

AN EXPERT STRENGTH AND CONDITIONING COACH'S PRACTICAL KNOWLEDGE

by

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(Under the Direction of Paul G. Schempp)

ABSTRACT

In attempting to precisely define the professional knowledge base for the strength and conditioning coaching profession and to gain a better understanding of strength and conditioning coaches' work, the purpose of this study was to analyze and report the content of practical knowledge used by an expert strength and conditioning coach. The study followed a qualitative case study research design. The participating expert coach met the following requirements: minimum 10 years of coaching experience, head strength and conditioning coach position at collegiate level, coaching at an NCAA Division I institution, possessing CSCS or SCCC designation, and formal recognition on coaching achievement from a professional organization. Data collection included observation, interviewing, and document analysis. After performing a thorough data analysis, ten major knowledge categories emerged, which were separated into two main clusters. The participant possessed a form of practical knowledge that was foundational in his work to carry out strength and conditioning programs. Entitled as Foundational Practical Knowledge, this cluster contained six categories, such as knowledge of coaching strength and conditioning, facility and equipment, exercises and techniques, injuries, athletes, and planning. The second type of practical knowledge, named as Applied Practical Knowledge, was based on the knowledge categories of the Foundational Practical Knowledge cluster, and was mainly used in action. This knowledge cluster included knowledge of plan modification, supervision, coaching pedagogical strategies, and professional improvement. The findings of this study indicated that the examined expert strength and conditioning coach's practical knowledge was just partly based on his Foundational Disciplinary Knowledge, which was attained from formal education. Major parts of his practical knowledge were obtained from experience, real-life practices, or other professionals. Other parts, such as categories in the Applied Practical Knowledge cluster, were pedagogy related knowledge types. It was recognized that formal coaching educational programs often do not focus on these inevitably important knowledge needs. The present study suggests including pedagogy courses in coaching educational programs and preparing prospective coaches for the pedagogical demands of this profession.

INDEX WORDS: Knowledge for strength and conditioning, Coaching, Practical knowledge, Expertise in coaching, Experts, Coaches' knowledge

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DEDICATION

Ezt a disszertációt az édesanyám emlékének szentelem, aki egy végtelenül szeretettel teli, odaadó és kitartó személy volt. Születésem óta csak a legjobbakat akarta nekem és mindig is büszke volt rám, de sajnos a büszkeségének eme újabb pontját, az én doktori címszerzésemet nem élhette meg. Bár tudom, hogyha nem is ezen a világon, de valahol most is bizonyosan büszke rám...

This dissertation is dedicated to my mother, who unfortunately could not live the moment when I obtain my doctoral degree. I know, however, that she is very proud of me now...

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CHAPTER 1

INTRODUCTION

The purpose of competitive sport training is to provide athletes with a quality exercise regimen that will aid them in succeeding in competition. Improving athletes' physical, as well as mental and emotional performance, is and always has been the main goal of those coaches who work with athletic teams or individuals. Coaches have been around for as long as people have engaged in any form of physical competition, may be even before the days of the original Olympic Games in ancient Greece (Gummerson, 1992). According to Sisley and Wiese (1987), the coach is the most important factor affecting the athlete. It is the coach who navigates between theory and practice, in other words the scientific basis of sports and the athletes' sport performance. Woodman (1993), supporting this point of view, stated that "the application of science to sports performance is channeled through the coach" (p. 10). Due to the fact that athletic performance is affected by numerous variables, the job of coaches is quite complex. According to Launder (1993), the coaching task is a highly complex process in which a vast array of skills, information, knowledge, and even wisdom are brought to bear on a range of problems that can involve all aspects of the athlete's life. Thus, although coaching is a progressively developing profession and as such, it is based more and more on scientific and systematic facts, in essence, it is still an art (Woodman, 1993). Others also believed that coaching is somewhere on the borderline of solid science and the mastery of art (Dick, 1989; Lyle, 1986). According to Woodman (1993), "in order to be fully effective

in this art, the coach must develop a better understanding of the sciences that relate to athletes and their performance” (p. 5).

The coaching task and the role of the coach might also differ according to the sport, conditions, and the number, age and performance level of athletes. Working with athletes who reach high performance levels requires the coach to have specific responsibilities, such as developing those athletes into successful international performers (Woodman, 1993). This might make it necessary “that the coach works with assistants and coordinates other professionals from specialized areas” (p. 3). It has been recognized that strength and conditioning plays a crucial role in the preparation of athletes of a variety of sports. Increasing numbers of strength and conditioning coaches are involved in athletic programs assisting head coaches in the preparation of athletes. According to Pullo’s (1992) theory, “the selection of strength and conditioning professionals with the needed academic training, qualifications and experience is essential if athletic programs are to optimally prepare athletes for quality performance and to prevent injury” (p. 55). Compared to the traditional athletic coaching, strength and conditioning coaching is a relatively new but rapidly improving field. Today, professional associations, such as the National Strength and Conditioning Association (NSCA) and the Collegiate Strength and Conditioning Coaches association (CSCCa) hold these professionals together. The strength and conditioning coaches cooperate with the head coaches of specific sports and work directly with athletes striving to develop their physical abilities (Kontor, 1989).

Professionals working as strength and conditioning coaches mostly hold certifications such as the Certified Strength and Conditioning Specialist (CSCS) title, which is awarded by the National Strength and Conditioning Association, or the Strength

and Conditioning Coach Certified (SCCC) credential from the Collegiate Strength and Conditioning Coaches association. Very few coaches in the field possess distinct certifications, such as the CSCS-D (with distinction) by NSCA, or the Master Strength and Conditioning Coach (MSCC) designation from CSCCa. These credentials refer to “professionals who apply scientific knowledge to train athletes for the primary goal of improving their athletic performance” (Baechle, 1997, p. 64). Obtaining these designations requires a well-established and broad theoretical and practical knowledge base. Still, because coaching strength and conditioning involves more than simply designing programs and supervising athletes (similarly to other fields of athletic coaching), “strength coaches are often required to have knowledge that cuts across several domains” (Dooman, Titlebaum, & DeMarco, 1998, p. 31).

In coaching, just like in any other profession, some individuals emerge over others with their talent, knowledge, enthusiasm, preciseness, and perseverance. These individuals are often labeled experts, who possess numerous distinctive characteristics that make them exceptional. Although most meaningful human actions can be performed with different degrees of expertise (Tan, 1997), possession of a large body of knowledge and a variety of procedural skills are prerequisites to be an expert in any given field. As Tan (1997) explained, “the degree of excellence that experts have gained is crafted by extensive knowledge that is amassed over years of experience” (p. 31). However, knowledge alone does not make one an expert coach, because being skilled in transferring that knowledge is also essential.

As previously mentioned, the job of any coach is quite complex. In this complexity, the knowledge of coaches, regardless of their level of expertise, is one of the

most important determining aspects of how well the competitors will be prepared for upcoming events (Cote, Salmela, & Russell, 1995b). According to these authors, “like teachers’, the coach’s job is to transmit and transform a collective body of knowledge and skills on a given subject in order to help athletes acquire and use that knowledge in various situations” (p. 65-66). Due to the complexity of coaching, coaches are expected to possess knowledge in a broad scale of disciplines. Nevertheless, they typically receive sparse training through coach education programs (Gilbert & Trudel, 1999, 2001), thus these programs often do not provide a thorough knowledge base for practical coaching. Salmela, Russel, Cote, and Baria (1994) explicitly questioned the effectiveness of the coach-centered programs that exist in some countries. These authors conducted a study with the intent of analyzing the content and structure of coaches’ experiential knowledge and found that coaching expertise is organized differently from that presented in coaching manuals.

Examining elite national and Olympic coaches, Gould, Giannini, Krane, and Hodge (1990) concluded that experiential knowledge and informal education had significant importance in the development of expertise in coaching. Coaching experience and consulting with other successful coaches has been frequently reported as important sources of knowledge used in coaching practice (Gould et al. 1990; Saury & Durand, 1998). Consequently, there is a need to improve the quality of the existing coaching education programs. This can be realistic only if research based information about the knowledge that is crucial for effective coaching is gained. As Gilbert and Trudel (1999) advocated, “in order to develop the value of the (coaching) educational programs, there is a need to analyze the knowledge of those coaches who work in their fields efficiently” (p.

1). In this kind of analysis, the focus should be placed on the coaches' knowledge being used in practice, rather than their knowledge, which is theoretical or propositional. Educational philosophers distinguish these two types of knowledge and argue that practical "knowing-how" is different from theoretical "knowing-that" (Ryle, 1949; Curtis, 1977; Arnold, 1988). According to Ryle (1949), knowing-how representing practical knowledge involves the actual disposition to be able to do things, whereas knowing-that represents theoretical knowledge about how the world is. In addition, whereas knowing-that is a function of human theorizing, knowing-how is an expression of rational practice (Ryle, 1949). Arnold (1988) emphasized that theory is not always the precursor of practice, specifically in sports, crafts and arts. Therefore, in order to define the essential knowledge for effective coaching, research must focus on the practical component of coaches' knowledge base.

Because in coaching, specifically in coaching strength and conditioning, the prerequisite knowledge of expertise has not been identified, research studies in this field are to be based on other domains or fields of expertise. Due to the similarities between teaching and coaching, it is the teaching profession in which the existing abundant research base provides support for research in coaching. The comparability of teachers and coaches received extensive support in the literature. It has been suggested that both teaching and coaching involve the same basic process and types of knowledge (Horn, 1987; Tharp & Gallimore, 1976). For instance, Gilbert and Trudel (1999) contrasted coaches with teachers and stated the similarities between these two professions, as both groups must possess knowledge across a wide range of domains. Prompting for research in coaching, Tinning (1982) suggested that conceptual models of teaching should be used

in coaching research. Also, Gould, Giannini, Krane, and Hodge (1990) described similarities between physical education teacher education programs and coaching education programs and argued that both are concerned with bridging the gap between sport science specific knowledge and professional practice.

In research on teaching and teacher education, it has been recognized that examining expert and effective teachers' practical knowledge is useful and valuable. Teachers' practical knowledge has been defined as a complex, practically oriented set of understandings, which teachers actively use to shape and direct the work of teaching (Elbaz, 1981). When effective teaching and the knowledge base for effective teaching is examined, teachers' shortcomings can be identified and eventually eliminated, through the improved teacher education programs (De Vries & Beijaard, 1999). According to these authors, "it is expected that, at least to some extent, research on teachers' practical knowledge better takes into account what really matters in teaching and that this knowledge should be taken seriously by educational researchers in their attempts to depict good teaching" (p. 377). As pointed out by Johnston (1992), the knowledge that guides practice of teachers should be a vital topic to educators involved in teachers preparation, thus education programs should focus on practical knowledge demonstrated by expert teachers and implement it in the developing process of pedagogical expertise.

Marlatt (2001) argued for a model of pedagogical expertise that could be developed from the practical experiences and knowledge of expert teachers. As he highlighted, "theoretical knowledge is often taught in teacher preparation programs, but preservice teachers... may also be better served by describing experienced and expert teachers' practical knowledge base and setting up a model for pedagogical expertise in

teacher preparation programs” (p. 333). In addition, in-service, experienced teachers might also benefit from such analyses. According to Elbaz (1983), “it is possible for teachers to become aware of and articulate their own practical knowledge, and that this process can lead to greater self-understanding and professional growth” (p. 170).

Accordingly, it is necessary to examine the practical knowledge of expert coaches in strength and conditioning, which may lead to the overall improvement of the field of strength and conditioning. As Gould, Giannini, Krane, and Hodge (1990) claimed, “there is a need to better understand elite coaches, their educational backgrounds, and their own perceived coaching education needs” (p. 333).

Research Question

In order to provide useful information for coaches about the art and science of coaching, it is important to examine in-depth the knowledge domain of expert coaches (Cote, Salmela, & Russell, 1995b). An in-depth examination of an expert strength and conditioning coach’s practical knowledge could enhance the development and standards of educational programs designed for coaches, and consequently, it may positively influence the training programs created for athletes. In attempting to precisely define the professional knowledge base for the strength and conditioning coaching profession and to gain a better understanding of strength and conditioning coaches’ work, the purpose of this study was to analyze and report the content of practical knowledge used by an expert strength and conditioning coach. This study was specifically designed to address the following research question:

- What is the content of knowledge that an expert strength and conditioning coach uses in practice?

Definition of Terms

Expert: An expert is someone who achieves exceptionally high performance in a given domain (Ericsson & Smith, 1991).

Knowing-how: Knowing-how represents practical knowledge; it involves the actual disposition to be able to do things, and it expresses rational practice (Ryle, 1949).

Practical Knowledge: A complex, practically oriented set of understandings, which a coach actively uses to shape and direct the work of coaching. Elbaz (1981, 1983) in examining teachers' knowledge identified the following components of practical knowledge: knowledge of subject matter, knowledge of curriculum, knowledge of instruction, knowledge of self, and knowledge of the milieu of schooling.

Strength and Conditioning Coach: An individual working directly with athletes to develop all physical qualities (speed, strength, power, agility, cardiovascular/muscular endurance and flexibility) (Kontor, 1989).

Certified Strength and Conditioning Specialist (CSCS), and Strength and Conditioning Coach Certified (SCCC): Strength and conditioning credentials that recognize those professionals who apply scientific knowledge to train athletes for the primary goal of improving their athletic performance (Baechle, 1997).

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this study was to analyze and report the practical knowledge used by an expert strength and conditioning coach. This chapter will review the literature related to the practical knowledge of coaches. Specifically, the review will focus on different topics of related literature and will be divided into six sections. These include (a) a description of coaching as a profession; (b) an introduction of the field of strength and conditioning, the individuals working in this field, and the knowledge of these individuals; (c) summarizing the literature on the knowledge of coaches; (d) delineating papers on coaching expertise and the knowledge of expert coaches; (e) reviewing studies devoted to defining and interpreting practical knowledge; and (f) epitomizing research studies that analyze teachers' and coaches' practical knowledge.

Coaching as a Profession

Coaching is viewed as a complex, multifaceted profession that requires versatility. According to Launder (1993), the coaching task is a highly complex process in which a vast array of skills, information, knowledge, and even wisdom are brought to bear on a range of problems that can involve all aspects of the athlete's life. The versatility of the coaching task is fully described by Fairs (1987), who states that the coaching process is dynamic, organized, systematic, and deliberate and that it involves observation (information collection), assessment (problem identification), goal setting (development of a plan of action), coaching (implementation of the plan), and reassessment

(evaluation), which is an ongoing function throughout the process. This complex coaching process is generally based on a variety of scientific areas, including anatomy, physiology, biochemistry, biomechanics, growth and development, statistics, tests and measurements, motor learning, psychology, sport medicine, nutrition, pedagogy, sociology, and information and communication technology (Balyi, 1992; Bompa, 1983).

According to Woodman (1993), in order to appreciate the value of coaching science, it is necessary to understand the job of coach. In a very general perspective, the job of the coach is to help athletes achieve their best possible level of performance. In the broad sense, it can be defined as preparing an athlete for competition.

This can encompass a wide range of tasks from teaching basic skills to beginners, planning and implementing long-term training programs, immediate pre-competition preparation, and providing technical and tactical advice throughout a competition or performance. Coaches must be able to implement, evaluate, and modify training programs for effective development of the athlete. They must be able to develop an effective competition plan and build recovery and regeneration techniques into program planning to reduce the chance of overtraining or injury. (Woodman, 1993, p. 3)

It is also recognized that coaches at various levels, dealing with different types of athletes may have differing professional goals. By Woodman's (1993) perspective, when working with beginner athletes, the coach's main concern is to provide practice and competitive environments for the athletes, which ensures maximal participation, sequential development, and proper acquisition of basic skills. In addition, according to Horn (1987) and Martens (1988), a coach's challenge is to teach physical skills, as well as

to build character, instill integrity, and point the way for youngsters to become confident, self-reliant adults. Gilbert and Trudel (1999), who examined youth coaches, concluded that some coaches see themselves as responsible for the social and moral development of youth, while other coaches view their primary responsibility as teaching sport specific techniques and tactics.

When athletes reach a more competitive level of sport practice, the coach's role is modified. According to Woodman (1993), coaches who work with elite athletes are responsible for developing talented athletes into successful international performers.

This may require that the coach works with assistants and coordinates other professionals from specialized areas. The tasks at this level are much more specialized and include conducting integrated and periodized training programs, talent identification and long-term development programs, organizing training camps, going on road trips, using sports science and information technology and services, demonstrating leadership and personnel management skills, and dealing with the media. (Woodman, 1993, p. 3)

Pyke (1992) suggested that the modern coach is also responsible for the development of the athlete outside the sport arena, including assistance with personal and career development. Pyke further indicated that coaches should possess some essential characteristics for being successful professionals, such as having well-developed planning and administrative skills, being competent communicators in both oral and written forms, being competent budget managers, having a broad vision of their sport, being able to integrate the elite program with the lower levels of the sports development pyramid, and being innovative and open-minded. Harre (1982) suggested that developing

the athlete's personality (attitude, convictions, habits, and behavioral patterns) and moral qualities should also be part of the process.

Concerning coaches' instructional strategies, Bompa (1983) argued that athletes should be trained both physically and theoretically. He explained that coaches should share theoretical knowledge with the athlete, which eventually will accelerate the athlete's development and provide for motivation in training. Supporting this view, Woodman (1993) explained that "developing athletes in this way makes them more 'coachable'. It makes communication between athlete and coach much more effective because the athletes have a better understanding of why they are being asked to do certain things in training" (Woodman, 1993, p. 4).

One of the most salient perspectives that Woodman (1993) repeatedly expressed is that coaching, as a developing profession, is becoming more and more scientific and systematic, but in essence, it still remains an art. This notion is supported by Dick (1989), who believed that coaching is mainly an art. He compared the coach to an artist, who must have creativity and technical mastery over the materials and tools in use. He also stated that the coach must have a great comprehension of the purpose of each practice and its relevance to the entire preparation process, while at the same time understand the growing, changing person of the athlete and the role of sport in his or her life. Woodman (1993) further theorized that "in order to be fully effective in this art, the coach must develop a better understanding of the sciences that relate to athletes and their performance" (p. 5). Lyle (1986) placed coaching close to the borderline of science and art, and suggested that sport performance is not an exact science, mainly because a lot depends on the individuality of the coach, the decision-making is influenced by

experience, and the vagaries of the psychological aspects of performance point to human factors as a key part of the process.

Viewed from either a scientific or an artistic perspective, coaches' knowledge is a significantly important factor in the coaching process. Gould, Giannini, Krane, and Hodge (1990), in reflecting coaches' knowledge, surveyed 130 elite coaches, aiming to develop a profile of the coaching education background and self-perceived coaching educational needs of coaches. Authors ranked coaches' major ways of developing their coaching style and the results showed that experience and modeling were ranked as the most important, followed by figuring a style out and reading coaching books and journals, with coaching classes ranked as least important. The most important contributors to the sampled coaches' coaching knowledge were attending clinics, lectures or seminars, reading books or coaching journals, seeing films, talking to other coaches and also attending in competitions. Coaches were also asked to rate their understanding of the body of knowledge in various sport sciences of coaching skills and strategies. The results revealed that coaches rated themselves most knowledgeable in the skills and strategies of the sport areas and least knowledgeable in sport law. Additionally, the coaches also rated themselves as moderately knowledgeable in the sport sciences such as sport physiology, sport pedagogy, or sport biomechanics.

Overall, the coaches that were surveyed overwhelmingly supported the idea of holding elite coaching clinics, initiating coaching science courses, and implementing mentor-type coaching apprenticeship programs. In addition, "one of the most important themes arising from the findings was the importance of experiential knowledge and informal education in the development of an elite coach" (Gould et al. 1990, p. 341).

Admitting the complexity of the coaching process and the necessity of a well grounded knowledge base, Woodman (1993) summarized coaching as an emerging profession:

Despite the rapid developments in coaching science, the better dissemination of coaching knowledge, the greater application of scientific techniques, and better planning, coaching is still very much an art that requires optimal application of this developing knowledge to each coaching environment to ensure maximum development of each athlete... There is a little of the artist in all good professionals. Regardless of the level of scientific knowledge and the use of scientific methods, it is often the application of that knowledge and methodology through individual flair that separates the excellent practitioners from others. It is perhaps about putting science to the service of the art. (Woodman, 1993, p. 6)

Strength and Conditioning Coaches and their Knowledge

Strength and conditioning plays a crucial role in the preparation of athletes in a variety of sports. In Pullo's (1992) interpretation, "the selection of strength and conditioning professionals with the needed academic training, qualifications and experience is essential if athletic programs are to optimally prepare athletes for quality performance and to prevent injury" (p. 55). Sutherland and Wiley (1997) stated that the involvement of strength and conditioning in athletic training is vital, mainly because "an athlete who is unfit cannot perform up to expectations and may be vulnerable to injury... Therefore, many teams hire strength and conditioning coaches to help prepare athletes for top performance and avoid injuries" (p. 266).

It is a relatively young and constantly growing profession. According to Owens and Titlebaum (2002), about two decades ago strength and conditioning coaches were enthusiastic people who loved to train (themselves or other athletes) and eventually they were the ones who turned a hobby into a profession. These professionals joined together and established the National Strength Coaches Association in 1978. In 1981, the name of the association was changed to National Strength and Conditioning Association, according to Taylor (2001), apparently in order to reflect the increasing diversity within the profession. As the field of strength and conditioning developed, a growing number of people turned to coaching as a profession. In the meantime, job conditions and responsibilities more clearly were specified. As stated by Kontor (1989), the strength and conditioning coach is:

An individual who works directly with athletes to develop all physical qualities such as speed, strength, power, agility, cardiovascular/muscular endurance and flexibility, including nutritional and drug-free restorative considerations which improve athletic performance and prevent injuries specific to the performance of a given sport. This responsibility is performed under the direction of the head coach of a specific sport. (p. 75)

Armitage and Johnson (1994) defined the head strength and conditioning coach as “a coach and administrator who is a Certified Strength and Conditioning Specialist (CSCS)” (p. 485). They described strength and conditioning professionals as the ones who organize strength and conditioning programs and are also responsible for the overall program, facility, equipment, and staff, and for such administrative tasks as preparing a budget, purchasing equipment, preparing proposals, and dealing with administration.

Most college head strength and conditioning coaches hold a CSCS title and an increasing number of institutions require it from the applicants. CSCS is awarded to individuals by the National Strength and Conditioning Association (NSCA) after passing a rigorous examination. Baechle (2001) indicated that the “CSCS credential has gained the reputation as the most challenging examination that is specific to strength training and conditioning athletes and the most difficult and prestigious of all nationally and internationally recognized certifications to obtain and possess” (p. 69). Owens and Titlebaum (2002) supported this notion, affirming that “the CSCS program is nationally accredited and is the most comprehensive certification program available for strength and conditioning professionals. It incorporates both theoretical and applied principles across the entire spectrum of the profession” (p. 44). By Dooman’s, Titlebaum’s, and DeMarco’s (1998) interpretation, NSCA offers CSCS credentials in order to “identify and recognize those professionals who possess the knowledge design and implement safe and effective strength training and conditioning programs” (p. 32). Baechle (1997) defined Certified Strength and Conditioning Specialists as:

Professionals, who apply scientific knowledge to train athletes for the primary goal of improving their athletic performance. They conduct sport-specific testing sessions, design and implement safe and effective strength training and conditioning programs, and provide guidance regarding nutrition and injury prevention. (p. 64)

Strength and conditioning coaches may come from different fields, therefore this population shows broad diversity. Pullo (1992) surveyed 145 college strength and conditioning coaches examining the demographic characteristics, educational

backgrounds, experience levels, and duties. He found that over 50% of the surveyed professionals held a physical education or exercise science undergraduate degree. As Pullo further explained, “these degrees contribute to a solid knowledge base for strength and conditioning” (p. 56). Brooks, Zialtz, Johnson, and Hollander (2000) summarized the characteristics of strength and conditioning coaches as:

The typical head strength and conditioning coach as an athlete has played varsity-level football or track and field. Coaches tend to spend a significant portion of their time on administrative duties, provide strength and conditioning services primarily for men participating in revenue sports, administratively report directly to the athletic director, hold CSCS certifications, and have undergraduate degrees in health, physical education, recreation or exercise science. (p. 489)

The field of strength and conditioning does not have a firmly established educational setting as a basic requirement. People turn to strength and conditioning professionals from a wide variety of professions, but mainly they hold some physical education or exercise physiology related degrees. As stated by Kleiner (1999), although NSCA encourages higher education institutions to involve strength and conditioning related courses in their curriculum, strength and conditioning can not be found as a major or an area of study at the college level. However, most colleges and universities offer exercise science related courses such as exercise physiology, and many of these programs focus on anaerobic training and adaptations, and other courses can be found that focus on resistance training related activity classes. Some universities have Certified Strength and Conditioning Specialist (CSCS) on their faculty or staff, which make it helpful to educate students more specifically (Kleiner, 1999).

Garhammer (1998) suggested that the academic preparation of strength and conditioning professionals should include a strong exercise science background. Moreover, coaches should have practical experience including a competitive sports background, in which strength and conditioning was an important component. Kleiner (2001) further expanded Garhammer's suggestions by stating that instructional areas such as human anatomy and physiology, exercise physiology, kinesiology/biomechanics, nutrition, scientific principles of strength and conditioning, resistance training and conditioning, exercise technique/exercise prescription with emphasis on anaerobic exercise, and program design as related to strength and conditioning should be provided in exercise physiology courses, in order to be eligible for NSCA recognition. Dooman, Titlebaum, and DeMarco (1998) explained that because coaching strength and conditioning entails more than simply designing conditioning programs and supervising athletes in the weight room, "strength coaches are often required to have knowledge that cuts across several domains, especially in exercise physiology, sport psychology, biomechanics, and nutrition" (p. 31). Baker (2001) also suggested that strength and conditioning coaches should possess a sound knowledge of the biomechanics of the exercises. He called these basic premises that coaches should know in order to "modify the technical behavior of the athlete to develop the most biomechanically sound lifting behavior" (p. 64).

But biomechanics is not the only field that should be included among the basic premises. Strength and conditioning professionals should constantly expand their knowledge base and bring different scientific fields into their theoretical repertoire to stimulate professional improvement. Fekete (1999) urged for continuing education

courses for professionals in this field to expand one's knowledge base and to gain further respect and recognition as professionals. He claimed that "providing fresh, relevant, and high-quality material and selecting our continuing education courses in a critical, discerning, and open manner is the best safeguard against becoming inflexible, irrelevant, and outdated" (p. 68). Fekete suggested that the science of strength and conditioning should be constantly expanded with relevant facts, theories and working hypotheses of health sciences, which, if incorporated in the strength and conditioning professionals' knowledge base, eventually could be translated into practical and qualitative improvement. He further suggested that mere expansion of one's knowledge may remain ineffective without constant reorganization and testing of knowledge. In agreement with expansion of professionals' knowledge base, Dooman, Titlebaum, and DeMarco (1998) explained that strength and conditioning coaches can never be overqualified. These authors claim the strength coaches "must possess a good range of knowledge including that specific to the sports of the athletes with whom they are working" (p. 34).

Research on Coaches' Knowledge

Regardless of the notion that coaching is an art or a science, coaches' knowledge is a significantly important factor in the coaching process. According to Cote, Salmela, and Russell (1995b), it is the coach's knowledge that has the most direct impact on an athlete's development. Although coaching has emerged as a scientific discipline (Woodman, 1993), there is a limited number of studies available that deal with expert or non-expert coaches' knowledge. According to Cote, Salmela, Trudel, Baria, and Russell (1995), coaching is a domain in which the task and prerequisite knowledge of expertise have not been identified. Therefore, it is the teaching profession where the existing

abundant research base provides support for research in coaching. It is possible due to the similarities between teaching and coaching. As explained by Gilbert and Trudel (1999), “like teachers, coaches are expected to possess knowledge across wide range of domains” (p. 1).

Coaches in general are required to comprehend and implement a complex body of knowledge. Campbell (1993) and Martens (1987) emphasized that coaching education programs in general should include sections on anatomy, biomechanics, pedagogy, physiology, nutrition, and sport psychology. Also, according to Cote et al. (1995), coaches must develop a repertoire of sport-specific techniques and tactics, in addition to the knowledge of personal characteristics and knowledge of the context. Coach education programs exist only in some countries, mainly emerging not more than two decades ago, therefore these still are “in the formative stage of development” (Gilbert & Trudel, 1999, p. 1). Some authors, for instance, question the effectiveness of these developing coaching programs (Douge & Hastie, 1993; Woodman, 1993). According to Gilbert and Trudel (1999), coaches are expected to possess knowledge in a broad scale of disciplines, but typically receive sparse training through coaching education programs. Therefore, “in order to develop the value of these educational programs, there is a need to analyze the knowledge of those coaches who work in their fields efficiently” (p. 1).

Salmela, Russel, Cote, and Baria (1994) also argued that the effectiveness of the coach-centered programs that exist in some countries is not clearly proved. These authors conducted a study with the intent of analyzing the content and structure of coaches’ experiential knowledge. They found that coaching knowledge was complex in structure. The authors found evidence of different types of interrelated knowledge sets, including

procedural, declarative, and metacognitive knowledge, and showed that coaching expertise is organized differently from that presented in coaching manuals.

Cote and his colleagues conducted a series of research studies involving expert gymnastic coaches. Cote, Salmela, Trudel, Baria, and Russell (1995) argued that although the sport psychology and sport pedagogy literature deals with numerous publications on coaching, no theoretical frameworks were created in explaining the most important factors in the coaching process. As they explained, “there are no comprehensive frameworks that represent the complex reality within which coaches work” (p. 2). Authors like Lyle (1993) and Woodman (1993) have described coaching as a dynamic and systematic process. This process involves steps such as observation, assessment, development of a plan, implementation of the plan, and reassessment. On the other hand, Cote et al. (1995) argued that this proposed process only represents coaches’ actions in developing athletes, but provides no information regarding the variables that need to be observed and assessed by coaches in order “to build a plan of action” (p. 2). Tinning (1982), in the early stages of research on coaching, suggested that conceptual models of teaching should be used in coaching research, in order to identify the characteristics of coaching. On the other hand, Cote et al. (1995) argued that the conceptual models used in research of teachers are not appropriate for representing the complexity of the coaching process, since variables such as competition do not appear in teaching. Cote et al. further claimed the necessity of structuring the content of the coaching domain to promote its advancement as a profession. In supporting this view, the authors introduced the findings of Gould, Giannini, Krane, and Hodge (1990), who in surveying 130 national team, Pan American, and/or Olympic coaches concluded that “less than half of the coaches sampled

felt that there exists a well-defined set of concepts and principles for coaches” (p. 342). Most of the coaches that were surveyed reported that they acquired most of their knowledge through their own coaching experience and from observing other coaches (Gould et al. 1990). Salmela (1994, 1996) examined the knowledge of expert team sport coaches and found that their early experiences as athletes and as novice coaches were determinant in shaping their future operational tactics in training and competition.

Cote et al. (1995) examined seventeen Canadian expert high-performance gymnastic coaches and strove to reveal important concepts and strategies that they used in their coaching. An expert system approach proposed by Buchanan et al. (1983) was used in the study, by which the authors constructed a coaching model. The authors in describing coaches’ cognitive structures used the notion of mental models referring to Glaser (1987), Holyoak (1984), and Johnson-Laird (1983). Cote et al. (1995) further rationalized that an assessment of the knowledge structures of expert coaches would provide guidelines for improving coaches’ development. They specifically tried to identify those variables that affect high-performance coaches in their work, and to provide a model of how that knowledge is being used in solving problems. In-depth interviews were used for data collection following the guidelines for ethnographic interviews proposed by Spradley (1979). Findings revealed that mental models of coaches were characterized as flexible and adaptive structures. Coaches’ mental models represented knowledge about different components. In order to illustrate the interrelations of these components, Cote et al. elaborated a modeling system (Figure 1.), thus clarifying how expert coaches utilize their knowledge when working with athletes. As mental models are particular knowledge structures that are constructed mentally to represent

different situations, the authors explained that “the core of understanding for expert coaches tend to consist of having a ‘working model’ in their mind for developing elite athletes” (Cote et al., 1995, p. 13). This means that coaches knowing the athlete’s potential and considering different factors, such as their own and the athlete’s personal characteristics and the contextual factors, create a mental model of what actions must be taken. This model is used as a basis to decide which knowledge is important to use in different settings, such as the competition, organization or training. Authors further expressed that expert coaches tend to construct a new model for each athlete, and this model serves to establish the actions for developing that particular athlete.

