important for personal and content knowledge learning. Factor C highlighted formal studies as important for learning at a personal, relational and content knowledge learning.

Conclusion: Even though there were many different options to choose from, most of the coaches thought that the informal educational source experience was the preferred method to gain knowledge from about their coaching job. This was a very interesting found, and since the Q method cannot make clear cause and effect conclusions this finding should be investigated further in future research with the use of both qualitative and quantitative research methods.

Preface:

Working with this thesis has been very interesting and I have learned a lot. The topic for the research was developed through the end of my first year as a master student, when I was introduced to theories around learning and how this related to coaching. As a relatively new and inexperience coach myself, I found it very interesting to investigate research that included the topics learning to coach and knowledge for coaching.

I feel very privileged to have been allowed to cooperate and work with knowledgeable researchers at Olympiatoppen Midt-Norge and Senteret for Toppidrettsforskning that are based at Granåsen Toppidrettssenter. A huge thanks to them for giving me a place to work and for the good working environment they have contributed with. I would like to give a special thanks to Frode Moen for being my supervisor and giving me good guidance, for including me in his project and for introducing me to Q methodology.

To do this research with Q methodology was very challenging since this research method was completely new to me. I have learned as I went on, which I think have been an advantage as I have been able to be learning by doing.

I would like to thank all the coaches that took their time to participate in this research, without their involvement I would not have been able to write this thesis.

I would also like to thank family and friends for their support during my work on this thesis. You have helped me keep my spirits up through this last year, and for that I am very grateful.

Ida Bruem Reistad

Table of contents

Introduction:

The coaching practice has today become a recognised profession. One of the reasons coaching sport has gained a profession status is its similarity to the teaching profession and for the similarity sport has to physical education (Jones, 2007; Siedentop, 2002). The governing bodies of sport have increased their coaching courses for required certification, and by that helped coaching sport become an acceptable profession. The increase in formal education sources that gives the coaches certifications to coach have lead to more research on how the coaches learns and acquire knowledge that they use in their coaching practice (Cushion et al., 2010). The research have come to conclude that there exists several sources that the coaches use to gain more knowledge for their profession, and just because the formal education sources, as higher education and governing sport courses, give certifications it might not be the best source for the coaches to learn (Erickson, Bruner, MacDonald, & Côté, 2008; Gilbert & Trudel, 2001; Nelson, Cushion, Potrac, & Groom, 2014).

In a study done by Stoszkowski and Collins (2015) the coaches actual and preferred methods of acquiring coaching knowledge were investigated, and they found that the coaches used several different source for this purpose. Higher education, personal experiences and continuing professional development courses were all mentioned. They concluded that even though the informal sources of experience were the ones the coaches preferred, did they recognise the importance of more formal sources and also a desire to seek these sources. Mesquita, Isidro and Rosado (2010) did a similar study and found experiential sources as much more valued learning sources than higher formal education. Other research on this topic agrees with this, and highlights the importance of getting a clear view on what sources the coaches prefer to learn from to be able to optimise these sources to create more knowledgeable and competent coaches (Cushion et al., 2010; Irwin, Hanton, & Kerwin, 2004; Mesquita, Ribeiro, Santos, & Morgan, 2014).

The purpose of this research thesis is to investigate the coaches' own subjective views on their knowledge acquisition and learning (Moen, Reistad, Myhre & Allgood, 2016).

Theoretical background:

As this thesis focuses on coaches' knowledge acquisition and learning, the theory will explain education for coaching, relevant learning theory, level that learning can occur on and more specific theories for the coaching practice. Education is gone into detail first because of its aim to stimulate learning and the development of new knowledge. Thereafter constructivism will be described since its approach to knowledge is most applicable for the very complex and social role of coaching (Cushion et al., 2010). Next the individual, relational and content knowledge level of learning is explained to emphasise areas that are important for coaches to have knowledge about (Côté & Gilbert, 2009). The end of the theoretical background will consist of specific theories for the coaching practice, and highlight how the theory connects with the everyday work as a sport coach.

Education

Since acquiring knowledge and the learning process can occur at any time, education must be seen as more than just something that is related to schools. Nelson, Cushion and Portac (2006) looked at the development of coaching knowledge as something that occurred within a framework of formal, non-formal and informal learning. This framework was originally developed by Coombs and Ahmed (1974) to look into education and learning that happened outside of the traditional place- and time-bound schooling system. They compared education and learning to each other and developed a three part education and learning framework.

Formal education

Formal education is defined by Coombs and Ahmed (1974, p. 8) as "institutionalised, chronologically graded and hierarchically structured educational system". Higher education related to sport science and coaching and coach certification programmes developed by the governing bodies of sport falls in under the category formal coach education. These types of courses are usually institutionalised and have normally a guided delivery (Mallett, Trudel, Lyle, & Rynne, 2009). Through formal education programmes the coaches will gain a certificate for coaching, and the programmes can be divided into several levels that have to be taken in a set order. This order has the beginner level first, which must be registered and certified before the next level can be

reached. The beginner level is necessary to complete before moving up to a more advanced level. Common for the formal education programmes are that they are build on a curriculum and a set of guidelines for what is to be learned, and that they are compulsory (Nelson et al., 2006).

Through attending coaching programmes in the regiment of the governing bodies of sport the coach will obtain a certificate to coach in specific sports. These programmes are organised by the independent sports to specialise coaches to coach their sport (Wright, Trudel, & Culver, 2007). Through these certification programmes the coaches will learn to use the correct terminology for the technical aspects of their sport, and learn how to apply them correctly to enhance the athletes development (Callary, Werthner, & Trudel, 2012). This sport-specific content knowledge has been reported to be important for excellence coaching, and it is learning that the coaches value (Côté & Gilbert, 2009; Stoszkowski & Collins, 2015). The governing bodies of sport certification programmes and university degree coaching programmes have both been criticised for the lack of relevant learning towards the practical work as a coach. Even so, research suggest that it is important to obtain some kind of formal certification to increase the knowledge base relevant for coaching, and especially for young and inexperienced coaches (Mallett et al., 2009; Wright et al., 2007).

Informal education

Informal education is based on personal experiences and reflections within the sport, and includes experience as an athlete, coaching experience, interactions with other coaches and athletes, and informal mentoring (Cushion et al., 2010; Erickson et al., 2008). Informal education is defined as "The lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment" (Coombs & Ahmed, 1974, p. 8). From this definition informal education becomes a learning process that continues throughout the life, and for a coach it will be a process proceeding as long as the coaching career and as long as the coach is exposed to the sport setting.

Experience as an former athlete within the sport is reported to be an advantage in coaching, but not a necessity (Irwin et al., 2004). The advantage is that the coach will

have a great understanding of the sport from an athlete point of view and therefore might relate better to the athletes feelings. The coach will also have experienced several other coaches and gained experience from how their coaching styles worked (Wright et al., 2007). Experience as a coach is stated to be learning by doing, and include the coach reflecting on own experiences and by the use of the method trying and failing (Irwin et al., 2004). Moon (2004, p. 82) explains reflection as 'a process of re-organizing knowledge and emotional orientations in order to achieve further insights'. Gilbert and Trudel (2001) divided reflection into three parts as a result of their findings and in agreement with the current literature (Schön, 1983). Reflection in action happens when a coach reflects while still in the coaching mode of training. Reflection on action occurs when the coach reflects between training, and retrospective reflection on action occurs when the reflection cannot affect the situation and are performed outside of the season. Learning from reflection over own experience is an important source for further development for the coaches (Cushion et al., 2010).

Another informal experiential learning situation that coaches prefer is interactions with other coaches and their athletes. Through conversations and observation of other expert coaches and peers the coaches learn more about their own coaching practice (Cushion et al., 2010). Ericson et al. (2008) found in their study that the coaches ranked interaction with other coaches/peers as the second most valued knowledge source right behind learning by doing. This is also the case in other studies, and it is reported that the coaches continue to learn by sharing experiences and coaching cases with each other for a shared discussion (Gilbert, Gallimore, & Trudel, 2009; Mesquita et al., 2010; Stoszkowski & Collins, 2015). Informal mentoring is a method for the inexperienced coaches to seek knowledge from experienced coaches. The novice coaches can learn to become more reflective about their coaching practice by having a mentor to observe, discuss and be observed by (Irwin et al., 2004). By having a mentor to consult with can be timesaving for the new coach since the mentor can give advice on what works and not out from own experiences, so the novice coach saves time by not having to try out methods that do not work for oneself. Through this the novice coach learns from others' experience (Erickson et al., 2008).

Learning through interaction with others is a preferred method of knowledge acquisition by coaches, and this is in agreement of Lave and Wenger's theory of communities of practice (Erickson et al., 2008; Lave, 2003). In these communities and in the theory of social learning the whole environment around the coaches is important for learning. So also interaction with the athletes is reported to be important for the coaches learning, and especially the learning of interpersonal skills. By communicating with them and observing them the coach learns how to best approach the athletes to optimise the athletes learning and engagement into their sport. Good performances within sport are reported to be a result of good cooperation between athletes, coaches and the whole sporting team. It is therefore important for the coach to seek information from the athletes to gain more knowledge for their coaching practice (Callary et al., 2012).

Non-formal education

Non-formal coach education is the third form of education. Non-formal education is defined as "any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population" (Coombs & Ahmed, 1974, p. 8). Therefore, non-formal coach education includes courses, seminars and conferences that do not take part at the formal institutional level. This may be a short course that focuses on specific themes and areas of interest, which is often used by the experienced coach as a continuing professional development (Cushion et al., 2010). Non-formal education differs from formal education since it does not have a set curriculum or the requirement of certification, and it differs from informal education since non-formal education is more structured and organized (Nelson et al., 2006). These dividing lines between the three forms of education are in reality very vague so all the three forms blends together in the practical world (Coombs & Ahmed, 1974).

Courses, seminars and workshops are organized for coaches with formal education as a form for continuing professional development, where the focus is to stimulate further learning through specific areas. It is also organized for coaches without any form for formal qualifications as a method to enhance their knowledge about their sport and the coaching practice. These workshops are usually structured to focus on one aspect of the coaching practice, and therefore do not take a lot of time (Trudel, Gilbert, & Werthner,

2010). Through workshops and seminars the coaches can get the opportunity to make acquaintances with other coaches from their own sport and from other sports. Opportunities to exchange experiences and discuss areas of importance with other peers in more structured environments can help the coaches into their future development. This emphasises the social structure of the profession coaching, and that more formalised communities of practices are important for coaches knowledge acquisition (Mesquita et al., 2014). Through attending seminars directed for coaches learning, all the coaches in the course will obtain the same new knowledge and therefore have the primary knowledge base necessary to lead more effective discussions with the coaching peers (Stoszkowski & Collins, 2015).

The use of books, the Internet and sport journals are a part of the non-formal knowledge source for coaches. This is a part of the coaches continuing development, and has been reported to be important to become an expert coach (Wiman, Salmoni, & Hall, 2010). Coaches need to seek knowledge for themselves and not wait until there is a course or seminar to acquire knowledge. By reading up to date research and follow the training discussions on the internet the coaches will be able to evolve their knowledge (Mesquita et al., 2014). This falls under continuing professional development that Nelson et al (2006, p. 255) defines as " all types of professional learning undertaken by coaches beyond initial certification". The research on this is mostly related to physical education teachers and not coaches, but one can argue that teaching and coaching has some important similarities that makes the research relevant for coaches too. Furthermore, the research within the non-formal education domain is infrequent since the division from non-formal towards the informal and formal education is so vague (Cushion et al., 2010). This framework for education clarifies all the possible situations that the coaches can acquire knowledge from and that can stimulate learning. From these educational levels the goal is always to make learning occur such that the coaches can gain additional knowledge about the coaching process (Nelson et al., 2006). Coaches' knowledge and learning can be divided into three levels, and these levels can be discussed to be an outcome of the educational levels (Côté & Gilbert, 2009; Nelson et al., 2014).

Constructivism

The constructivist epistemology is a philosophy and model of knowing, so it is not a learning theory in itself (Dyer, 2009). It is the origin for some learning theories as social-constructivism and constructionism. Constructivism focuses on the active roles of the individuals in constructing knowledge, and that knowledge is experiential, evolving and context dependent in nature. Three central individuals that have created theories and contributed to the constructivist epistemology are Jean Piaget, Lev Vygotsky and John Dewey (Dyer, 2009).

Jean Piaget is a vital person who has contributed to the work within constructivism. He emphasised the role of the individual in constructing their own knowledge (Ültanır, 2012). The process of equilibrium is the central in Piaget's vision of the learning process. Here the individual adapts to the environment and ensures to use the environment to meet its needs. This process was developed into a framework that explained how people comprehended with new knowledge (Illeris, 2006). By actively interacting with people, the surrounding and the world knowledge are acquired, and it is either assimilated or accommodated by the individual (Ackermann, 2001). New knowledge that is constructed to fit into the knowledge already existing has been assimilated. The new experiences are linked to previous experiences to construct meaning from it. To be accommodated, the existing knowledge has to adapt to the new knowledge. The previous experiences and the new ones are in discordance to one another, and so the previous experiences are adapted into the new ones to construct new knowledge (Illeris, 2006; Ültanır, 2012). When Piaget talked about interacting with the surroundings to create new knowledge, he meant that there was a cognitive subject that constructed knowledge into an integrated and holistic understanding based on previous perceptions (Fosnot, 2005; Jarvis, 2003). The previous perceptions are vital for new knowledge to be learned since new experiences are to be understood from these previous perceptions (Illeris, 2006).

Where Piaget's theory focuses on the individual constructing its own knowledge, Lev Vygotsky developed a theory that had its focus on how knowledge occurs trough social interaction. Vygotsky's thoughts around knowledge and learning are more in the direction of how knowledge was formed through interacting with others (Lourenço,

2012). The social surroundings have an impact on what the learner will seek to understand and integrate into the self as knowledge. The people around, the way the individual grew up, and the culture that the individual belongs to contributes to the learning process. What the learner learns is directly related to these social aspects. These contextual experiences will become the learner's tools into future learning situations, and this together with the current social situation the learner is in new knowledge will develop (Imsen, 2014). To optimize learning it is beneficial to interact with peers and more knowledgeable others. Through this the learner can observe and be guided by others to be able to understand new knowledge. Vygotsky highlights that a teacher, coach and instructor should guide their learners through tasks instead of feeding them answers so that the learning occurs in action (Vygotskij, 1978). His theory of social development emphasises that learning happens first on the social level and second on the individual level. Interacting with other people is the first step toward acquiring new knowledge, and with the cultural context the learner participates in development of knowledge is in progress (Lennard, 2010).

John Dewey has also contributed to the constructivist epistemology with his theory on experience and reflection. He emphasised the importance of experience and how experience was the basis for knowing (Dyer, 2009). Knowledge is, according to Dewey, not a representation of the reality, but by experiencing and participate in the social world the individual is a part of the reality, and knowledge is the action of being in the reality (Ültanır, 2012). Learning is therefore not a process with an end goal, but an everlasting and continuing process. By living in the reality and gaining more and new experiences learning occurs simultaneously. Learning is something active so the learner must take part in the action to be able to learn from it. Dewey made a quote that emphasises this: Learning by doing (Imsen, 2009). With this he meant that the learner must experience it to be able to comprehend and to actually learn from it. The body needs to experience and participate in the action for the mind to be able to reflect upon it and make a conscious experience from the action. So knowledge becomes an "embodied action that is brought about by one's experiencing of "mind"" (Dyer, 2009, p. 26). The learning needs to start within the learner and through actively participate with the surroundings in the world the learning process occurs and new knowledge will be constructed (Imsen, 2009).

The constructivist epistemology, through the work of Piaget, Vygotsky and Dewey, views learning and acquiring knowledge as a mainly social activity, where past experiences are used to understand new experiences and where the reflective process is important for the individual to draw learning from an experience (Dyer, 2009; Lennard, 2010; Moon, 2004). It also highlights that learning is both an individual and a social process. It is an individual process since the learner brings the past experiences into a new learning situation, and that the learner has to want to learn and has to be actively involved in the process for learning to occur (Imsen, 2014). It is a social process since the learner needs to interact with the surroundings of the world to be placed in learning situations, and by actively involve with them learning occurs (Dyer, 2009). Since learning is a social process it cannot only occur through school-based education, it may appear through any experiences throughout a person's life. Therefore, acquiring knowledge and to be in a learning situation is something that may happen at any time and at any moment. Jarvis says that "Knowledge is contingent upon circumstances, and learning is a process which directly reflects on this" (2003, p. 43). These circumstances are context dependent and individual to each learner (Imsen, 2014).

For the very complex and social profession sport coaching the constructivist epistemology is very relevant. Experience is vital for the theories of the epistemology, and through social interactions with other individuals and the environment and through systematic reflection the coaches can learn form their experiences. Reflection is especially important for a more deeper and meaningful learning. That coaching is social is unquestionable since the profession relays on social interactions with the athletes to be able to stimulate learning for the athlete to increase sporting performance (Cushion et al., 2010). More specific theories about experience, reflection and the social side of coaching will be explored further in this chapter.

Learning

To become an expert coach there is some specific skills that need to be learned. These skills all relate to the coach's ability to coexist in the social environment. It is important for a coach to have adequate knowledge about skills as sport specific techniques and

how to provide them to others, how to interact with other people and how to create a positive training environment (Côte & Sedgwick, 2003). These skills can be learned through different methods, and they can be categorized in three different levels of learning. Côte and Gilbert (2009) highlighted how previous research on coaching knowledge and learning expressed the importance of including professional, interpersonal and intrapersonal knowledge when looking at coaching effectiveness and expertise. For this study these three areas for coaching knowledge are used to look at how the coaches acquire this type of knowledge, and are therefore labelled as learning at a content knowledge, relational and individual level.

Individual level

For learning to occur on an individual level the learner has to want to acquire new knowledge and the motivation to seek it. The individual level refers to intrapersonal learning, where the coach learns about him/herself through knowledge acquisition. Psychologist Carl Rogers looked into the aim of education and thought it should be to help students become individuals that had internalized their specific coaching practice (Nelson et al., 2014). The knowledge that the coach has acquired should become a part of the self, and it should be in constant change as the knowledge changes. Through this learning process the coach should be able to learn about him/herself as an individual, and be able to create a self-perception as an individual (Rogers, 1959).

Rogers states that for learning to influence behaviour it has to be self-discovered and self-acquired. No learning can happen if the learner does not want to learn, and the best way to achieve learning is to seek it for oneself (Rogers, 1969). By actively involve oneself in the action it will stimulate the learning process and the learner takes responsibility of the process to create a learning self-identity. Only through active involvement can the learning stimulate change within the individual. The learner must have the belief that everything can be learned, that every experience is an opportunity to learn from and that seeking new experiences will enhance learning (Kolb & Kolb, 2009). This self-awareness and the intention to act upon the learning experience is a common feature for metacognition, which is a definition on what people know about their knowledge, and can be said to be an observation of own mental processes (Vos & De Graaff, 2004). The metacognitive knowledge the coach has impacts the learning by how

knowledge acquisition is confronted. To be completely in the action with the whole self and have an awareness of what the learning process entails for oneself will give a greater understanding of the experience and the knowledge that can be gained from it (Kolb & Kolb, 2009; Rogers, 1969).

The coaching process consists of opportunities to learn on a constant basis. From every experience there is opportunities to learn, and to have the knowledge of how to best utilise these learning opportunities will help the coach's continuing professional development (Cushion et al., 2010). To have an adequate metacognitive knowledge of how the coach think will therefor be important. To develop learning self-identity like this can be learned, but takes time (Kolb & Kolb, 2009). The learning self-identity one has is developed from previous experiences and from the background that one comes from, so new experiences will be processed through those circumstances (Moon, 2004). To think about ones thinking, as in metacognition, will lead the coach to develop a greater understanding of oneself and gets a clearer view on what the coach have of knowledge and not (Zohar, 2011). A greater understanding of oneself will give the coach a greater perception of what is important to extract from learning experiences so that more knowledge can be acquired to become an expert coach (Moon, 2004; Wiman et al., 2010).