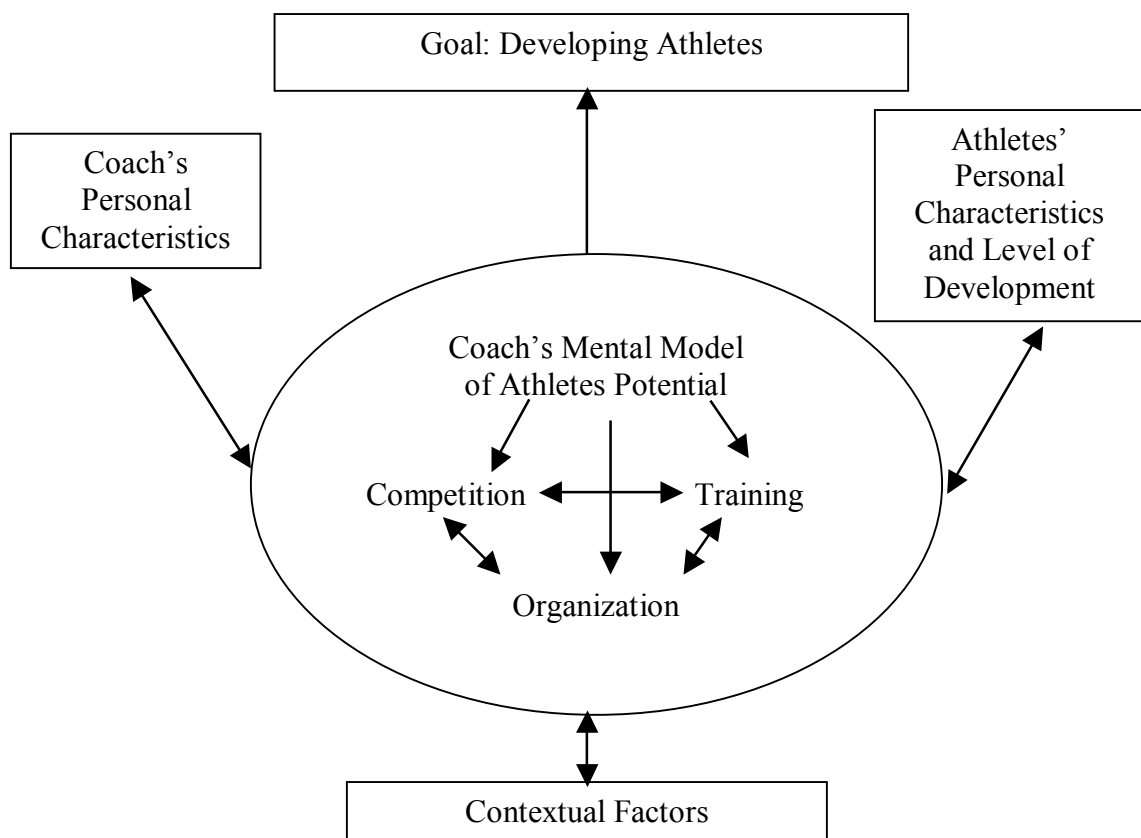


Figure 1 - The coaching model. (Cote, Salmela, Trudel, Baria, & Russell; 1995a)

Cote et al. stated that the proposed model has been used successfully as a conceptual framework to examine coaches in team sports and in figure skating as well. Authors suggested that the proposed model could serve as a conceptual framework in other studies for analyzing the most important factors in the coaching process and the relationships among these factors. However, authors admitted that this model is not necessarily a complete and accurate understanding of a phenomenon. More likely, mental models are helpful in representing of how concepts interact. Furthermore, the model is individual-specific, as “the accuracy of the representation depends on the level of knowledge of the coach who constructs the model” (Cote et al., 1995, p. 14).

Cote and his colleagues provided explanations of the way in which coaches actually structure and implement their knowledge, but other researchers opposed these justifications. According to Saury and Durand (1998), the model developed by Cote and colleagues is too general, because “the actual task of a coach cannot be totally defined or specified in advance” (p. 255). Saury and Durand (1998) reflected on both the study by Salmela et al. (1994) and Cote et al. (1995) as “they did not deal with the operational dimension of coaching, and they did not help us understand or conceptualize this dynamic, adaptive aspect of coaching” (p. 256). Saury and Durand further argued that an analysis of the knowledge of gymnastic coaches cannot be generalized for other disciplines due to the stable and unchanging environment of gymnastics, as opposed to other sports in which the environment is uncertain and highly unpredictable, such as in sailing. Consequently, coaches who train athletes in different disciplines might have different types of knowledge and operating modes. For instance, since strength and conditioning coaches are not directly involved in their athletes’ competition settings,

rather in their training and preparation sessions, the competition and training components of their coaching model might be different from those coaches' in gymnastics.

Due to the aforementioned considerations, Saury and Durand (1998) focused on analyzing the practical knowledge that expert coaches used in sailing training settings. Five expert Olympic sailing coaches participated in the study, each of them met the required criteria: (1) possessing officially recognized professional qualification, (2) possessing officially recognized skills, such as holding position as National Olympic Coach, (3) at least 8 years of coaching experience, (4) experience as a top level athlete, (5) recognition as effective at the international level. The authors took a cognitive ergonomics approach and considered the coach as activity task-oriented. Data were collected on site in a real-life situation, using direct observations of training sessions and in-depth interviews with coaches as data collection techniques. Five training sessions were included in the analysis and an in-depth interview was conducted after each training session. Data were evaluated using grounded theory, as advocated by Strauss and Corbin (1990).

Results showed that the coach's task during training sessions was defined from the coach's perspectives as a set of constraints, and this included the principles of training efficiency, the temporal dimensions of the actions, and the dynamic and uncertain nature of the situation. As the authors explained,

to cope with these constraints, coaches devised various operating modes, including the use of standard routines, flexible planning strategies that permitted improvised adaptations to the context, a mode of coach-athlete collaboration that

led to the joint control of training, and involvement in the training situation based on reference to past experience. (Saury and Durand, 1998, p. 262)

The authors further discussed that various types of knowledge were revealed, such as procedural, practical, and personal knowledge. Explaining the latter two, both practical and personal knowledge are tightly linked to experience, context dependent, and difficult to verbalize. These findings are parallel to Yinger's (1987) conception of improvisation as a dominant factor in teachers' practical knowledge. Yinger argued that teachers have a rich store of knowledge that enables them to make sense of immediate situations and bring past experiences to bear on these situations to invent, virtually on the spot, actions that fit these circumstances. He also expressed that practical knowledge, which encompasses past experiences and personal intentions and understandings, is inseparable from action in a situation. Thus, the reason why teachers and coaches have difficulties in verbalizing what they do in specific situations, is because of what they know is firmly connected to situational frames (Yinger, 1987).

In further analyzing practical knowledge related to coaching tasks, Saury and Durand (1998) discussed that coaches implemented organization routines and adopted a mode of involvement in the task, in which coaches' past experiences were connected to their immediate experience. Authors claimed that coaches "lived the training sessions vicariously" (p. 264). By the authors' interpretation, this was possible because the coaches were athletes themselves once, thus they experienced similar situations and sensations as their athletes. Therefore, the coaches were involved in the training, and "this involvement in the situation reflected a largely implicit form of knowledge strongly tied to the coach's past experiences" (p. 264). In explaining the salient differences

between explicit and implicit knowledge, the authors referred to Leplat (1990). By Leplat's perspective, explicit knowledge is descriptive, theoretical, and declarative. Specifying it to sports training, "this type of knowledge encompasses scientific and technical knowledge about sports, as well as prescriptive theories of training and instructional models" (Saury & Durand, 1998, p. 264).

Implicit knowledge is explained as composed by two categories. Automatic processes or procedures belong to the first category, the processes that implement procedures in which routine tasks are executed automatically. The second type of knowledge refers to action sequences and the execution context. Saury and Durand (1998) addressed this knowledge as "professional know-how" (p. 264). It is hypothesized that this knowledge is not conscious, cannot be represented in declarative format and is probably acquired through action. Implicit knowledge in coaching is used to comprehend situations and cope with difficulties. Implicit coaching knowledge, by the interpretation of Saury and Durand (1998), relates to Cote and his colleagues' (1995) terms of mental models. This type of knowledge, which is highly dependent on the individual's experience, also accounts for the flexibility of expert coaches and their adaptability to new, unexpected, or problematic tasks (Cote et al., 1995).

Saury and Durand (1998) further explained that knowledge of coaches is both the product and manifestation of a personally experienced involvement, and is linked to the coach's own history. Here, experienced coaches connect present situations to past experiences and these practical experiences "may be stored in the form of contextualized directories of diagnostics and operational acts. These directories help make complex situations meaningful and permit appropriate actions following the immediate recognition

of situations by analogy with past experience” (p. 264). Overall, findings concerning coaches’ knowledge are tightly correlated to findings in research on expertise and on teachers’ practical knowledge, which are introduced in the following sections.

Research on Expertise and Knowledge of Experts

If the goal of an investigation is to reveal the necessary knowledge base for the field of strength and conditioning, coaches who work the most effectively must be examined. Fully understanding the knowledge and skills developed and used by the most recognized coaches in the field is required in order to create the most appropriate coaching education and licensing programs (Martens, 1987; Salmela, 1996). The competence of the best coaches is mostly studied by using models of expertise (Chi, Glaser, & Farr, 1988; Ericsson & Smith, 1991). Experts have proven over time that they can perform tasks, overcome obstacles, and solve problems with skill, graceful ease and extraordinary proficiency (Bell, 1997). Unlike certain professions and most athletes’ measurable and assessable performances, coaches’ work is uneasy to measure (Saury & Durand, 1998), therefore defining expertise in coaching is difficult. Expert performance is generally defined as consistently superior performance on a set of relevant tasks in a specific field of human activity (Bereitner & Scardamalia, 1993; Ericsson & Smith, 1991). As McCullick, Cummings, & DeMarco, (1998) theorized, “expert coaches achieve consistently superior results, and do so over a long period of time” (p. 42).

Expertise is not necessarily an inherited attribute, but rather it is obtained through years of experience and deliberate practice (Bereiter & Scardamalia, 1993; Ericsson & Charness, 1994; Ericsson & Smith, 1991). Research has indicated that it takes at least ten years of experience and dedicated practice to attain expert status (Ericsson & Lehmann,

1996). Various researchers link experience to expertise (Tan, 1997; DeCourcy, 1999; Cote et al, 1995; DeMarco & McCullick, 1997; Bell, 1997). Although a critical component of expertise, experience alone is not a sufficient condition for expertise (Lesgold, et al., 1988; Siedentop & Eldar, 1989; Bell, 1997; Tan, 1997).

Although psychology related research studies pertaining to expertise have been conducted for several decades, the study of expertise is a relatively young field of research in the sport sciences (Woodman, 1993). In fact, the first study on expertise emerged in the mid-sixties, due to the seminal work of DeGroot (1965, 1966). In his early pioneering study on capturing expert performance, DeGroot focused on investigating differences between novice and experienced chess players and later it was extended by Chase's and Simon's (1973) study. These investigations revealed significant differences in the knowledge structures between weak and experienced players.

In rationalizing experts' superior performance in a given domain, Glaser and Chi (1988) emphasized that experts' thinking and problem solving is a process that requires a rich structure of domain specific knowledge. Studies contrasting novice and expert performances show strong interactions between structures of knowledge and processes of reasoning and problem solving. Thus, Glaser and Chi suggested interpreting high levels of competence as the interplay between knowledge structures and processing abilities. Experts possess "an organized body of conceptual and procedural knowledge that can be readily accessed and used with superior monitoring and self-regulation skills" (p. xxi).

Related to experts' large domain specific knowledge, Chase and Ericsson (1982) analyzed short and long-term memories of expert performers. They claimed that skilled memory is a general component of expert-level skill. Their Skilled Memory Theory states

that expert level performance depends on experts' efficient use of their domain-specific knowledge base. Extensive practice in a given domain lets experts to acquire knowledge structures and various procedures, which help for efficiently encoding and retrieving task-relevant information in long-term memory. Consequently, developing skilled memory allows experts to increase their working memory capacity for familiar materials.

Staszewski (1988) supported the rationale of the Skilled Memory Theory that experts increase their active memory capacity by learning to efficiently encode and retrieve information in the long-term memory. However, Staszewski questioned the generality of this theory, mainly because research findings supporting the Skilled Memory Theory are limited to tasks involving intentional memorization. Examining mental calculation experts, Staszewski concluded that "an important part of developing expert skill involves learning how to use content knowledge effectively and efficiently" (p. 125). Consequently, skilled memory might be considered as a general component of expert knowledge across wide range of cognitive skills.

Experts possess various qualities that make their performance superior to the majority. Due to the increasing number of studies pertained to expertise, numerous characteristics were revealed that experts possess. Chi, Glaser, and Farr (1988) summarized the key characteristics of expert performances, the summary of which was later applied to depict the characteristics of expert coaches (DeMarco & McCullick, 1997; Tan, 1997; McCullick, Cummings, & DeMarco, 1998). Although experts are individually unique, they share some common characteristics that allow them to perform in exemplary ways.

Domain specificity

One of the most emerging characteristics of experts is that they Excel mainly in their own domains. Attaining superior skills in one domain might not be transferable to other domains. Glaser and Chi (1988) provided a possible rationale for this assumption as experts have a good deal of specific domain knowledge, which is not generalizable to other domains.

Extensive knowledge

Expert coaches possess large quantities of knowledge (Bell, 1997), and vast amounts of information about their sport and athletes (DeMarco & McCullick, 1997, McCullick, 1999). The Excellence of expert coaches is achieved by their extensive knowledge and skills that are accumulated over years of experience (Tan, 1997). This extensive knowledge base is highly specialized (domain specific) when compared to the knowledge of novice coaches (DeMarco & McCullick, 1997; Tan, 1997). Experts are not only highly knowledgeable of a particular field, but also greatly skilled in applying their knowledge (Tan, 1997; Abraham & Collins, 1998).

Structured knowledge

It is assumed that expert coaches gain their extensive knowledge base through years of playing, watching, and coaching in progressively higher levels. As they progress through the coaching ranks, their knowledge becomes stored and organized into learned patterns and schemata (DeMarco & McCullick, 1997). Experts possess highly developed declarative and procedural knowledge, and this knowledge is structured in complex, sophisticated, and hierarchically organized ways that make it easy and economical to recall and apply (Tan, 1997).

Perception of patterns

Experts perceive large meaningful patterns in their domain. Through observations, experts quickly perceive large clusters of information (Tan, 1997). Experts' ability to perceive large meaningful patterns does not necessarily reflect a generally superior perceptual ability, rather a more precisely structured organization of the knowledge base (Glaser & Chi, 1988). Drawing information from their knowledge stores, they are able to reliably predict the next series of events or can plan a more appropriate course of action (Tan, 1997).

Fast and accurate problem solving

Experts are fast and more accurate in performing skills of their domain and in solving problems. When solving simple tasks, experts demonstrate quickness, which is acquired through the extended practice of that kind of task, thus making the skill more automatic. In solving complex tasks, experts invest time identifying, defining, and analyzing a problem before searching for possible solutions (Tan, 1997). Thus, experts were found to be slower than novices in the initial phases of problem solving (Glaser & Chi, 1988), mainly because at this point experts try to better understand the problem by analyzing it thoroughly (Tan, 1997). During this analysis, experts rely on their extensive knowledge base and their hierarchically organized knowledge structures to construct a mental representation of the problem. Due to the stored reasonable patterns, moves, and solutions, experts can infer relations to help to define the situation, identify constraints, isolate factors causing the problem, and evaluate possible solutions (Glaser & Chi, 1988; Voss & Post, 1988). Thus, experts overall solve problems faster and with less error than novices (Glaser & Chi, 1988).

Automatic routines

Experts perform numerous tasks and solve various problems automatically. Their many years of experience and familiarity with the environment lead experts to rehearse and repeat behavior patterns until they are subconscious, automatic routines (Tan, 1997).

Experts appear to perform these rehearsed patterns with fluidity, elegance, and ease. In addition, according to Bell (1997), expert coaches also rely heavily on intuition in the decision-making process.

Superior memory

Experts have superior short-term and long-term memory, thus they can recall a great deal of information about their subject. This highly developed memory is most likely associated with the automaticity of many portions of their skills, freeing up resources for greater storage (Glaser & Chi, 1988). Also, their superior ability in recalling information stems from the way they process and store information; they store knowledge in recognizable chunks organized in strategically significant ways (Tan, 1997).

Frequent self-monitoring and self-appraising

Experts have strong self-monitoring skills. They frequently observe themselves, assess and identify their shortcomings and knowledge deficiencies, and notice when they make errors or they fail to correctly comprehend problems (Glaser & Chi, 1988; Tan, 1997). Expert coaches also monitor their effectiveness via self-appraisal (Cross, 1995). It is possible that the superior monitoring skill and self-knowledge of experts reflect their greater domain knowledge as well as the way they store that knowledge in memory (Glaser & Chi, 1988; Tan, 1997).

Perpetual learning

Expert coaches are aware of the need for planned and deliberate attempts to improve their practice and are characterized by an insatiable desire for continual improvement (Bell, 1997). Expert coaches are also expert learners who strive to improve by using their own assessments, reflection, their peers, and books or professional journals (McCullick, Cummings, & DeMarco, 1998; Schempp, Templeton, & Clark, 1998). Experts enjoy talking about their subject, and they often seek out others' views on pertinent topics (Tan, 1997). By observing, discussing, and corresponding with other coaches, coaches can gain tremendous practical knowledge (DeMarco & McCullick, 1997). Experts often possess impressive libraries and journal collections pertinent to their sport and coaching practices (O'Donnell, 1998; DeMarco & McCullick, 1997).

Providing feedback

Expert coaches are also expert communicators who have mastered the art of providing corrective feedback or reinstruction without interrupting the flow of practice or a game (McCullick, Cummings, & DeMarco, 1997). Experts are better able to determine what athletes need to know, when to give it, and how to give it (Markland & Martinek, 1988). According to Jones, Housner, and Kornspan (1997), during practice expert coaches give out much more technical instruction, while inexperienced coaches have far more instances of silent observation. Expert coaches are more deliberate planners, consequently are more confident than novices that their practice plan will be effective (Jones, Housner, & Kornspan, 1997).

In sum, studies repeatedly provided evidence that expert coaches possess a great deal of knowledge pertained to the subject they coach (Leas & Chi, 1993; McCullick,

1999). Expert coaches' extensive coaching experience is a dominant factor in contributing to their practical knowledge. Researchers striving to explore the unique nature of expertise in various domains have established a firm basis for future research.

What is Practical Knowledge?

Before research on teachers' and coaches' practical knowledge is reviewed, it is necessary to define and interpret what practical knowledge is. The distinction of practical knowledge from technical knowledge reaches back to the era of Aristotle. During the past several decades, different theorists construed practical knowledge in various ways. Reviewing the debate on the interpretation of practical knowledge provides a clearer comprehension of research on teachers' and coaches' practical knowledge. This form of knowledge has a specific importance regardless of the individual's domain. As explained by Arnold (1988), "it is well recognized by philosophers that apart from theoretical or propositional knowledge, or the knowledge of 'knowing that' something is the case... there is another kind of knowledge that is practical and is concerned with 'knowing how' to do, or proceed with, certain kinds of activities" (p. 119). On the other hand, Wright (2000) expressed that practical knowledge has not always been recognized as separate kind of knowledge, as he explained that "traditionally, epistemology has focused almost entirely on propositional knowledge as justified true belief, and this has been to the detriment of an understanding of practical knowledge" (p. 274).

Ayer (1956) explained that the word knowledge figures in both theoretical and practical knowledge, and because theoretical knowledge has become the paradigm, practical knowledge is always explained in theoretical terms. Yet, according to Wright (2000), there were theorists who have taken extreme positions in their views of human

knowledge. Some of these theorists denied practical knowledge as a form of knowledge at all, and they considered that the term “know” should be associated only with knowing-that, where reference to truth is required.

Ryle (1949) was among the first ones in attempting to explain practical knowledge separately of propositional knowledge, bringing the knowing-how theory in contradistinction to knowing-that. According to Ryle, knowing-how represents practical knowledge, which involves the actual disposition to be able to do things, whereas knowing-that represents theoretical knowledge, which explains about how the world is. Ryle further argued that whereas knowing-that is a function of human theorizing, knowing-how is an expression of rational practice. Therefore, the ability to do something with intelligence is recognized as a kind of practical knowledge. Ryle’s view has come under attack, mainly because of the sharp distinction of propositional and practical knowledge misses the phenomena that lie between. Wright (2000) argued that Ryle’s analysis did not interpret practical knowledge as a many sided knowledge kind, and also failed to highlight the existence of a whole network of relationships between various types of knowledge. Wright explained the rationale of practical knowledge relating it specifically to physical activities. He argued that “it is essential to look at performance as a whole, characterized by many different kinds of qualities (for example physical skill, stamina, strength, and grace). Practical knowledge has to be seen as an integral performance, which will be understood in terms of the activity itself” (p. 278).

Similarly, Franklin (1981) argued that the distinction between theoretical and practical knowledge cannot be explained by examining the distinction between knowing-that and knowing-how, since knowing-how can be theoretical as well. Therefore,

knowing-how is an ambiguous concept. By Brown's (1970) opinion, Ryle's achievement was not in separating the two different types of knowledge, but in showing that while there is one kind of knowledge, that is the propositional knowledge, there are two ways of ascribing it. According to Carr (1981),

the main difference between theoretical and practical knowledge is that whereas the concern of the former is with the discovery of truths that are adequately supported by reason and confirmed by experience, the latter is concerned with the execution of purpose in action, conducted in a rational manner and confirmed by a reasonable degree of success. (p. 60)

Anscombe (1957) argued that whereas in theoretical reasoning we aim to move logically from statements about the world to conclusions about it, in practical reasoning we are directed toward the execution and realization of our intentions and purposes.

Arnold (1988) theorized that "when a person knows how to do certain things of a particular sort, his or her knowledge is actualized or exercised in what he or she does. His or her intelligence is made manifest in deeds, skills, and accomplishments" (p. 120).

Arnold emphasized that theory is not always the precursor of practice, specifically in sports, crafts and arts. In sports, someone usually teaches how to do things first and directly. On the other hand, Arnold admitted that theory can be useful and beneficial in guiding practice. He further specified the characteristics of practical knowledge and distinguished knowing-how in a weak sense and knowing-how in a strong sense. In explaining the practical knowledge in a weak sense, he referred to a person who is physically able to do something at a demonstration level, but has a poor understanding and describing ability regarding the technique. A person with the strong sense of practical

knowledge is not only able to perform but also provides insight and understanding of the way in which that thing was done. By Curtis's (1977) interpretation, "knowing-how in the sense of being able to do it and knowing how to do it in the sense of being able to say how it is done are often very different affairs" (p. 84). Emphasis is placed here on intentional practice, meaning that practical knowledge in the strong sense refers to a person who is able to perform and repeat that performance at will (Arnold, 1988).

Arnold further detailed the characteristics of practical knowledge and stated that it is "concerned with (a) practice, not theory, or at least not only theory; (b) action, not just or only thought or belief; (c) intentionally doing something in the world rather than just thinking or providing information or speculating about the world" (p. 123). Wright (2000) summarized the criteria of practical knowledge in a slightly different way. By his perspective practical knowledge implies performance in an activity if (a) it is the result of intentional human action; (b) it is normative; (c) it will be assessed by norms other than those to do with truth; (d) the performance criteria are constitutive of the activity in question; (e) engagement in the activity will be subject to evaluation and refinement. Wright further explained that one's possession of practical knowledge, if it is looked at holistically, is focused on the person's performance, but this performance should be associated with agency, intentionality, and initiation into valued social practices.

Researchers extensively examined practical knowledge related to the work of teachers. The practice for the teaching profession is usually not guided directly by the conscious application of theoretical knowledge (Carter, 1990; Conelly & Caldinin, 1985). Practical knowledge, which guides teachers' professional practice, is much more than merely an accumulation of propositional facts (Rubin, 1989). The rationale for analyzing

teachers' practical knowledge is greatly expressed by DeVries and Beijaard (1999), who declared that "theoretical knowledge is very often abstract knowledge and it is not certain that teachers really integrate it into their own subjective theories of beliefs about teaching" (p. 376). As opposed to other approaches that focus on exerting control over teachers by prescribing what they have to do and how they have to think, "research on practical knowledge is more reality-based and gives a description of what teaching really implies" (p. 394).

A seminal work associating practical knowledge of teachers belongs to Elbaz (1981, 1983, 1991), who was the first one to define the conception of the teachers' knowledge as practical knowledge. This knowledge is related to teachers as "teachers are ultimately the people whose task it is to translate theoretical notions into practice" (p. 43). Elbaz's notion of teachers' practical knowledge was inspired by a number of theoretical sources, for example, Dewey's (1938) view of the dialectical relationship of theory and practice and Polanyi's (1958) conception of personal knowledge. The proposed view of the teacher as holding and using practical knowledge was based on a case study consisting of a series of open-ended discussions with one teacher. The conception of practical knowledge by Elbaz's interpretation is broad, as it encompasses knowledge of practice as well as knowledge mediated by practice. As Elbaz explains, "the teacher's practical knowledge is not a compendium of practical advice from other fields, but rather a body of knowledge oriented to a particular practical context" (p. 49).

Defining this type of knowledge, Elbaz explained it as a complex practically oriented set of understandings which teachers actively use to shape and direct the work of teaching. This is the "knowledge derived from practice of instructional routines,

classroom management, student needs, and the like” (p. 47). Elbaz further explained that the teacher’s knowledge grows out of the world of teaching as the teacher experiences it and this knowledge allows the teacher to function in that world. Emphasizing the interrelation of theory and practice in teachers’ knowledge, Elbaz turned to Dewey’s (1938) analysis. This provides a clear statement accentuating that all knowledge originates in felt problems.

The main point that Elbaz strove to make here is a notion that educational knowledge is often considered empirical or analytical. Because this kind of knowledge tends to place a relatively low value on experiential knowledge, even the teachers themselves may be unaware of the value of their own knowledge. Therefore, Elbaz encouraged teachers to view themselves as originators of knowledge. Also, although it is assumed that teachers’ knowledge may be largely unarticulated, teachers do have a broad range of knowledge, which guides their work. By Elbaz’s theory, this includes knowledge of subject matter; of classroom organization and instructional techniques; of the structuring of learning experiences and curriculum content; of students’ needs, abilities, and interests; of the social framework of the school and its surrounding community; and of their own strengths and shortcomings as teachers. Further articulating teacher’s practical knowledge, Elbaz expressed that as teachers confront all manner of tasks and problems, they draw on a variety of sources of knowledge to help them to deal with these. Therefore, Elbaz urged to view teachers’ knowledge as practical, which is “something dynamic, held in an active relationship to practice and used to give shape to that practice” (p. 48).

Elbaz's seminal work encouraged other researchers to further examine teachers' knowledge. In addition to Elbaz's term of practical knowledge, a variety of other terms reflecting on knowledge that guides practice such as practical theories of teaching (Sanders & McCutcheon, 1986), personal practical knowledge (Connelly & Caldinin, 1985), folkways of teaching (Buchmann, 1987), and the wisdom of practice (Shulman, 1987) emerged. Investigators in this area often used the comparison of practical rationality and technical rationality and argued that practical rationality is fundamentally different from the technical rationality that dominates academic conceptions of professional knowledge (Schon, 1983). While research driven by technical rationality often leads to generalizations and practitioners are to apply this objective, realities of practice are quite different. Professionals make complicated interpretations and decisions under conditions of inherent uncertainty (Doyle, 1986), and to do this they engage in practical thinking that leads to an action appropriate to the particular situation (Carter, 1990). The knowledge required for practice under these circumstances is experiential and it evolves out of "reflection-in-action" (Schon, 1983) as professionals deal with the complexity and uncertainty. Moreover, "practical knowledge is shaped by a professional's personal history, which includes intentions and purposes, as well as the cumulative effects of life experience" (Carter, 1990, p. 300).

According to Clandinin and Connelly (1985), teachers' practical knowledge is often considered to be highly individual and context- and content-dependent, sometimes based on the conviction that one teacher's practical knowledge should not be compared with that of others in a search for generalizations about this kind of knowledge, because that would deny its idiosyncratic nature. Carter (1990) also called attention to this

problem of studying teachers' practical knowledge, as this type of knowledge is characterized as situational, experiential and particularistic. Thus, individual views might dominate findings, which, from a scientific point of view, is not very productive. Because of these considerations the emphasis was on the personality of the teacher in Connelly's and Clandinin's (1985) investigation and they termed teachers' knowledge as personal practical knowledge, which, as they explained, is experimental, embodied, and reconstructed out of the narratives of a teacher's life.

Other researchers, such as Goodson (1997) and Hargreaves (1996), suggested being cautious in emphasizing individual teachers' practical knowledge and staying at the personal and practical level, because this way it is not likely that theoretical insights can be obtained. Goodson (1997) explained that although individual teachers' practical knowledge is valuable, the individual level should be transcended to a wider contextualized mode. Therefore, it is necessary to look for similarities and differences in teachers' practical knowledge and the contexts in which they are involved, and to search for underlying theoretical principles (Hargreaves, 1996). According to Meijer, Verloop, & Beijaard (2001), such indications of similarities and patterns in teachers' practical knowledge do exist and research may reveal them. Others also advocate the possibility of generalization; for example Grimmett and MacKinnon (1992) argued that this type of knowledge can act as a "framework" for teaching and, as such, contribute to teacher education. That finding is similar to the statement from Carter (1990), who articulated that "although there is a wide variation among classrooms, teachers, and students, it is possible to codify in a general sense what teachers know that enables them to navigate within these settings" (p. 302). Assuming that part of teachers' practical knowledge is

shared by many teachers and that the shared parts of teachers' knowledge can be reconstructed by studying teachers' practical knowledge, Meijer, Verloop, and Beijaard (2001) called for research "that may lead to greater insight into the shared elements and structures in this type of knowledge" (p. 172).

Other researchers also adhered to general categorizations regarding teachers' personal or practical knowledge; for instance Lampert (1985) defined teachers' knowledge as personal knowledge, which refers to the knowledge of who the teacher is and what he/she cares about and knowledge of students beyond paper and pencil tests that is used by a teacher in accomplishing what he/she cares about, what students want and what curriculum requires. Grumet (1987), who used narrative in working with teachers, explained that personal knowledge "is constituted by the stories about experience we usually keep to ourselves, and practical knowledge by the stories that are never, or rarely related, but provide, nevertheless the structure for the improvisations that we call coping, problem solving, action" (p. 322). Carter (1990) related practical knowledge to the "knowledge that teachers have of classroom situations and the practical dilemmas they face in carrying out purposeful action in these settings" (p. 299).

Fenstermacher (1994) defined the term practical knowledge as the knowledge that teachers generate as a result of their experiences as teachers and their reflections on these experiences. In Marlatt's (2001) explanation, teachers use their practical knowledge base to express purpose, give shape and meaning to their experiences, and structure social reality. Interestingly, as Marlatt explained teachers' practical knowledge, defining it as "how educators think about their classroom practice" (p. 331), is congruent with Elbaz's (1981) interpretation. Defining practical knowledge as a complex, practically oriented set

of understandings which professionals actively use to shape and direct their work seems timeless and still accurate. Thus, this is the driving definition used in the present study.

Teachers' and Coaches' Practical Knowledge

In examining and analyzing practical knowledge, research studies have dominantly focused on the teaching vocation as opposed to other professions. Abundant research exists on teachers' and teacher educators' practical knowledge, however, research focusing on coaches' practical knowledge is quite penurious. Therefore, it is rational to examine research findings regarding teachers' practical knowledge, and use this database as a pattern for research on coaches' practical knowledge.

As previously mentioned, Elbaz's (1981, 1983) study provides insights into the overall scope and organization of teachers' knowledge and the connection of that knowledge to practical conditions of teaching. However, the focus in Elbaz's study "tends to be on the characteristics, rather than the substance, of what teachers know" (Carter, 1990, p. 300). Elbaz organized the content of teacher's practical knowledge into five categories. These are the knowledge of subject matter, the knowledge of curriculum, the knowledge of instruction, the knowledge of self, and the knowledge of the milieu of schooling.

In addition to these categories, Elbaz also proposed three terms in order to identify the structure of teachers' practical knowledge and to reflect its relationship to practice, to the teacher's experience, and to the personal dimension. These terms are "rule of practice", "practical principle", and "image". These three terms embody the teachers' goals in different ways: "the rule of practice may be followed methodically, while the

principle is used reflectively, and the image guides action in an intuitive way” (Elbaz, 1981, p. 50). Further detailing the classifications of these forms of practical knowledge, Elbaz explained:

The rule of practice is simply a brief, clearly formulated statement of what to do or how to do it in a particular situation frequently encountered in practice. A rule of practice may be highly specific... The practical principle is a broader, more inclusive statement than the rule. Practical principles embody purpose in a deliberate and reflective way... The third level, that of images, is at once the least explicit and most inclusive of the three. On this level, the teacher’s feelings, values, needs, and beliefs combine as she formulates brief metaphoric statements of how teaching should be and marshals experience, theoretical knowledge, and school folklore to give substance to these images. Images serve to guide the teacher’s thinking and to organize knowledge in the relevant area. The image is generally imbued with a judgment of value and constitutes a guide to the intuitive realization of the teacher’s purposes. (p. 61)

Overall, Elbaz’s interpretation of practical knowledge clearly reflects the fact that teachers’ knowledge is mostly based on their experiences in classrooms and schools. This perspective is supported by Berliner (1988), who also declared that experienced teachers possess a practical knowledge that has developed through education, preparation, experience, and developmental processes. Kyriacou (1993) claimed that teachers’ practical knowledge base develops over the years, starting with the time when teachers become students in education. According to Marlatt (2001), “practical knowledge is not usually acquired vicariously and abstractly (as theoretical knowledge is acquired in

teacher preparation courses), but is learned, tested, and developed through field experience” (p. 333). Also, this practical knowledge base has great influence on the development of pedagogical expertise (Marlatt, 2001). According to Berliner’s (1988) perspective, in developing pedagogical expertise, teachers learn from experience that is important in teaching. Saury and Durand (1998), in examining expert coaches, also emphasized professional experience as an important factor in developing practical knowledge. Coaches’ practical knowledge is “largely based on previously experienced situations considered to be typical, familiarity with the coaching situation, and contact with athletes” (p. 264).

Elbaz (1981) in further analyzing teachers’ practical knowledge declared that it is not only based on experience, but it is also directed toward the coping with problems that arise in their work. However, at the same time Elbaz underlines that teachers’ knowledge is “capable of being formulated as ‘knowledge’, and of being used to generate consistent practice” (p 67). DeVries and Beijaard (1999) also believed that teachers’ practical knowledge should be seen as continually developing knowledge. As these authors claimed, “it should not be considered as static, but as knowledge in a professional growth perspective, which has developed and has become elaborated over the years and which will develop further in the future” (p. 395). In addition to this, Fieman-Nemser and Floden (1986) found teachers’ practical knowledge to be time bound and situational-specific, personally compelling and oriented toward action. Mayer (1994) concluded that practical knowledge “develops from experience, resides in the minds of teachers to talk and is highly valued by them” (p. 512). According to DeVries’s and Beijaard’s (1999) opinion, although experience is an important source of practical knowledge, other sources

are also relevant for the development of practical knowledge. Referring to Johnston (1992), DeVries and Beijaard mentioned the biography of teachers, formal knowledge learned during teacher preparation, and teachers' norms and values. According to Beijaard and Verloop (1996), the information from these sources is integrated into a teacher's practical knowledge during the teaching career. As DeVries and Beijaard (1999) claimed, this integration process "is in large measure determined by a teacher's own teaching situation" (p. 377).

Clandinin and Connelly (1985) concentrated on specific teaching episodes in a teacher's classroom and on the personal practical knowledge defined as an account of how the teacher knows this situation. They rejected Schon's (1983) focus on problems in favor of an emphasis on regularities and patterns, that is, practical rules and principles, routines, rituals, habits, cycles, rhythms, and images. Image is especially important as a type of knowledge that "draws both the past and the future into personally meaningful nexus of experience focused on the immediate situation that called it forth" (Connelly & Clandinin, 1985, p. 198).

Carter (1990), in summarizing research on practical knowledge by that time, concluded that research on teachers' personal knowledge tells more about the characteristics of teachers' knowledge than about what teachers know. In other words, this kind of research furnishes "a theory of how teachers learn by teaching and how teachers use their knowledge, rather than a generalized conception of what teachers know" (p. 302). On the other hand, DeVries and Beijaard (1999) drew attention to other existing problems regarding the quality of the content of teachers' practical knowledge. Because teachers' practical knowledge is highly contextualized, as it is knowledge that

works in practice, it is not always consistent with objective or scientific knowledge. Consequently, it is difficult to qualify much of this knowledge. “However, given the elements of the context in which they work, it is very understandable why teachers think about teaching as they do” (DeVries & Beijaard, 1999, p. 394).

Meijer, Verloop, and Beijaard (1999; 2001) summarized former research findings and concluded that the following characteristics of practical knowledge were previously identified: (a) Practical knowledge is personal, as each teacher’s practical knowledge is to some extent unique. (b) Practical knowledge is contextual, since it is defined in and adapted to the classroom situation. (c) Practical knowledge is based on experience, indicating that it originates in, and develops through experiences in teaching. (d) Practical knowledge is mainly tacit, because teachers are often unable to articulate their own knowledge. (e) Practical knowledge guides teachers’ practice. (f) Practical knowledge is content related as it is connected with the subject that is taught.

Summary

This chapter reviewed the literature pertained to the research topic of the present study. In specific, the review focused on six related literature topics such as (a) the description of coaching as a profession; (b) the introduction of the field of strength and conditioning, the individuals working in this field, and the knowledge of these individuals; (c) summarizing the literature on the knowledge of coaches; (d) delineating papers on coaching expertise and the knowledge of expert coaches; (e) reviewing studies on defining and interpreting practical knowledge; and (f) epitomizing research studies analyzing teachers’ and coaches’ practical knowledge.

CHAPTER 3

METHODS AND PROCEDURES

The purpose of this study was to examine and report an expert strength and conditioning coach's practical knowledge to gain a better understanding of the work of coaches in this field. This chapter describes the methods and approaches designed to provide information to answer the research question:

- What is the content of knowledge that an expert strength and conditioning coach uses in practice?

In this chapter, the research design, the participant, data collection methods, research procedures, and data analysis methods are presented.

Research Design

This study was conducted following a qualitative case study research design. In the past few decades, the acceptability of case study research has changed significantly (Stake, 1985), and case studies have been increasingly used as research tools (Yin, 1994; Hamel, 1992; Perry & Kraemer, 1986). Several research studies (Elbaz, 1981; Langley & Knight; 1996; John, 2002) used case study design in examining practical knowledge. In her seminal work, Elbaz (1981) explained that she selected a case study design to analyze a teacher's practical knowledge, "because vivid and full description of a single case is not only educationally valuable in itself but also particularly called for in the present state of our understanding of teachers' knowledge" (p. 51). Elbaz viewed the case study design as

a method appropriate for attaining an understanding of a teacher's knowledge from her own perspective. This eventually led to exemplify the conception of practical knowledge.

Case study, as a research tool has been defined in various ways. According to MacDonald and Walker (1977), the case study is “the examination of an instance in action” (p. 2). Wilson (1979) explained case study as a process “which tries to describe and analyze some entity in qualitative, complex and comprehensive terms not infrequently as it unfolds over a period of time” (p. 448). According to Stake (1985), a case study is the study of a single case, in which the case is usually “an entity of intrinsic interest, not merely a sample from which to learn about the population” (p. 278). By Merriam's (1988) definition, “a case study is an examination of a specific phenomenon such as a program, an event, a person, a process, an institution, or a social group” (p. 9). Yin's (1994) explanation of a case study refers to “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p. 13).

Case studies are used as research tools with a distinctive purpose. Merriam (1988, 1998) clarified that researchers use case study designs to gain an in-depth understanding of the situation and its meaning for those involved, and to interpret or theorize about the phenomenon. Accordingly, the purpose of this study was to gain a thorough understanding of an expert coach's practical knowledge and to theorize practical knowledge used in coaching strength and conditioning. Because this study was conducted as qualitative in nature, according to Merriam (1988), it can be considered as hypothesis-generating research, as oppose to quantitative studies, which generally serve hypothesis-testing purposes.

The application of a case study design offers a special framework for investigating real-life and complex social units that contain multiple variables (Merriam, 1985). The present study strove to explore the practical knowledge of an expert coach, when the phenomenon, the knowledge of the coach is quite complex and includes multiple variables. However, the purpose remained deepening the understanding of the specific case, which is the knowledge of the participant. Thus, as Stake (2000) claimed, case studies are to refine theory and suggest complexities for further investigation, as well as help to establish the limits of generalizability: “the purpose of a case report is not to represent the world, but to represent the case” (p. 448). By Merriam’s (1988) notion, case studies “might test theory, clarify, refine, or extend theory, or, in qualitative case studies, develop new theory” (p. 57). Consequently, case study design was considered rightly suitable for this study in exploring, describing, explaining and theorizing practical knowledge of an expert strength and conditioning coach.

Researchers have recognized the benefits of using a case study approach for better “understanding the process or dynamics of certain aspects of practice” (Merriam, 1985, p. 204). Applying case study research is especially useful when the purpose is “to understand a particular case, not just to compare it to others or to know the collective” (Stake, 1985, p. 278). Accordingly, the purpose of this study was to learn about the practical knowledge of one expert coach and not necessarily to generalize to all coaches. Merriam (1985) further explained the benefits of a case study as opposed to other designs, as a case study approach can provide a deeper understanding and higher level of explanation than conventional experimental or survey designs. These latter designs are not able to explain the complex links in real-life interventions. Due to the complexity of

the phenomenon under investigation in the present study, experimental and survey designs could not offer appropriate frameworks. To gain a better insight into the content of an expert strength and conditioning coach's practical knowledge and to be able to explain this phenomenon in thorough detail, case study design offered the most appropriate framework.

Bromley (1986) explained that case studies, through direct observations in natural settings and access to subjective factors such as thoughts and feelings, can get closer to the subject of interest than experiments and surveys, which often use convenient data. In addition, "case studies tend to spread the net for evidence widely, whereas experiments and surveys usually have narrow focus" (p. 23). Stake (1981) claimed that knowledge learned from a case study is different from other types of research knowledge in four important ways: it is more concrete, more contextual, more developed by reader interpretation, and based more on reference populations determined by the reader. Overall, taking into account that case study research is anchored in real-life situations and it results in a rich and holistic account of a phenomenon (Merriam, 1988), it was considered correctly usable for this study.

Participant

Recruiting participant

An expert strength and conditioning coach was invited to participate in this study. The researcher, after obtaining the approval of Human Subjects Office for research with human participants, searched for possible applicants. This search was assisted by a list of strength and conditioning professionals working in the south eastern part of the United States, provided by the NSCA State Director, as well as various Internet sources. The

researcher was able to find abundant information about the potential participants on the Internet, regarding their educational and professional background, certifications, and work experience. After identifying and locating the most appropriate individuals, the researcher contacted them via mail or e-mail. While making the first, initial contact with the possible participants, the researcher provided a brief explanation about the nature and the rationale of the study and asked for reply. After receiving responses from the potential participants, the researcher ranked the most appropriate subjects, according to the criteria list. For instance, coaches with more experience were ranked higher. When designating the No. 1 ranked coach, the researcher contacted him by phone, explaining further details about the study and asking for a personal meeting.

During the meeting with the No. 1 ranked strength and conditioning coach, the researcher further explained the purpose and the rationale of the study. As the cooperating coach showed interest in participating in the study, the researcher asked him to fill out a background questionnaire (Appendix A), in order to obtain more, yet unknown information about the participant, related to his educational background, professional experience, etc. This information was immediately analyzed. As the cooperating coach met all the required criteria, the researcher classified him as an expert strength and conditioning coach and an appropriate participant for this research study. All the details of the research study were discussed, and the participant was encouraged to ask questions. The expert coach agreed to participate in the study, after which he was asked to read and sign the Informed Consent Form (Appendix B). Following this, the researcher and the participant discussed the schedule and the pace of the research, and designated dates for data collection.

Criteria for selection

Studies examining expert coaches (Cote et al., 1995; Schempp, Templeton, & Clark, 1998; Saury & Durand, 1998) used numerous criteria, such as years of experience, performance reached by the athletes of the coach, held qualifications, recognition by associations and colleagues, etc., in order to define “expert” for research purposes. As explained by Abernethy, Thomas, and Thomas (1993), “the selection of expert subjects clearly needs to be directly related to the research question one is addressing” (p. 337). Considering Abernethy et al.’s suggestion along with the various criteria used in other expertise studies, the participant selection was based on the following criteria:

1. At least 10 years of coaching experience in strength and conditioning
2. Holding a head strength and conditioning coach position at collegiate or professional level
3. The coach’s team has been consistently performing well (participated in play-offs in NFL, or has firm reputation in NCAA Division I)
4. Certified Strength and Conditioning Specialist (CSCS) designation obtained from the National Strength and Conditioning Association, or Strength and Conditioning Coach Certified (SCCC) designation obtained from the Collegiate Strength and Conditioning Coaches association (CSCCa)
5. Formal recognition of coaching achievements from a professional organization (awards, distinctive ranks)
6. Recommended by the NSCA State Director.

Data Collection

Several case study researchers (Rist, 1982; Yin, 1981b; Merriam, 1985) emphasized three major strategies for collecting data in case study research, such as observation, interviewing, and document analysis. Coincidentally, numerous studies analyzing teachers' and coaches' practical knowledge (Elbaz, 1981; Johnston, 1992; Langley & Knight, 1996; Saury & Durand, 1998; De Vries & Beijaard, 1999; Keedy, 2001; John, 2002) used some combination of observations, interviews and document analyses as primer data collection methods. According to Meijer, Verloop, and Beijaard (2002), it is necessary, because the exploration of practical knowledge, which is a multi-dimensional concept, requires multiple instruments. Merriam (1985) explained that data collected with these three methods are used to build the intensive, thick description of a case study. Considering these explanations, the researcher of the present study applied these three methods as primary sources of information.

Numerous authors advocated that a variety of data sources should be used when applying case study research, in order to enhance the validity of the findings (Stake, 2000; Yin, 1994; Merriam, 1985; Guba & Lincoln, 1981; Owens, 1982; MacDonald & Walker, 1977) and to reduce the likelihood of misinterpretation (Denzin, 1989; Goetz & LeCompte, 1984). Calling it an overriding principle in doing case studies, Yin (1994) claimed that multiple sources of evidence should be used to increase the quality of the research. He defined multiple sources as evidence derived from two or more sources, which converge on the same set of facts or findings. Yin further explained that a single source has no complete advantage over all the other possible sources, therefore a good case study researcher wants to use as many sources as possible. Through using multiple

sources of evidence in the present study, the development of converging lines of inquiry became possible, through which the researcher attempted to draw accurate findings and conclusions.

The use of multiple methods of data collection is what some researchers (Denzin, 1970; Yin, 1994; Stake, 2000) call triangulation, while others (Meijer, Verloop, & Beijaard, 2002) specify it as triangulation by method or multimethod triangulation. Yin (1994) underlined that in case study research, there is a better need to use multiple sources of evidence than in other research strategies, such as experiments, surveys, or histories. In fact, using multiple methods of data collection is the major strength and invaluable advantage of case study research (Merriam, 1988; Yin, 1994), and accordingly it was implemented in the present study as well.

The purpose of triangulation is to clarify meaning, thus verifying the repeatability of an observation or interpretation. Triangulation also helps to clarify meaning by identifying different ways the phenomenon is being seen (Flick, 1998; Silverman, 1993). Merriam (1988) defines it a methodological triangulation, when a researcher combines dissimilar methods of collecting data, such as interviews, observations, and physical evidence, to study the same unit. Problems of validity also can be addressed with triangulation, as the “multiple sources of evidence essentially provide multiple measures of the same phenomenon” (Yin, 1994, p. 92). The researcher of the present study, through emphasizing the use of multiple methods strove to collect valuable information that emerged from more than one data source and attempted to triangulate every piece of information in order to enhance the credibility of the research findings.

Procedures

Using interviews for data collection

Interviews are essential sources of information in case study research. An interview is a conversation with a purpose to obtain a special kind of information. As Patton (1980) explains, “the purpose of interviewing is to find out what is in and on someone else’s mind” (p. 196). Researchers interview participants to find out from them those things that cannot be directly observed. The purpose of interviewing is to allow the researcher to enter into the other person’s perspective (Patton, 1980), to understand the world from that person’s points of view, and “to unfold the meaning of peoples’ experiences” (Kvale, 1996). Another purpose of an interview might be to corroborate certain facts that the researcher thinks have already been established. The researcher of the present study most generally sought verifications of initial findings emerging from observing training sessions. Through the conducted interviews, the researcher was introduced directly to the participant’s perspectives, which in most cases verified that the observed knowledge content was indeed held, practically applied, and developed deliberately. Here, following Yin’s (1994) recommendations, the researcher carried out interviews in which the specific questions were carefully worded, so that the researcher appeared genuinely naïve about the topic and allowed the respondent to provide a fresh commentary about it. In order to find out the most about the participant’s practical knowledge, a series of interviews took place.

Overall, the researcher conducted eight formal research interviews with the participating expert coach, in addition to the countless short conversations that took place mainly during the observed training sessions or in-between sessions. Moreover, the

researcher conducted a semi-structured interview with a colleague of the participating coach, the main assistant coach, who provided valuable information regarding the subject's practical knowledge. All interviews, including interviews with the participant and his assistant, ranged in duration between 30 and 60 minutes. Furthermore, the researcher had conversations with four other assistant coaches and with several athletes. Here, the researcher tactically asked questions, so that the conversation partners provided substantial information about the participant's practical knowledge without knowing the purpose of the research.

Commonly, the nature of an interview is determined by the designed structure of it. Interviews may range from highly structured questionnaire-driven interviews to open-ended, conversational formats. In most case studies semi-structured interview formats dominate, which are guided by a set of questions and issues to be explored, but neither the exact wording nor the order of questions is predetermined (Merriam, 1988). The researcher of the present study mainly applied this type of interviews. The interview topics were designed before the process of the data collection based on previous research findings on practical knowledge (see Appendix C for interview topics). At this point, the researcher brainstormed a long list of questions about the coaching practices in strength and conditioning, and organized them into the appropriate categories.

In the beginning phase of data collection, when participant observations were dominant, the researcher strove to learn enough about the participant and the setting, to refine and more precisely categorize the previously set questions and to produce more questions for subsequent interviews. Consequently, as the researcher became more familiar with the observed coaching routines and the setting, and as he obtained more

information about the participant, he was able to address more narrowly focused, more precisely worded, and more real-life context related questions.

The researcher considered Yin's (1994) warning about interviews, as they are subject to the common problems of bias and inaccurate articulation. Thus, observations and documents were generally used to triangulate information gained from interviews. For instance, when during the interviews the participant explained his beliefs of the importance of careful planning and consideration of previous unit and training plans in designing workouts, the researcher was able to verify this information by analyzing a portion of training plans from the participating coach's collection, as well as by the observed actions of the participant. Also, in order to avoid inaccurate recall of the participating coach's words during the research conversations, all interviews were audiotaped and shortly following the interviews transcribed, personally by the researcher. During the numerous short conversations that took place both during the observed workout sessions and in-between sessions, the researcher strove to write down the participant's exact words immediately after these conversations, followed by some on-scene interpretations.

Using observations for data collection

Observations are useful sources of data in case studies, providing a great deal of information about the topic being studied. An important characteristic of observations is that they take place in the natural field setting. While interview data represent secondhand information about the phenomenon, observations are firsthand experiences (Taylor & Bogdan, 1984). Merriam (1988) highlighted the importance of this, as the observer sees things firsthand and uses expert knowledge and experience in interpreting

what is being observed, as opposed to relying merely on filtered information provided by interviews. Still, she emphasized that in case study research, interviews and conversations are often interwoven with observations. Indeed, in the present study, observations and research interviews were very tightly related.

During data collection, the researcher carefully followed Kidder's (1981) guidance in carrying out observations, as those were deliberately planned ahead of time, recorded systematically, and controlled for validity and reliability purposes. According to the aforementioned procedure, the researcher had discussed the schedule of data collection with the participant before the data collection actually started. Therefore, the exact dates and hours of training observations were stated beforehand. Also, the researcher established a recording routine, where staying close to the participant, all coaching actions were clearly seen and recorded as observation notes.

The researcher recorded the main episodes of the observed training sessions, athletes' responses to coaching directions, the participating coach's behavior, decisions, moves, actions, conversations with athletes and assistant coaches, and documented exact words of feedback or instructions as well. Furthermore, the researcher mostly sought the logic and rationale behind the participant's decisions and actions, striving to reflect his knowledge used on the scene. In addition, the researcher collected numerous questions during observations, most of them related to exact, real-life training situations, which made it possible during the subsequent interviews to make the participant talk about reality-based practices of coaching, instead of hypothetical theories. Regarding Kidder's (1981) suggestions on controlling research observations for validity purposes, the researcher made sure throughout the data collection process that all themes and initial

findings emerging from observation data were triangulated with either interview or document data. Enhancing the reliability of observation data, reoccurring events were recorded repeatedly, and in addition, all observation notes were typed and systematically organized shortly after taking those, thus making it more manageable for further analysis.

Yin (1994) distinguished direct observation, which refers to a field visit to the case study site, and participant-observation, where the researcher, while observing participants, has a variety of roles in the case study situation and actually participates in the events being studied. In the present study, when the participating coach carried out his training sessions for the athletes participating in the athletic program, only direct observations were used, where the researcher observed the coach 'in-action'. The researcher's participation in the observed training sessions could have hindered the appropriate recording and might have been too intrusive in the setting. However, the researcher took advantage of the participant's offer of participating in numerous training sessions, during which the participant worked out with his assistant coaches. Moreover, the researcher also attended and actively participated in a strength and conditioning coaching camp that the participant organized for other coaches. The participation in these training sessions allowed the researcher having a better insight of the participant's thinking process, training philosophy, professional decisions, and beliefs.

To avoid being intrusive, the researcher stayed far out of the action during the first few observations. However, because of the tremendous noise in the gym during the workout sessions, this occasionally made it difficult to hear the participant's words, thus made the validity of the observation data questionable. Attaching a cordless microphone to the participant was not applicable, therefore the researcher sought other solutions. By

the repeated encouragement of the participant, the researcher stayed close to him, but still out of action. Following the participating coach's every step during the training sessions occasionally made the recording process more difficult, however the researcher developed this routine to a higher level by the later stages of data collection.

Regarding the necessary number of visits and the overall time of observation, Merriam (1988) noted that it is not precisely predictable ahead of time. The researcher of the present study planned for one to two observations weekly, for a ten to fifteen weeks data collection period, which was assumed to provide sufficient data for saturation. Overall, the researcher observed two to four training session during each visit at the gym. The number of observed training sessions on a weekly basis varied between two to nine, depending on the number of visits. All together, the researcher observed 28 training sessions, which was sufficient to become familiar with the participant's coaching routines.

Using documents for data collection

The third significant source of information came from various documents. Documents might have different roles in case study research, such as augmenting evidence from other sources, verifying emerging hypotheses, creating new categories, offering historical understanding, or tracking change and development. In certain case studies, documents might be so important that the researcher must apply an extensive document retrieval and analysis, while in other studies they may be of only passing relevance (Yin, 1994). In the present study, documents were expected to provide additional information about the observed coach's practical knowledge, but they were

used for triangulation purposes as well. The researcher strove to collect all relevant documents from the participant.

According to Merriam (1988), the advantage of using documents is their stability. Documents are considered ‘unobtrusive’, as opposed to interviews and observations, which often intrude as foreign elements into the social setting, and are often limited to those participants who are accessible and cooperative (Webb, 1981). On the other hand, data from documents are not subject to these limitations, because documents are not produced for research reasons, and the investigator cannot alter what is being studied by his or her presence (Merriam, 1988). As the presence of the researcher of this study might have slightly influenced the observed coach’s instructional behavior and communication with the athletes, the various forms of documents, which are stable in nature, supported emerging theories. While documents are unaffected by the research process and grounded in the real world, therefore are objective, they may be fragmentary and their authenticity may be difficult to determine. Thus, by Merriam’s (1988) recommendation, after collecting relevant materials, the researcher assessed the nature and authenticity of all documents. As mostly training plans and handouts to athletes were collected, it was a quite straightforward verification that these documents were indeed used in real-life.

The term document refers to a wide range of written and physical materials. Yin (1994) distinguishes documents, such as letters, agendas, written reports of events, administrative documents, proposals, progress reports, evaluations, articles appearing in the mass media, and archival records, such as service and organizational records, maps, charts, name lists, personal records, and survey data. Merriam (1988) mentions physical traces as a third type of document available to case study researchers. The researcher in

this study collected various forms of plans, including periodized season plans, macro- and microcycle plans and training plans. In addition, as the participant often provided handouts and educational booklets to his athletes, the researcher collected copies of those as well. These handouts generally included workout plans for athletes, written instructions and technique demonstrations with drawn figures, as well as motivational thoughts. With the collection of such documents, the researcher was able to identify the knowledge that the participating coach strove to convey to his athletes, knowledge that he felt valuable in the athletic preparation.

Termination of data collection

The case study researcher has to make a strategic decision, in regard to how much data should be collected and how long the complexities of the case should be studied (Stake, 2000). Lincoln's and Guba's (1985) suggestion was kept in mind, so that collection of data was suspended when the researcher noticed emerging regularities in data, and realized that further data collection could result in moving away from already emerged categories. Theoretical saturation criterion (Strauss & Corbin, 1990) was also carefully monitored by the researcher. When the researcher noticed that additional data from the different sources did not offer new answers to the research question or overlapped with the information that the researcher already obtained, data collection was terminated.

As the case study research design requires extensive and thorough data collection, the researcher of the present study planned for collecting evidence over a ten to fifteen weeks period. This time frame was assumed to provide sufficient time allocated for becoming familiar with the setting, getting to know the participating coach's actions and

routines, and understanding his behavior, professional actions and instructional processes. Indeed, the data collection was spread over a sixteen week period, where the number of visits varied between one and three on a weekly basis. By the end of the sixteen week period, the researcher felt confident about being familiar with the participant’s coaching actions. Furthermore, the researcher was provided sufficient amount of information through the numerous data collection techniques, which are summarized in Table 1.

		Data Collection Method				
		Formal interviews	Informal conversations	Direct observations	Participant observations	Documents
Individuals	Participant	8 audiotaped, transcribed interviews 30-60 minutes	Numerous short conversations during and outside workouts	28 training sessions, and work outside workouts observed	5 training sessions participated, 1 coaching camp participated	Variety of training plans, handouts, educational booklets
	Assistant coach	1 audiotaped, transcribed interview 45 minutes	Numerous short conversations outside workouts	-	-	-
	Four other assistant coaches	-	Numerous short conversations outside workouts	-	-	-
	Athletes	-	Numerous short conversations outside workouts	-	-	-

Table 1 – Data Collection Summary.

Note: According to the research question, all observations focused only on the participant; so, although assistant coaches and athletes were present as well, these individuals were not observed.

As the researcher had numerous informal conversations, in addition to the formal interviews, with the research participant, not only the previously established interview topics were thoroughly discussed, but all the questions that were raised during the data collection process were also answered by the participant. Furthermore, this extensive period spent in the training environment provided the researcher an opportunity to have several short conversations with several assistant coaches, who worked with the participant, and with some athletes as well. All informal conversations with the assistant coaches and the athletes were pertinent to the research question. Furthermore, a formal semi-structured interview with the participant's main assistant coach also contributed significantly to obtain valuable data.

Data Analysis

In case study research, the investigator is immersed in the totality of the case (Merriam, 1988). As the researcher of the present study became more and more familiar with the setting and collected more data, underlying patterns and conceptual categories emerged. It has been heavily emphasized that in case study research data should be analyzed while still being collected (Merriam, 1985; Yin, 1981a; Owens, 1982; Rist, 1982; Smith & Louis, 1982). The researcher of the present study performed data collection and analysis simultaneously, which provided him guidance in further data collection. Shortly after recording each interview, the researcher transcribed those personally, which provided him to be better immersed in the data. Handwritten data from observations were also typed by the researcher, emergent insights were noted, initial codes were highlighted, and all data were filed for further analysis.

As insights and tentative hypotheses emerged, the researcher refined and reformulated the pre-established interview questions, collected more questions, and organized all the questions into clearly separated categories or interview topics, thus striving to produce more believable and trustworthy findings. Merriam (1988) explained that a lack of ongoing analysis might result in unfocused, repetitious, and overwhelming data, thus the researcher generally strove to analyze newly collected research data. Although the process of data collection and analysis took place simultaneously, data analysis became more intensive once all data were in.

Intensive data analysis started with organizing all data. Once data from various sources were separated and organized into chronological order, data coding took place. Each interview transcript, all observation notes and all the collected documents were coded. Once all data was read through and coded, the researcher refined the codes and, in case of interview and observation data, typed those into the text. Following this, the coded, typed, and printed data chunks were organized into main themes. Here, the researcher placed every piece of paper containing a fragment of data into pertinent piles, which piles were refined and modified repeatedly. This process resulted in emerging conceptual categories and later in main themes. Once clearly distinguishable themes emerged, the researcher reviewed and reorganized all data pieces, ensuring that all the pieces were placed under the appropriate theme or, in some occasions, under more than one theme.

In order to improve credibility of the findings, the researcher took into consideration Yin's (1994) recommendations, as the researcher must do everything to make sure that the analysis is of the highest quality. For this purpose, four principles were

considered. First, the researcher strove to rely on all the relevant evidence when analyzing the data. After main themes and the included categories were created, the researcher revised those, making sure that all categories were supported by data from multiple sources or by repeated data. Thus, the researcher took into consideration only those categories that were confirmed by information from at least two sources, or numerous recurring regularities from a single source. Also, the researcher attempted to include all major rival interpretations in the analysis. In addition, the analysis addressed the most significant aspects of the case study. Finally, the researcher brought his own prior subject-related expertise to the case study and considered to state his subjectivity related to the research topic. Important to note that the researcher had quite extensive experience and firm knowledge in the field of strength and conditioning. The researcher possessed CSCS credential from NSCA, and had work experience related to strength and conditioning. As a physical education teacher and a Certified Strength and Conditioning Specialist, the researcher had not only knowledge and experience in the field, but beliefs and perspectives of an effective strength and conditioning program. For instance, the researcher was a keen supporter of hard work and organized training sessions, preferred dictatorial coaching style and believed in the application of variety in training programs. However, the researcher strove to eliminate the influence of these subjectivity perspectives and attempted to answer the research question in the most valid and reliable way, considering various aspects related to the quality of the study.

Quality of the Study

Many researchers have disdain for case study research, mainly because the lack of rigor in many case studies (Yin, 1994). The researcher of the present study, in order to

avoid the influence of biased views on the direction of the findings and conclusions, took into account three tests that were commonly used to establish the quality of social research and to judge the quality of a research design. According to Kidder and Judd (1986), these tests are: internal validity (establishing a casual relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships), external validity (establishing the domain to which a study's findings can be generalized), and reliability (demonstrating that the operations of a study, such as the data collection procedures can be repeated, with the same results). Qualitative researchers considering these various tests often use terms, such as trustworthiness, credibility, and consistency. In the present study, following Merriam's (1988) terminology, issues of internal validity, external validity, and reliability were taken into consideration.

Internal validity

To contribute to the theory and practice of a given field, research studies must be believed and trusted. As Merriam (1988) explained, research studies "need to present insights and conclusions that ring true to readers and other researchers" (p. 163).

According to Kemmis (1983), it is the researcher's critical presence in the occurrence of phenomena, along with observation, hypothesis-testing, and triangulation, which makes the case study scientific. According to Merriam (1988), internal validity, also termed as credibility, deals with the question of how one's finding match reality. Using her recommendations, four strategies were used to ensure internal validity:

- triangulation (using multiple sources of data and multiple methods to confirm the emerging findings)

- member checks (taking data, interview transcripts, and initial interpretations back to the participant to check for accuracy and validity)
- long-term or repeated observations at the research site
- peer examination (asking colleagues to comment on the findings as they emerge)

External validity – generalizability

According to Merriam's (1998) explanation, external validity concerns with the extent to which the findings of one's study can be applied, in other words, can be generalized to other situations. Generalization is treated in different ways by researchers. Some state that generalization should not be emphasized in all research (Feagin, Orum, & Sjoberg, 1991; Simons, 1980). According to Walker (1980), a researcher should attempt to provide information that facilitates the reader's own analysis more than to deliver statements of generalization. Affirmatively, Merriam (1988) declares that generalization from a single case, which was selected in a purposeful manner, makes no sense at all. By her perspective, a researcher selects a case study approach because the emphasis is on understanding the particular case in depth, instead of knowing what is generally true of the many.

On the other hand, Stake (2000) explains that researchers cannot avoid generalization. They generalize to happenings of their cases, but this generalization can be unconscious for both the researcher and the reader. By Yin's (1994) perspective, case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes. In this sense, the investigator's goal is to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization). The researcher of the present study accepted Merriam's (1988)

hypothesis, as the purpose of the study was to reveal the content of the participant's practical knowledge. According to this hypothesis, one expert coach's practical knowledge is not necessarily generalizable to all coaches working in the field. However, the researcher strove to improve generalizability of the present study by searching for commonalities in strength and conditioning coaches' work, by providing a rich and thick description, and by rationalizing how typical this studied case was.

Reliability

According to Merriam (1988), reliability refers to the extent to which one's findings can be replicated. The term reliability in the traditional sense seems to be a misfit in qualitative research, because human behavior is never static. Therefore, Lincoln and Guba (1985) suggested considering terms such as "dependability" or "consistency" of the results. This refers to results that make sense, are consistent, and dependable. Using Merriam's (1988) suggestions, the investigator of this research used three techniques to ensure that results were dependable. The investigator strove to explain the assumptions and theory behind the study, used triangulation, which strengthened both reliability and internal validity, and involved an independent peer audit in the study, who checked the investigator's research actions. Merriam (1988) suggested to take into consideration other terms, such as credibility, believability, or adequacy when designing a case study research. To improve the credibility of the findings of the present study, according to Owens's (1982) suggestions, four additional techniques were used: a prolonged data-gathering took place on site, member checks were incorporated, referential materials were collected, and the researcher strove to develop a thick description.

In addition, following Yin's (1994) recommendation, the researcher strove to develop a presentable database. For this purpose, all interviews were transcribed, the handwritten observation notes were typed, and all observation and document analysis notes were collected in a file. Thus, other investigators would be able to review the evidence directly, which may also increase the reliability of this case study.