Relational level

An important aspect of the coaching practise is to interact with those in the sporting environment. Athletes, parents, sport clubs and management are included in the sporting environment and are people that the coach needs to have a good relationship with. This aspect highlights the importance for the coach to develop interpersonal skills (Côté & Gilbert, 2009). Coaching is a social profession and to become an expert coach social skills are essential. Especially the coach-athlete relationship is important for a positive outcome of the coaching process. It is important for both the coach and the athlete to understand each other's feelings, thoughts and behaviours to obtain a good relationship (Jowett, 2009). Communication skills are important to create this relationship. Good communication is vital for creating a mutual understanding between two people, and to achieve mutual trust and respect (Margaret, Kirubakar, & Kumutha,

2010). It is therefor important for the coach to have the knowledge to put emphasise into and accept these skills (Rogers, 1959).

Communication can be both verbal and non-verbal, since one can communicate with the whole body without saying anything verbally (Margaret et al., 2010). Since the relationships the coaches have toward each athlete are different for each case, the coaches need to contextualise their knowledge for developing the best possible relationship (Nash, Sproule, & Horton, 2011). How to deliver feedback to athletes and how to read the athletes body language and their responses is part of the communication skills that is necessary to build good relations toward the athletes. To be in relation to other people is to be living and acting in the world through experience (Allgood, 1995). Learning from experience can come from both self-experience and others' experiences that becomes available through communication. The learning occurs when some sort of reflection over the experiences are involved in the process. Through reflection the learning becomes a part of the coach on a deeper level by integrating it into the self, so it has a greater chance of a change that will last for the knowledge of these interpersonal skills to enhance the coach's expertise (Moon, 2004; Rogers, 1969).

Studies have shown that the interpersonal behaviour of the coach has a significant impact on the athletes (Amorose & Anderson-Butcher, 2007). Stebbings, Taylor, Spray and Ntoumanis (2012) did a study that looked at antecedents of perceived coach interpersonal behaviours, and concluded that the well being of the coach increased the chance of healthy interpersonal behaviour and a better relationship between the coach and the athlete. A literature review performed by Langan, Blake and Lonsdale (2012) looked at research done on the effectiveness of interpersonal coach education interventions on athletes and found that improving the coaches interpersonal behaviour had a positive impact on athlete outcomes. No cause and effect could be concluded for coach education and athlete outcome, but several studies are in agreement of how the coaches interpersonal behaviour can impact the athlete for positive outcomes (Davis & Jowett, 2014; Jowett, 2009; Mageau & Vallerand, 2003). Since these studies shows the importance of the coaches interpersonal behaviour, it should be included in the study to get a view of how the coaches feel that the formal, informal and non-formal sources provides these relevant skills.

Content knowledge level

Lee S. Shulman (1986) discusses the knowledge base for teachers in his research. One knowledge base is called content knowledge, which is defined as "the knowledge, understanding, skill and disposition that are to be learned by school children" (p. 9). Siedentop (2002) translated this definition to be more relevant for physical education and sport by stating that a coach of a sports team or teacher in physical education "need to have a reasonable mastery of the sport activities they will teach to their students and players – that is their content knowledge" (p. 374). This knowledge base is divided into three parts: subject matter content knowledge, pedagogical content knowledge and curriculum content knowledge (Shulman, 1986). Cassidy, Jones and Portac (2009) discuss how this knowledge base not only works for teaching but also for coaching sport. Subject matter content knowledge refers to "The knowledge a coach has, or has access to, that represents the extent of the activity being coached" (p. 127). To be able to coach the subject matter the coach needs to have knowledge about how to deliver it to their athletes, which is called the pedagogical content knowledge. The last part of the framework is curriculum content knowledge, and that is explained as "the knowledge of resources available to the coach" (p. 128).

Coaches need to have a good understanding for the sport they are coaching, which means that they need to have a great understanding of the content knowledge of their chosen sport (Cassidy et al., 2009). To become an experienced and an expert coach it is important to understand the technical aspect of the sport, to know how to best deliver it to optimise learning for the athletes and to be aware of the resources that are available (Nash et al., 2011). Abraham, Collins and Martindale (2006) notes in their study that the coaches identified sport specific and pedagogical knowledge as very important knowledge sources. The coaches themselves therefore recognize the importance of learning at a content knowledge level.

To learn at content knowledge level can also help the coaches in their beliefs in their own abilities to lead, instruct and diagnose, which is called coaching efficacy (Feltz, Chase, Moritz, & Sullivan, 1999). To thrust their own skills within the pedagogical aspect and thrust their knowledge about the subject matter and the curriculum is important for the coaches to be able to gain the confidence needed to perform their job. To develop

good coaching efficacy depends on many factors and among them are level of education and paste experiences (Feltz, Sullivan, & Short, 2008; Mesquita, Borges, Rosado, & Batista, 2012). Level of education is relevant to coaching efficacy since learning at the content knowledge level is set as an outcome of education through formal and non-formal sources (Feltz et al., 1999; Sullivan, Paquette, Holt, & Bloom, 2012). Past experiences are relevant for the coaches' perception of how effective their knowledge and skills have been in the coaching job. All the three educational sources are therefor relevant for coaching efficacy and content knowledge learning, and since coaching efficacy also affect the coaches' relational and individual aspect is the framework relevant for learning at all the three levels. The complex role of a coach makes it necessary to seek out several sources to increase their knowledge and skill, and the social aspect of it ensures that the learning is a continuing process (Cushion et al., 2010).

Theory for coaching practice

The framework of knowledge acquisition highlights all the areas the coaches seek information from and how it is learned, and the constructivist epistemology show the theories that are highly relevant for the coaching practice. Further in this chapter, more specific theories that have been inspired by Piaget, Vygotsky and Dewey, and that have been based on the constructivist epistemology will be explored in relation to coach learning and knowledge acquisition.

Experiential learning theory

David Kolb describe learning as a continuing process that proceeds due to new experiences. Learning cannot have focus on the outcome since it does not stop and since it is ever changing through new experiences. The experiential learning theory has defined learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984, p. 41). Kolb developed a learning cycle to explain the process of learning from experience, which starts with the learner actively participate in actual learning activities. From this involvement in the activity the learner moves on to reflecting on these occurring actions, and through reflection then formulates ideas while considering opinions of other experts (Lennard, 2010). Learning from experience is always relevant since all learning originates from experience. It

usually involves an active phase, some mechanism of feedback and a formal intention to learn (Moon, 2004). Coaches have reported to recognise the importance of learning from experience, and have rated experiential learning as the most useful method to learn more about coaching (Irwin et al., 2004; Mallett, Rynne, & Billett, 2014; Mesquita et al., 2010; Stoszkowski & Collins, 2015).

Reflective practice

Reflective practice is a phrase first used by Donald Schön, and emphasises the use of reflection in professions that are complex in nature and consists of unpredictable situations (Moon, 2004). Reflective practice is therefore highly relevant for coaching sport where the social environment and the lack of a set curriculum make the job very unpredictable (Gilbert & Trudel, 2001). Reflective practice is the second step in Kolbs experiential learning cycle, and it is the process where the experience is thoroughly considered by connecting knowledge and practice. Reflection takes place through considering how previous knowledge and experiences connects to the current experience (Schön, 1983). It is a way of purposely thinking to achieve an outcome for more complex issues. Learning from reflection occurs when the material is challenging to the learner and when the learner deliberately wants to understand the material. Refection is a skill that everyone can learn, and it can be advanced and made more effective through formal, informal and non-formal education (Irwin et al., 2004; Moon, 2004).

The reflective practice highlights that learning by doing can be argued to be reflection in and on experience (Erickson et al., 2008). Reflection in and on experience acquires full presence of the learner so that the learner can recognise the learning possibilities that occur. This is also important for the coaches to be able to integrate the learning into the self and to be able to change behaviour (Rogers, 1969). Learning to reflect upon own experience can come from many sources among them higher education and mentoring. Higher education aims to stimulate critical reflection in the coaches so that the coaches can use all the impressions they get by experience to create their own personal coaching practice (Mallett et al., 2009; Nelson et al., 2014). Especially informal mentoring are a source of learning preferred by the coaches, and studies have found that more

experienced coaches can be useful to stimulate reflection within the novice coaches (Irwin et al., 2004; Stoszkowski & Collins, 2015).

Communities of practice and situated learning

Jean Lave and Etienne Wenger is the first to mention Communities of practice as an explanation of the situations in how individuals learn. The emphasis for the theory of communities of practice is on the social side of the learning process, and that individuals learn in all of the different groups they are a part of in the society (Illeris, 2006). These groups or communities that an individual is a part of can be all from work related and professional settings to the family and friends related settings (Wenger, 2000). Learning within communities of practice is very relevant for coaches since they report that their learning occurs mostly through working with others (Erickson et al., 2008; Gilbert et al., 2009). A coach is a participant in several communities of practices from one with the athletes and the team surrounding them to the family at home. Through all of the communities of practices learning situations occurs, and it is how these practices is built up that gives the directions to what it is possible to learn (Wenger, 2000).

The possibilities for learning that are present at any given moment and that are limited to that exact situation is called situated learning. A community of practice that consist of a group of coaches limits the possible learning to the experiences and knowledge that those coaches already have (Lave, 2003). A new and young coach that participate in a community of practice with more experienced coaches has the opportunity to learn a lot about the job of a coach, but these learning opportunities are restricted to only these specific coaches' experience and may not be good learning or learning that the coach is able to relate to. The new coach will bring own experiences with him/her into these communities that will also limit the learning possibilities (Stoszkowski & Collins, 2014). Lave and Wenger explains the movement from a new and inexperienced member of the community to a full member of the community as legitimate peripheral participation. The new coach has to learn and gain experience from the communities of practice to become a full member and a legitimate participant with enough knowledge to become a peer to the group of coaches (Lave & Wenger, 2000).

Sfard's metafor for Learning

According to Anna Sfard (1998), learning can be looked at through two different metaphors. One is the acquisition metaphor that understands knowledge as something the learner must acquire and attain so that the learner becomes the owner of the knowledge. The other metaphor is the participation metaphor, which emphasises that knowing is an action to participate in and not something to attain. The participation metaphor expresses that 'learning should be viewed as a process of becoming a part of a greater whole' (p. 6). This means that to learn something the learner has to be interested and partake in the action oneself to be able to integrate it into the self. This is the difference between the two metaphors; where the acquisition metaphor looks at knowledge as something to possess the participation metaphor looks at learning as something that evolves into the self.