Ethics

According to Stake (2000), "qualitative researchers are guests in the private spaces of the world" (p. 447). To ensure strict ethics and a good manner in conducting this investigation, the researcher of the present study considered various issues. As aforementioned, the participant was informed about the nature and the process of the research in the very beginning. Dates of observations and interviews were discussed ahead of time and continuously adjusted to the participant's availability. The participant was constantly encouraged to state limits of access for the researcher in carrying out the study, as well as to give suggestions or express concerns regarding the research process. During the data collection process, the researcher strove to be the least intrusive as possible, seldom interacted with the athletes during training sessions, occasionally with the participant, but only if the participant initiated the conversation. In addition, to avoid biased views of the participant, the researcher did not have any social contact with the participant. Conversations with the participant were strictly related to the research question, thus personal conversations were limited. The participating coach received a copy of the printed interview transcripts for validation purposes and was asked to read and confirm. The researcher followed the rules for protection of human subjects and exercised great caution to minimize risks.

CHAPER 4

PARTICIPANT AND SETTING

The purpose of this study was to analyze and report the content of practical knowledge that was used by an expert strength and conditioning coach. This chapter will briefly introduce the expert strength and conditioning coach, who was chosen to participate in the study. A short description of the setting, the participant's working environment will be also included in this chapter.

The Participant

From all the potential participating coaches, the researcher, through a fortunate recruiting process, obtained an agreement on participation from the highest ranked potential participant. Coach John Boyd (pseudonym) was the head strength and conditioning coach at the University of Oconee (pseudonym), a major NCAA Division I institution in a large metropolitan in south eastern region of the United States. At the time of data collection, Coach Boyd had been coaching strength and conditioning for sixteen years, the last twelve years as a head strength and conditioning coach. The year of the data collection was his second season as a head strength and conditioning coach at University of Oconee. Coach Boyd was a member of both NSCA and CSCCa, and held a Strength & Conditioning Coach Certified (SCCC) credential from CSCCa. Shortly after the data collection process, he was awarded with the Master Strength and Conditioning Coach (MSCC) designation, which was only available to those individuals who had been full-time collegiate strength and conditioning coaches for a minimum of twelve years.

Acknowledging his professional achievements in the field of strength and conditioning, he was awarded with the “College Strength and Conditioning Professional of the Year” title for the Atlantic Coast Conference by the National Strength and Conditioning Association in year 2000. Coach Boyd was highly recommended by the NSCA State Director and met all the criteria for participation.

Coach Boyd was a white male, which according to a survey study by Pullo (1992) was considered typical, as 94% of all NCAA Division I strength and conditioning coaches were white males. Coach Boyd’s educational background, athletic experience and involvement in strength and conditioning showed numerous correspondences to the survey findings of Pullo about an average collegiate strength and conditioning coach. He received his Bachelor’s degree in physical education and later a Master’s in exercise science, thus he belonged to the 63.4% of Division I strength and conditioning coaches who had an education in either physical education or exercise science. He started his coaching career during his graduate studies, as he was a strength and conditioning graduate assistant at a Division I institution.

Coach Boyd was an athlete during his high school and college years, practicing one of the throwing events of track and field. During his athletic years, he was continuously involved in strength and conditioning training, thus he established a firm basis of the various strength training exercises and techniques. According to Pullo’s findings, 96.6% of the Division I strength and conditioning coaches had strength training experience, as 69.4% of them participated in football and 28.2% of them in track and field trainings. After finishing his graduate studies in exercise science, Coach Boyd obtained an assistant strength and conditioning coach position at another NCAA Division

I institution, where he spent two years. At this point, he became a head strength and conditioning coach at a Division II institution, and three years later he obtained a head position at a Division I institution. Coach Boyd spent seven years at that institution before accepting the head position at University of Oconee. As a head strength and conditioning coach at University of Oconee, at the time of data collection, Coach Boyd was a full time staff member, coached training sessions primarily for the university's football players, but oversaw the entire strength program, including all the ten varsity sports at the institution. He thus was indirectly responsible for several hundred athletes, and directly worked with 100-120 athletes participating in the football program. As the director of the strength and conditioning program, he was also responsible for six assistant strength and conditioning coaches, guiding and overseeing their work. His top assistant coach, Coach Hodges (pseudonym) was also involved in the strength program of the football team, while other strength coaches supervised the strength and conditioning program of athletes from other sports.

Coach Boyd had a very good reputation in the field. He had been working with successful teams in the past and with thousands of athletes in various sports. As in most institutions in the United States, football is the most significant sport in the athletic program, and because the role of strength and conditioning is vital in football, many coaches in the field tend to work or strive to work with the football teams. Coach Boyd, in the latter stages of his career worked exclusively with athletes in the collegiate football program, so as at University of Oconee. Although during his career Coach Boyd worked with both male and female athletes, at the time of data collection at University of Oconee he dealt only with male athletes.

The Setting

Coach Boyd's immediate working environment was the stadium at University of Oconee. The strength and conditioning facility was located in the basement of the stadium, therefore this was ideal for Coach Boyd to be able to conduct both in-gym strength and power sessions and on-field speed and conditioning trainings. The gym where Coach Boyd worked was a state-of-the-art facility, where the strength training room was over ten thousand square feet, and it was extendable with an extra four thousand feet area, which was mainly used for speed and agility training. The football field was right outside the gym, thus Coach Boyd often preferred to use it when the weather conditions allowed him.

The very well-equipped strength and conditioning room expressed Coach Boyd's beliefs of an ideal facility. At the time of data collection, the facility was set up according to Coach Boyd's and his assistant coaches' demands and as a result of their recent work. The gym was both a training facility and a memorial room, where trophies, awards, and pictures were used for decoration and commemoration. The room was organized very rationally and space-economically. A corner of the gym was used for the cardiovascular equipment, including treadmills, stationary bikes and stair climbers. A huge portion of the gym was for the so-called Olympic weight-lifting exercises. Here, several squat racks and weight lifting platforms were placed in a straight line with geometrical precision. Around weight training bars, one could find weights and plates, everything nicely organized. An about eight foot wide passageway separated the "Olympic-lifting" area from the other parts of the gym. This aisle was not simply for separating the two main parts of the gym, but frequently used for various exercises, including warm up,

stretching, skipping and hopping exercises, as well as on-floor “own-bodyweight” exercises.

The other side of the gym included benches and various strength training machines. Closer to the aisle, several benches were located, flat and incline benches for the bench press, along with adjustable abdominal boards. Closer to the other wall of the gym, several other, mostly adjustable benches were placed, and a vast set of dumbbells, ranging from 2 to 200 pounds. The variety of machines represented the goal of the strength and conditioning program at University of Oconee. It was a special pool of equipment, which was not exactly similar to regular fitness-center type of diversity of equipment. As some exercises and movements were heavily emphasized, important machines for those movements could be found in more than one replication. Other machines were also specifically used for the athletic program and could not be found in conventional fitness gyms, such as inverted squat machines, forearm machines or neck-machines. All the walls were covered with mirrors, which was essential for technique check and correction. Other strength and conditioning related, miscellaneous items were also at hand in the gym. Among these, plyometric boxes, various sizes of medicine balls, hurdles, agility ladders, bars, ropes, sandbags, and many other things could be found. In the inner corner of the gym, offices for the coaches were placed. The offices had large windows, so the entire gym was visible from inside. Staff members were well equipped with office supply, computers with printers were available, also TVs with VCR and phones. Coach Boyd’s office was decorated with several framed pictures on the wall, along with his certifications and diplomas.

Coach Boyd and his assistant coaches worked in this environment on a daily basis. They strove to create an attractive, practical, warm, and professional environment. It appeared to be important that the workout room was a good working environment for the coaches, well equipped for the athletes and the program, maintained for safety, and attractive for visitors. Coach Boyd had done and continuously did a lot for improving the environment in which he worked.

CHAPTER 5

FOUNDATIONAL PRACTICAL KNOWLEDGE

The purpose of this study was to analyze and report the content of practical knowledge that was used by an expert strength and conditioning coach. After performing a thorough data analysis, as the findings of the study, ten major knowledge categories emerged. Coach Boyd's practical knowledge, including these ten categories, could be sharply separated into two main clusters. Coach Boyd showed evidence of possessing a form of practical knowledge that was used as a basis in his coaching. This type of practical knowledge was foundational in his work to carry out strength and conditioning programs. Entitled Coach Boyd's Foundational Practical Knowledge, this cluster contains six categories, such as knowledge of coaching strength and conditioning, facility and equipment, exercises and techniques, injuries, athletes, and planning. These six categories will be discussed in detail in this chapter. Chapter 5 will focus on the Coach Boyd's second type of practical knowledge, which was mainly used in action, thus it was named as Applied Practical Knowledge. This knowledge cluster includes Coach Boyd's knowledge of plan modification, supervision, coaching pedagogical strategies, and professional improvement. To better describe the content of these knowledge clusters, two figures were created illustrating the components of the knowledge categories in these main clusters. Figure 2 provides a map on Coach Boyd's Foundational Practical Knowledge cluster, in which the six main knowledge categories and the main pieces of the categories are illustrated.

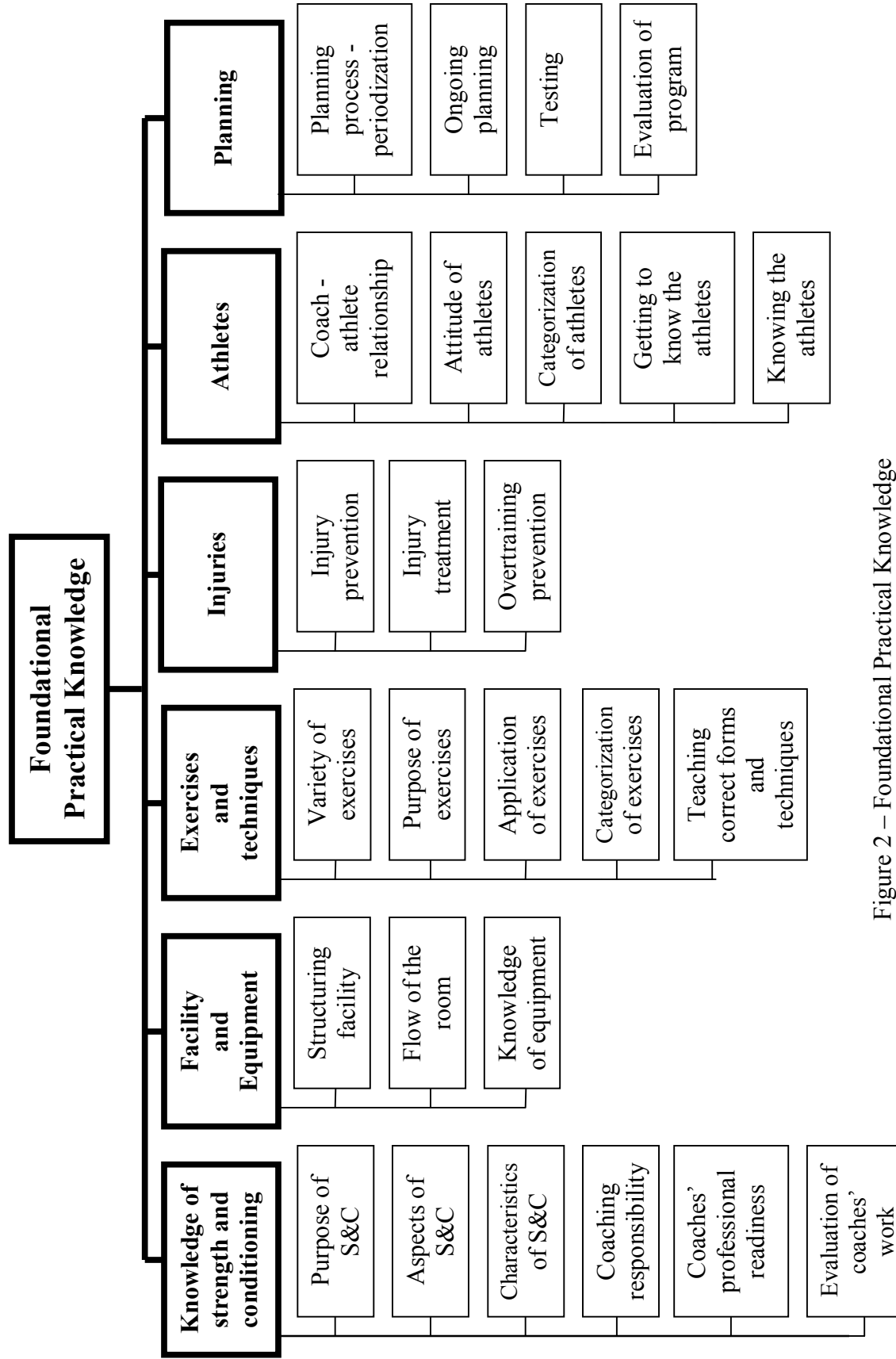


Figure 2 – Foundational Practical Knowledge

Strength and Conditioning and Coaching in the Field

Purpose and characteristics of strength and conditioning programs

In the previous chapters, the field of strength and conditioning was extensively discussed, the purpose of such training, the job responsibilities and professional knowledge needs of coaches working in this field were detailed. When examining an expert strength and conditioning coach's knowledge, it becomes necessary to clarify what the given coach thinks about this profession, and the beliefs and philosophies shaping the expert coach's work. Coach Boyd appeared to have a very clear belief about the purpose and the aspects of strength and conditioning in the preparation of athletes. The simple purpose of the profession is to improve the athletes' physical and mental abilities, in order to enhance their performance in their respective sport.

Everything we do is trying to be sport specific, to try to get that athlete better in their sport, so we're looking at ways to make them faster, stronger, quicker, more powerful, more explosive, more flexible, and at the same time work on certain areas to make that athlete better in each sport and in each position. The aspects of the training, well, it's almost too numerous, you can count so many areas, such as balance, coordination, flexibility, speed, endurance, conditioning, strength, strength-endurance, power, explosion, with the use of plyometrics, agility, quick feet drills...

Sport specificity is an important issue in making strength and conditioning useful in the preparation of athletes. Apparently, in order to design a sport specific conditioning program, strength coaches must be knowledgeable regarding a given sport and must comprehend the biomechanical and physiological needs for the sport. If the goal is to improve the athletes' sport specific physical performance, strength coaches must possess sport specific subject matter knowledge, as Coach Boyd expressed it, "to know the sport, the movement, and what's trying to get accomplished in that sport." Strength coaches may differ regarding their experience level in the various sports. It is apparently

beneficial if the strength coach has experience of practicing a given sport that he or she is dealing with, however, this is not a requirement. According to Coach Boyd, in case of lacking such experience, strength coaches must take actions in order to learn about the sport and to be able to prepare the athletes more specifically for that sport. He considered various actions that strength coaches can do, such as learning from the sport-coaches, going to practices, or watching the sport extensively in different settings. This is important in order to know the sport, “because once you see the movements, you know the movements what they’re trying accomplish in their area, you can apply that to the area of sport in the strength room.”

In Coach Boyd’s working hypothesis, strength and conditioning trainings are not simply targeting some physical development of the athlete but the primary characteristics that are essential for performing at a higher level in the given sport. He believed that strength and conditioning programs must be designed in such a way so as to make the athletes’ better specifically in their own sport.

What we’re dealing here is preparing the athlete to participate in their sport at the highest level possible, physically and mentally... It’s all geared to their sports. Nothing to do with fitness and other things, it’s all strength and conditioning for the sport, and hopefully it goes on to the playing field.

As strength and conditioning is a supplemental training form, the successful preparation of athletes for advanced sport-participation is dependent on various factors. Achieving the physical and mental improvement, making the athlete faster, stronger, and more powerful still does not mean that the athlete will indeed perform better in the given sport. However, according to Coach Boyd’s working theory, improvement only matters in the given sport and not necessarily in strength and conditioning. Therefore, it is crucial for a strength coach to realize that athletes’ development in strength and conditioning is

beneficial only up to a certain point, and the ultimate goal is to perform better in the given sport. Athletes must be viewed from a sport-focused perspective, thus the strength coach must know when and how to modify the program to keep it sport-specific.

The bottom line, I think for any athlete to improve, is to improve in their sport... Basically, improving is what we're looking for. But we're getting certain levels where guys are getting strong enough, when we think a guy has reached what he needs to reach as far as strength, then we don't necessarily need to do any more of heavy lifts. They're not doing powerlifting, they're not being Olympic lifters, so we move onto other things that they can improve on. Obviously, there will be something else we need to work on.

Considering this purpose, Coach Boyd set up his training sessions in a fashion that those were closely mimicking the given sport-competition conditions, creating game-like situations. The trainings in the right phase of the preparation were just as fast paced as the games or competitions in the given sport. Coach Boyd further believed that in addition to making the athletes' physical preparation sport-specific, coaches in the field must deal with the individual differences among athletes as well. They must carefully set up their programs and take into consideration each athlete's strengths and weaknesses and try to address those characteristics. Therefore, strength and conditioning programs, according to Coach Boyd, should be both sport- and individual-specific.

It's a parallel process: you have to understand the sport and you have to strive toward the sport-specific training, meanwhile you have to take into consideration the individual differences and individual aspects of the athletes... You have to look at each athlete individually... Depending on what their needs are, we have to accommodate some of their needs... We do as detailed as we can, but sometimes it gets a little general. But we're still looking to make the athlete better in every aspect in those areas which are going to help achieving those goals.

Trying to take into consideration all the sport-specific and individual needs, therefore, is essential for designing a rational strength and conditioning program. Nevertheless, other aspects still influence the successful sport participation of the athlete,

most importantly the talent of the given individual. Coach Boyd believed that strength and conditioning training could significantly improve an athlete's physical attributes, but not necessarily the sport-specific skills and talent. He acknowledged that an athlete has to be decently skilled in the given sport if it is expected that the strength and conditioning program makes further improvements for that athlete.

We can make the athletes faster, we can make them stronger, we make them more flexible, but we can't make them a better person to play the sport. You have to be able to play the sport and we can help them to play the sport better... The athlete has to bring some genetic potential that we can work with.

Consequently, as Coach Boyd theorized, the best strategy that strength and conditioning coaches can apply is setting up a well rounded program that addresses both sport-specific and individual needs. According to Coach Boyd's belief of the program set-up, it also has to be goal-oriented. Goals and objectives of a program must be carefully set up at the beginning of the season, and must be evaluated and refined as the program proceeds. The strength coach who designs the program must have a thorough comprehension of these program objectives, which are greatly influenced by the requests of the sport head coach. It is the head coach of a given sport program who makes the ultimate decision regarding the preparation of the athletes, thus strength and conditioning coaches must adjust program goals to the special demands of the sport head coach.

I think you need to understand the whole issue of what you're trying to accomplish. It's important! You have to know, mainly, what is your objective... Incorporate with that, you have to work with the coach of that sport. So, I need to work with that person, cause he may have some goals, and he sees the whole team, that even though we're thinking of one, he may have something else that we have to work on. So he may see it from a little bit different perspective. I feel my knowledge is in the area of strength and conditioning, but he may see something as a coach outside that.

Strength and conditioning coaches' responsibilities

In the preparation of athletes for a given sport, the main role belongs to the head coach of the sport. In most collegiate sports, head coaches deal with the athletes intensively. They recruit the athletes for the program, deal with them on a daily basis, and thus become a significant part of the athletes' sport career. In the preparation of athletes in most sports, strength coaches have a very important, but still secondary role. They mainly work in their own environment and contribute to the athletes' sport preparation with supplemental training. Nevertheless, their role in the athletic preparation process might still be crucial. Frequently, athletic achievement is highly dependent on the strength coaches' job performance. As aforementioned, strength and conditioning coaches' primary job responsibility is to design and carry out a rationally designed program and to contribute to athletes' physical and mental preparation in various ways. Coach Boyd, in addition to setting up workouts for the current athletes, also takes care of some of his former athletes and others who wish to pursue a successful athletic career: "I'm making workouts for these players, I'm making up workouts for me, and after that I'm making up workouts for other guys and people that come and ask for things." By Coach Boyd's viewpoint, it is important that coaches understand that they work with people, and they are responsible for other human beings' physical development, thus they must have a strong commitment to their duty. He believes that coaching strength and conditioning is a job where the coach "can touch a lot of different individuals, work with a lot of people, and make things good."

According to Coach Boyd, in the process of designing and carrying out strength and conditioning programs, the safety of athletes must receive a heavy emphasis. As

strength and conditioning programs may often be very intensive, parallel to the intensity, the risk of injury also increases. Strength coaches must know ways and methods to prevent injuries and ensure safety. It is the strength coach's responsibility to provide a safe program to the athletes, and to ensure that all athletes work with correct technique.

We want to make sure that they are at the proper and safe form for all the lifts, and nobody get hurt... To get someone hurt, it's going against everything we're trying to do, to make the athlete better on the field or the court... Everything we do here is to make them perform better.

This brief description of job responsibilities is only superficial; other important areas will be detailed in subsequent sections of this chapter. In addition to the job responsibilities that are general among all strength coaches, head strength and conditioning coaches have several additional responsibilities. Firstly, the head strength coach at most collegiate sport programs is not only responsible for one given sport, but for the conditioning of the entire athletic program at the institution. Athletic programs might include 10-15 different sports, some of which has men and women teams. At University of Oconee, at the time of data collection, there were 15 different sport programs. Coach Boyd supposedly had some comprehension of all the sports in the program, as well as an understanding of the differences when coaching men and women. Running the strength and conditioning program for all sports, Coach Boyd was responsible for setting rules and guidelines in the program and in the use of facility.

Mostly, head strength coaches have various administrative and budgetary responsibilities and must be concerned about budgetary issues. Closely related to this, the head coach is responsible for the strength and conditioning facility, equipment, and devices. Maintaining or renewing the facility, buying and updating equipment, improving the facility specifically targeting program improvement, is all among the responsibilities

of the head strength coach. In addition to being responsible for all the programs and the facility, Coach Boyd acknowledged that he was responsible for the entire strength and conditioning staff. Depending on the extent of a given athletic program and the number of sports in the program, several assistants might work in cooperation with the head strength coach. Head strength coaches are not only responsible for overseeing and organizing the work of these assistant coaches, but also for hiring new staff members, evaluating their work, and promoting the assistant coaches' professional growth. Coach Boyd took this responsibility very seriously, just as much as being concerned with his own professional development. Therefore, attending various conferences and clinics was also interpreted as a must among his responsibilities. This was not only for his own development, but also for networking, meeting other coaches, becoming familiar with other programs, and introducing the assistant coaches to others. As he expressed, "I try to bring my assistants to as many conventions and conferences as I can, to enrich their knowledge". Coach Boyd was greatly concerned about his assistants' professional improvement and the progress that they were making in their professional career.

I think a good, valuable tool is to get your assistant to have freedom of trying to develop their programs, trying to do things on their own, and to get their experience level... Any time the assistants can help me, I try to involve them as much as possible. If you can get your assistants involved in the main sport at your school, that is a good experience for them, and that usually carries them on if they interested in pursuing a career. That may carry them on to get into another job, if they have experience with a large sport. If they are doing other sports, individual sports, that's great too, because that always helps. But when they can deal with team sports, that helps even more, because that gives them experience with large sports.

Strength and conditioning coaches' professional preparation

Coaching strength and conditioning is a profession, in which, just like many other fields, people pursuing a career must climb a hierarchical ladder. In this process, coaches'

professional improvement, their knowledge development, and the overall experience gained working in the field is significantly important. Internships in coaching strength and conditioning are available at numerous institutions, which are useful for students to experience the real weight room environment and to see real job conditions. Later, graduate students might obtain a graduate assistant position, which most often means a deeper involvement in the given program, perhaps eventually a job offer as an assistant coach. Coach Boyd revealed that when he was involved in hiring a new assistant coach, he looked at the applicants' educational background, possible athletic experiences, and mainly their professional field experiences. The level of required experience differed, depending on the requirements for the open position. For an entry position for instance, Coach Boyd tended to look for applicants with limited experience, as opposed to a higher level assistant position, which apparently required extensive professional experience. Even though experience weighed heavily, Coach Boyd acknowledged that he carefully distinguishes among useful and less useful experiences.

You get a person that's been in programs before and they're going to have a lot of experience, but a lot of time it maybe experience you are not as happy with, or you don't like the things that they've been taught in the past, or the techniques that they've been taught... I look at the people they've worked with, the schools they've been at, if at reputable schools, programs that I'm familiar with. Overall, I look at what programs they've done.

Coach Boyd's strategy of looking at the applicants' background and the program in which they had been involved reflected the quest for the appropriate practical knowledge from the applicant. It is imperative that all of the coaches' practical knowledge and professional belief in a given program matches both the goals and objectives of the program, and the professional perspectives of the head strength coach. In addition to being experienced and possessing the demanded practical knowledge, an

assistant coach's personality and ability for cooperation are also determinant factors, to correctly fit in a program. Once an assistant coach becomes a member of Coach Boyd's staff, he or she must work up to the expectations. Coach Boyd frequently observed his assistants' work and evaluated them on a regular basis. The purpose of these evaluations was mainly to foster their professional growth. Coach Boyd gave suggestions for areas of improvement, ways to improve, and advice on being a better coach in the field. To advance in their career, strength coaches usually work for a year as assistant coaches to gain experience, often at several institutions, striving to enter into larger athletic programs. Eventually they might obtain a position as a head coach, which according to Coach Boyd, clearly requires the experience factor.

I think the biggest thing from the assistant to the head strength coach is the experience factor... You can get all the degrees as you want, but the experience as the head coach, or as a top assistant for many years of learning, every facet of the program, that's going to be the biggest difference... You see a guy that has been a coach for 10-15 years, we know he's put in a lot of time, he's put in a lot of effort, sometimes successes, sometimes failures, but he's put in a lot of time into it, so he has a lot of experience. So that's the biggest difference, getting that experience.

“Learning on the go”

Strength and conditioning coaches must possess a good deal of basic knowledge, even when entering the field as an intern. This knowledge might be extended and shaped later, but certain basic knowledge is essential. Coach Boyd had his background in physical education and exercise physiology, and he preferred one having such a knowledge base. He found it essential to be knowledgeable in “exercise physiology, and sciences of knowing how the body works, the study of the body.” Coach Boyd believed that practical knowledge and field experience are more important for working in this field than certifications. According to his belief, certifications can be obtained and certain

aspects of the field can be learned while gaining experience, but practical knowledge evolves with practice and is continuously extendable.

The practical knowledge sometimes overcomes some of those other things, they can learn on the go some of the other things that they aren't strong in, some of the fields... You can always get the certification, if you pay the money and do a little more research. But the knowledge of on the floor experiences, that's something you have to put time in... Those are important hours.

In addition to being experienced in coaching strength and conditioning, according to Coach Boyd, other areas should be learned. Becoming acquainted with the facility and learning gym management strategies, as well as improving basic computer skills in order to design workouts are all things that can be learned through experience. Athletic experience, on the other hand, is something very beneficial and valuable for someone willing to be a strength coach. Coach Boyd did not believe that possessing athletic experience is always a requirement for strength coaches, but it certainly is a benefit.

Being an athlete or having been an athlete, means having a little better knowledge and understanding of what that person is going through... It's a benefit being an athlete or former athlete to transferring some of that knowledge to what we're trying to teach our athletes... Having done a lot of techniques, lifts and strength drills, going through a lot of those things can help you as a coach.

One major advantage of being a former athlete and having experience in practicing strength and conditioning is the acquired skills of complex techniques, some of those that are essential in the implementation of a strength and conditioning program. Olympic lifts, for instance, are considered probably the most difficult techniques to properly execute, and therefore are quite difficult to teach as well. However, these techniques are uniquely valuable in improving athletes' strength and power.

An important area is understanding of how to do Olympic lifts or techniques, and having people to actually know how to teach them and work with them... We're not trying to make Olympic lifters, but we're trying to teach the movement to the best of our ability.

Evaluation of strength and conditioning coaches' work

According to Coach Boyd, it is an important aspect for all coaches working in the field of strength and conditioning to know how to evaluate their program and how to evaluate their own work. There are several testing methods and procedures that can be used to evaluate the athletes' physical performance and highlight their improvement in strength and conditioning. However, as was discussed earlier, strength and conditioning plays a secondary role in the preparation of athletes for the given sport, thus strength and conditioning testing does not always provide a true evaluation, either for the athletes or for the coach. It is the athletes' sport improvement that plays a crucial role. Rightly or not, strength and conditioning coaches are often evaluated by the sport and competition performance of the athletes.

If you see performance improving on the field or on the court, if they are improving there, then I think you're successful... Wins and losses being what you're judged by. Obviously, if your team is winning a lot, you know the training program is going well, the coaches are doing a good job, everything is good... When you're not winning, then you can look at why you're not winning.

Coach Boyd expressed his belief that strength and conditioning became a big business. Huge money is invested into athletic programs, and strength and conditioning tends to take a larger part of these programs. On the other hand, parallel with the investments, the expectations are high as well. Coach Boyd acknowledged that there is some pressure put on the strength and conditioning coaches, "to make the athletes better, and if they don't, usually they get removed." The constant demand for making the athletes better, requires the strength coach to follow the development of the field and keep up with the current trends. According to Coach Boyd, the field of strength and conditioning became much more scientific than it was before, as the number of research

studies greatly increased examining athletic performance. Strength coaches need to look at new studies and strive to improve professionally. However, Coach Boyd noted that the field went too much into the direction of science, which might hinder the true development of athletes.

Sometimes it gets too much, trying to be so scientific, and they forget the basis of what we're trying to do, to make the athlete better and working hard. Some people have lost the focus of getting just working hard.

According to Coach Boyd's belief, strength and conditioning is still the field that requires hard work, which is the only way to achieve athletic improvement. Although the field became more scientific, the basics have not changed significantly. Becoming better performance-wise is still the matter of hard work in the weight room and other related areas. By Coach Boyd's standpoint, strength coaches should adhere to this perspective and look for further improvement of making their programs better. Interaction of strength coaches, learning from each other is important in order to improve professionally. As he indicated, "coaches do the same things, it's just a little different approach of how people apply it; strength coaching is a lot of borrowing ideas from people and using them to help your athletes." Searching constantly for their professional improvement requires strength coaches to give true determination to their work. Without the right attitude, without the motivation and determination of giving their best as a coach, achieving higher levels of coaching performance is not attainable. Coach Boyd showed a good working attitude and enjoyment in his work that assisted him in professional improvement. In his case, the job took devotion in providing the athletes with the opportunity for hard work and growth.

Every time I wake up I just say: "I enjoy going to work, I enjoy working with the athletes"... You come into that last group that comes in, and you want to be a little tired and fatigued, but you know that group deserves as much effort as I gave

to the 6 o'clock group. So, you say: "I'm going to do it, I'm going to push them, and I'm going to make them work better".

Coach Boyd repeatedly articulated his belief that determination is needed for this job, for different reasons. First, as the coach shows determination for the job, athletes notice and appreciate that and it eventually might motivate them to work harder. Also, as coaching strength and conditioning requires tremendous amount of preparation, adjustment, and work on the floor, it is not possible to produce a high quality work with a bad attitude or inappropriate approach.

If you have any sense of pride in yourself and in what you're doing, and if you want the athletes actually achieve something, then I think you just have to make them do something good, and that's a lot of preparation, planning, changing workouts, and continually trying to get better as a coach. That's how you can make them better athletes.

Coach Boyd, by doing his job with a positive attitude, putting a great effort in his work, fulfilling carefully his coaching duty, and generally striving for professional improvement achieved confidence in his work. He seemed to be open for new ideas, not afraid of critics, thus he did not mind letting other people observe his sessions and evaluate his work. He knew that he gave the best he could and that he was prepared to do what his job required him to do.

I'm confident in what we do and how we approach things... I encourage people to see what we're doing, and if people ever have questions about our program, I encourage them to come down and look... They'll see how hard people are really working... I'm 14-15 years into the business, I'm hired to do this job, and as long as they're comfortable with the program, I'm directing it.

Facility and Equipment

Structuring the facility

Creating a facility, designing it specifically to achieve the goals of a given strength and conditioning program, continuously improving it, purchasing new

equipment and accessory devices, as well as maintaining and cleaning the facility, are all among the responsibilities of the head strength and conditioning coach, with the possible involvement of the staff. Head strength coaches have their own individual beliefs and perspectives of how a facility should look, what kind of equipment is essential for a successful program, and the way in which the equipment should be arranged in the facility. Most often, head strength coaches have the privilege of making changes with the facility, by building, restructuring or modifying those, as they are responsible for the budget. Coach Boyd had experience of filling positions as a head coach and entering athletic programs with a differently equipped facility. In most cases, he had to take action in reconstructing or renewing the given facility. In doing so, Coach Boyd established and greatly developed his knowledge of facility design and equipment needs.

I've been in places where I came in and most things were bad or I didn't like, so we got all new things. Also, a place that was built from scratch, that was non-existent, we built it from the ground up, and did everything. And another place, where I came in and it was nice, but it also was a little outdated, needed to be updated, so some things have stayed the same, but a lot of things have changed.

In most cases, institutions have the facility already structured and equipped, and the newly hired strength coach might make changes with it. Athletic directors usually provide freedom to the head strength and conditioning coaches in updating or restructuring the facility, however they must consider budget limitations. Most strength coaches make changes to the facility, according to their professional perspectives and preferences. Coach Boyd indicated that he also had certain preferred beliefs of equipment that he needed for his program, as usually a head strength coach considers things that "he likes, or thinks that will be the difference maker for him." Therefore, the structure and the outlook of a facility might change greatly as head strength coaches directing the facility

change. Coach Boyd appeared to have a comprehension of reasons, why it is important that a facility is continuously improved and the equipment updated. First, the safety of the athletes is mostly considered important in strength and conditioning programs. Old, worn, outdated equipment could mean higher risk of injuries, and an accident might be harmful even for the athletes' careers. Another reason why facilities need to be kept new and constantly outdated is their attractiveness for recruiting purposes.

Recruiting in college athletics is a huge business, and you need to keep up with everybody else out there, to make sure you have the best facility. So when people walk in, they can see that, and say "hey that's a great facility, I'd like to come here".

Coach Boyd knew that the facility at University of Oconee had to express his professional beliefs, had to be structured to reflect the goals of the set strength and conditioning program, and also had to look new and updated for attractiveness purposes. When he entered the program, he knew that the weight room had to be an ideal environment for working and training. He strove to make the facility "a better place for us (the coaches) and more importantly for the athletes." It was not only the matter of having new equipment in the weight room, but having the right equipment, in the right number, to fit the needs of the program and the number of athletes in the program. Coach Boyd also had to have a great deal of knowledge of the various equipment, machines and training devices, knowing what kind to buy, where to buy, and how to select the ones best fitting the program. This requires knowledge of how an ideal strength and conditioning facility should look, and what actions must be taken to structure, modify and improve the facility to create a great workout environment. Achieving this, he meticulously made changes, not sparing time and effort to further improve the room.

Well, this room improvement, we got this changed a lot since we've been here, getting new machines, a new age of things you know. Making the place a better atmosphere... Old and outdated equipment, we replaced with new equipment... Several of the machines that we wanted for the development of our athletes, some jumping apparatus pieces that we needed, we added to the program, and also updated treadmills... Medicine balls were ordered, jump ropes, agility cones and ladders and all these other speed devices that we added to the program, I mean many small things.

When structuring the facility, training equipment was not the only issue that Coach Boyd had to deal with. Creating a good working environment for the coaches was also essential from Coach Boyd's viewpoint. If the coaches have a better environment in which to work, their working attitude may increase, which eventually could improve the program for the athletes. Creating the appropriate size and number of offices, therefore was also important. He had to think about the proper view of the entire facility, locating the offices to the right place of the room, from where he can oversee the majority of the facility. Equipping the offices was an additional concern that Coach Boyd had to care about. With the improvement of the field, computers became more and more necessary and useful as supporting devices to the strength and conditioning programs. As the facility was lacking computer technology, it was Coach Boyd's task to fill this gap. Other, various things also had to be included on the long list of changes.

We had to improve the coaches' work area... I feel like, giving these coaches a better attitude, they will go out and work a little bit harder... Also another area that we really lacked in was just doing computer work, the computer system was real bad, so we updated all the computers, TVs with VCRs, for viewing tapes of the athletes and for viewing tapes with athletes. Fax machines, and refrigerator to keep cool drinks and things like that, microwave for heating some food for the coaching staff.

When examining Coach Boyd's point of view about facility improvement, it was revealed that he considered this issue as a never-ending story. Coach Boyd was still not perfectly satisfied with the current facility, even though it was one of the best in the field.

He believed that generally there were things that he as a strength coach could wish for. He knew about other facilities that had something that was better for the strength and conditioning program. The size of the room, for instance, seemed that would never be satisfactory for Coach Boyd, as the more athletes in the athletic program, the larger room they needed.

You know, you can probably use more room, have a little bigger area for agility drills and have a track area put in where we can do some running with inside the weight room. I know some schools do have all these.

Knowing “the flow of the room”

Knowing the facility is vital for a strength coach to plan appropriately and to carry out strength and conditioning training sessions effectively. Coach Boyd demonstrated a great deal of knowledge of the facility that he worked in, with all the equipment included. Knowing the facility, knowing what kind of equipment is available, and knowing the location of all the equipment is essential when planning a training session. Especially, when the training session is planned to be carried out fast-paced and with smooth transitions, the strength coach must know how the athletes need to move from station to station, what exercises might be incorporated, according to the availability of equipment. Coach Boyd showed repeatedly that he knew the facility well, thus he was able to work with large groups, with the given number of equipment, and make the sessions fluent and continuous. Coach Boyd was able to carry out all training sessions continuous and fast-paced, which were deliberately designed that way.

You have to know the facility. I could go into a place, look at it and be able to make a workout there in ten minutes if I see what the flow of the room is... I know the flow of this room, I created the flow of this room myself. I changed it since I've been here, I've changed everything to where I want things to be, so I know when I put things to certain areas that we can go from one to the other.

By this statement, Coach Boyd explained that he not only knew what the flow of the room was, but that it was previously visualized and the facility was deliberately structured, according to his original ideas of how the flow of the room should be created. Supposedly, Coach Boyd possessed a thorough knowledge of facility management before entering this institution, and he had firmly established ideas about the ideal structure of a facility for carrying out a strength and conditioning program effectively.

Knowledge of equipment

During the observed training sessions, Coach Boyd demonstrated an apparent knowledge of every piece of equipment. The room was thoroughly equipped with various devices, from cardio equipment to resistance training machines, to Olympic platforms and a range of free weight apparatuses. Operating the cardio machines requires knowledge not only of the purpose of the exercise, but the right adjustment of speed or intensity, inclination and resistance. Some resistance training equipment in Coach Boyd's gym cannot be found in most regularly equipped weight rooms, as these were specifically purchased to meet the goal of the training program. Along with all the other machines, Coach Boyd exactly knew how these machines worked, what muscle groups they trained, and for what movements and in what sports the exercises performed on these machines could be useful. Moreover, he knew what alternative exercises could be performed on these machines, different from what the machine was originally designed. Hence, Coach Boyd applied various modifications, using machines in unorthodox ways, performing seemingly impractical movements. But when the movements were actually analyzed, one can see the purpose of how those fit in the preparation of athletes.

Knowing the functioning of all this equipment (cardio equipment and resistance training devices) presupposes that Coach Boyd had experience of using this equipment, thus understands its functioning well. A good example of his knowledge of the resistance training machines is a training session, when athletes were working out in a circuit format, high intensity, very fast pace. Athletes were switching each other on the machines, moving frequently from one to the other, and Coach Boyd was persistently moving around, observing, supervising. One athlete had a problem with a machine for leg extensions. This particular machine had two adjustments, one at the legs and one at the back. If these are not adjusted properly, the trainee might feel pain in the knee joints, as extra pressure is placed on them. The athlete did not know what to do, so Coach Boyd stepped to the machine and made the right adjustments in a split second. He did not have time to figure out how the machine worked as far as the adjustments, or to figure out what adjustment might have been the best for that athlete. He had to act quickly, and his knowledge and experience of using the given machine made it possible for him to take action swiftly.

Another time when Coach Boyd's knowledge of equipment was determinant was the situation of necessary exercise modification. Taking place because of injuries of athletes or because of gym management issues, many times originally planned exercises had to be replaced with other alternatives. Here, Coach Boyd had to make decisions, based partly on his knowledge of equipment, whether the alternative exercise would provide similar results as the originally planned ones or something different. Some athletes might, for instance, complain about a certain exercises, as those hurt while performed. Coach Boyd found alternative exercises that targeted the same muscle group,

was similarly effective for the objective of the training, and did not hurt. Knowledge of a variety of exercises and knowledge of a variety of equipment was required to do that.

Maintaining and cleaning a facility with all the equipment is also the strength and conditioning coaches' responsibility. As a facility is in constant use, equipment becomes dirty or unattractive for use. Coach Boyd was aware of that the attractiveness of the room could only be maintained with constant cleaning. Furthermore, frequent check and repair was needed for most of the machines, to ensure both the proper functioning and to insure the safety of the athletes. Numerous situations occurred during the research observations, when Coach Boyd warned an athlete to use the equipment properly, worrying about the quality of the equipment. Coach Boyd knew that purchasing new equipment did not happen frequently, so maintaining the quality of the existing equipment was essential.

Exercises and Techniques

A major part of Coach Boyd's practical knowledge focuses on knowing a variety of exercises and strength and conditioning techniques. Coach Boyd's repertoire of exercises appeared amazingly broad. More importantly, the number of exercises that he applied in his training sessions was exceptionally high. During the observed training sessions, surprisingly, there were often new or different exercises applied, two workout sessions seldom looked the same. Coach Boyd has an insatiable desire to learn new exercises and to apply those in practice. Although numerous exercises were used in the program, they were not applied just for the sake of variety, all of them were selected purposefully. Coach Boyd knew that not all exercises were equally beneficial in the program and were not necessarily useful, especially if applied in the wrong phase of the preparation. When selecting the most appropriate exercises for the given training session,

Coach Boyd took into consideration the goal of the overall program, the goal of the particular workout session, and the given sport. His hypothesis of sport specificity was determinant at this point. Other, not particularly sport-specific exercises might also have been used in the program occasionally, but these were considered as secondary or supplemental exercises, and applied mainly on light training-intensity days.

We don't just do (exercises) for the sake of doing it. We're doing them for a purpose. We're really looking at that purpose (of the program) and trying to accomplish it... Selecting the specific exercises, I'm looking for certain types of activities... We're trying to be sport-specific and making that person a better athlete for that sport. So we're looking at exercises that will help to improve them for that sport.

When a strength and conditioning program comes to the point of applying exercises, the coach's knowledge and ability to teach the correct techniques is crucial. Coach Boyd had a great deal of knowledge of teaching exercises. He made a distinction between exercises, as he theorized that teaching machine exercises might be a bit easier than teaching free-weight strength exercises. He rationalized that machines are easier both to teach and to learn, because most newly-designed weight training machines are structured to ensure the trainee's safety and make the execution uncomplicated. On the other hand, he considered machines less beneficial in the sport-specific athletic preparation. Building on the basic principles of kinesiology, Coach Boyd knew that when sports are played in real-life context, everything moves in "free space", therefore, strength and conditioning must mimic this spatial movement, which can be better achieved with free-weights. Generally, free-weight exercises mostly represent the highest level of difficulty, even though some are easier than others, depending on the complexity of the movement. Coach Boyd knew that being sport-specific requires more free-weight based exercises, among them a number of complex movements. Teaching these to

athletes with no former experience in strength and conditioning was often quite challenging for him. He must have had a thorough practical knowledge of how to teach these movements for the athletes, ensuring both safety and physical development.

It's easier to teach the machines than to teach free-weight movement... A machine, it's pretty much fixed the way the movement is going to happen... Everything in free space is moving, that's where the teaching comes, to know how to teach the right positions, to make sure the athlete can get it.

When it comes to teaching the most complex movements, Coach Boyd appeared to apply gradation in the process. He first evaluated the athletes, carefully observing them executing simple and later more complex movements. In the first stage of learning a complex free weight exercise, athletes used very low loads, sometimes only the bar or a small dumbbell. Once the movement was properly acquired, the load would be gradually increased, over a longer period of time. The various Olympic weightlifting exercises constituted the most complex group of movements in Coach Boyd's strength and conditioning program. Ironically, probably due to their complexity, Coach Boyd considered these the most important pieces of the entire program. Olympic lifts were often used in his strength and conditioning program to improve strength and power of athletes, making the athletes more dynamic and explosive. It is generally believed that Olympic lifts improve the athlete's power, which is easily transferable to most sports. Coach Boyd called it by a biomechanical term as the principle of "triple extension." In consideration the necessary amount of practice to acquire the proper Olympic weightlifting forms, Coach Boyd's goal was to achieve improvement in athletes' sport-specific power, and not necessarily to improve in the given lift beyond their needs.

Olympic lifts to me are just the explosion, the coming off the floor powerfully, and transferring that to the field or the court... Triple extension, it extends from the ankle to the knee and to the hip. When those three areas extend to a full

amount on the floor, that's a very similar movement to what we're dealing with in a lot of sport movements... To make the athlete more explosive, more powerful, you can incorporate a lot of that into the Olympic lifts... We're not trying to make Olympic lifters, but we're trying to teach the movement to the best of our ability.

Coach Boyd's strength and conditioning exercise repertoire was not limited to strength training exercises and techniques. He had a broad collection of exercises in numerous other related areas that he touched upon in his well-planned and well-rounded program. Areas such as cardiovascular endurance training, plyometric training, improving speed, agility, and balance are just a few examples. Improvement of flexibility seemed to take a major role in his overall training goal, which necessitated that Coach Boyd possessed a variety of stretching and flexibility improving exercises, with the prerequisite knowledge of correcting those techniques. Stretching exercises were used in the program for injury prevention and treatment purposes, so Coach Boyd had to know the most appropriate stretching exercises on the given muscle groups, in order to meet the sport-specific training goals.

The desire of searching for new ideas led Coach Boyd to establish a wide repertoire of exercises on all these different areas. Expanding his collection of exercises was important for Coach Boyd all throughout his professional career, as he frequently looked for new ideas and conceptions that he had not yet tried. He frequently applied new exercises in his strength program. Some of these new exercises were Coach Boyd's own creations, which were generally tested before applied in training. Coach Boyd not only coached others but also actively worked out on a regular basis. During his workouts, he tried all the new exercises, thus tested them before the application in the training program. Moreover, he often tried out complete training sessions, just to see how intensive they were, and to have an idea what the athletes would go through physically.

An obvious benefit of his practical experience in working out became important in times when originally planned sets of exercises needed to be replaced with others. Whether it was because of gym management constraints, or some athletes being injured, Coach Boyd often had to devise exercises on the scene, which would fit in the program needs. One example for this was a situation when an athlete complained to him while performing a free-weight biceps exercise. Coach Boyd quickly made a decision and put the athlete on a machine to perform a similar movement. His knowledge of the machine was significant here, but more importantly, his experience of performing that exercise weighed heavily, as he was able to adjust the correct seat height and the right weight for that athlete, before the athlete would have already tried it. Apparently, he needed to know the given athlete as well, knowing his abilities, thus accurately guessing the necessary load for that exercise. But even more than that, his knowledge of the exercises made it possible for him to help that athlete and give him this alternative exercise that he could perform without any difficulties.

Injuries

Preventing injuries

Injuries are obviously part of the game of any sport, so we try to reduce the occurrence of injury on the field or on the court by performing in here, getting them in better condition and making them stronger.

Coach Boyd's own words greatly expressed the importance of injury prevention and treatment in carrying out strength and conditioning programs. Injuries occur more or less frequently, depending on the nature of the given sport, the preparation of the involved athletes, and the level of the competition. Some sports, for example football, produce more frequent injuries than do others. In the process of athlete preparation,

according to Coach Boyd, strength and conditioning coaches must learn ways to prevent injuries, and once injuries already happened, actions to take to treat those injuries for faster recovery. In addition, strength coaches must take actions to reduce the likelihood of injuries that happen during the strength and conditioning sessions.

According to Coach Boyd's belief, flexibility, the range of motion of the joints, must be enhanced for injury prevention purposes. In Coach Boyd's training program with football players, extra attention was paid to stretching tight hamstrings, hip flexors and knee extensors. Stretching was incorporated in all the weight room training sessions, both as part of the warm-up and as part of the cool-down. Often Coach Boyd assisted the athletes with stretching, staying in the weight room after training sessions with those athletes who crucially needed to improve their flexibility. Supervising and assisting athletes with stretching exercises required Coach Boyd to possess a thorough knowledge of human anatomy, physiology, and kinesiology. As Coach Boyd put it, he needed to know "how the body works." One day for instance, Coach Boyd shared stories of injuries that he had seen in the weight room during his career. Giving details of these injuries, Coach Boyd demonstrated an apparent knowledge of human bones, joints, ligaments, and tendons, the functioning of those, how those were injured, and how injuries could be prevented.

Coach Boyd took several different actions in the weight room to prevent injuries. He believed that safety should be among the most important aspects of the training. He strove to provide a harmless environment for the athletes to workout in and ensured correct techniques and safe forms. This presupposes that he deliberately and systematically trained the athletes throughout many years to perform with safe forms. As

too high training intensity might also be harmful, Coach Boyd paid attention to “controlling the tempo” of the training sessions as well.

But occasionally things may happen. If you see them getting off technique-wise, or we see them holding something, it doesn't look right or doesn't feel right, or move tight, we pull them back, we try to get them back. We're testing it and if they don't look right, we say “hey, back up, let's not do that”.

As indicated, prevention of injuries started early in the process. It extended from teaching all athletes the correct form of exercises in the very beginning when they entered the program, to the actual training sessions, when techniques and forms were checked. Also, according to Coach Boyd's conception, injury prevention must be part of the planning. The different phases of the season were designed in a way that athletes did not get over or under-trained for the demanded type of workout intensity. Workout sessions needed to be structured rationally and proper form of exercises were required from the athletes.

So there's always ways you can prevent that, but the main thing is being real smart in your whole process of the year and making sure, you just watch everybody, and hope. You always hope, anytime these guys are lifting heavy, you always hope that you're not getting anybody hurt, you don't want that to happen. You try to train them right, so those things won't happen.

Injury treatment

Although actions were taken in Coach Boyd's program to prevent the occurrence of injuries, occasionally those still did happen. Injuries might happen on the field or on the court, while practicing the given sport, or might happen in the weight room, while in a strength and conditioning session. During most strength and conditioning training sessions, an athletic trainer was present, observing the sessions, taking action immediately on the scene in case of accidents. Coach Boyd knew that it was his responsibility to provide the athletes with a safe training program, and that he was

accountable for the occurrence of injuries. Head coaches of a given sport expected to see athletes' physical improvement as a result of the strength and conditioning sessions, but did not tolerate injuries obtained in the weight room. Coach Boyd knew that there might be serious consequences of such incidents.

In a weight room when you get an athlete hurt, it could hurt you more than just mentally, because the coach could go after you pretty hard. Obviously if it's a good player, then you're hurt, because the head coach counts on that player.

Occasionally there were mild injuries occurring in the weight room. Muscle pulls, strains, minor bruises from performing with high intensity and lifting heavy weights may often happen. At that point, strength coaches must focus their knowledge to treat those injuries appropriately and to speed up the recovery process. Most injuries were assessed by athletic trainers, as they worked in conjunction with Coach Boyd's staff. Athletic trainers gave recommendations for treatment and provided strength coaches with a list of exercises that should be avoided. Coach Boyd modified his training program accordingly. He frequently had discussions with the athletes regarding their injuries, and he wanted constant updates from them about their recovery. In most cases, Coach Boyd strove to involve the injured athlete in the training, either by letting the athlete use lighter weight or by giving the athlete exercises that they felt more comfortable performing. Often, the number of injured athletes was taken into consideration in carrying out the training sessions, assistant coaches might have been responsible for working with a smaller group of injured athletes, while Coach Boyd worked with the rest of the group.

Overtraining

Overtraining does not belong to the group of injuries, but it is similar to injuries in the sense that they both result in diminished athletic performance. Overtraining occurs

due to inappropriate training intensity, volume or duration. It can be prevented with careful planning and by knowing the individual athlete's tolerance level. When overtraining takes place, athletes can't perform at the normal level, they become exhausted easier, and their attitude toward training worsens as their inspiration to work out diminishes. Overtraining is something that most strength coaches experience during their coaching career, and Coach Boyd had also seen signs of overtraining on his athletes before. He acknowledged that he "noticed the athletes really fatiguing", and concluded that he pushed the athletes "to the point where they just did this too much."

According to Coach Boyd, prevention of overtraining must be heavily considered when strength and conditioning professionals design training programs for athletes. This requires a basic knowledge of training principles and periodization, knowing how to apply subsequent training sessions varying in intensity. Coach Boyd expressed a belief that prevention of overtraining also requires knowledge of athletes. Here, he had to know the normal performance level of all the athletes, and the amount of training stress that the athletes can optimally tolerate. Furthermore, knowing the goal of the program and ways for program adjustment was also essential in the prevention of overtraining athletes.

For preventing overtraining, you just have to be smart with that stuff. There are all kinds of knowledge factors, for instance knowing your athletes, knowing what you're trying to accomplish, and most importantly knowing how to back off. You should not be afraid to back off.

According to Coach Boyd, once overtraining affects an athlete, the strength coach must act quickly to prevent further reduction of athletic performance. To make the necessary modifications as early as possible, it is vital for the strength coach to be able to recognize the signs of overtraining and realize that overtraining is taking place. Coach Boyd believed that "overtraining can be corrected pretty quickly, if the strength coach

knows the signs, knows how they look and is able to recognize them.” Indeed, Coach Boyd frequently checked his athletes’ condition, asked them about their health, and made changes when he considered necessary.

Knowing the Athletes

Coach-athlete relationship

In achieving improved athletic performance, the relationship of athletes and coaches is a crucial element. Coach Boyd found it very important to have a well-established and good relationship between himself and the athletes. He believed that he successfully established an open, friendly, but still strict coach-athlete relationship with his athletes, which helped to create a relaxed atmosphere in the weight room, and was ideal for hard work. According to Coach Boyd’s viewpoint, it was important to be friendly with the athletes, however, he intentionally did not cross the line of “being too friendly with any athletes,” thus he managed that his relationship with his athletes remained professional. During the observed training sessions, Coach Boyd acted naturally in working with the athletes; he was the leader in the gym, but still was approachable. Athletes often joked with him, he responded well, especially during the more relaxed sessions. Occasionally on the other hand, when the emphasis was on hard work, Coach Boyd did not tolerate any deviations from giving full effort. Here, he made it clear that maximum performance was required, and due to the respect that he gained from the athletes, his authority was rarely questioned.

Treating all athletes equally in the weight room was among Coach Boyd’s top priorities. He believed that a true professional should not forget about or ignore certain athletes during training sessions, simply because they are not as talented or as important

individuals on the team as others. Making sure that all athletes received motivation for improvement to the same extent was an important pedagogical issue for Coach Boyd. Moreover, he wanted to keep his good reputation and the fame of his gym, as any athletes could go to other places and talk about experiences gained in Coach Boyd's sessions.

I treat everyone who comes in here fair, I work with everyone, I try to give everyone a good time... I want to make sure everyone gets some perfect time when come in here. Because these athletes represent our room, and when they leave, I wanna make sure they can be proud of where they came from, and know that they got pushed and they worked real hard in our program.

Coach Boyd knew that not all the athletes were equally receptive to his fair and equal treatment. Although receiving motivation and encouragement from Coach Boyd equally, certain athletes were not willing to give effort and strive for improvement. This was a crucial element for Coach Boyd in somewhat differentiating among athletes, or at least, maybe subconsciously, favoring certain individuals over others. According to him, "everyone who walks in this room is going to get treated fairly and get pushed the same way, but how they push themselves, that will make the difference." Motivation, encouraging the athletes for better performance, as Coach Boyd elucidated, was part of his job. He believed that motivation was becoming increasingly a greater part of his job, as athletes of the new generation needed more motivation and push from behind than athletes in earlier years. When athletes did not perform up to the expectations, or did not have the right attitude for work, Coach Boyd knew that it was necessary to step in and use some type of pedagogical tools for motivation. Among Coach Boyd's expectations from the athletes, the heaviest emphasis was placed on hard work and full effort. Coach Boyd was fully convinced that the strength and conditioning program that he set up for the athletes was effective and all athletes could achieve athletic improvement, if they

listened to his instructions and were willing to give effort. Mostly, those athletes who cooperated were the ones who enjoyed the workouts, and according to Coach Boyd, they would be the ones eventually seeing improvement.

When they come in, they work real hard for us, at the same time they can enjoy themselves a little bit... It's a simple process of coming in here and just to listen to everything we say, working hard and giving a total effort every time. If they do that, I think they'll be happy with what they see as results.

Coach Boyd knew that not all athletes belonged to this category, and not all athletes had the will for hard work. Coach Boyd was not only assured that these athletes, due to their work ethic, lost the chance to show appropriate improvement, but he felt that these athletes refused his assistance in becoming a better athlete. This attitude from an athlete made Coach Boyd gradually give less respect to that person and eventually lose confidence. This apparently hurt the good relation between coach and athlete.

Probably the one thing that doesn't make you like them is probably work habits. When they come in and not work as hard, or push themselves as hard on a constant basis... People who continually don't want to work, or try to skip training, to me, that's just not a good thing, because you're basically going against someone who's just trying to help you... What they're saying to me is that they just don't want to get better.

Coach Boyd treated all athletes equally in the weight room, approached everyone with the same positive attitude, and motivated them the same way. He knew, due to his experience on the field, that those athletes who were willing to cooperate and those who were not, were easily distinguishable. When working with new recruits, as Coach Boyd experienced it, the hardest workers and the least hard workers stood out of the group the most quickly. He most of the times tried to push the least hard workers repeatedly, he knew that this working attitude may change as progress was being made. He already had success with athletes who initially had poor working attitudes but later turned around,

made improvement and became successful in their athletic career. However, if an athlete repeatedly rebuffed Coach Boyd's help, he lost confidence in the athlete, and simply turned to others who were better subjects for professional cooperation.

That type of attitude, "I don't care about working out", those people usually stand out. So you work with them and if they continue not to accept that you push them, that sometimes makes you not respect that person as much as you would someone, who comes in and does everything and works hard. So you move onto the next person who's going to be willing to be pushed... There's a lot of guys that come and push themselves to the point of exhaustion, because they wanna get better.

Fortunately for Coach Boyd, most athletes with whom he had been working at the University of Oconee belonged to the "hard worker" group. Experiencing working with less cooperative athletes in the past made Coach Boyd appreciate working with his athletes even more. As he phrased it, "here, everybody is pretty good people, they're all decent individuals." Achieving success in cooperating with athletes, according to Coach Boyd, did not come automatically. He had to work for that, as he had to strategically create a setting where athletes brought the right attitude into the gym. Establishing and reinforcing rules was essential for Coach Boyd, in order to have the right milieu in the weight room. Failure to give a good effort during the sessions was not tolerated. Various things, such as tardy or missing sessions, were punished severely. Most athletes had the right comprehension that hard work in the gym was for their own athletic performance, but often Coach Boyd had to enforce rules and guidelines to remind the athletes of the purpose of being in the weight room. Punishment was something with which athletes had to contend, if they did not perform as expected.

They know that if they are not on time or they miss unexcused, than there will be a punishment and will be pretty severe... We don't have any people miss ever, and if they do, they get punished hard and never miss again, because the punishment fits.

Working with athletes who had the right attitude for hard work, made the atmosphere better and the program more enjoyable for both coach and athlete. Coach Boyd's goal was to make the athlete know that they worked out for their own benefit, for their own development, and ultimately for the team's success. He also wanted them to know that rules were only enforcement procedures ensuring serious work, and Coach Boyd was there to help them to enhance their athletic achievements. Once athletes understood and accepted these concepts, workout became no longer a duty, but an enjoyment. Parallel to that, Coach Boyd ceased to be a mean coach, and became a person whom they liked and trusted.

I think it's come to the point where they know they come in here to get better and they know we're pushing them everyday to get better, so when they come in here, I think they enjoy, because I think they know they are going to get results from their workouts... For the most part, I think people like coming down here, and I think they like my personality and how I deal with them... I think for the most part they like me.

Coach Boyd presumed that he successfully made all athletes cooperative not only with the aforementioned rule setting, but also with earning athletes' respect. He showed tremendous determination to do his job, and athletes greatly respected that. Coach Boyd went well beyond the point of simply doing his duty. He was truly determined to make the athletes better performance-wise, and he worked hard for them. He knew that it was vital that he knew the athletes personally, thus he could work for their individual development. He deliberately took action to get to know his athletes, spending time with them on a regular basis, and interacting with them as often as he could. Coach Boyd used the time before and after training sessions and on off-days as well to meet athletes and talk to them, even if only for a few minutes. He knew that the more time he spent among them, the more accurate the picture he obtained about every one of them, consequently

the better training program he could design. With this, Coach Boyd showed not only determination for the job, but a caring type of attitude toward the athletes. Athletes, as they recognized Coach Boyd's attitude, responded positively and showed respect to Coach Boyd, which as aforementioned was another contributor factor to hard work. A good example of Coach Boyd's determination was the fact that he went to most games and cheered for the team, advocating the "we all win or we all loose" attitude. Caring so much about the athletes helped Coach Boyd to develop a relationship with some athletes that went beyond the formal "coach-athlete" relationship. It often got emotionally charged.

I think you get somewhere attached to people, cause you're working with them so closely, and for so many years, you obviously will get some kind of bond with them... You feel some kind of emotions.

Getting to know the athletes

As previously discussed, it was imperative for Coach Boyd to know the athletes individually, for more effective and more individual-specific training purposes. When getting to know them, it was more important for Coach Boyd to obtain information about their athletic and strength and conditioning experience, rather than about their personality or other attributes.

I think you need to know what kind of person are you dealing with... It's nice to have a little bit of an idea of who they are, who has the experience, who doesn't have the experience in working out.

Coach Boyd's practice to get to know each athlete was strategically planned and deliberately achieved over a long period. Coach Boyd admitted that it usually took several semesters for him to feel confident about knowing a certain individual. At the beginning of the process, when new recruits entered the program, Coach Boyd's task was

to get as much information about them as possible, especially regarding their training experiences. The majority of information came from the sport head coach, who was primarily responsible for the recruitment of athletes. Coach Boyd also obtained valuable information from the athletes themselves, as he talked to them on an individual basis at the very beginning of their collaboration. Most importantly, Coach Boyd was interested in their background, where they came from, if they had strength and conditioning experience, and if they did, what kind of experience they had. Coach Boyd was aware of the fact that the large number of athletes in the program made it nearly impossible for him to know about each athlete's life and athletic career in detail. Thus, he only wanted to obtain some background information about them, and those things in the athletes' lives that affected their workout in the weight room.

Action taken for getting to know the athletes was more intensive in the beginning of their cooperation than in later phases. The first few weeks or few months were the time-period when Coach Boyd wanted to talk to them more frequently, as well as to talk to others about them. Coach Boyd truly looked for the opportunities to interact with each athlete, but it mainly happened outside the training sessions. Short periods of time before and after training sessions were most often spent with short conversations or joking around. In addition, Coach Boyd went to all the sport specific training sessions, in this case at University of Oconee to all football trainings, where he tried to interact with the athletes on the sideline. Any other occasions when meeting athletes outside the weight room were also used for gaining information. However, Coach Boyd kept his relationship with athletes strictly professional, and tried to stay away from relations with the athletes that are personally too close.

I like to know things happening in their lives that may affect them in the weight room. I like to keep it kind of a teacher-student type of relationship, where you know some but not everything.

As previously mentioned, strength and conditioning programs, according to Coach Boyd's theory, should be sport- and individual-specific. This necessitates knowing other key characteristics of each athlete, including their level of athletic-performance, and their medical background or possible injuries. Regarding the latter, Coach Boyd obtained valuable information from the athletic trainer, who had information filed about all the athletes, concerning their injuries and medical status. Once athletes' health issues had been cleared, in order to create an individual-specific training program, Coach Boyd had to focus on getting to know them performance-wise. He achieved that with a series of testing procedures. In the very beginning of the program, Coach Boyd applied a general conditioning testing, which highlighted each athlete's strength, power, speed, endurance, and flexibility level. In the later phases of the program, testing became more sport-specific. In addition to testing athletes regarding their physical performance, Coach Boyd also intensively observed them in the early stages of the program, which gave him a good idea about the athletes' technical proficiency level, how they moved in the gym, how well they performed the various lifts, and how intensively they could train. Based on his extensive experience working with athletes, he believed those athletes with firm basics in strength training were easily distinguishable from the lesser experienced ones.

We just look at the athletes as far as their techniques, how they handle themselves in different parts of the weight room, we can tell what they need... In general, looking at someone saying this person works hard, this person doesn't, it's pretty easy to tell. It's not really hard, once you've been in for a while... If they don't have any background, we can see pretty fast just by the things that we do for start.

The athletes

Getting to know the athletes was an extensive process for Coach Boyd, but was inevitable for carrying out an effective strength and conditioning program. According to Coach Boyd, athletes could be categorized according to a variety of aspects. He rationalized that achieving success and setting up an individual-specific program, strength coaches need to know in which category the given athlete belongs. Coach Boyd used various categorization methods in practice. He knew that athletes could be differentiated according to their physiological characteristics, including body types, bodyweight, body composition, muscle type, etc. In addition to the physiological characteristics, athletes might be separated by psychological features. Motivational level or the ability to respond well for motivation, was particularly important, in order to perform well in the weight room consistently. Different types of athletes may emerge if viewed from this perspective, but for Coach Boyd, the major criterion was their ability for hard work. Coach Boyd believed that there was a certain link between an athlete being a hard worker and being a successful athlete. He theorized that success in sports requires hard work. Whether Coach Boyd was right or not, his coaching philosophy was based on preferring the consistently hard working athletes, and he truly believed that those will eventually succeed.

There are players in their sport that are real good players but maybe not the best athletes... Obviously, the person who wants to get better and works real hard, may not always be the best person in that sport, but might be the hardest working person in the sport. And obviously, they always make you feel good, because they're always just doing everything we ask. Working real hard and pushing themselves.

Apparently, Coach Boyd favored those athletes who brought the right working attitude to the weight room and were disciplined in their training. Those, who needed

constant motivational assistance, may have been less preferred. There were also athletes who pretended to work hard, but in fact, they did not make a good effort in their training. Getting to know the athletes and placing them in these categories was essential for Coach Boyd, in order to make sure the program moves in the right direction.