The constructivist epistemology touches into both metaphors when looking into coach learning. Piaget's view on constructing its own knowledge, Vygotsky's theory of acquiring learning through social interaction and Dewey's viewpoint on experience and participation as central for learning all include aspects of both the metaphors for learning (Dyer, 2009; Sfard, 1998). For coach learning the literature looks into how coaches develops new knowledge by using previous knowledge to understand it, by interacting with coaching peers and through internalise new experiences by actively participate in the experience (Nelson et al., 2014; Stoszkowski & Collins, 2014; Wright et al., 2007). Sfard (1998) states that the two metaphors for learning cannot exist alone, but that a theory should include both to give the best view on how learning happens and how it is developed for the learner.

With the foundation in the constructivist epistemology, theory about coach education and learning and previous coaching research the research topic for this thesis was set to coaches' view on knowledge acquisition and learning. To get a greater view on what the coaches think about their own learning to become a coach, and how they acquire the knowledge they use in their coaching job the research was formulated around the coaches' own subjective viewpoints on the topic. To investigate the subjective views the Q method was chosen as the methodology to give the topic clarity.

Methodology

Q methodology was chosen for this research for its aim to investigate subjective views on a research topic. For this study the coaches' subjective beliefs are of interest, so the Q method is the right research method to use. The nature of the methodology gives the study the right perspective in that each coach gets to present their subjective meaning through the Q sorting process. Through this process statements, or other expressions of the subject matter, are ranked through the Q sorters own point of view so that their subjective meaning will be expressed (Brown, 1993). Subjectivity is behaviour; it is the part of the concourse that has been experienced by the self, and it is not possible to test or measure as it is an inner experience without rights and wrongs. The Q sorter does the measurement in Q methodology during the Q sorting process. From that process the data goes through a statistical procedure before analysis and interpretations of the subjective meanings are completed with the purpose of the study in mind (Thorsen & Allgood, 2010).

The Q methodology was considered as the best method for this research for its use of both quantitative and qualitative approaches. To have chosen a pure quantitative approach would have reduced the coaches' personal viewpoint to objective measurements, and their subjectivity would therefore have been lost (Watts & Stenner, 2012). The quantitative approach has pre-defined phenomena and established tests that the persons in the study are measured against, which is not the purpose of Q methodology and this study (Storksen, 2012). If a pure qualitative approach had been chosen the in depth exploration of the subject matter would have been possible, but then the statistical analysis that gives clarity to the nuanced opinions would have been lost (Brown, 1980). Through factor analysis the viewpoints of the coaches can be compared to find similarities and dissimilarities, and those with similar viewpoints (sorted the Q sorting similar) will fall under the same factor that represents the coaches shared point of view of the subject matter (Watts & Stenner, 2012).

It was William Stephenson that developed the Q method in 1935. He thought that the current scientific methods did not qualify to study human thoughts, feelings and behaviour, since those methods reduced it to objective measurements. The use of the subjective approach when the subjects sort the statements and the use of the objective

statistical approach to process the Q sorts, it became possible to explore the human subjectivity in a more appropriate manner (Watts & Stenner, 2012). By using some aspects of both qualitative and quantitative research methods the Q methodology is hard to place within just one of these. It lays somewhere in between the two traditional research methods (Storksen, 2012). The methodology makes it possible to explore the human subjectivity, and the participants get to reflect upon the chosen topic and express their subjective value, belief, emotion and experience (Thorsen & Allgood, 2010). Charles Spearman inspired Stephenson through the development of the Q methodology, and the statistical part of the method was inspired by Spearman's factor analysis (Stephenson, 1993).

Q methodology differ from the typically R methodology in that it does not focus on comparing groups or testing group differences. The focus is rather on exploring the personal viewpoints around a subject matter (Watts & Stenner, 2012). In R methodology the persons are the population, while in Q methodology the statements are the population. This makes it possible to describe the populations of viewpoints instead of the populations of people (Stephenson, 1952; Van Exel & de Graf, 2005). From a Q study, one will then be able to look at the sorting done by the participant from one subject matter in whole, and not as a mere separate answer to one single question (Brouwer, 1999). Psychologist Carl Rogers used the Q method a lot in his therapy sessions. Even though he only performed the Q sorting with his participants without performing the factor analysis, he appreciated the objective measurement of the self through this method (Ellingsen, Størksen, & Stephens, 2010; Rogers, 1959). Q methodology was first mainly used among psychologist researchers, but in the last fifty years other areas of research have started to appreciate this method of studying human endeavours (Brown, 1993).

The Q methodology consists of these five steps: 1) defining the concourse, 2) developing the Q sample, 3) selecting the p sample, 4) the Q sorting process, and 5) analysing and interpretation. These steps are described more in detail with relevance to this study.

1. Defining the concourse

The concourse is "the flow of communicability surrounding any topic" (Brown, 1993, p. 94). Words, paintings, photographs and music may all be a part of the concourse as long as it represents the shared knowledge about the subject matter. In the Q study the concourse can be expressed as statements of words, through audio or pictures. It is up to the researcher to decide which representation is the most relevant to the study (Thorsen & Allgood, 2010). For this study the concourse is represented through statements of written words. All the possible statements that can be made about the subject matter and that is common knowledge for the people related to the subject matter have been considered (Watts & Stenner, 2012). Relevant literature was analysed to give more clarity to the subject matter so that the concourse could be disclosed.

The subject matter in this study is knowledge acquisition for the coaching practice, so that was the basis for the search when looking into the literature. Important keywords were: Sport, coaching, coach and knowledge acquisition, with the combinations sports coaching, coaching practice and coaches' knowledge acquisition. Through analysing the results from these keywords it became clear that coach learning and coaching education was important aspects to look into further (Cushion et al., 2010; Erickson et al., 2008; Stoszkowski & Collins, 2015). During the process of investigating coach learning and education it became evident that coaches knowledge acquisition is a complicated process where different methods are used. A large amount of the research focused on the framework developed by Coombs and Ahmed (1974). This framework described three areas where knowledge acquisition occurred named formal, non-formal and informal knowledge sources. These three areas of knowledge acquisition represent all the methods of gathering information, and became evident into further working with the concourse (Cushion et al., 2010). The work of Carl Rogers (1969) was used to explore learning. He emphasised that to be able to use the knowledge the coaches acquire they will have to learn it at an individual- and a relational level. The knowledge has to be integrated into the self, and related to the world around. Also for a coach that has a very interdisciplinary job, all of the knowledge has to be related to a whole as in content knowledge (Shulman, 1986). All of these aspects around the subject matter became more evident by looking into the concourse.

When the analysis of the research of the relevant literature were completed, about 100 statements were found relevant from the concourse. These statements were then the foundation for the next step in developing this study.

2.Developing the Q sample

The Q sample is the statements drawn from the concourse to be presented for the participants (Watts & Stenner, 2012). From the concourse it became clear that knowledge source and learning were two important aspects related to the subject matter. Coombs and Ahmeds (1974) framework were considered highly relevant in understanding how coaches acquire the knowledge that they use in their practice. For this reason knowledge source was set as an effect in this study. The framework for knowledge source was used to state the levels that are formal, nonformal and informal. Learning was set as the second effect, since learning is a part of acquiring new knowledge (Jarvis, 2004). The levels for learning were developed by looking into the works of the psychologists Carl Rogers and Lee Shulman (Rogers, 1969; Shulman, 1986). Learning at a personal level, at a relational level and learning content knowledge was set as the three levels.

Table 1: *The design of the statements based on coach knowledge and learning.*

Effects	Levels		
Knowledge source	a. Formal	b. Non-formal	c. Informal
Learning	d. Personal	e. Relational	f. Content

For this study it was important to uncover what knowledge source the coaches preferred and to expose what they believed to be the benefits from that particular knowledge source. From this it became clear that the knowledge sources and the learning effects fits together in that one is an outcome of the other. The formal, non-formal and informal knowledge sources aim to stimulate the learner to gain more knowledge at a personal-, relational- and content knowledge level. To explore how the coaches feels that the knowledge sources helps them to learn more at these levels through the statements of the concourse, the statements became categorical cells to find all the possible combinations to be studied as shown in Table 1.

By multiplying the levels from one effect to the levels of the other effect nine combinations of statements were obtained as shown in Table 2. This multiplication made it possible to find statements that showed how the three knowledge sources were linked to personal, relational and content knowledge learning. The first combination is formal knowledge source and personal learning (ad). Statements within this combination represents to what degree the coaches' feel that formal sources, as for example higher education, have contributed to their learning new sides about themselves that they use during their work as a coach. Statements related to the second combination that is formal sources and relational learning (ae), will give the coaches the opportunity to express how for example higher education have had an impact on their learning to relate to other people. The last combination with the formal knowledge source is with content knowledge learning (af), and statements in this combination represent how the coaches have learned important aspect for their sport by taking a course within higher education. This will be the same for the non-formal and informal knowledge sources combination with the levels for the effect learning (bd, be, bf, cd, ce, cf).

Table 2: *The combination of levels in the design*

	Combination of levels								
Knowledge source learning	a	a	a	b	b	b	c	c	c
	d	e	f	d	e	f	d	e	f
Statement Number	1, 10, 19, 28, 37	2, 11, 20, 29, 38	3, 12, 21, 30, 39	4, 13, 22, 31, 40	5, 14, 23, 32, 41	6, 15, 24, 33, 42	7, 16, 25, 34, 43	8, 17, 26, 35, 44	9, 18, 27, 36, 45

From the concourse, a total of forty-five statements were selected as highly relevant for the study. Each combination of cells was allocated five statements that were connected but with positively, neutral and negatively viewpoints. To hinder the sorter detecting the structure in the statements the first statements in each cell were allocated a serial number from 1 to 9, the second statements were allocated the numbers from 10 to 18, the third 19 to 27, the fourth 28 to 36 and the fifth statements were allocated the numbers 37 to 45.

3. Selecting the P sample

The P sample consisted of 45 Norwegian coaches that coached at different levels. One group of coaches were attending a coach education program at the Norwegian University of Science and Technology, and coached athletes at an international level. One group worked at different gymnasiums for elite sports in Trondheim, and one group of coaches worked at the club and district level with athletes that were 15 and 16 years old. This variance in the P sample made it possible to explore different viewpoints about the research topic. Coaches from different sports, different levels and gender differences are included so that the subject matter is viewed from different angels. This variance did also ensure that the group did not become homogenous (Watts & Stenner, 2012). The coaches had background from 11 different sports with a mix of male and female coaches, as shown in Table 3.

Table 3: *The P sample divided into gender and sport.*

Sport	Male	Female	Total
Biathlon	18	6	24
Cross country skiing	4	4	8
Triathlon		1	1
Nordic combined	2		2
Tennis	1		1
Handball	2		2
Snowboard	1		1
Ski orienteering	1		1
Cycling	2		2
Boxing	1		1
Football	1	1	2
Total	**33**	**12**	**45**
Mean Age	*39*	*37*	*38*

The average age of the coaches was 38, with the oldest at 54 and the youngest at 24. The sample group had practiced as coaches in an average of 10 years. The educational background varied from gymnasium level to postgraduate level, and 21 of the coaches reported to have relevant sport education from higher education. The level of completed coaching programs within the different governing bodies varied from level one and up to level four. The Norwegian coach education programs goes from level one which is the starting point, and up to level four which is the top level.

4. Q sorting

The Q sorting is the process were the participants' sort the statements into a rank order from most agree to most disagree. The sorting is done within a distribution scoreboard, and it can be either free choice or forced distribution (Watts & Stenner, 2012). The participants get specific conditions for sorting the statements, this to enlighten the participant's viewpoint on the research topic. All of the statements are neutral until the participants starts to sort them and gives them emphasised meaning (Thorsen & Allgood, 2010).

For this study an 11-point forced quasi-normal distribution scoreboard was chosen that ranked from most strongly disagree (-5) to most strongly agree (+5) (fig.1). This distribution scoreboard is recommended for Q sets of 40-60 items (Brown, 1980). The specific condition the participants was supposed to sort from were to consider what knowledge source they believed had influenced their coaching practice as it is today, and consider how this source had influenced their personal-, relational-, and/or content knowledge learning (see appendix for specific instructions). The statements were provided on separate and numbered cards (see appendix for complete list of statements). A timeframe of 45 minutes were given to complete the Q sorting. The researcher was present during the sorting, and was available to answer questions the participants had.
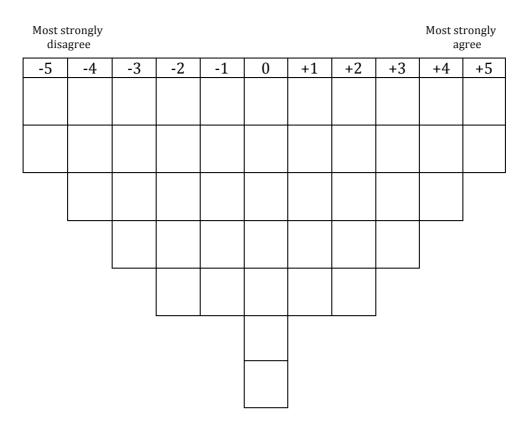
Most strongly
disagree

Most strongly
agree

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

Figure 1: The distribution scheme.

First the participants were instructed to read through all of the statements before sorting them into three piles (disagree, no opinion/neutral, agree). After this, the participants were asked to go to the agree pile and take out the two statements which they mostly agreed with and put them in the scoreboard under +5 before performing the same for the disagree pile at -5. This procedure was repeated for three statements at +4 and -4, four at +3 and -3 and so on until all of the columns in the scoreboard had been allocated a card number with statements. It was stressed that the statements put in the columns from +3 to +5 and -3 to -5 was the ones the participants should use the most time to consider which statements to go in them, since these columns represents the strongest feelings.

5. Analysing and interpretation

It is the viewpoints that emerge from the Q sorting that are the subject for the factor analysis. The viewpoints are made clear by detecting which Q samples have been sorted in a similar manner and are loading on the same factor (Van Exel & de Graf, 2005). The factors represent the viewpoints, and they show how many different distinct viewpoints there are on the subject matter. A factor is made up of those Q sorts that have been sorted in a significantly similar manner and it forms a completely new Q sort that represents those shared viewpoint of the q-sorters from that factor (Brown, 1980).

In this study all of the individual Q samples were analysed through the software PQ-methods (Schmolck, 2002), which is a software developed specifically to analyse Q methodological data (Allgood & Svennungsen, 2008; Rhoads, 2007). The correlation matrix is the first that comes out from the PQ-methods programme. Here all of the Q sorts are intercorrelated with each other, and the nature of the similarities and dissimilarities are measured. By looking into the correlation scores of the correlation matrix some clues are given on how many factors that will emerge and which Q sorts that will belong to them. All the viewpoints made by the participants are represented in the correlation matrix and it is from the correlation matrix that factors can be extracted by identifying the patterns of similarity in the study variance. The study variance was estimated through the use of Centroid factor analysis, which is a factor extraction technique. This method is used to find what viewpoints are held in common by the Q sorters, and how these viewpoints vary between the group and between individuals (Watts & Stenner, 2012). Through the centroid factor analysis first one factor is extracted, and after the first factor is clear it is the second factor's turn. Usually this continues until it has extracted seven factors that each one contains Q sorts that share the same viewpoints (Brown, 1980).

From the centroid factor analysis comes an unrotated factor matrix table that shows the eigenvalue and variance for each factor. The eigenvalue and variance shows the strength of an extracted factor, and the higher these scores are the stronger the factor is. Usually, factors that have an eigenvalue greater than 1.0 are extracted to be rotated. The next criteria to use to determine the number of factors to be rotated are to look at the significant loadings for each factor. The factors that have two or more significant

loadings are included in the rotation. To calculate the significant loading this equation is used: the standard deviation of the forced distribution multiplied with the result of 1 divided on the square root of the number of statements in the Q sample (Watts & Stenner, 2012). For this study the significant factor loading was set to: $2.69*(1/\sqrt{45})$ = $0.39 \approx \mathbf{0.40}$. Humhrey's rule is a third criterion to use to find factors to rotate. This rule says "that a factor is significant if the cross-product of its two highest loadings (ignoring sign) exceeds twice the standard error" (Brown, 1980, p. 223).

After performing these objective methods for extracting factors, the researcher can use a more subjective method by looking closer at the factors and at what viewpoints they represent. As Brown states: "it is best to take out more factors than it is expected ahead of time will be significant" (1980, p. 223). The researcher can with the foundation in the theory and by the judge of the significance of the viewpoints in the factors include more factors in the rotation than the objective criteria allow. The factors that have been extracted both by objective and subjective criteria are then rotated either by the VariMax method or by hand. The purpose of the factor rotation is "to position each factor so that its viewpoint closely approximates the viewpoint of a particular group of q-sorts" (Watts & Stenner, 2012, p. 127). Through the by hand rotation the researcher is the one that rotates the factors. In the by hand rotation the concern about the factors are theoretical, and the researcher looks at the subject matter from different angels. The purpose is to find the angle that best fits into the theory by statistical criterion that the researcher has to judge the acceptability of (Van Exel & de Graf, 2005). The VariMax method is more objective and a complementary approach to the by hand rotation. It is an objective rotational procedure that have wide acceptance for its statistical structure. The method does the rotation of the factors for the researcher, and gives factors that most Q sorters load on. The by hand and the VariMax method are complementary to each other in that the weakness of one is the strength of the other. Both methods are acceptable to use in academic research (Watts & Stenner, 2012).

The factor rotation makes clear what Q sorts that have viewpoints that is closely approximated to a particular factor, and through the loading exactly how close the approximation is. Through rotation the mission is to increase the factor loadings of Q sorts, and the rotated factor loadings are used to decide which Q sort to include in the

interpretation of the factors. The next step before interpreting the factors is to create factor arrays. A factor array is one Q sort for one factor that has been created out of all the Q sorts that significantly loaded on that factor. It is the factor array for the factors that are the base of interpretation (Watts & Stenner, 2012). When interpreting the factors the basis is the factor scores rather than factor loadings. The factor scores represent the most prominent statements that the group has the strongest feelings about. This score is the average of the score given to the statement from the group associated with that factor (Brown, 1993). For this study the factor scores from 3 and -3 to 5 and -5 were the basis for interpretation, as these are the scores that the P sample most strongly agree and disagree with (Brown, 1980). Further explanation for the analysis and interpretation will be given during the chapter about results.

Reliability and validity

Validity and reliability in Q methodology is rarely discussed since it is the subjective view of the person that is to be measured, and there is no outside criterion for a person's inner feeling (Brown, 1980). Even so, some notes can be included to ensure that it is taken under consideration.

Validity is defined as "degree to which a test or instrument measures what it purports to measure" (Thomas, Silverman, & Nelson, 2011, p. 193). For a Q study this can relate to some degree to the validity of qualitative research, where the theory, conditions and method of the research must be well documented. For this study the theory have been described earlier in this thesis, and the conditions and the method have been described earlier in this chapter. The participants got specific conditions for sorting the statements to ensure that the subject matter was considered from the most appropriate angle, and that the validity would be good.

The ability a method has to be performed several times with the same conditions and with the same results is the method's reliability. The higher the chance for the same results in a retest the higher the reliability of the research is. For Q methodology the reliability translates to "will the same condition of instruction lead to factors that are schematically reliable" (Van Exel & de Graf, 2005, p. 3). Brown (1980) states that the

reliability in Q methodology, that can be said to be the replicability, is high since research has shown that by performing a test-retest the correlation between the sorts is 0.80 and higher. Therefore, by giving the same instructions for the Q sorting at a later time, one can expect the same Q sorters to sort the statements in similar patterns as the first time. This will make the same factors emerge at the second time. Brown (1980) also mentions that the reliability of the factors rises when the number of sorts that significantly load on the factors is high. Even though it is better for the reliability that the factors has a high number of sorts loading on them, it is up to the researcher to analyse them as seen fit (Watts & Stenner, 2012).