Some athletes are just lazy and don't wanna do a thing in the weight room, and some will come in here and do everything you ask without ever having say a word to them... Some people are trying to fool you a little bit sometimes, in a sense that they look like they're working hard and you turn your back and then they're trying to cheat you.

Knowing the athletes

Above, the need for Coach Boyd to know his athletes has been discussed. During the observed training sessions, Coach Boyd proved a number of times how well he knew his athletes. In many instances, his knowledge of athletes was critical in decision making, program adjustment, gym management and other issues.

As previously mentioned, Coach Boyd worked exclusively with the football team, the largest group in the athletic program at University of Oconee. For gym management and scheduling purposes, the large football group was divided into three or four smaller groups. Each athlete had his own schedule, with the designated training sessions and he was required to go to the gym as indicated. Coach Boyd not only knew all the athletes on the team by their names, but also knew exactly which athlete was supposed to workout in a given session. During the workout sessions, as groups were further split, Coach Boyd consistently separated the athletes according to their position and role in the team. There were two major groups separated, as the strength players, usually including the larger body size and stronger athletes, and the skill players, those whose play is based on their speed and agility on the field.

In carrying out workout sessions, Coach Boyd's decisions mostly depended on or were associated with his knowledge of his athletes. When he gave instructions, the depth to which he explained a given task depended on how much he felt that the athletes needed explanation. In many cases, exercises were only explained with a few words, for instance, "legs in and out on the bench." This sort of instruction necessitated an extensive working relation between coach and athlete, through which the coach could know what the athletes did know and what they did not. Thus, for new or less frequently practiced exercises, Coach Boyd applied a more detailed explanation, or even a combined verbal explanation and demonstration. At other times, in addition to announcing the task, Coach Boyd also gave a brief explanation about the purpose of the exercise, and clarified how that exercises could be beneficial in playing the sport. This presupposes that he knew exactly what athletes had done in the past, so he knew their level in the athletic preparation. Whether demonstrating a task or not, whether explaining a task in detail or not, it all depended on his knowledge of athletes, how much assistance he believed that the athletes needed. His confidence level determined his strategy for task presentation.

The confidence, what I feel that they need to know, or not need to know. It's really to my degree of confidence of what group is in and how far they've been in the program... So it goes age and it goes my confidence on each person.

Coach Boyd's knowledge of athletes became even more crucial when athletes were in action. Knowing about the abilities of all the athletes' made it possible for Coach Boyd to give instructions on the weights, which athletes needed use for certain lifts, or the intensity level, at which they had to perform certain tasks. This was rarely optional in Coach Boyd's training. Athletes most often did not choose the weight that they wanted to use, as it was either previously determined by Coach Boyd, according to each athlete's

earlier physical test results, or Coach Boyd determined it on the scene. When it came to testing athletes' performance, Coach Boyd knew what performance was expectable and acceptable from each individual on the team.

I know where the athletes need to be pretty much weight wise... Also physically, you can look at a person to see if they lost weight, gained weight, gotten bigger, gotten more muscular, we do body fat testing, bodyweight to see how they're changing.

Another aspect of knowing the athletes individually became important when Coach Boyd's task was to motivate his athletes. Knowing what kind of athlete the given person was and knowing the best way to motivate that person for higher performance, all originated from knowing the athlete. Here, Coach Boyd also needed to know the best instructional methods to use for the individual athlete, for instance if that person needed more explanation or demonstration. Furthermore, Coach Boyd needed to see the athletes all together as a team, knowing who were the better and the weaker athletes, and where could the team improve overall. Knowing that the coaches' success mainly depends on the team's success, and the team's success often depends on the best players' performance, Coach Boyd wanted to make sure that those "important" players receive extra attention.

Certain people that are marking your program, you know that these people are the ones you got to really watch. You have to know the ones that stand out... If it's a player that is going to be a player that we really count on with the production on the field, maybe our star player, we may wanna make sure that we stay with him a little extra, and make sure he does a little bit more.

Planning

Planning process

Planning is a significantly important part of strength coaches' work. Achieving the goals of strength and conditioning training partly depends on the precision of the plan

for the given season, unit or session. Coach Boyd placed a great deal of emphasis on this part of his responsibilities, as he knew that athletes could only improve in their sport if strength and conditioning workouts appropriately fit in the entire training process.

Rationally designing the most ideal course of the athletes' preparation for their sport took most importantly cooperation between the sport head coach, the strength coach, and other staff members involved in the process. Goals and objectives had to be stated and a well-designed schedule needed to be created. Once Coach Boyd had an idea of how the strength and conditioning sessions would fit in the process, he was able to proceed on to designing the seasonal strength and conditioning plan.

Coach Boyd believed that the full year, or the full season, was to be used as the largest unit of the plan. He did not plan further than a year, as goals and conditions could change significantly each year. It took time and devotion from Coach Boyd to think through all the aspects of the seasonal plan. He tried to involve his assistants in the planning process by designing plans together as a group, knowing that it could be a good learning experience for them, but at the same time, they might have also come up with rational suggestions. As the first step of the planning process, Coach Boyd and his assistant coaches stated the strength and conditioning related goals and objectives of the season for the athletes in the given sport, after which they designated the main units of the season, such as the off-season, pre-season, in-season, and others. This was followed by breaking down the main seasonal goals and objectives, thus determining the goals of each unit, and later creating a schedule of training sessions, depending on the role of strength and conditioning in the particular unit. Coach Boyd knew that the importance of strength and conditioning could change throughout the year, as at some points it was

heavily emphasized, while other times, such as in-season, it had only a secondary role behind the sport training. Overall, however, the sport-specific training and the strength and conditioning training mostly went hand-in-hand.

At certain points, strength training is really secondary, because the number one goal is to play the sport out on the field and we're just part of that, a smaller part, and we don't want to overshadow the work they have to do for their sport... But, as long as we're doing sport-specific stuff, then it's always do work hand-in-hand together. But just one flips over the other at times.

Once Coach Boyd and his assistant coaches rationally structured the main units of the season, they further broke those down into weekly plans, thus designating the number of workout sessions and the groups working out each week. According to the goals and objectives of the unit, anticipatory goals and objectives were determined for the weekly and daily workouts. However, Coach Boyd knew that these goals would likely change as the program proceeded. In order to designate the goals and objectives of the different units rationally, Coach Boyd needed to have a thorough knowledge of training principles and a firm idea of how sport-specific periodization had to be carried out. As he placed emphasis on different physiological characteristics in preparing the athletes for the upcoming season, Coach Boyd strove to implement a rationally periodized plan.

The off-season period, we're looking for heavier percentage and volume for the main exercises, that's the biggest time for strength gains. And then we'll cut back and emphasize more speed and conditioning work leading into the season itself... It is power and explosion entering the season... In-season, we take the volume down, maintaining strength, but our goal is to continue to work heavy, to get them stronger... So overall, maintaining strength in-season and gaining a lot of strength in off-season.

Planning the main units or cycles and breaking those down into weekly and daily workout plans required meticulous work. Coach Boyd and his assistant coaches needed to take into consideration the number of days that athletes could workout each week, and

that training intensity had to vary among workout sessions. Also, an important component to consider was that sport-specific training should have not been influenced by strength training sessions, and sufficient rest time had to be provided between workouts. Coach Boyd wanted to make sure that the athletes can perform their best in their sport training, which required careful and deliberate planning of the strength and conditioning sessions.

We want to make sure they're fresh coming out to the field. That's something you have to think about beforehand, because you can't just throw it together. I plan it to make sure we're getting our lifts, but at the same time we want to give the rest time to make sure they're ready to perform on the field.

Another aspect of planning was the issue of scheduling training sessions and creating groups. As stated earlier, Coach Boyd worked with the football team, the largest group in the athletic program at University of Oconee, including over a hundred athletes. Consequently, due to gym management issues and athletes' class schedules, he needed to create smaller workout groups. At the beginning of each semester, Coach Boyd went through each athlete's class schedule, and assigned groups to workout at different times. Organization of workouts and creation of groups had to be done in advance.

To create the overall schedule takes some time, but we're able to make it a lot more organized and know exactly when a person is supposed to be here. Also, we can look into the whole week and know exactly when everyone is supposed to be in the gym.

"There's no guess-work"

According to Coach Boyd, planning is mostly an ongoing process. He was aware that numerous things may have influenced the originally planned unit or workout. Therefore, planning a workout session in detail could not be done far in advance. When designing a detailed workout plan, Coach Boyd wanted to take into consideration all the

factors that may have affected his decisions. He knew that both previous strength and conditioning training sessions, and the previous sport training sessions might have all affected athletes' ability and performance in the upcoming sessions. Thus, Coach Boyd found it essential throughout his entire career to visit all the sport training sessions, in this case at University of Oconee the football trainings, which usually were on days between the strength and conditioning sessions. He wanted to see what happened to the athletes outside the weight room, as well as he wanted to know in advance if someone was injured. He rationalized that training plans could be better adjusted if there was enough time for considering all the influencing factors, rather than making decisions quickly on the spot. Therefore, if an athlete was injured while practicing football, Coach Boyd wanted to know about it, before the athlete came to the strength training session.

I think it's important for the strength coach to be part of the team they work with, to go out to the field and see what's going on, how hard they practice, how beat up they might be, or how tired they are, just to know where we have to be workout-wise the next day or the day after that.

Once all the factors were taken into consideration, Coach Boyd and his assistant coaches discussed the plan for the upcoming workout. Most often, each workout was discussed and thoroughly planned a few days in advance. Coaches looked at the original plan, checking the goals and objectives that were designated for that unit or week, and rationally determined the way in which that workout session could contribute to achieve those goals. They pieced together the most useful exercises for that session, created stations, determined training intensity and volume, and designated the role of each coach during the session. When determining the type of exercises to be used, the workout load, and the number of sets and repetitions, coaches took into consideration all the athlete's individual characteristics, making the workout plan as individual-specific as possible.

Furthermore, workout sessions were carefully designed considering time management issues as well. Coach Boyd knew by experience approximately how long did it take for a given number of athletes to perform certain activities. Workouts were accurately planned for an hour to an hour and a half time interval.

You know how long a typical workout takes, so you can plan a workout by having sections... That's how we break it down, we look at how we want to put those lifts in, and what we try to accomplish with those lifts... We have all the percentages and the names written down, so they know exactly what they going to lift each time they come in. So, there's no guess work, there's no thinking of how they feel, we're always trying to push them.

Testing - evaluation

As mentioned above, Coach Boyd indicated that planning was mostly ongoing, as it went through several stages. In the planning process, he had to take into consideration not only the conditions of the program, but even more importantly, the athletes' physical development. Working with percentages was a strategy that Coach Boyd used to make each workout as individual-specific as possible. In this sense, each athlete performed the designated exercises by a certain percentage of his or her own maximum performance. This necessitated that athletes' maximum performance was tested on a regular basis. Coach Boyd knew that testing had to be part of planning, thus he placed emphasis on it, in order to determine athletes' individual needs as accurately as possible.

All our major lifts are broken down by percentages of the maximum lifts of that person. So we test three times in the year, we'll be able to go after those maximum lifts and take that in the rest of the year by percentages... Testing is pretty much incorporated in the planning process.

Testing was not only beneficial to determine athletes' training level and individual needs, but it also was a way to evaluate the program. By testing, Coach Boyd knew whether the goals and objectives of the given unit had been met or not. To obtain

an accurate picture of the athletes' physical improvement, it was important for Coach Boyd to apply testing regularly and reliably. As reliability was considered imperative in testing, Coach Boyd had to clearly designate the testing procedures, making sure that assistant coaches were aware of all the details, and performed consistently. Also, testing physical performance only made sense if it was sport-related, therefore Coach Boyd often designed with alternative testing procedures, which more accurately tested athletes' sport-related physical attributes. Once consistency in testing procedures was achieved, test results could be reliably used for program evaluation.

We like to be consistent in our testing... We are looking at that sport, what the needs are and what's the eventual outcome, so we'll have different testing... For program evaluation, we look at test results from point A to point B, that's how we judge if our program is getting better.

Coach Boyd believed that a strength coach was a good planner if at the end of the planned period the test results met the previously stated goals. Certainly, achieving program goals necessitated more than just good planning, as carrying out the plan in an appropriate manner was also quite important. Regardless, Coach Boyd strove to evaluate his program on a regular basis, by applying performance tests to determine whether the program is on the right track. He theorized that constant evaluation was essential to avoid major derailments. If a program did not go as well as planned, frequent testing may have pointed that out, providing Coach Boyd opportunity to revise. On the other hand, if he would have ignored the need for frequent evaluation, his program might have easily gone beyond recovery. In addition to testing on a regular basis, Coach Boyd also evaluated each of his training sessions, in cooperation with the assistant coaches. They discussed achievements, as well as errors and shortcomings, and made adjustments accordingly for

upcoming training sessions. Similarly, periods and units were also evaluated, as they moved along the program.

If you evaluate how things are going per day, per session, you're getting a closer evaluation of what actually is happening. If I just looked once a year how our program is doing, then you're missing a whole bunch of days there that could've went bad... I think it's important to look, because some people don't look sometimes and they wait too long to evaluate what they're doing, to see if it's working or not, and usually it's too late.

Knowledge needed for effective planning

Thorough preparation and precise planning were important issues in Coach Boyd's work. He believed that the goal of strength and conditioning, as well as the goal of his program could only be achieved if each unit, each week, and each workout session was planned circumspectly. All the different influencing factors must have been taken into consideration when planning for a group of athletes. This required Coach Boyd to possess knowledge of various aspects of strength and conditioning. According to him, perhaps the most important subject-matter that a strength coach must know is the goal of the program, and ways that the given goal can be achieved in the particular environment. He further acknowledged that strength and conditioning programs need to be goal-oriented, as the coach must know where he or she wants to take the athletes. Cooperating with the sport head coach, the needs of the entire team and the needs of each individual athlete must be determined, and thus, the most viable way to achieve those goals must be invented. For this purpose, Coach Boyd frequently consulted with the coaches involved in the football program, where they expressed their opinion about each player's physical performance. Furthermore, coaches discussed improvement needs of different athletes and possible ways for development. Coach Boyd took into consideration the obtained information when planning for units or workout sessions.

According to Coach Boyd's understanding, a basic knowledge of human physiology and training principles was crucial when he was designing training plans. Knowing how the human body works and responds to stress were essential to determine the physical needs of athletes and to design a plan that fulfills those physical needs. In addition, firm knowledge of other areas, such as the facility and exercises must have been possessed, if he wanted to meet those goals of physical development. Coach Boyd knew that his experience also played a central role in the planning process. As he had planned seasons repeatedly, including hundreds of workout sessions on the go, his experience factor could help him to find the most appropriate ways to achieve improvement. Trying out a great deal of exercises, experimenting with new ideas, testing the effectiveness of certain training theories, or working with coaches who had different coaching philosophies were the strategies for Coach Boyd to gain valuable experience in planning.

There are so many components, so the planning process takes all that... Being a good planner, I think it's the overall knowledge of the program, to see what the team needs, to be more successful. To see and to be able to react, to make something happen, that is the good planner... So, your knowledge comes in the biggest factor of the field of strength and conditioning, to be able to incorporate whatever the sport head coach says and take that and come out with a workout that is pretty successful for the whole team... The basic physiology, understanding how the body adapts to those type of stresses, is something that you need to know. And you have to know the facility, knowing the room and knowing how to make the flow, that's to be able to plan with the staff... With years of experience that you put out on the table and plan what you think is going to work, you'll have knowledge where things will come a lot easier. It's from that experience that you know what things have worked for you and what things haven't worked. Sometimes it's a trial and error.

Summary

This chapter provided an overview Coach Boyd's practical knowledge that appeared to be foundational in his work. Six major concepts were analyzed in detail. First, Coach Boyd's approach and conception of the field of strength and conditioning,

the purpose of strength and conditioning training, aspects and characteristics of strength and conditioning programs, strength coaches' job responsibilities and professional readiness were discussed. In the second section, Coach Boyd's knowledge of the facility, including knowledge of structuring a facility, knowing the flow of the gym, and being familiar with all the equipment was explicated. The third part unfolded his vast knowledge of exercises and techniques, focusing on his knowledge exercise repertoire, and his knowledge of applying, teaching and correcting exercises. In the fourth section, his knowledge of injury and overtraining prevention and injury treatment was expounded. The fifth part focused on his knowledge of athletes, examining the different types of athletes and detailing his relationship with the athletes participating in the athletic program, as well as looking at actions that he took in order to know his athletes better. Finally, his notion of the planning process and his beliefs of effective planning were elucidated, by which his thorough knowledge of the principles of planning, testing procedures and program evaluation was revealed.

CHAPTER 6

APPLIED PRACTICAL KNOWLEDGE

Coach Boyd's practical knowledge can be separated into two main clusters. In the previous chapter, the foundational knowledge that Coach Boyd built upon in his work was detailed. This chapter will discuss Coach Boyd's knowledge that was applied when active coaching took place. This knowledge cluster includes Coach Boyd's knowledge used in practice when modifying original workout plans, knowledge of supervision, knowledge of coaching pedagogical strategies, and his knowledge of professional improvement. Figure 3 provides a visual illustration of the knowledge categories and the main components included in the Applied Practical Knowledge cluster.

Modification of Plans

One day we walked outside ready to run on the field, but I forgot that there was a group of people running on our field that day and we were not able to use it. So quickly, we had to go to the stands and do a whole different running workout for that day. And I just changed our routine on the spot. I could've just put my hands on my head and say "Oh no! OK guys, that's it for the day, let's go home, forget about it"... You can always do some kind of workout, as long as you don't just give up on the situation.

"Planning is always on the go"

It was discussed in previous chapter that Coach Boyd's planning process started with the largest unit, the yearly plan, and he broke this largest unit down to smaller pieces, approaching the daily workouts step by step. Some components of the workout sessions were predetermined, but the details were elaborated, as Coach Boyd got closer to the given session. He strongly believed that this step-by-step approach was necessary,

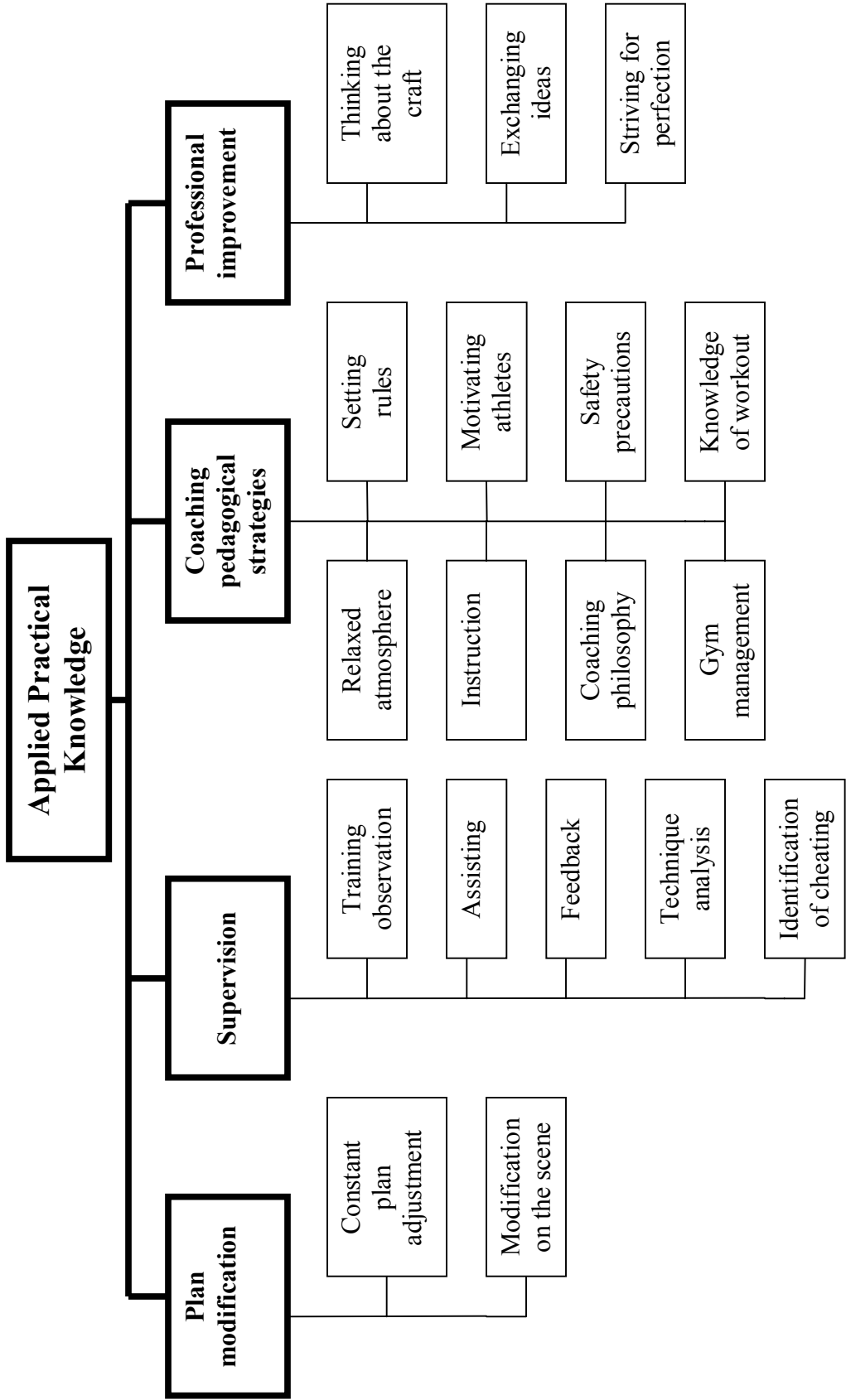


Figure 3 – Applied Practical Knowledge

because this way he could ensure considering more influencing factors, rather than planning far in advance, without knowing the occurring conditions. As conditions changed, the previously planned workout had to be modified. Coach Boyd knew that changing the original plan was not necessarily harmful; indeed, it was necessary to meet the designated goals. He found it essential to have a good idea of what he wanted to achieve in a given training session, and as long as he stayed with that goal, the training session might have been altered a lot of different ways. Often, workouts were modified on the spot, while they took place. Due to Coach Boyd's belief of evaluation, he and his assistant coaches had short conversations during the sessions, quickly discussing how they felt about the flow of the workout. If there was anything that they were not satisfied with, they could change it "on the go." Also, as Coach Boyd dealt with several groups on a daily basis, usually applying the same or similar workouts, he learned from the errors and miscalculations of the earlier sessions, and made modifications accordingly for the latter sessions.

Just because it's written down, doesn't mean it's always going to stay that way, but you have a good general idea of how everything is going to go and you plan accordingly to that... Me and my head assistant will continually communicate and we might have to cut a set here, we might have to add a set. You know, we'll do that within the workout... We modify as we move. We may change an exercise on the spot, we may change the order. Usually it will stay pretty much the same type, but it may be a different form of that exercise to make the flow better... And for the next group we may change things. If it looks good, it's doing well, we'll keep it as is. But, it's always on the go and it's always changing.

Modifications on the scene

When workout sessions were carried out, various situations could occur that forced Coach Boyd to change one or more components of the original plan. Perhaps the most significant matter that Coach Boyd frequently considered during the workouts was

the flow of the session. He generally had a firm expectation of how intensively he wanted the athletes to work, and how fast-paced the training should have been. If the workout did not flow as smoothly as he imagined it, or if athletes were having problems with certain exercises, Coach Boyd made modifications on the spot. Sometimes the athletes just could not perform up to his expectations, may have been tired or sore, thus Coach Boyd had to eliminate certain exercises or cut back the workout volume. Another repeatedly occurring factor was the injury of athletes. Seemingly, there was not a single training session when all the athletes were healthy and perfectly capable of strenuous workout. Coach Boyd had to deal with injured athletes on a daily basis. Some of them had serious injuries previously and were on an extended rehabilitation program, some of them had just been hurt from a recent training session and needed only a few days to recover. According to the type and the seriousness of an athletes' injury, Coach Boyd had to apply slight or considerable modification of the training plan. It may have been as "easy" as giving the athlete an alternative exercise, and as complicated as compiling a totally new, individually tailored workout. Despite being healthy, athletes very often complained about certain movements or exercises, as they did not feel comfortable performing those. Coach Boyd had to be able to modify the original plan spontaneously on the scene and devise an alternative exercise that both fitted in the workout and allowed the athlete to perform without complaints.

In addition, changes in conditions frequently forced Coach Boyd to make necessary modifications. Equipment malfunctioning or break down happened quite regularly. This often compelled Coach Boyd to make changes in the planned gym management. For instance, during an observed training session, twenty athletes were

divided into four groups of five. Athletes performed circuit training with four designated stations. Running on treadmill was one of the four stations that they had to incorporate in the circuit, five athletes on five treadmills, according to the original plan. One treadmill broke down on the spot, completely unexpectedly, so one athlete out of each group could not perform at the same time with his group-mates. Coach Boyd had to modify his workout plan. He selected one person from each group and created a fifth station, consequently four athletes in each group circled around five stations, using the four functioning treadmills. Thus, the workout was carried out similarly to the originally planned and Coach Boyd achieved the goal of the given workout session as well.

Other devices, for instance resistance training machines, could also break down, forcing Coach Boyd to consider alternative exercises. Furthermore, changes in weather conditions could influence Coach Boyd's workout plans as well, especially in those periods when outside running sessions were incorporated in the plan. Rain, wind or extremely high temperature occasionally forced Coach Boyd to consider possible solutions for modifying plans of on-field workouts. These situations were often quite challenging for Coach Boyd, as the modified workouts had to be similar to the originally planned ones regarding the intensity level, volume, or structure of exercises, yet some restrictions might have narrowed the number of solutions significantly. A situation could be even more difficult to solve if more than one factor influenced the workout at the same time. Often, for instance, more than one athlete was injured in the group, and the athletes' injuries were quite varied. Most commonly, athletes had minor bruises, sprains or muscle pulls, but more serious injuries, such as twisted ankles, torn ligaments, or ruptured rotator cuff muscles were not uncommon either.

Coach Boyd knew that certain situations may have often forced him to consider changes in the planned workouts, where he had to make quick decisions most often spontaneously. During his coaching career, he mastered this ability. He believed that any situations could be saved, or any problems could be solved, as long as the strength coach was determined to find solutions. Although it was important for him that the modified workout remained similar to the original one, sometimes changes might have altered it significantly. However, these forced changes could even make a workout turn out better than the original. Sometimes these imperative changes were actually beneficial.

It's just making changes on the spot as quickly as you can, not to interrupt the whole flow of the group... Sometimes it's not exactly what you wanted, but you can always do some kind of workout, just be open for different things... Sometimes you may pick something up that might be a little harder or a little easier, but usually, if you want to switch to something, it's a change for the better.

Modifications did not always mean changes because of some negative factors, such as injuries, equipment malfunctioning, or time restriction. Coach Boyd may have just simply miscalculated a certain factor in a given training session, which thus had to be adjusted to the real values. For instance, on a few occasions, he actually underestimated the athletes' abilities. The planned workout volume, intensity, or the load for a given exercise were just simply too light for the athletes, so Coach Boyd had to increase those accordingly. For this reason, Coach Boyd found it vital to evaluate each session and each period during the process, so modifications could be made in time. According to his perspective, to effectively modify the original plan, a strength coach must have a thorough understanding of the program goals and objectives. If the modification takes place during a workout session, where exercises need to be replaced, a good repertoire of exercises is crucial for effective action. Here, experience is apparently a factor when

dealing with unexpected situations, as the strength coach may find a solution easier, simply because the situation had happened before.

Effectively modifying plans on the spot requires the true knowledge of the program, to know the exercises and other exercises that can be used to replace that. So knowledge of knowing how to accomplish what you're trying to accomplish... With experience, I think you'll have the knowledge where things will come a lot easier.

Supervision

Supervising the entire strength and conditioning program and the individual training sessions constituted a large portion of Coach Boyd's work as a coach.

Supervision was related to his cognitive actions, on which he relied when performing certain actions while carrying out training sessions. When supervising, Coach Boyd had to consider various training factors before taking action.

Observation of training

Coach Boyd knew that even the best workout plan or program design could be wasted if it were not applied in practice the correct way. Therefore, Coach Boyd placed heavy emphasis on his actions while a session was in process. Knowledge of effective observation of the training sessions was one of the most crucial things that Coach Boyd had to possess for achieving success. He deliberately established a routine, including a variety of actions that he used during his sessions. Necessary for good observation, Coach Boyd knew that he frequently had to move around the gym, in order to find the places with the best overall view, seeing most of the athletes. As most strength and conditioning sessions in his gym were very high-paced, he also became very active during those trainings. When coaching a session, he rarely stayed more than 30 seconds at one spot, but rather changed his position, walked or ran around, observed athletes from

closer and farther range. He eagerly strove to pay attention to each and every athlete in the gym, caring equally about everyone.

Apparently, Coach Boyd knew what to look for in a training session. His observation of athletes' work appeared to be conscious. During training sessions, as he phrased it, he looked for "certain points of technique for each exercise to make sure that athletes do it correctly." His involvement in the training varied, as sometimes he was in charge of certain actions, while at other times he gave more responsibilities to his assistants. Since he worked usually with at least one assistant coach, he knew that he did not always have to undertake all the responsibilities, such as instruction, demonstration, observation, feedback, correction, motivation and many others. Coach Boyd often gave several tasks to his main assistant coach or to other assistants cooperating in the work, as he liked to step back and be less involved in the instruction, and rather be a more active observer. Observation did not mean that he constantly interacted with the athletes; in fact, Coach Boyd frequently was a silent observer. He moved around vigorously in the gym, observed as many athletes as he could, and mostly tried not to interfere, unless he perceived it necessary. He believed that he had to let the sessions flow and interrupt only when it was essential. When he saw an athlete with an incorrect form, or someone needed assistance, Coach Boyd stepped in. He often worked with an athlete one-on-one, but seldom took his eyes off the rest of the group. While instructing or correcting an athlete, he positioned himself in a way that he had the best view of the rest of the group, so he could see everything that happened in the gym. Usually he did not stay too long with an athlete, unless that athlete needed more assistance, or if the given athlete was uniquely

important for the program and Coach Boyd wanted to make sure that he paid extra attention to that person.

Certain people that you know that are marking your program, you know that these people are the ones you got to really watch... If it's a player that that we really count on with the production on the field, may be our star player, we may wanna make sure that we stay with him a little extra, and make sure he does a little bit more.

Assisting and spotting

A major part of Coach Boyd's numerous activities during a workout session was assisting the athletes with various exercises. Assistance of athletes may have included helping an athlete during a movement to keep his or her posture, supporting an athlete for instance performing a balance exercise, spotting during heavy weight lifting, or assisting with stretching exercises. Coach Boyd was frequently involved in all of these types of assistance. All these and other forms of assistance required Coach Boyd to have physical contact with the athlete. Here, he most importantly needed to know what the athlete was doing, how the athlete needed to perform the given movement, and the correct way of assisting in that activity.

As improving flexibility was heavily emphasized in Coach Boyd's strength and conditioning program, stretching was performed in each training session, both as part of the warm up and, especially for those athletes who radically needed to improve in flexibility, as part of the cool-down. Coach Boyd knew that although most stretching exercises could be performed without anyone's assistance, the best way to improve one's flexibility was to provide some extra force, to push or pull the body part close to the end of the given joint's range of motion. Therefore, he assisted numerous athletes with stretching, usually the ones who needed the most help. He knew the importance of

stretching, and because he knew his athletes so well, he was aware of the athletes who needed more flexibility on certain body parts and the ones who did not. His assistance in stretching required an apparent knowledge of the correct stretching exercise, as well as knowing what muscles were stretched with the given movement, and what the appropriate way of assistance was. He also had to know the related training principles of stretching, such as the frequency and duration of stretching a muscle to improve in flexibility. When spotting, Coach Boyd also demonstrated knowledge of the correct way of spotting, as far as how much help was needed to be given and the correct form of spotting. Coach Boyd knew that with spotting he ensured athletes' safety during weight lifting, however, providing too much help could ruin the benefits of the training.

Coach Boyd very often provided spotting personally, nevertheless, because of apparent gym management issues in making the flow of a session smoother and faster, he frequently asked his athletes to spot one another. For this purpose, Coach Boyd taught his athletes not only the correct lifting techniques, but also the correct ways of assisting a partner. Athletes learned how to spot in weight lifting and how to assist each other with stretching. When athletes spotted each other, Coach Boyd, knowing that some athletes were not as experienced as others, observed watchfully, and was ready to step in if it was necessary.

Feedback

When a workout session took place, Coach Boyd zealously moved around the gym, observed every single moment and movement of the session, and interacted with the athletes extensively. Most of his verbal interactions were corrective type of feedback. Coach Boyd corrected a lot. He looked at the athletes' techniques, considered if they

should have been corrected or not, and if he decided that it was necessary in that moment, he provided corrective feedback. Providing feedback did not always mean interrupting an athlete's workout or influencing the flow of the workout, as very often athletes were corrected as they performed the given task. The majority of Coach Boyd's corrective feedback was verbal, only a few words instructions, occasionally accompanied with schematic demonstration.