Results

From the unrotated factor matrix seven factors was extracted. To reduce the number of factors to be rotated, first the criterion for the eigenvalue above 1 was tested which gave four factors. Thereafter the significant factor loadings were looked into and from that the number of factors were reduced to two. The third objective criteria that were used were Humphrey's rule of standard error, which gave only one factor to include in the rotation. By looking more closely into the viewpoints that the factors represented, a subjective decision was made to include three factors, since these three had clear distinctive viewpoints that enlightened the subject matter. The reason to use a more subjective approach to extracting factors are that the purpose of this research, which are to look into the subjective viewpoints the coaches have, and therefore all these three factors were deemed relevant for the research. The VariMax method was used to rotate those three factors since this is a highly acceptable statistical method to use within Q method (Watts & Stenner, 2012).

Table 4: Factor matrix from the VariMax rotation

Q-Sort	A	B	C	Q-Sort	A	B	C
1.	**0.66X**	0.39	0.22	25.	**0.68X**	0.19	0.16
2.	0.06	**0.50X**	0.07	26.	**0.82X**	0.23	0.07
3.	**0.64X**	0.39	0.33	27.	*0.49X*	0.25	*0.46X*
4.	**0.80X**	0.13	0.09	28.	**0.86X**	-0.01	0.23
5.	**0.76X**	0.23	0.28	29.	*0.66X*	0.30	*0.40X*
6.	**0.64X**	-0.07	0.09	30.	*0.60X*	*0.44X*	0.23
7.	**0.93X**	0.03	0.04	31.	**0.83X**	0.12	0.07
8.	**0.64X**	0.05	0.23	32.	**0.70X**	0.21	0.15
9.	*0.52X*	*0.50X*	0.07	33.	**0.82X**	0.18	0.32
10.	**0.81X**	0.05	0.03	34.	**0.70X**	0.36	0.10
11.	**0.56X**	0.30	0.20	35.	**0.78X**	0.18	0.25
12.	0.00	0.00	-0.08	36.	**0.48X**	0.24	0.20
13.	**0.74X**	0.22	0.01	37.	*0.57X*	0.35	*0.53X*
14.	**0.82X**	0.16	-0.01	38.	**0.79X**	0.15	0.27
15.	**0.73X**	-0.14	0.24	39.	**0.78X**	0.17	0.10
16.	**0.90X**	0.10	0.07	40.	**0.80X**	0.12	0.35
17.	**0.67X**	0.17	0.26	41.	**0.79X**	0.28	0.23
18.	**0.81X**	0.10	0.19	42.	*0.65X*	0.11	*-0.41X*
19.	**0.79X**	0.05	0.35	43.	**0.77X**	0.25	0.25
20.	*0.80X*	-0.01	*0.40X*	44.	**0.79X**	0.15	0.05
21.	**0.76X**	0.08	0.19	45.	**0.90X**	0.09	0.04
22.	**0.67X**	0.07	0.34	Pure cases	36	1	1
23.	*0.49X*	0.17	*0.44X*	Mixed cases	42	3	7
24.	0.37	0.18	**0.65X**				

Note: Factor scores that are a contributor to a factor is marked with an X, bold faces are pure cases and italic faces are mixed cases loading on more than one factor. Pure cases are those that only load significantly on one factor, and mixed cases are those that load significantly on more than one factor.

Table 5 shows the correlation between the factors, and between all the three factors the correlation is graded as low to medium. After studying the factors it became clear that factor A and C shared some common viewpoints. Even though they have some common viewpoints they do have their own individual viewpoints that made them into separate factors.

Table 5: Correlations between factor scores

Factors	A	B	C
A	1.00	0.17	0.53
B	0.17	1.00	0.30
C	0.53	0.30	1.00

Factor A: Informal sources as experience, reflection and communication are important for personal and content knowledge learning.

There are 42 subjects that load significantly on factor A when mixed cases are included. When looking at the statements that define factor A against the combinations of levels (Table 2) it becomes clear that the informal source is the main source for knowledge for those who loads on factor A. Statements 7, 9, 18 and 16, which are placed on the most agree side of the scoreboard, all belongs to the informal knowledge source. So do statements 36, 34, 44 and 45 from the other side of the scoreboard. From the informal knowledge source; all these statements are combined with either personal or content knowledge learning as an effect. Therefore the main viewpoint of the subjects loading on factor A is that informal knowledge sources affect the coaches' personal- and content knowledge learning.

In further examination of the statements the specific knowledge sources from the informal source are reflection and communication with other coaches and athletes that comes from experience. Experience is emphasised as a knowledge source from which the coaches acquire the knowledge for their personal learning and the sport specific content knowledge learning. The combination of experience as an informal knowledge source and sport specific content knowledge learning are the combination the coaches value most within this factor, since the most statements are containing this combination

and they are ranged furthest to the left and right in the scoreboard (statements 9, 18, 45 and 36).

Table 6: The high and low scores for statements representing factor A.

Number	Statement	Strength
7	My personal development is a result of reflecting over my experiences.	+5
6	Through conversations with other coaches I have developed a greater understanding of my sport.	+5
9	My understanding of my coaching practice has definitely developed through communicating with the athletes.	+4
18	My own experience as an athlete is my most important knowledge source about my sport.	+4
16	I have discovered new sides of myself through trial and error, and reflection.	+4
36	Systematic reflection on my own experience as a coach has little influence on my coaching practice.	-4
34	Experience is irrelevant for my personal evolvement.	-4
44	Conversations with my athletes have not affected my communication in a positive direction.	-4
45	My knowledge of my sport has been developed independently of reflection over my own experience.	-5
42	Other coaches have not influenced my knowledge of my sport.	-5

Factor B: Informal knowledge sources as experience and communication with others, and formal knowledge sources are important for personal and content knowledge learning.

Factor B has three significant loadings with mixed cases included. This factor was included on its own because it clearly represents a different viewpoint from the other two factors. Informal knowledge sources are emphasised in this factor. Through experience and communication with the athletes the subjects loading on this factor express the importance for their content knowledge and personal learning (statements 9 and 34). Other sources within the informal knowledge source, as reflection, are understood as not so important regarding any of the three learning sources (statements 26, 45 and 16). However statement 36, which is placed at -4 in the scoreboard, contradicts this. It disagrees to reflection not having an impact on the coaching practice. Trough further examination of the scoreboard for those statements placed at +3 and -3,

the formal knowledge source is highlighted as important for personal and content knowledge learning.

By looking at the statements for factor B against the table of combinations of levels (table 2), it shows that all of the knowledge sources are represented as well as two of the learning sources personal and content knowledge. The combinations non-formal knowledge source and personal learning (Statements 32 and 40) and Informal knowledge source and relational learning (statement 26) are not important for the subjects that load on factor B. Statement 6 is placed at +5 in the scoreboard and emphasise the importance of the non-formal knowledge source and content knowledge learning.

Table 7: The high and low scores for statements representing factor B.

Number	Statement	Strength
6	Through conversations with other coaches I have developed a greater understanding of my sport.	+5
32	My observing other coaches hardly influences my empathy.	+5
9	My understanding of my coaching practice has definitely developed through communicating with the athletes.	+4
26	I seldom think about how reflection might have developed my relational qualities.	+4
45	My knowledge of my sport has been developed independently of reflection over my own experience.	+4
28	I have no opinion on whether or not my experiences have developed my understanding of my sport.	-4
40	Books have definitely helped me to understand new sides of myself.	-4
36	Systematic reflection on my own experience as a coach has little influence on my coaching practice.	-4
16	I have discovered new sides of myself through trial and error, and reflection.	-5
34	Experience is irrelevant for my personal evolvement.	-5

Factor C: Formal studies influence learning at a personal, relational and content knowledge level.

There are seven significant loadings on factor C when mixed cases are included.

The formal knowledge source is the main emphasis for factor C. When looking at the table for combinations of levels (Table 2) compared to the statements that the subjects for this factor feels most strongly about, it becomes clear that the effect of the formal knowledge source stretches through all the three levels of learning (statements 1, 3, 11, 12, 30 and 20). The two most occurring combinations are formal knowledge source and content knowledge learning, and informal knowledge source and personal learning.

Factor C highlights the importance of both formal knowledge source as studying at the university and informal knowledge source as reflection and experience. The formal knowledge sources are most important for the content knowledge and relational learning, while the informal knowledge source seems to be more important for the personal learning. This is also emphasised by the statements set at +3 and -3 in the scoreboard.

Table 8: The high and low scores for statements representing factor C.

Number	Statement	Strength
1	My studies at the university have definitely helped me to develop on a personal level.	+5
17	I have developed through critical reflection on how I work with others.	+5
3	Formal education has definitely helped to develop my work as a coach.	+4
11	I have learned to meet others in a good manner through studying at the university.	+4
12	My applied understanding of the coaching practice has evolved through lectures at the university.	+4
25	I have no opinion on whether or not my experiences have developed me as a person.	-4
35	Experience has not influenced my behaviour toward others.	-4
20	I have no idea if studies at the university have had an impact on my interpersonal qualities or not.	-4
30	My job as a coach has not particularly been influenced by studies at the university.	-5
34	Experience is irrelevant for my personal evolvement.	-5

Discussion

The purpose of this study was to investigate the coaches' subjective views about how they acquire their knowledge for their coaching practice. Through this study 45 coaches have expressed their subjective viewpoints, and these viewpoints are further discussed with the theory of coach education and coach learning.

The results from this study show that most of the coaches load significantly on factor A that represents informal coach education as experience, reflection and communication, and these sources affect on personal and content knowledge learning. With 42 out of 45 coaches loading on factor A when mixed cases are included are very interesting since it was expected to be more divergence because the coaches come from different backgrounds, years of coaching, education and because of the many possible options they had to choose from. Alongside this main factor two other factors emerged with three and seven loadings when mixed cases have been included for factor B and factor C. Factor B highlights both informal and formal coach educations as important for personal and content knowledge learning, so factor B represents a different viewpoint to the research topic. The third viewpoint, factor C, looks more into how the formal coach education is important for learning at all the three levels included in this study. The factors are discussed in the order A, C and B where the two factors that have the most divided viewpoints are looked into first before the third factor that share common features with both of the other factors are discussed.