Most of the feedback that Coach Boyd preferred to use during training sessions was feedback with a skill cue. For instance, when athletes ran on treadmills they often tended to lean forward and look down, which could hinder them to execute long strides. Coach Boyd correcting their running technique most often told them: "pump your arms" or "chest up." Thus, he attempted to both correct the existing deficiency and teach the athlete the proper execution. Coach Boyd's corrective feedback at times may have been as general as "smooth push", or as specific as "sit back more on your heels." Other times he did not only correct, but also provided a detailed explanation of what should have been done and why. For instance, "with the squat your hip should be as low as your knee, because that stretches the quadriceps." This way the athlete could have a better comprehension of the appropriate form of technique. Another type of corrective feedback that Coach Boyd used quite frequently was a combined technique-correction and encouragement. An example is when athletes had to make wide strides with a rubber cord attached to their ankles, pulling their feet together. As the athletes had to make long, wide and quick steps with this extra resistance, Coach Boyd both corrected and encouraged when said: "stretch it, come on, step wider, stretch it."

Coach Boyd used corrective feedback fairly frequently, however, provided positive feedback sparingly. He did not believe in the usefulness of frequent praising, as it could be meaningless to the athletes if used all the time. Instead, Coach Boyd remained critical and corrective, and acknowledged good technique and performance only when those were pertinent. Sometimes, his verbal praise turned out as a joke, by which still acknowledging the given performance. An example is when once athletes performed agility exercises, where the purpose was to move their feet as fast as possible on an agility device. All the athletes strove to be the fastest and they all did well, but one athlete was saliently the fastest. While the whole group was surprised, they also smiled as Coach Boyd mentioned, “he’s so fast with his steps, he looks like a dancer.” When he gave positive feedback, those most often were general, “good job” or “not bad” forms of acknowledgements. He believed that positive feedback was much more useful if it came from the athletes. As he theorized, a technique or form was better developed, if the athlete felt the improvement or recognized the progress performance-wise.

Everyone is going to have something to correct... I like to correct people, so I give probably more corrective feedback than positive... If they do it right, I like to say: “hey it was a good job”, but how much better they feel doing that, that’s usually positive feedback from them saying: “yeah, it feels much better.”

Technique analysis

As Coach Boyd observed the athletes executing the assigned exercises, he analyzed their form and corrected accordingly. When analyzing the execution of an exercise, he compared it to the biomechanically precise technique, or as he phrased it, to the “ideal form.” Each exercise or technique has an ideal or rational way of execution. According to Coach Boyd, the ideal techniques have been time tested, as throughout many years strength coaches and athletes have been using those, and rationalized the

correct way of execution. Biomechanics and kinesiology-related research in strength and conditioning also justified the correct way of performing certain exercises. However, the “ideal” forms of exercises are not always the same as most strength and conditioning books or research studies state. Often, Coach Boyd modified exercises, according to the needs of the given sport that he dealt with, or made adjustments related to the environment in which he worked. Also, his own workout experience greatly influenced the required forms of the different exercises, as generally he wanted his athletes to execute techniques the way he did. Thus, the ideal forms most often were, in fact, Coach Boyd’s ideal forms, which sometimes were quite different from the ones accepted generally in strength and conditioning.

We compare exercises to the ideal, what those are supposed to look like... There are different variations of every lift and everyone has their little way of doing things... We look at the technique the way we think it’s the ideal.

According to Coach Boyd’s theory, technique correction was a necessary component of learning the most appropriate ways of performing exercises. As the ultimate goal was to improve in sport-specific performance, the most appropriate form had to be achieved, in order to see the greatest improvement. If athletes had deficiencies with their forms, their improvement may have been discontinued. Thus, Coach Boyd believed that learning the correct forms was a crucial part of strength and conditioning training. When teaching the correct forms of the various exercises, he knew that some were easier to learn, and apparently, as an exercise became more complicated, learning the precise form took longer. As previously mentioned in the section about exercises and techniques, Olympic lifts, the most technical exercises in the weight room were also the most important ones in Coach Boyd’s sport-specific preparation of athletes. Other

complex techniques or combined movements were also more challenging to learn, therefore, Coach Boyd had to pay extra attention of teaching those, as opposed to other, less complex forms.

Coach Boyd knew well that learning the correct form of a complex movement required time and enormous amount of practice from the athletes. He was also aware of his own responsibilities in the athletes' learning process, as he had to use rational coaching strategies and plan an increasingly challenging instructional process to achieve the desired results. It was essential, for instance, that Coach Boyd not only corrected techniques but also reinforced those corrections and made sure that athletes made the necessary adjustments. Consequently, it was not satisfactory for Coach Boyd to see the athletes being able to perform a technique correctly occasionally, but he wanted them to be consistent with the proper form. Thus, he often asked the athletes to repeat an exercise or to start over, ensuring that the assigned workout was done entirely with appropriate forms.

Among his arsenal of instructional strategies to promote learning, demonstration of techniques was a key component. Coach Boyd believed that athletes could learn better if they had a visual schema to follow. Therefore, along with verbal explanation, he often used demonstration as a way of correction. He preferred correcting an athlete with a schematic demonstration of both the right and the wrong execution. This way, he could underline the key differences and promote the athlete's comprehension of the given exercise. Although he may have achieved great results with these various instructional strategies, Coach Boyd knew that athletes should continuously improve their technique, as there generally was something to change or modify to make their form more effective.

More advanced lifts, the Olympic lifts, will take a little more attention... Learning the correct techniques is a process, it's not going to happen one day, one week, it's going to take the course of the year, or several years to do everything. Technique is an ongoing process in the weight room.

When working with different techniques, especially in the case of complex techniques, Coach Boyd quite often provided skill cues to help the athletes in their form-improvement. Skill cues were brief hints, drawing the athletes' attention to certain main points of the given movement. For instance, when sprinting on the treadmill, athletes often lost their posture and struggled with their strides. Here, Coach Boyd reinforced the most important skill cues, such as "eyes up, chest up, and knees high." He also used an advanced level of providing skill cues, which became particularly beneficial when trying to improve an athlete's technique. He knew that a skill cue could be even more helpful if provided at the right moment. Therefore, he did not simply tell the athletes on what to focus, but also carefully observed several attempts for the given movement and gave a skill cue at the appropriate time. Sometimes the given cue was like a signal, reminding the athlete of what to do at that point. An illustrating example is when athletes performed power-cleans, a form of Olympic weight-lifting, during which Coach Boyd wanted his athletes to hop at a certain point during the movement. As an athlete tried the movement, he shouted "hop!" at the right time, when hopping was supposed to take place. This technique greatly assisted the athletes in better comprehending the flow of a movement.

Although Coach Boyd believed in the importance of correcting techniques, he also had to judge rationally as to how much correction was crucially needed. It was necessary for him to see the point at which technique-correction was unnecessarily abundant and perhaps took over other objectives of the training program. Coach Boyd had a clear vision of what level he wanted the athletes to be technique-wise, and as he

knew all the athletes' strengths and weaknesses in their techniques, he strove to improve those, but only up to the envisioned level. He knew for instance that Olympic-lifts had great importance in the strength program for football players, but he was also aware of the goal of the program, which was to make the athletes play football at an improved level. Therefore, improving athletes' skills in performing Olympic-lifts beyond a certain point was needless. The main objective remained a sport-specific physical improvement in a safe way.

You want to correct as much as you can, but if you correct every single set, every single minute, you won't get anything out of it. It's not like the Olympic training center, where we can concentrate every single minute on one individual, and making sure everything is perfect. We're not trying to be Olympic weight-lifters...we want the main points across in a safe form... And we'll make adjustments as we go along.

Overall, Coach Boyd's main reason for correcting techniques was ensuring safety. Improving forms for achieving physical development was also important, but secondary. Safety was his top priority. He observed the athletes and checked their form, most importantly to make sure that they were not exposed to harm. As soon as he perceived that an athlete was losing the correct form of an exercise due to an overly heavy load, he immediately stepped in and made adjustments. The most obvious action he could do in such a situation is lowering the weight. This could happen quite often in a strength session, as the calculated percentage-based strength level of an athlete did not necessarily match his or her abilities of maintaining a correct form with the given load.

If we see anything way out or the lack of what we're looking for, we want to correct that. If anyone is getting hurt or the weight is too heavy, we try to make adjustments... We'll go lighter and let them do it correctly with a lighter weight and work on the technique and not risk being hurt.

Identification of “cheating”

An important aspect of knowledge that Coach Boyd possessed clearly came from his extended experience on the field, both as a former athlete and as a coach. “Cheating” is quite prevalent in strength and conditioning, as often times athletes “cheat” unconsciously and innocently. “Cheating” on a technique may be as simple as working with the wrong form, usually to be able to surmount the excessively heavy weight. As an athlete executes a technique, due to the heaviness of the load, he or she may lose the correct form, thus largely incorporate assisting muscle groups in the action. Here, a problem may occur, as the target muscle group is not trained properly, because the assisting muscles may take over. Additionally and even more importantly, losing the correct form of a technique endangers the athlete’s health. For instance, when a trainee performs standing biceps curls and the load becomes heavy, the trainee may unconsciously hyperextend in the lower back, thus helping the exhausted upper arm muscles with a number of others muscles to lift the weight. The danger of performing this exercise with overly hyper-extended lower back is to hurt the vertebral discs in the lumbar spine area, which may even harm an athlete’s career. Therefore, Coach Boyd found it crucial to be aware of and correct these types of errors. Another common form of “cheating” that athletes may use is simply not performing as many repetitions as assigned. To prevent this, Coach Boyd often stood right next to the athletes and counted the number of repetitions out loud.

Knowing how the athletes could possibly “cheat” when performing certain tasks was central in Coach Boyd’s process of technique analysis and correction. In fact, it was another form of correction, a sort of anticipation of errors, taking action before those even

could take place. Knowing beforehand that athletes could use certain tricks or “cheating” when executing an exercise helped Coach Boyd in ensuring correct forms. Here, he gave skill cues to the athletes along with the announcement of an exercise, drawing the athletes’ attention on his anticipation of that problem. Furthermore, he not only stated that he will pay considerate attention on those details, but actually took action to hinder the occurrence of those. A good illustration was a training session, when athletes had to perform shuttle running on the football field, touching lines on the ground when turning around. Coach Boyd anticipated that athletes could “cheat” and abridge the running distance by not touching the given line, thus he not only stated that he wanted the athletes to touch the line when turning around, but actually stood at the line, making the athletes know that he was watching them closely. This way he prevented arguments, in addition to having more authority to use sanctions for not accomplishing the task.

Another example is an athlete who had to perform push ups with numerous repetitions. Coach Boyd anticipated that the athlete might “cheat” on the range of motion of the execution, as not bending or not extending his arms adequately. Knowing the basic training principles, including the importance of full range of motion in executing resistance training exercises, he took action in order to prevent the athlete from “cheating” in such a way. He placed one of his hands on the floor under the athlete’s chest and his other hand in the air, right above the athlete’s shoulders. The athlete had to touch both of Coach Boyd’s hands, moving all the way down and all the way up, otherwise he did not count that repetition. With this strategy, he ensured the correct execution of the technique in each repetition, and thus he was able to promote the athlete’s physical development.

Coaching Pedagogical Strategies

Throughout the 14 years of coaching, Coach Boyd established certain instructional routines and set a number of rules that govern his coaching pedagogical strategies. His practical knowledge was notably driven by these instructional strategies. In carrying out training sessions, he performed a variety of actions purposefully in a manner that he believed contributed to the goal of his strength and conditioning program significantly, or at least assisted him in more effective coaching.

Atmosphere in weight room

Coach Boyd theorized that the best condition that he could provide for his athletes was a relaxed atmosphere in the weight room. Creating such a comfortable environment required most importantly that Coach Boyd to be calm and composed at all times. Indeed, during the observed training sessions, he rarely raised his voice, and seldom looked too anxious either. Although athletes repeatedly did things incorrectly, or tried to tease him by pretending that they did not understand a given task, Coach Boyd mostly remained calm and serene. He knew that he had to have a tremendous amount of patience, be serious but easily approachable for the athletes. Moreover, he had to be consequential, but at the same time be very tolerant with athletes who could fail repeatedly. He further theorized that the weight room should be a place where athletes enjoyed going and where they were greatly encouraged to perform their best. He created the atmosphere more relaxed or more competition-like and inspirational, depending on the purpose of the given session. Basically, when he directed athletes' work in the gym, he either allowed the athletes to perform with a little less effort and have a bit more fun, or he did not tolerate any type of deviations from hard work, accepting only maximum attention and full effort.

When he wanted his athletes to perform their best and give maximum effort, he reinforced a set of rules that he purposefully established in the gym. With these rules, he managed the athletes to work in a disciplined manner. This deliberate rule-setting routine of Coach Boyd indicated a firm pedagogical knowledge that he used in his work.

We have a little more relaxed atmosphere at times, at other times we make it harder on them, as different workouts require different manner of how we react to them... When they come in here, it's time to work, not the time for talking... As far as our rules are concerned, those are the rules we set, if they didn't like it, it's really too bad. Those are the set rules, it's just the matter of being disciplined and following the rules.

Rules

Coach Boyd applied a variety of rules when running training sessions, thus coordinating the work in the weight room, and controlling athletes' actions. Most importantly, he applied numerous punishment strategies that athletes' learned and experienced throughout the years of training. Punishment in Coach Boyd's interpretation was a "consequence for something." Therefore, if athletes did something that was not expected from them, or they performed in an unacceptable way, according to the set rules, they paid the consequence. Punishment generally consisted extra work, such more sets or a given exercises or additional exercises to perform, mostly bodyweight exercises. Rules were set to regulate athletes' actions, behavior, and even their attitude in the gym. Coach Boyd believed that rules and punishments were necessary components of athletic preparation, as these were part of athletes' mental and emotional preparation for coping with various stresses, both during the period of preparation and in competitions.

One of the most important rules was controlling athletes' attendance in the strength and conditioning training sessions. It was required for all athletes to participate in all sessions, unless they had an acceptable excuse, for instance sickness. Coach Boyd

seriously retaliated if athletes acted irresponsibly. Missing a training session unexcused entailed severe punishments, for instance extra weight lifting sets or extra time running on the treadmill. A sort of punishment was the consequence of being late as well, not as severe as an absence, but harsh accordingly. Athletes knew that Coach Boyd started the training session right on time consistently, and they rather arrived a few minutes earlier in the gym than later. In fact, during the observed training sessions, a number of athletes arrived even 15-20 minutes earlier to the gym, making sure that they did not arrive late. Most of these athletes had been punished before because of arriving late, hence they learned that Coach Boyd was serious with his rules, thus attempted to be on time.

I like punishment, it's a consequence for something... They know that if they are not on time or they miss unexcused, then there will be a punishment and will be pretty severe and usually they don't have a miss again, because of the punishment fits. We don't have any people miss ever, and if they do, they get punished hard and never miss again... And when they are late, we're doing some extra with them, anything to make them remember.

In Coach Boyd's training sessions, the level of punishment fitted the level of act. Missing a training session was probably the most harshly retaliated fault, while athletes' other less significant actions were punished less severely. Coach Boyd believed that consistent application of all the rules in the program taught the athletes to obey those, and this way in the long run, they would learn responsibility. He knew well that the only way to make the athletes take the set rules seriously was if he stayed with the rules, applied them consistently and avoided making exceptions. Being consistent was not only related to applying the various rules, but also to being consistent with the assigned workout. Frequently, as workouts are quite challenging to finish, athletes tried to negotiate with Coach Boyd, striving to skip sets or finish up exercises earlier. He avoided the athletes to take over, as he consistently stayed with the announced amount of work. He knew that if

rules and regulations were reinforced on a general basis, athletes would more likely obey them. On the other hand, if an athlete was punished while others were not for the same action, rules would not make sense any more. Consequently, it was important in Coach Boyd's coaching routine that he not only established a set of rules, but also consistently applied those, made no exceptions, thus making all the athletes disciplined.

If it's something severe, the punishment will be more severe. For every action, there's a reaction, how we respond to what they did... Consistency, I think makes everyone understand, "hey, if we listen and we do what we are supposed to do, and follow the rules, there's not going to be a problem". If I start not being consistent with the rules, that's when we start having problems, because when I'm punishing this guy and not punishing this person, now that's when you have conflict.

Among the rules, some were more prevalently applied than others. For instance, in Coach Boyd's hypothesis, the weight room was not the right place, and the workout sessions were not the right time for athletes to socialize or to have conversations. As previously mentioned, he preferred having a relaxed atmosphere, but did not tolerate any athletes to "goof off." Hard work was the only acceptable activity in the weight room during workout time. Even on days when the atmosphere was more relaxed and athletes only performed supplemental workout, Coach Boyd did not tolerate if athletes talked in small bevs or if they slacked off and sat on benches inactively. He consistently broke those small groups up and directed the athletes to continue with their workout.

Another prevalently applied rule for the athletes was to meet Coach Boyd's requirements, as far as the workouts go. When he instructed the athletes to perform a certain number of sets of an exercise with a given number of repetitions, athletes were closely monitored ensuring that they indeed performed all that they had been told. He often stood close to the athletes and counted repetitions, reinforcing that the given set was

fully accomplished. Other times, when running on the field, athletes had to perform certain tasks in a given time interval, and if they failed, they were punished. Some athletes were unable to meet the required standards, therefore, they received punishment repeatedly. However, if they showed progress, even though still not performing up to the expected level, the punishment may have abated slightly. Athletes sometimes tried to avoid punishment by finding various excuses, but due to Coach Boyd's consistency in applying those rules, they failed mostly. He and his assistant coach very often stayed longer with those athletes who were punished, making sure that they performed all the punishment exercises. This further developed athletes' responsibility, consequently they tried to avoid "cheating" or not performing up to the expectations in the future. In fact, athletes seemed to accept Coach Boyd's rules so much that often times they did not even question if they deserved their punishment or not, they automatically did the extra work.

Instruction

During the past fourteen years during which Coach Boyd spent working in the field of strength and conditioning, his instructional strategies have been crystallized. He established several routines that he believed aided him in coaching, such as strategies in instruction, providing explanation, and demonstrating tasks. Some of these frequently applied instructional and coaching strategies were deliberately created and developed, while others evolved almost unconsciously, during making adjustments to the need of the program. One prominently important instructional strategy that Coach Boyd intentionally developed was simplifying task explanation. When instructing, he strove to be as clear and as brief as possible, mostly saving time on task explanation. He deliberately created various actions and taught numerous terms to his athletes, just to make the instructional

part of the training sessions shorter, thus structuring the workout in a much more fluent manner. In most cases, when Coach Boyd announced a new exercise, he used very short, only a few-words of instructions, and announced the number of repetitions, sets and depending on how the workout was set up, the working load. For instance, he announced a task as “legs in and out on bench, three sets of ten”. This necessitated that he and his athletes spoke the same language, in other words, the athletes perfectly understood him when giving seemingly unclear instructions. Certainly, as he worked with the athletes for several years, he knew what his athletes did understand and on what things he may have needed to use a more extensive explanation. He knew whether an exercise was applied frequently or not, consequently, if the athletes already knew what he meant by those few key words that normally would not make sense.

In addition, Coach Boyd used simplified instruction in gym management as well. He tried not to over-explain where athletes had to go, how they must form groups, or what weights they needed to use for certain lifts. For instance, when performing Olympic-lifts on the platforms, athletes could chose from different sizes of plates, which were also colored differently. Often, he announced the required load by simplified instructions, as instead of telling his athletes a given weight, he asked them to put, for instance, a green and a yellow plate on the bar. This way he ensured that athletes did not mistakenly lift with incorrect weights, and this also speeded up the process of loading weight, as athletes did not have to calculate.

It is just an easy way of knowing simply the weight, for them just to be able to throw on a blue and a green takes no thinking about those pounds, they can just put it on and then go. Time wise, it can move a lot more quicker and we can go and move on to the next thing without taking a whole brunch of time.

As mentioned in the previous sections of the chapter, Coach Boyd often provided skill cues during his sessions. Important to note that feedback and technique-correction was not the only time when he drew the athletes' attention to certain parts of the movements, but he also tended to incorporate skill cues in announcing tasks. This combination of providing instruction and emphasizing certain skill cues was mainly used when athletes performed more complex exercises, where Coach Boyd wanted to remind them of various details of the movements that are crucial in the execution. Overall, regardless if it were a simple or a more complex movement, when applying exercises that athletes had previously practiced numerous times, Coach Boyd only gave verbal instruction and a few-words skill cues, which he believed were enough to make the task clear for the athletes. This required that he knew his athletes well, knowing what they had already done in the gym, and the exercises with which they were supposed to be familiar. When applying these known exercises, explanation of tasks became simplified.

On the other hand, when an exercise was given out to athletes with which they may have not been as familiar with, Coach Boyd had to make adjustments in his instructional strategy. This was the point when he applied a visual demonstration. He performed demonstrations in various ways, depending on the nature of the task, and also on how he felt that the athletes could understand his instructions. If, for instance, the athletes had already tried a given exercise before, he may have provided verbal explanation of the task, listed some essential skill cues, and presented schematic demonstration. Here, he only mimicked the movement, just to make the athletes better understand what he meant by his simple verbal instruction. If an exercise were more complex or completely unknown for the athletes, he may have demonstrated it as it was

supposed to look. Here, depending on the difficulty level of the task, he may have provided verbal explanation during the execution, or afterwards.

Occasionally, Coach Boyd also used an athlete to demonstrate an exercise, while he had a chance to provide more verbal explanation. Sometimes, he used demonstration to clarify the correct execution of an exercise, especially when athletes performed it consistently wrong. For instance, during a session Coach Boyd provided the athletes with a simplified task announcement, as “perform manual neck on the bench with your partner.” Athletes understood what he meant, as one person lay on the bench and lifted his head up, while his partner pushed it lightly back, providing “manual” resistance. However, athletes did not perform this task as he wanted them to perform, therefore, he stopped the session and demonstrated with an athlete how to assist a partner. Demonstrating an exercise apparently required Coach Boyd to be able to demonstrate it appropriately, with the right form, technique, speed and dynamism. When demonstrating an exercise correctly, especially when demonstrating a complex movement, he made sure that athletes received a visual idea of the task. In addition, Coach Boyd believed that he could gain respect from the athletes, as they would see him staying active and being able to surmount difficult challenges. In essence, Coach Boyd’s purpose with this was not his own glorification, but the motivation of his athletes. In fact, athletes were greatly inspired if challenged by others, and if their coach demonstrated a proper technique or an appropriately dynamic movement, they responded by trying harder.

The main lifts of the program take a little more instruction. That’s going to take a little more entailed explanation and sometimes we may just show them how to do it... I think it’s always good to be able to show them how to do it. I like to show them, so they’re confident in my ability to teach, and I can show them exactly what we want them to accomplish.

Providing explanations for the athletes did not always mean simplification in Coach Boyd's work. Repeatedly, he provided explanations on the rationale of various tasks. Often, athletes asked him about the purpose of different exercises and he mostly attempted to provide a sport-specific explanation. Rarely, athletes questioned some of the exercises that Coach Boyd asked them to do. Here, he used explanations of the purpose of the tasks as justifying the benefits of those. He knew that athletes wanted to understand the exercises and the reason of doing them. Therefore, he made sure in most cases that he provided satisfactory answers to the questions and concerns of his athletes. Other time, Coach Boyd may have used a task explanation as a metaphor, for motivational purposes. Bringing up an imaginary situation as an example was something that he found very effective as a motivational strategy. For instance, in an observed training session, athletes practiced sprints on treadmills. As they became exhausted, they started to lose their form and were barely able to keep up with the speed. Coach Boyd used an effective motivation when telling his athletes to imagine a big game when in the last minute a turn-over takes place, with which they could win the game if sprinting fast. By placing his athletes' minds in a game situation, Coach Boyd partly made sure that the athletes understand why they have to perform repeated fast-paced sprints, and also he was successful in motivating them to a point where their performance did not decline any further.

We try to explain some of the reasons why we do certain things. And usually they can feel that area what we're doing. We try to give them short, not like sitting down for a lecture but if they come up and ask we'll explain more details.

Motivating athletes

A very important part of any strength and conditioning coaches' job is the ability to motivate their athletes for better performance. Coach Boyd believed that although he

had talented and very enthusiastic athletes in his strength program, his encouragement was very often needed. Athletes sometimes felt down and as they knew that he expected high levels of performance from them, they occasionally tried to negotiate for lesser workout load. Coach Boyd's work not only included ensuring that athletes did not "cheat" on their workout volume or they worked with appropriate forms, it also put the athletes' minds on the workout in which they were willing to push themselves even more. Coach Boyd knew that the only way he, as a strength and conditioning coach, could achieve success was if the athletes improve physically, which was greatly dependent on the quality and quantity of the work they did during the preparation.

Coach Boyd had to make sure that both the quality and the quantity of the workouts were appropriate. Careful and rational planning may have ensured the quantity, but the quality really depended on the actual work performed in the gym. It was crucial in his belief that the athletes were pushed from behind to the point where they performed their best. Even though it was sometimes hard to increase the enthusiasm level in the gym, Coach Boyd had to do this day-by-day, session-by-session. In fact, he believed that one of the most challenging aspects of his job was to have the enthusiasm from his part and to try to pass it over to the athletes, especially when coaching four long sessions a day, four times a week. He knew that he had to treat each group the same way, thus, he had to motivate the late afternoon groups just as much as the early morning group. Furthermore, he knew that it was not enough to fire the athletes up in the early stages of the workout, but that fire needed to blaze all the time during the session.

For motivating the athletes, Coach Boyd created different routines. Most frequently, he motivated his athletes simply by his presence. When he was close and was

around the athletes, they most often tried harder or better. Using his observation routines, he mainly looked for athletes who may have needed more help, and possibly worked with that person one-on-one for a short time. When he worked with an athlete individually, he still wanted to make sure that others were inspired as well, therefore, he tended to talk loud to that particular athlete, while other athletes standing close may also have received the motivation, this way indirectly. Also, he purposefully approached the best players frequently during training, making sure that they received extra encouragement. Coach Boyd knew that as the team's success may have depended on these key players, his job also partly depended how well these players were prepared. Thus, he attempted to ensure that those athletes received extra considerate attention.

A guy that we really count on with the production on the field, maybe our star player, we may wanna make sure that we stay with him a little extra, and make sure he does a little bit more. You always got to look at the guys that might make the difference and push them a little bit more, count a few more reps and making sure everything gets done correctly, because that's the line of having your job or not having your job, how your star performers play.

When it comes to motivating the entire group, one of the most effective coaching strategies that Coach Boyd believed in was applying some form of competition or challenge in the workout. He liked competition and he believed that athletes had to be placed in a competition setting as often as possible. As athletes were preparing for a competitive setting, they needed to be challenged frequently and they had to get used to it. Competitions in Coach Boyd's program could be as simple as who was going to win a lap of running, or who was performing the best on a given test when the entire group was being tested. He applied some sort of award for the winners of the competition, or other times, a punishment for the losers. Prizes for good performance may have ranged from verbal praise to some material prize, such as a T-shirt or an energy bar. An in fact

effective motivational tool that he established at University of Oconee was an award system for the athletes. As athletes' were tested several times during a year, the very best performers received an award. But this award system was not simply about finding the best performer on one specific testing procedure, but the athlete who could perform consistently well on several testing formulas. The testing exercises were set and Coach Boyd predetermined a certain level for each of the testing formulas that athletes needed to reach in order to get the award. As the levels were extremely high, only a few athletes were able to achieve those. They received an award from the athletic staff and a photo taken of them hung on the wall for the entire year, until the next performance testing.

Your goal is to win in sports, so we try to push everything through that goal. When you compete, people push a little harder, and as you push each other, you're pushing yourself to get better... We have several different prize things... Just little things, it makes a little competition within the groups... Players that meet certain criteria of standards that we have posted here, if they make those they get an award for that.

Another often used motivational tool in Coach Boyd's program was stating an example as a model to follow. When challenging his athletes with an exercise, Coach Boyd observed and looked for the best performers. Repeatedly, he placed the best performing athletes in the spot light and asked them to perform in front of their peers. This turned out to be greatly motivational to all the athletes in the group, as they saw how their teammate was able to perform the given task, and in this healthy athletic team, no athlete wanted to fall behind. Some other times, he used athletes in the other groups as examples. For instance, one of the observed training sessions was extremely challenging for the athletes. Some of them did not believe that they could finish up all the required exercises. Here, Coach Boyd mentioned that the athletes in the earlier groups performed the very same workout, and they were able to complete it. Creating a competition-like

spirit, athletes did not want to fall behind the other group, so they pushed themselves more and successfully completed the workout.

Coaching philosophy

Coach Boyd had a very firmly established concept of how he approached the field of strength and conditioning and how he carried out a program to achieve the predetermined goals and objectives. He was a hard worker and expected his athletes to be hard workers as well. His actions to motivate his athletes originated in his own highly motivated self. He found enjoyment in his job, therefore he was able to push himself beyond exhaustion and be devoted to the work that he did. His coaching philosophy was shaped around the notion of making the athletes working hard, which eventually would turn out as an improved athletic performance.

My whole philosophy is to come in here to work everyday, and to push the athlete as hard as I can push them...both physically and mentally to attain those goals. Try to get the enthusiasm and effort to them to make them better every day.

Coach Boyd demonstrated an unquestionable devotion to his job. Several of his actions in the gym were driven by his determination to achieve his goals with the athletes and to be “the best coach possible”. He was enthusiastic and worked hard especially if he believed that a given concept was going to make the program or the athletes better. He seldom missed a day of work, no matter what the conditions were. Very often, he went in the gym even on days when there was no strength and conditioning sessions scheduled, frequently during breaks, just to make sure that he helped athletes who were willing to workout during those days. When in the gym, Coach Boyd strove to reduce time spent in his office. Only the most crucial issues, such as official paperwork, phone calls, or program planning made him to stay in his office, otherwise he worked somewhere in the

gym. He spent most of his time “on the floor,” and performed all the tasks that strength coaches need to perform. Among various things for instance, he was involved in facility cleaning and maintenance. Here, instead of giving such tasks to his assistants, he was an example for them. When it came to coaching, he not only dealt with the athletes who were currently in the program at University of Oconee, he also took care of others on a regular basis, such as his former athletes, or athletes from other institutions, who came to University of Oconee to have him direct their training.

Your athletes are worth it (the effort). So, you look at them as people as you really want to take care of when they come into the program, and you want to have the best things for them... I feel that we're obligated to help them out, but I want them at the same time to get some good experience from us, and when they leave here, they can say “hey, we learned something and did something good.

Among his coaching practices, Coach Boyd found it very important to be altruist, to strive to like the people that he worked with and especially, to treat every athlete equally who entered the gym. Either dealing with motivation of an athlete or teaching a technique, he was willing to provide each athlete with the same treatment to the same extent. He believed that it was crucial in order to achieve the goals of the program. Coach Boyd knew the importance of an appropriate pedagogical approach in coaching, as he believed that to be a good strength coach one best “be good with people.” Being good with people did not only focus on the athletes, but he was also very caring with his assistants as well. He was not simply their boss, but their mentor, who guided their way in professional development.

I'm trying to groom every assistant to be a head coach one day. If one of your assistants move onto a head coaching job, and you look out there and see some of those people worked under you and learned some things from you and you helped them a little bit, that makes you feel good. That's a part of the whole process, trying to help all your assistants to become a little better and a little more knowledgeable and that's what is going to take to be a head coach.

Safety precautions

Coach Boyd's coaching philosophy determined several of his actions and practices that he felt inevitable to incorporate when coaching strength and conditioning and striving for success. Most of these practices, again, were applied because Coach Boyd was truly determined to achieve his best as a coach, and he took into consideration all the different issues that could possibly affect the strength program. One of these practices was his involvement in the athletes' sport training sessions. Although it was not his duty, he felt that it was important to visit all of the football sessions in which his athletes participated, thus becoming closer to the athletes and also making adjustments to the strength and conditioning program, related to the sport training sessions. As has been mentioned, Coach Boyd placed safety on the top on his list of priorities. He wanted to make sure that all athletes were safe in the weight room, but in addition, he also wanted to know what happened with the athletes outside the weight room that may have possibly affected their workout in a harmful way. Moreover, he wanted to make sure that the strength and conditioning training sessions were properly adjusted to the overall sport program, so the athletes did not become too fatigued in a strength session when they needed to be fresh for a football practice or game. Ensuring safety and freshness of athletes, therefore, was one of the most prominent actions of Coach Boyd in his program.

I'm always looking at the program to be safe. I put it very high on the list, if not the highest thing... To make it safe and to make it a good environment you always have to correct people, as far as making sure they're safe... I will never let even a guy that doesn't matter as far as playing on the field do something so incorrectly that's going to hurt. I will never sacrifice that... I go to all the practices that they have. The purpose is just to see and evaluate what's going on and if someone got hurt, then we have a good idea of what to expect the next day, or how hard they trained... You just have to make changes as you go. So the set workout is always going to change, making sure everything is done safely.

Gym management

Dealing with management issues took place in Coach Boyd's work vigorously and frequently. He possessed a great deal of practical knowledge of how to effectively schedule athletes, organize the gym, or run a workout in a way that it fit in the given time frame. As he worked with the football team at University of Oconee, he dealt with over a hundred athletes in his own program. In addition, as the head strength and conditioning coach, he was indirectly responsible for all the several hundred athletes who were in the athletic program at University of Oconee. One of the greatest challenges for him was to schedule the workouts of different groups and different sport teams in the weight room in a way that those were not going to hamper each other. He attempted to provide the large sport teams with using the gym exclusively, while other smaller teams may have needed to share the weight room. When it came to scheduling the workout sessions, Coach Boyd wanted to divide the large football team into three or four smaller groups, with which he found it easier to work in the weight room. At this point, he had to carefully determine the workout time schedule, taking into consideration each and every athlete's class schedule and other sport teams workout times. When successfully creating a viable weight room schedule, it was applied for the length of a semester, and with the start of a new semester, he had to start over his meticulous scheduling work.