Factor A

Factor A emphasises how experience, reflection and communication with others have an impact on personal- and content knowledge learning. These three informal educational sources are all categorised as experiential learning that emphasises learning by doing and learning through social interaction (Erickson et al., 2008; Kolb, 1984). Experience is the base of all learning, so it is not surprising that the coaches emphasise experience as the main source for learning at an individual and content knowledge level (Moon, 2004). Through placing statement 7 and 16 to the right in the scoreboard they highlights how the method of reflection over own experiences have helped them develop as a person. Statement 7 especially expresses the importance of reflection for learning at the

individual level since the coaches have ranged this as one of the most important statements that describe their knowledge acquisition. According to Rogers (1969), the learner must be actively involved in the action, and self-experience the action to be able to integrate the learning into the self and then learn at an individual level. Learning at an individual level is for Rogers to learn to know oneself at a deeper level. Rogers believe that to be in touch with the inner feelings, thoughts and the impulse reactions one have, the individual will be able to develop as a person and so extract as much as possible from the experiences that occur. In the everyday job as a coach it will be important for the coach to know him/herself well to be able to control feelings and impulse reactions in interaction with the athletes. The coach should be able to control the feelings that occur during the interaction in choosing to share them with the athletes if it benefits the athletes' learning (Nelson et al., 2014). This kind of self-consciousness as metacognition is important for success as a coach, and can be developed through reflection on own behaviour (Kolb & Kolb, 2009; Moon, 2004).

Informal reflection over own experiences within the coaching practice is not only reported to be a preferred method of knowledge acquisition for the coaches in this study, but also in other research studies (Mallett et al., 2014; Stoszkowski & Collins, 2015). Wiman et al. (2010) found in their study that expert coaches seek learning sources that will help them develop at an individual level, and that reflection upon own behaviour is highly used for this purpose. The problem with informal reflection is that it is based on the previous knowledge of the coach, and those personal experiences that the coach has will impact what is thought to be relevant issues to reflect upon. With only previous experiences as a source to start reflecting from more limitations will arise (Gilbert & Trudel, 2001). To fully exploit the possibilities that are made available a combination of others' experiences, theoretical background and personal experiences are reported to be useful to optimise the reflection process (Irwin et al., 2004). For this the formal and non-formal coach education can help since through those education sources the reflecting process becomes more structured so it will be easier to recognize all the possible learning opportunities, and the theoretical background of the coaching practice are clarified (Mallett et al., 2009; Moon, 2004).

Formal education is recognised as an method to learn about the sport specific content knowledge, so that the coaches loading on factor A emphasises informal education as a method for content knowledge learning is unexpected (Nelson et al., 2006). Many of the coaches had completed higher education relevant for sport, but emphasised informal education as more important for their knowledge acquisition and learning. This is a very important find in that even though formal education has been completed, it is not a source the coaches seem to gain the knowledge necessary for their coaching job from. Even though this find was not expected, it is not strange that the coaches prefer informal sources for their content knowledge learning. Especially the informal source of communication with others is highlighted as important for the coaches loading on factor A through statement 6 and 9. Other studies have also found that communication with other coaches and athletes is a preferred method for learning. This find have been explained as a convenience, since it is a source that is within reach during the coaches' everyday life. To interact with peer coaches, athletes and other members of the sporting environment is a part of the coaching job, and is therefor something the coaches does on an everyday basis (Erickson et al., 2008; Stoszkowski & Collins, 2015).

Statement 6 and 9 is placed at +5 and +4 in the scoreboard and so emphasizes how much the coaches prefer the informal source communication for their learning and knowledge acquisition. The informal education sources belong to Sfard's participation metaphor, which focuses on the learners' own participation in the process (Sfard, 1998). This metaphor emphasises the social interaction with communication between two participants that actively participate in the dialogue as very important. This is in contrast to the acquisition metaphor, where the formal education source belongs to, that highlights more the individual part in the social milieu. The practice of giving lectures where the teacher conveys knowledge to the learners without much participation does not invite the learners to good communication with others (Mesquita et al., 2010). This might be why the coaches prefer informal education more than formal education.

Lave and Wengers theory about community of practice belongs to the participation metaphor, and highlights how the learner continues to learn within the daily community (Wenger, 2000). Learning from peer coaches within these communities is done by actively being involved in the learning situation, which is also central in the

constructivist epistemology (Dyer, 2009). Within this theory the learning from informal mentoring is important, and other studies have also found that the coaches prefer this method (Erickson et al., 2008). Experienced coaches can, through mentoring, give the novice coaches the tools they need to reflect upon their coaching practice and among those tools help them structure their reflection to increase learning (Irwin et al., 2004; Moon, 2004). The problem with the informal mentoring is that the novice coach will observe both good and bad coaching, and without any other theoretical knowledge about the coaching practice they might adopt all that they learn. The coach that is the mentor might not have the knowledge and skill to stimulate structured reflection within the novice coach, which can make the reflecting possibilities decrease instead of expanding (Mesquita et al., 2014; Stoszkowski & Collins, 2015). The formal education can be a solution to this problem by supporting formal mentoring with knowledgeable and experienced coaches that are educated to help the novice coaches recognise the varied influences the social milieu can have (Stoszkowski & Collins, 2014, 2015). The coaches loading on factor A does not seem to appreciate this aspect since they do not include formal education as a source for their knowledge acquisition.

The social side of learning is the view the coaches loading on factor A values highly, and more specific the participation the coaches need to take in their own learning by experience it for themselves in a social setting. A great part of the social setting is the relations the coaches are able to develop with the other individuals in the milieu. Other studies have found that good communication is key to a good relationship between the coach and the athlete (Jowett, 2009; Kristiansen, Tomten, Hanstad, & Roberts, 2012; Frode Moen & Sandstad, 2014). It is therefore very curious that the coaches loading on factor A does not emphasise learning at the relational level as an effect of the informal source communication. Learning at the relational level is not highlighted in factor A. The coaches seem to think that learning at the individual and content knowledge level as more important.

Factor C

Factor C has a viewpoint that looks more into how the formal education can stimulate learning at a personal, relational and content knowledge level, and how the informal education sources reflection and experience also contributes to learning. Since six out of seven coaches that significantly loads on factor C has completed higher formal education (BA, MA, PhD) it is not surprising that they emphasise the importance of formal education for their learning. However, the surprising part is that this is in contrast to factor A, which also consists of the majority of coaches having completed higher formal education, but who appreciates the informal education source experience as a much more valuable learning source. Both of the learning sources have been reported to be valuable to coach learning since they contribute in different ways for the learning to become optimal (Mallett et al., 2009).

The coaches that loads on factor C includes reflection and experience as important for personal learning, which is in agreement with the viewpoints of factor A. Nelson et al. (2006) highlights in their study that the formal education gives an understanding of the sport sciences, which include the theories behind the practical profession. So one can argue that the coaches loading on factor C recognises the value of learning the underpinning theories of their profession for then to understand the whole of it through reflection and experience in action. To be able to make good reflections out of experiences basic understanding needs to be in place, or the quality of the reflection might not be good enough to enhance suitable learning (Mallett et al., 2009; Moon, 2004). This might be why the coaches loading on factor C highlights formal education sources as so important compared to the viewpoint of factor A. To understand the basic theory and the specific aspects behind the practical can improve the coaching efficacy and then lead to the coaches feeling more confident when in action. The experiences they make might be better and more meaningful when the whole aspect is understood. Going into a coaching experience with a higher coaching efficacy can help the coach make the good reflections needed for enhanced learning and then improve the coaching effectiveness (Feltz et al., 2008; Mallett et al., 2009; Sullivan et al., 2012).

Factor B

Factor B highlights how both informal and formal education can stimulate learning at a personal and content knowledge level. Informal sources as experience and communication with other coaches and athletes are considered as most important. Factor B includes similar viewpoints with both factor A and C, but it also has viewpoints that are dissimilar that makes it a factor capable of standing on its own. Similarities with factor A are that both factors emphasises experience as important for personal and content knowledge learning. However, the difference is that the coaches loading on factor B emphasises others' experience more than own experience. Statement 6 shows the importance of this since it is placed furthest to the right in the scoreboard. This is very interesting since own personal experience is reported to be very important for personal and content knowledge learning (Rogers, 1969; Wiman et al., 2010). Mallett et al. (2009) concluded in their study that every form for experience was important, but that different forms could be more beneficial in different stages of the coaching career. So one can argue that the coaches loading on factor B are in a stage of their coaching career that makes them benefit and appreciate learning from others experience through communication more than through own reflection.

Statement 45 states that knowledge of the sport has been developed independently of reflection over own experiences, so it highlights that reflection is not important for the content knowledge learning. This is in clear contradiction with other research investigated (Gilbert & Trudel, 2001; Irwin et al., 2004; Moon, 2004). More interestingly is that statement 36 is placed at -4 in the scoreboard, which means that the coaches disagree with this statement. The statement describes that systematic reflection over own coaching practice has no impact on the coaching practice, which by interpretation means that they do actually think that reflection have impacted the coaching practice. These two statements, 45 and 36, are therefore in conflict with each other. Stoszkowski and Collins (2015) found similar results in their study, where the coaches did not mention reflection over own experiences and knowledge as a preferred method for learning. They discussed how this was unfortunate for the coaching practice, since the coaches then would replicate other coaches' approach to the profession and through that might adopt a less optimal coaching style. Since the coaches that load on factor B express that systematic reflection can be a great tool for learning more about the

coaching process, they do not reject reflection completely. An explanation for this opposition in the view on reflection might be that the coaches prefer systematic reflection developed from formal education above reflection that comes from informal education. By taking formal coaching courses, sport science degrees and have a formal mentor the reflection becomes more structured and the coaches gets to learn the theory behind what they do before they try it out themselves and reflect upon it (Irwin et al., 2004; Mesquita et al., 2014). "Enhancing reflective skills through formal education, making the awareness of experience as knowledge" (Moon, 2004, p. 158). The coaches understand the value of this through placing statement 36 on the left side of the scoreboard.

The coaches that loads on factor B also emphasises formal education as important for learning at all levels. The statements that highlights this is placed mainly at the +3 and -3 in the scoreboard, which means that they mostly prefer the informal sources but that formal sources are important too. To emphasise the importance of formal education is in agreement with the viewpoints of the coaches loading on factor C. The difference is on how strong their feelings about the formal sources are, since factor C highlights formal education as the most important educational source and factor B has ranged it as the second most important source. Another study have also found that coaches highlight formal education as important for their learning, but that informal education is preferred and is an education form that the coaches enjoy more (Stoszkowski & Collins, 2015). This viewpoint on the importance on both formal and informal coach education is in agreement with Sfard's point of view that both the acquisition and the participation metaphor is important when looking at learning. Sfard concludes in her article about the two metaphors "that we can live neither with nor without either of them" (Sfard, 1998, p. 10).

Summary

The three factors discussed all represents different views on the research topic. Factor A is the factor that almost all of the coaches loads on, which emphasises the strength of agreement between the coaches on the importance of the informal educational sources experience, reflection and communication. Especially learning on an individual and content knowledge level was emphasised in factor A. It is very strange that they see the importance of communication with others for their learning at an individual and content knowledge level, but not learning at a relational level which is reported to be an important outcome from this source (Jowett, 2009; Moen & Kvalsund, 2013). Another surprising found within factor A is the emphasis put on content knowledge learning as an outcome from the informal educational source. This outcome is the purpose of formal education that are supposed to convey knowledge and skills for the development of the individual (Imsen, 2009). From these findings, it can be argued that the formal education might not succeed in their method of conveying relevant knowledge and skills to the coaches, so it becomes more beneficial to seek new information from informal education instead (Gilbert & Trudel, 2001; Mesquita et al., 2014; Stoszkowski & Collins, 2015).

Informal reflection is also highlighted in Factor A as important for learning at an individual and content knowledge level. This is in agreement with the theory where learning by doing is central, and where reflective practice is important for learning (Imsen, 2009; Moon, 2004). Factor B is in contrast contradicting in its view on reflection. Reflection from informal sources is not seen as important, but systematic reflection from formal sources is. The coaches loading on factor B therefore seem to value the learning developed from formal education to be able to systematise their reflection instead of free reflection without the background knowledge (Irwin et al., 2004; Mesquita et al., 2014). This view on reflection is similar to factor C, where the coaches seem to value understanding the theories behind the coaching practice before developing more knowledge about the coaching practice by reflecting on experiences (Mallett et al., 2009).

Experience is a source all the three factors value for their learning. Factor A has it as the strongest viewpoint, factor C sees it as important but sees formal sources as more valuable and factor B sees experience as important through communicating with others.

While factor A highlights the value of both personal and others' experience, factor B only seems to value others' experience. It is through communication with other coaches, where their experiences are shared, that the coaches loading on factor B sees it as valuable. The coaches can be in a place in a place in their career at the current moment that makes them benefit more from this source (Mallett et al., 2009). Communication is valued by both factor A and B, and other research has also reported the importance of this through mentoring from both informal and formal sources (Erickson et al., 2008; Mesquita et al., 2014).

Conclusion

Through this thesis the coaches' subjective beliefs about their knowledge acquisition has been explored. Through the use of Q method three factors that represented three viewpoints on the topic emerged. These three factors was set as A, B and C, and consisted of the shared opinions between the coaches that significantly loaded on each factor. All the three factors highlight reflection and experience as valuable sources for their learning. This emphasises the importance of theses sources, and the agreement between all the coaches gives a reason to believe that this find could be generalised. The aim of this study was not to generalise any findings, which is not the purpose of the q-method, but the results showed a strong statistical significance in factor A since 42 out of 45 coaches loaded on this factor with mixed cases included. That one factor was so strong was very surprising since the coaches had many possible statements to choose from to represent their view on the topic.

That factor A did not mention formal education as important for their learning was a very interesting find. Even though many of the coaches had relevant higher education for sport, they did not value this source for their knowledge acquisition for their coaching practice. This should be investigated in future research to examine how the formal education manages to deliver what they are supposed to. Another aspect to investigate in future research is the non-formal education source in relation to why this source is not valued more among the coaches. The non-formal education source were not well emphasised through any of the three factors, which is very interesting since this source is created for each individual sport to arrange courses and seminars for the coaches continuing professional development (Nelson et al., 2006). Future research should focus on investigating these aspects of the coaches' knowledge acquisition with both quantitative and qualitative research methods to get a clear view on the opinions and facts behind these viewpoints.

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List of tables and figures

Tables

Figures

Appendix

Appendix 1: Q Sample with statement loadings on each factor

			Factors	
Statements		**A**	**B**	**C**
1.	My studies at the university have definitely helped me to develop on a personal level.	2	1	5
2.	My emphatic abilities have developed through lectures at the university.	-1	3	3
3.	Formal education has definitely helped to develop my work as a coach.	2	3	4
4.	Through conversations with other coaches I have learned to understand myself better.	3	0	1
5.	My ability to communicate well with others has evolved through active use of the Internet.	0	2	0
6.	Through conversations with other coaches I have developed a greater understanding of my sport.	5	5	3
7.	My personal development is a result of reflecting over my experiences.	5	-3	3
8.	My empathy has developed through an experimental approach.	2	2	1
9.	My understanding of my coaching practice has definitely developed through communicating with the athletes.	4	4	1
10.	I have developed a greater understanding of myself through lectures at the university.	1	3	2
11.	I have learned to meet others in a good manner through studying at the university.	1	-2	4
12.	My applied understanding of the practice of coaching has evolved through lectures at the university.	0	2	4
13.	I have definitely developed my understanding of myself through being guided by a mentor.	2	-1	0
14.	I have gained a greater understanding of how I influence others after participating in seminars sponsored by my sport.	3	2	1
15.	My understanding of my sport has evolved through communicating with my athletes.	3	3	2
16.	I have discovered new sides of myself through trial and error, and reflection.	4	-5	3
17.	I have developed through critical reflection on how I work with others.	3	1	5
18.	My own experience as an athlete is my most important knowledge source about my sport.	4	0	0
19.	I have no opinion about to what extent studies at the university have helped me develop myself on a personal level.	1	0	-3
20.	I have no idea if studies at the university have had an impact on my interpersonal qualities or not.	0	1	-4
21.	I have no opinion about whether or not my formal	0	0	-3

education has had an impact on my understanding of my sport.			
22. I am indifferent to whether or not non-formal settings have developed me personally.	-1	1	-3
23. I have no opinion about whether or not seminars have developed my empathy.	0	-1	0
24. I have no opinion on whether or not my understanding of my sport is influenced by communication with other coaches.	-2	-1	-2
25. I have no opinion on whether or not my experiences have developed me as a person.	-2	0	-4
26. I seldom think about how reflection might have developed my relational qualities.	-2	4	-2
27. I have no opinion on whether or not my experiences have developed my understanding of my sport.	-3	-2	-3
28. University studies have absolutely not developed me on the personal level.	-1	-4	-2
29. At the university I have not learned how to influence others.	-1	-2	-1
30. My job as a coach has not particularly been influenced by studies at the university.	1	-2	-5
31. I experience no benefit from observing others in order to understand myself.	-2	0	-2
32. My observing other coaches hardly influences my empathy.	-2	5	0
33. My athletes have not influenced my understanding of my sport.	-3	-1	-1
34. Experience is irrelevant for my personal development.	-4	-5	-5
35. Experience has not influenced my behaviour toward others.	-3	-3	-4
36. Systematic reflection on my own experience as a coach has little influence on my coaching practice.	-4	-4	-2
37. The way I see myself has not developed through studies at the university.	0	-3	-1
38. My ability to understand others has not been influenced through studies at the university.	1	2	0
39. My understanding of my sport has definitely not been influenced by formal studies.	0	-3	2
40. Books have definitely helped me to understand new sides of myself.	2	-4	2
41. My understanding of other people has not evolved through books that I have read.	-1	-2	1
42. Other coaches have not influenced my knowledge of my sport.	-5	0	0
43. Reflections about my experiences have hardly helped me to understand myself better.	-3	1	-1
44. Conversations with my athletes have not affected my communication in a positive direction.	-4	-1	-1
45. My knowledge of my sport has been developed independently of reflection over my own experience.	-5	4	2

Struktur for gjennomføring (45 utsagn).

1. Ta utgangspunkt i din situasjon som trener. Hva mener du har påvirket til at din anvendte trenergjerning har blitt som den har blitt? Hva har formet deg som trener? Ta utgangspunkt i de vedlagte 45 utsagnene og sorter disse med utgangspunkt i dine meninger om disse spørsmålene.

2. Les først alle utsagnene for å få en oversikt over hele innholdet. Ta deg god tid.

3. Del så utsagnene i 3 noenlunde like grupperinger i samsvar med de betingelser som er nevnt i punkt 1.

   a. Gruppe a de utsagnene som beskriver det du er enig med (til høyre).
   b. Gruppe b de utsagnene som beskriver det du ikke er enig med (til venstre)
   c. Gruppe c de utsagnene som er mer nøytrale, som ikke gir så mye mening, virker tvetydige, tvilsomme, uklare eller motsigende (i midten).

4. Du skal nå gjøre mer detaljerte fordelinger, der du skal velge ut tallverdier i hvert utsagn, fra en skala på +5 til -5.

5. Først legg ut alle utsagnene i gruppe a, de som du er mest enig med. Les så gjennom dem igjen og velg ut to utsagn som du er mest enig med. Plasser utsagnene lengst til høyre, + 5 i pakt med skjemaets mønster.

6. Deretter gjør det samme med gruppe b, de utsagnene som du er mest uenig med, og plasser deretter de to utsagnene som du er mest uenig med lengst til venstre, -5 i henhold til skjemaets mønster.

7. Gå så tilbake til de utsagnene som du er mest enig med og velg nå de 3 som du er nest mest enig med og plasser dem ved siden av utsagnene som du plasserte lengst til høyre + 4.

8. Gjør nå tilsvarende for den andre gruppen b, velg 3 utsagn og plasser dem på siden av utsagnene som du plasserte lengst til venstre, -4.

9. Når du kommer til +3 plasser 4 utsagn først under +3, deretter 4 utsagn under -3. Videre for +2, -2, +1, -1 og 0 er det de små nyansene som bestemmer hvilken kolonne du plasserer utsagnene i. Vær nøye og bruk god tid.

10. Når du har fullført fordelingen og plasseringen, se over den på nytt og avgjør om du er enig med deg selv. Hvis det fortsatt er noe du er misfornøyd med, juster plasseringene slik at du blir fornøyd. Plasser utsagnenes nummer på skjemaet og lever dette.

Lykke til!