During the workout sessions, Coach Boyd had to use another type of management related knowledge, which was specifically focused on carrying out the training session in a fluent and mostly high-paced manner. As the number of athletes was still considerably high in the workout groups, he further divided the groups. Most generally, he created two groups during the workouts, separating the larger body weight athletes playing in certain

positions on the field and the smaller body-frame athletes, who were called the skill position players. This way, he usually could share the coaching work with his top assistant coach, who took one of the groups while Coach Boyd took the other. Thus, the ratio of coach-to-athlete was significantly better, which meant that he and his assistant coach were able to provide more individual attention for the athletes. As the athletes in the small workout groups were physically alike, Coach Boyd was also able to control the load that the athletes used better. Splitting the groups according to the players positions when playing football required that Coach Boyd had a great understanding and knowledge about the sport, knowing which players should likely work together in the small groups.

We split them up with the bigger guys as opposed to the smaller, what's called skill positions. Usually the weights and some of the activities that we do within those groups vary in the other group. So we keep them separate at times, also for management of the area, with myself and my assistants working with football we can manage them a lot easier. So we start them on separate sides of the room, sometime they do similar activity sometimes different activities.

Once the small workout groups were created and placed at their stations, Coach Boyd attempted to run the sessions in a fluent and continuous manner. He strongly preferred compound set, triset, and circuit training type of formats, when athletes worked on two, three or more stations back-to-back. This way, the pace could be controlled and maintained at a high level, consequently a higher overall workout volume could be carried out in a given time-frame. Coach Boyd mostly strove to set up the training sessions in a way that those were fluent and almost non-stop. This required a careful planning, in which the exercises have to be watchfully chosen, knowing not only what exercises were the best for achieving the goals of the training, but also knowing which exercises could be combined for maintaining fluency in the workout. Coach Boyd's

ability to construct such a fluent, high-paced and non-stop workout mainly came from his great deal of practical knowledge of gym management, in addition to his imagination and creativity that he needed to use to come up with the best exercises and the most appropriate combinations. Indeed, he was creative and he did not like any time to go wasted while the athletes were in the gym. An example of an easier visualization of his gym management efforts was a workout, when athletes mainly focused on leg exercises. He combined two exercises that worked on different parts of the leg, but the two stations that athletes had to use were in the opposite corners of the gym. He realized that while athletes slowly walk from one station to the other and back, precious time was wasted. Therefore, he managed the athletes to perform walking lunges moving in-between the stations, thus the time used for transition was also utilized efficiently.

Another routine that Coach Boyd effectively used is related to the instruction of athletes. When athletes performed exercises that they were familiar with, and he did not need to give extended explanation on the given task, as previously mentioned, simplified instructions took place. In a workout session, when athletes performed numerous exercises at a fast pace, Coach Boyd wanted them to move onto the next exercise as quickly as possible. Therefore, at a given station, he looked for the first person who had completed the task and was ready to move onto the next exercise. At this point, he explained the next task to the first ready-to-go athlete, who could therefore get started with that new task, without waiting for the others in the group. When most athletes moved onto the next station, either Coach Boyd explained the task again, or the athletes who were already there passed the information over to their teammates. Although Coach Boyd may have needed to repeat an exercise announcement several times, this way he

ensured that each athlete shifted to the next station quickly, without waiting for the other athletes in the group to finish their task and without being interrupted frequently by his instructions.

Coach Boyd also used effective gym management when certain equipment was needed for a given exercise, or when the gym needed to be straightened up. He knew that it took much less time if a number of athletes moved the given number of weights or dumbbells, as opposed to him doing it alone. For instance, after a given exercise, Coach Boyd instructed the athletes to rack their plates, dumbbells or other items, which this way made it easier for him to maintain order in the gym. Assistant coaches were also involved in straightening the gym up after workouts, when using a large number of equipment.

Coach Boyd appreciated anyone's help in maintaining the gym.

We can always use more help, as we usually get myself, my head assistant and two to three other people. When there's lot more movement and a lot more going on, we can always use more help.

Knowledge of workout

During the workouts, Coach Boyd paid close attention to every individual athlete. He not only oversaw the workout and corrected athletes' forms, he also closely kept track of the flow. He knew exactly which athlete was supposed to be in which group, what exercise that groups was supposed to be doing, and more than that, how many sets or how many cycles they had performed for the given task. He knew at any point during the session where the workout was, what had been done and what was left out. Amazingly, Coach Boyd seldom used any papers or workout plan sheets to remind himself of the designed program. This presupposes that Coach Boyd had to have an updated knowledge of the training. He knew by heart what the athletes were doing during the given session,

as he was able to place the athletes in the imaginary picture of the workout and thus, he kept track of the training.

Achieving that, Coach Boyd knew all the workouts by heart, without any paper reminder, may come from two actions that he consistently performed foregoing the training sessions. Firstly, he spent considerable amount of time precisely planning and designing all training sessions. This was important for Coach Boyd, as he strove to apply a variety exercises in the workouts, making each workout something unique. By the time he was satisfied with the designed plan, he learned it quite well. Furthermore, before any workout session would take place, Coach Boyd tested the planned session, by performing all the tasks and activities from the first minute to the last. This, in addition, helped him to further memorize the flow of the exercises. Even more importantly, by trying out the workouts, he placed himself in the athletes' shoes and obtained a valid insight about the challenges of the workout, thus he knew beforehand what the athletes would feel when performing the tasks, and anticipated their difficulties and struggles. With these and other various actions, Coach Boyd prepared thoroughly for all his training sessions, attempted to learn about his own sessions and the exercises included. This, in combination with learning enough about the athletes, ensured that he could provide them with the most appropriate workout design that would lead them to achieving success in their sport.

I like to change workouts all the time, workouts change here as much as possible... I'm always looking for things to use for the athletes, to see if it's going to help them in their sport. So, my workout is affected, I'm doing more things in that sense, I'm trying to try out workouts to see how they work out with the athletes. Now the workouts we do a lot of different components in it to try out.

Professional Improvement

“Thinking about the craft”

The concern of professional improvement generally is not regarded as an area of one’s knowledge. However, defining Coach Boyd’s practical knowledge as practically oriented set of understandings that directed his work makes his beliefs in professional improvement essential to examine from a knowledge viewpoint, especially, as this issue played a central role in his work. The majority of his actions were partly determined by his quest for professional development, the will to be a better strength coach. He believed that his improvement as a coach needed to be constant, thus he strove for getting better professionally. He noted that a lot of people, including athletes and assistant coaches, depended on his professional performance, and it was his duty to achieve his best, both for himself and for those individuals. Coach Boyd interpreted the endeavor to become a better coach as striving to improve the program, consequently to improve athletes’ physical performance. He was truly determined to attain this goal, as he purposefully established firm routines to achieve professional improvement.

Cause we strive to get better... My head is probably filled with a lot of different knowledge, but at the same time, I’m always thinking about my craft, to try to make it better. So, it’s continually trying to think about things... It’s a job that you can touch a lot of different people and make things better for the athletes.

“Borrowing ideas”

Coach Boyd believed that strength and conditioning is a constantly evolving field, thus if someone wants to be among the best working in this field, ambition for professional improvement is indispensable. He theorized that the field of strength and conditioning develops rapidly, even more so than any other sport. Here, new sports and new athletes are placed in the system continuously, as the incorporation of strength and

conditioning becomes essential in increasing number of sports. Although the goal of strength and conditioning remains the same, to improve athletes' physical and mental performance, coaches working in this field face new challenges with the broadening variety of sports, athletes, and age groups.

Our field is the one that continuously evolves, even more so than any other sport itself. We're getting different athletes put into our system all the time. So you really have to keep on top of it... You got to constantly make changes, because you change, the players change, everyone changes throughout the years... I think the people that don't keep on the top of it are the ones usually passed by.

Coach Boyd indicated that his practical knowledge could be further deepened and extended if he stayed open to new ideas and accepted new conceptions from other professionals. He purposefully selected his assistant coaches with different backgrounds and experience, because he knew that a pool of professionals with a variety of working philosophies could bring color into a program. He was interested in others' approach to the field, and looked for ideas that he could borrow and apply in his program.

I think the knowledge increases because as you put a pool of different people together... as staff, you'll start seeing a variety of different things they have done, and that's really what strength coaching is, borrowing ideas from people.

In fact, he believed that the improvement of the field could mainly be achieved by exchanging ideas among professionals. Different gatherings of groups of coaches for the purpose of learning from each other, either at local or international level, could only be healthy and promotional for the field of strength and conditioning. He frequently went to different clinics, conferences and workshops, and eagerly looked for useful concepts to bring back in his gym.

At these professional clinics or conferences, Coach Boyd was mainly interested in practical ideas. He felt that the field became a bit too scientific recently, and was moving

away from what most strength coaches looked for. As his working hypothesis has been detailed earlier, he believed in hard work as the only avenue for athletic achievement, and according to his perspective, certain scientific approaches made coaches believe that hard work was secondary. Therefore, his interest focused on practical and immediately applicable ideas, rather than merely theoretical concepts. He was most satisfied if he learned new exercises, movement concepts, or drills extending his arsenal, or if he came to know ideas that he could structure into his program. Often, he looked for new equipment, some improved training devices and aids, with which he could improve his facility.

You go to clinics, you go to conventions to gain knowledge... Sharing ideas I think is just good and healthy for the whole business... That's how you grow as a coach... We keep going back to being practical and being hands-on. I like to go to conferences to see what I can take right then and come back to the gym and apply that to the athletes right away.

“Trying to be the best strength coach I can possibly be”

Coach Boyd was an achiever. He supposed that there was something more to learn, something to improve with. During his career, he worked with different strength coaches and in a variety of programs. He strove to learn from everyone with whom he has been cooperating, took ideas and built them into his own coaching philosophy. As his professional knowledge grew, he became confident. Dealing with hundreds of victorious athletes, running successful strength and conditioning programs, and achieving great results still did not stop him from being critical of himself, and searching for ways to improve. He knew that there was no perfect coach, just like there was no perfect strength and conditioning program. Some aspects could be somewhat improved.

I had won as a coach, being part of it as a strength coach, I've always looked again to see, is there anything we can do to help our team to get better. We're

always constantly looking and see if there's something we can improve on... There's no one being the best in everything they can be, you can always find some way to get better.

Coach Boyd theorized that the key was the constant evaluation of the program.

All the different parts of the program needed to be meticulously evaluated, if the goal was to improve. This included evaluating the entire yearly plan, as well as evaluating the smaller units and even each training session. This necessitated that he had some form of documentation or plan collected on file. Coach Boyd precisely prepared of all his training sessions with written documents and files them for future review. He had kept all his workout plans and all his seasonal and unit plans for many years. Training sessions were generally evaluated immediately after the session, with the cooperation of the assistant coaches. Larger units of the yearly plan were also evaluated at the end, making adjustments for the upcoming unit. The yearly workout plan was evaluated according to the previously determined goal of the given season. Once mistakes and unachieved goals were highlighted, suggestions for adjustments were discussed. Coach Boyd tried to involve his assistant coaches in the entire process, encouraging them to give recommendations. He knew that one of the most important things that he, as a coach, could do to improve professionally, was to learn from his previous mistakes. Underlining those mistakes and finding solutions were essential to prevent the same mistakes again. Apparently, experience may have ensured making fewer and less significant mistakes. Also, with experience, a variety of possible solutions could be amassed.

You come up with your own philosophy, your own way to present the workout and you put it down on paper. And if it doesn't work, then you make changes to it... You learn very quickly from those mistakes. Usually you try to think before of that... You got to look at each session and evaluate, I think if you do that you going to make yourself a better coach, because it keeps thinking about what should you be doing... Every workout that I dealt within the last 15 years, I have

some forms of those workouts written down on paper and I can go back to them. I've kept every workout, I have every single workout that we had.

Even if the goal of the season had been fully accomplished and all athletes had achieved great results, Coach Boyd still considered areas to change or ways to modify the program. He frequently searched for new exercises, drills, training concepts that he could incorporate in the preparation of athletes. He thought about the workout plan like a recipe. Once he had a recipe to make a good food, he tried new things with it. He added certain ingredients, he took away others, changed the portions. He strove to make the food more delicious, more appealing, or more nutritious. To achieve this, Coach Boyd collected ideas from different sources. Attending organized clinics and conferences was not the only strategy for collecting ideas. He used the Internet frequently, read journals or popular job related magazines, or visited other strength coaches' training sessions, exchanging ideas with them. Furthermore, he actively used his imagination in creating new exercises. He often came up with ideas during his own workouts. Whether it was a new movement, a new combination of techniques, equipment used in an unconventional way, or a newly developed device, Coach Boyd tested them and if he were satisfied, applied them in the strength and conditioning program. As he was generally open for new ideas, anything that he believed could fit in the program was a subject be tried out and eventually incorporated in the program.

You take the program that you worked with years, and you keep adding or taking from it to make it the best program you can make... What I did before, 10 years ago, not necessarily doing the same thing now. There are things that we do carry over. But at the same time, you look at different things that you have filed, and you take all that into consideration... I'm looking at my computer to try to figure out maybe some new ideas for another workout. I'm looking at the Internet to see what exercises I haven't seen before... I'm always looking for things to use for the athletes to see if it's going to help them in their sport.

Summary

This chapter provided an overview of Coach Boyd's second type of practical knowledge that he applied directly "in-action" when coaching strength and conditioning. Four major concepts were analyzed in detail. First, Coach Boyd's practices for plan modification were discussed, describing his actions when making adjustment in originals plans, listing various factors that could influence the originally planned training sessions, and showing examples of modifying plans on the scene. In the second section, Coach Boyd's knowledge of supervision was explicated, which included practices in training observation, assisting athletes, providing feedback, analyzing techniques, and identifying "cheating." The third part unfolded his vast knowledge of coaching pedagogical strategies, and focused on his strategies in creating a relaxed atmosphere in the gym, setting rules and requirements, applying instructional and motivational routines, taking safety precautions, making adjustments according to coaching philosophy, effectively managing workout sessions, and possessing a knowledge of the workouts. In the last section of the chapter, his knowledge and viewpoint of professional improvement was elucidated, the way he thinks about his professional knowledge and various actions that he takes for achieving excellence.

CHAPTER 7

DISCUSSION

This study aimed to examine and unfold an expert strength and conditioning coach's practical knowledge. By revealing the content of the knowledge that an effective and experienced coach uses in practice, other coaches working in the field may attain a better comprehension of the necessary knowledge base for coaching effectively, through which they may be able to identify their own shortcomings. Furthermore, this in-depth examination of an elite coach's knowledge could enhance the development and standards of educational programs designed for coaches, and consequently, it may positively influence the overall improvement of the field of strength and conditioning. The study was specifically designed to address the following research question: What is the content of knowledge that an expert strength and conditioning coach uses in practice?

As Coach Boyd's knowledge was disclosed and laid out, two main knowledge clusters were distinguishable. Both of these large knowledge clusters contained several knowledge categories that were dominantly used during Coach Boyd's everyday coaching practices. One of these two main clusters, containing six knowledge categories, appeared to be the foundation for the other knowledge cluster, which consisted five knowledge categories. All of these five knowledge categories were built upon one or more knowledge categories from the first cluster. Therefore, entitling the two clusters as Foundational Practical Knowledge and Applied Practical Knowledge clusters appeared to be appropriate, and in addition, it suitably expressed the existing relationship between the

two clusters. Coach Boyd's foundational practical knowledge included six categories: (a) knowledge of the field of strength and conditioning and coaching in the field, (b) facility and equipment, (c) exercises and techniques, (d) injuries, (e) athletes, and (f) planning. The second main knowledge cluster involved Coach Boyd's knowledge of (a) plan modification, (b) supervision, (c) coaching pedagogical strategies, and (d) professional improvement. In this chapter, these knowledge clusters and the included categories will be discussed and conclusions will be drawn.

During the process of mapping Coach Boyd's practical knowledge, numerous aspects of his knowledge base were revealed, along with personal and professional beliefs related to his work. The researcher of this study realized that an ongoing debate exists among researchers of human knowledge, arguing whether or not knowledge and beliefs relate to the same matter. Reviewing recent research in teaching, Borko and Putnam (1996) found that there is no clear or commonly accepted distinction between knowledge and beliefs of teachers. Reviewing practical knowledge studies, Meijer, Verloop, and Beijaard (2001) expressed that "in most studies only one term is used to refer both knowledge and beliefs" (p. 172). According to Calderhead and Robson (1991), beliefs often seem to be viewed as "filters", through which knowledge is acquired. Alexander, Schallert, and Hare (1991) argued that the term knowledge is used mostly to encompass "all that a person knows or believes to be true, whether or not it is verified as true in some sort of objective or external way" (p. 317). In attempting to express the relationship between knowledge and beliefs, Pajares (1992) stated that "knowledge and beliefs are inextricably intertwined... They play a critical role in defining behavior and organizing knowledge and information" (p. 325). Summarizing all viewpoints on this

issue and taking a stand for their research study on teachers' practical knowledge, Meijer, Verloop, and Beijaard (2001) declared:

Taken together, teachers' knowledge and beliefs are a huge body of personal theories, values, factual propositions, and so forth that are found in teachers' minds and that teachers can, sometimes more easily than at other times, summon and make explicit. A teacher's knowledge and beliefs are important determinants of a teacher's actions. (p. 172)

The researcher of the present study, in agreement with this statement, interpreted all Coach Boyd's revealed practically oriented beliefs and knowledge types as his practical knowledge that had a significant importance in guiding his work and everyday practices. In essence, numerous parts of Coach Boyd's vast knowledge base were professional beliefs. These beliefs were more than just influencing factors in Coach Boyd's coaching practices, in fact, they were crucial in determining Coach Boyd's actions. He also knew and acknowledged that professional beliefs were critical factors in his work. For instance, he expressed that during his career he collaborated with several different strength coaches, working with them or under their guidance. During this time, as he explained, "I took something from everybody and molded myself into what I believe, into what I am... I came up with my own philosophy, I came up with my own way to approach strength and conditioning."

Examining Coach Boyd's knowledge and professional beliefs from a practical viewpoint, several aspects emerged that were found to be foundational on the further parts of his knowledge. The Foundational Practical Knowledge cluster was a collection of various knowledge categories and beliefs that, while being essential in the practical

operation of coaching, were basis for the knowledge categories and beliefs of the other knowledge cluster. One of these categories, being perhaps the basis for all the other knowledge categories, was the collection of all his perspectives and comprehensions of strength and conditioning and his work in the field. His interpretation of the purpose of strength and conditioning was crucial in implementing programs. The way he construed the characteristics of his strength and conditioning program meant to be the central component of all his work, as the program that he purposefully applied was goal oriented, and sport- and individual-specific. Furthermore, he grasped his and other strength and conditioning professionals' job responsibilities comprehensively, and expressed his understanding of strength coaches' professional readiness and ways of evaluating work effectiveness.

Coach Boyd's knowledge of facility and equipment represented the second category of the Foundational Practical Knowledge cluster. His knowledge of how to structure and create an ideal strength and conditioning facility, what equipment to include and how to organize those was relevant in this category. He demonstrated consideration of numerous factors on this issue, such as equipping the facility related to the goal of the strength and conditioning program, safety concerns, and comfort and attractiveness cogitations. Moreover, knowing how his gym, or any gyms that he worked in, was structured appeared to be a critical factor in his work, as it greatly affected his gym management routines. Here, he based his knowledge on the available number and type of equipment, and the location of those. Furthermore, in the everyday coaching practices, he greatly built upon his knowledge of the various equipment that were applicable in the gym. Knowing the equipment included an understanding of the purpose and functioning

of these various devices, alternative ways of using those to better meet program goals, and lastly but not less significantly, proper ways and practices of maintaining them.

The third category of the Foundational Practical Knowledge cluster was composed by Coach Boyd's knowledge of exercises and techniques. This category included Coach Boyd's broad repertoire of exercises, which was a collection of drills, movements and techniques in strength training, plyometrics, speed and agility training, stretching, cardiovascular improvement, power and explosiveness development, balance training and others. Related to his arsenal of exercises, Coach Boyd also had clear concepts of methods to expand that repertoire, whether to figure out new exercises or learn about them from various sources. His understanding of the rational application of all the exercises was another major component of this knowledge category, along with his comprehension of the purpose and usefulness of exercises. Here, Coach Boyd took into account the sport-specific needs, the physiological effects of the exercises, as well as the biomechanical characteristics of those. Furthermore, the way he categorized all the exercises in his repertoire was determinant in his work. The final but one of the most important components of this category pertained to Coach Boyd's knowledge of the correct execution of all the different techniques, and the ways and methods of teaching them. Coach Boyd found it important to teach new techniques and exercises in progression, thus the athletes were gradually exposed to more difficult exercises, which were built on previously learned and already mastered movements. During this process, Coach Boyd carefully considered if the athletes were physically capable of progression and generally ensured safety. Cote, Salmela, and Russell (1995) examining expert gymnastic coaches found that they consistently used methods of teaching progressively,

they considered gymnasts' physical readiness when teaching new skills, and mostly ensured safety. Overall, the findings of this category greatly match with Dooman's, Titlebaum's, and DeMarco's (1998) statement that the strength coach must be able to demonstrate and apply knowledge in exercise presentation and proper technique in weight training.

Coach Boyd's knowledge of injuries constitutes the fourth category of this cluster. A great portion of his actions was designed to prevent the occurrence of injuries. His thinking on injury prevention was two fold. First, he hypothesized that preventing injuries in practicing the given sport was related to performing a well rounded strength and conditioning program. Second, he focused on preventing injuries while performing strength and conditioning training. Here, he emphasized flexibility training, ensured safety in various ways during sessions, and planned carefully to guarantee appropriate recovery time. Despite these various prevention techniques athletes still got injured frequently, thus a part Coach Boyd's knowledge had to deal with treating injuries. Actions taken for injury treatment included collaborating with the athletic trainers, modifying workout plans and exercises for the injured athletes, and applying stretching. The third part of this knowledge category was related to dealing with overtraining. Coach Boyd, while requiring hard work, also planned carefully and strove not to overtrain his athletes. Moreover, he regularly observed his athletes and frequently tested them, thus he was able to recognize the slightest deviations from the normal athletic performance development curve. His knowledge in this category, including both injury and overtraining prevention and treatment, was based on his thorough knowledge of human anatomy and physiology.

The fifth category of the Foundational Practical Knowledge cluster was related to the athletes that Coach Boyd dealt with. Coach Boyd expressed that he had a certain relationship with his athletes, and this coach-athlete relationship greatly affected the application of his strength and conditioning program. In their study examining expert gymnastic coaches' knowledge, Cote, Salmela, and Russell (1995) found that some gymnastic coaches strove to build a very similar relationship with the athletes as Coach Boyd. They revealed that the examined gymnastic coaches used dictatorial, peer pressure, respect demanding, and a friendly but "keeping a distant" relationship styles with their gymnasts. Similarly, Coach Boyd also strove to maintain a friendly relationship with his athletes, however, he maintained a certain distance and intentionally did not get too close to them. He was also dictatorial at times, and demanded respect from the athletes on a regular basis as well. In addition to his beliefs of the ideal coach-athlete relationship, Coach Boyd also had definite expectations on the attitude that athletes had to bring to the training sessions. Furthermore, he categorized the athletes from physiological, psychological and attitude related aspects.

Importantly, Coach Boyd had a deep and broad knowledge on all his athletes, knowing them personally as individuals. He knew his athletes' background, sport- and strength and conditioning-related performance level, playing positions, experience level, and their response to his motivational techniques. To achieve knowing all the athletes from such a diverse perspective, he had to take deliberate actions. Thus, he often had discussions with colleagues working with the athletes, he looked for opportunities to talk to them on a one-on-one basis, recorded their performance in the weight room and all their test results, and regularly observed them in training, thus storing information on

their behavior, habits, reactions and attitude. Researchers examining expert coaches made similar conclusions related the knowledge of athletes. Saury and Durand (1998) for instance, in examining expert sailing coaches' knowledge found that "an in-depth understanding of each athlete helped the coach interpret the athlete's behaviors and justified using different approaches" (p. 263). Related to the knowledge of athletes, similar conclusions can be drawn from the examination of Coach Boyd's work.

The sixth category of Coach Boyd's Foundational Practical Knowledge cluster was his knowledge of planning. A central component of this category was determined by his knowledge and comprehension of the planning process and the personal-professional beliefs of how the program periodization had to be composed. In creating a periodized program plan, Coach Boyd first carefully determined and took into consideration the major goals and objectives of the strength and conditioning program and the various phases within the program. Both the initial season planning, and the later ongoing unit and session planning was focused on these predetermined goals. He also established gym scheduling practices and routines for creating the athletes' workout schedules, and frequently experimented new ideas in his plans.

Another important characteristic of his knowledge about this topic was his hypothesis that planning had to be an ongoing process, as the different unit plans had to be refined as the season proceeded, and the workout session plans were created shortly before they took place. This way, demonstrating flexibility in planning, Coach Boyd was able to consider the most influencing factors, such as fatigue and injuries of athletes, facility management constraints, and whether conditions. Related to flexible planning techniques, Saury and Durand (1998) in observing expert sailing coaches also found

evidence that coaches planned flexibly. Those coaches often dealt with uncertain conditions, and as “the closer the events were in time, the easier they were to predict and control. Inversely, because of the dynamic and uncertain nature of the setting, the farther away an event was, the less rigidly it was programmed” (p. 260). Authors also revealed that certain events were more difficult to predict, thus coaches made second degree anticipations by foreseeing alternative courses of action.

An additional aspect of Coach Boyd’s knowledge of planning was the consideration of testing. Applying performance tests regularly, carrying them out in a valid and reliable method was vital in further program planning and modification. Testing procedures were used to both assess athletes’ physical improvement, and evaluate program accomplishments. Justifying Coach Boyd’s expertise in the planning process, the findings of Jones, Housner, and Kornspan (1995) are supportive. They assessed the planning knowledge of novice and expert basketball coaches and reported that expert coaches, when planning a session, would establish different goals and objectives, and identify how they would achieve their objectives, and how they would evaluate attainment of these objectives in a far more focused way than novices. In a similar fashion, Griffey and Housner (1991) demonstrated that experienced physical education teachers would ask many more questions before they would start planning. In addition, the experienced teachers were concerned with planning for possible incidents that may occur in a lesson. Taken together, Coach Boyd demonstrated a sophisticated knowledge of planning, a significant part of his coaching expertise.

Overall, Coach Boyd’s Foundational Practical Knowledge cluster contained knowledge in diverse aspects of coaching strength and conditioning. Some of this

knowledge was apparently based on his Foundational Disciplinary Knowledge base, including various aspects such as knowledge of anatomy, physiology, psychology, biomechanics, kinesiology, basic knowledge of periodization, program design and testing, basic facility management methods, and knowledge of training principles. Based on this factual knowledge, Coach Boyd developed his own Foundational Practical Knowledge base, which was practically oriented and adjusted to his personality and coaching philosophy, and adapted to the environment as well. Expanded by knowledge categories such as knowledge of athletes or injuries, Coach Boyd's Foundational Practical Knowledge base exceeded the suggestions for the necessary knowledge proposed by various strength and conditioning related studies. For instance, in their paper, Dooman, Titlebaum, and DeMarco (1998) claimed that the "strength coach must have an understanding of concepts related to strength and conditioning, such as exercise technique, program design variables, and weight room safety and design" (p. 31). In practice, an effective strength coach must have an understanding of a more multifaceted coaching conception. In Coach Boyd's case, the top level of this multi-level and broad knowledge base was the practical knowledge used in-action.

Entitled as Coach Boyd's Applied Practical Knowledge cluster, this was a collection of knowledge categories that emerged from the everyday coaching actions. The practice of plan modification appeared quite frequently in his work, thus his knowledge relevant to this coaching concept belonged to this cluster. Based on his vast knowledge of planning, and as aforementioned on his flexible planning routines, Coach Boyd frequently revised and adjusted the originally created program plan to the occurring conditions. Here, his knowledge of program goals was crucial, as it guided him in making

appropriate modifications. On a regular basis, Coach Boyd had to make modifications on the scene, often spontaneously. Such an action took place, when one or more of the various training factors, such as the flow of the session, athletes performance, injuries, comfort with exercises, weather conditions, gym management, or training time calculations were perceived to have a deficiency. Coach Boyd's actions when spontaneously modifying workout plans were similar to the sailing coaches' problem solving behavior in the study of Saury and Durand (1998), as they were found to improvise when meeting unforeseen circumstances.

Coach Boyd's knowledge of supervision was highly significant in his Applied Practical Knowledge cluster. This category was a collection of various important coaching cognitive practices that were frequently used in-action. Observation of athletes during the training sessions was one of his most prevalent action-based cognitive practices. In order to effectively observe his athletes, Coach Boyd relentlessly and deliberately moved around the gym, and observed the athletes looking for the ideal technique. After a quick cognitive technique analysis, Coach Boyd may have provided assistance, given feedback, or corrected. Coach Boyd partly assisted his athletes with technique correction purposes, but he also provided assistance when an athlete needed help in a movement, support in a balance exercise, or help in stretching.

When it came to providing feedback, Coach Boyd purposefully applied corrective verbal feedback most dominantly. Related to the dominance of negative feedback, Cote, Salmela, and Russell (1995) found that some expert gymnastic coaches preferred to use predominantly negative or corrective type of feedback, and only in a small percent positive feedback. In Coach Boyd's case, providing skill cues or schematic demonstration

was also used for corrective feedback purposes. Technique correction generally started with a fast technique analysis procedure, when Coach Boyd compared the seen technique to the designated ideal technique. At this point, he considered whether the flaw in the given athlete's exercise execution needed correction, ensuring safety aspects and taking into account the appropriate workout flow. Expert gymnastic coaches in Cote and colleague's study were also found to be consistent in correcting techniques for safety and injury prevention purposes. In Coach Boyd's workout sessions, correction was perceived to be necessary both to ensure safety and to reinforce the execution of the ideal technique. Another aspect of his supervision practices was his ability to identify athletes' improper exercises execution, in coaching terms the "cheating." Here, based on his vast athletic and coaching experience, he anticipated possible ways of "cheating" on the form, on the proper execution of an exercise, or on the required number of repetitions of a lift. By taking these numerous supervisory actions, Coach Boyd ensured athletes' safety and significantly contributed to their physical development.

The third category of the Applied Practical Knowledge cluster was the collection of the different coaching pedagogical practices that Coach Boyd heavily relied on. This knowledge category was composed of various beliefs, knowledge types and deliberate practices. First, Coach Boyd's belief of creating and maintaining a relaxed atmosphere in the gym while the sessions were taking place was a determinant factor. With this on mind, Coach Boyd intentionally approached all the athletes with a friendly and easygoing attitude, in order to achieve athletes' enjoyment in working out. His theory of the need for the enjoyment for appropriate motivational level was determinant here. Important to note that although Coach Boyd was friendly and easily approachable for the athletes, he

was also consequential. He deliberately set a number of rules that athletes had to obey while being in the gym. Coach Boyd was very consistent with these rules and with the application of the various consequential practices. The rules were created to control athletes' attendance in the training sessions, to inspire them for working hard, and to ensure that all of them met the set requirements. Coach Boyd applied various punishment practices when athletes disobeyed these rules. In Coach Boyd's belief, this was part of the athletes' mental preparation, and was useful to teach the athletes to be responsible for their actions. In the study by Saury and Durand (1998), expert sailing coaches were also found to teach and share responsibilities with their athletes. The sailing coaches' goal was to increase the athletes' ability to train themselves. Similarly, Coach Boyd trained his athletes in a way that they took responsibility for their actions, in addition to learning how to train on their own if needed, for instance, in off-training periods.

Another large portion of this knowledge category was the collection of instructional routines. One of the most dominant instructional strategies that Coach Boyd applied in his training sessions was the simplification of task explanation and gym management instructions. When simplifying instructions, Coach Boyd used brief orders, employing previously taught terms that the athletes already understood. Thus, Coach Boyd was able to save time and energy in giving out tasks for the athletes, or when managing the groups. Similarly, Saury and Durand (1998) also recognized "routine procedures" among expert sailing coaches, where the coaches did not give full instructions, but used terms and expressions with which the athletes were already familiar. This made the training management and organization economical, and the coach-athlete communication more effective. Related to task announcements, Coach

Boyd also tended to apply various skill cues and schematic demonstrations as part of the simplified instructions. Furthermore, Coach Boyd also considered the athletes' theoretical comprehension of the various tasks and the purpose of those tasks. Here, he provided verbal explanations on the reasons of performing certain exercises, answered athletes' questions, and drew imaginary sport-specific situations to better describe the rationale of executing those exercises.

The motivation of athletes is generally important in any sport-specific training, but it was found particularly imperative in Coach Boyd's strength and conditioning training, both as part of the athletes' mental preparation for the sport and as encouragement for hard work during training sessions. Establishing various motivational strategies and motivating athletes in different ways was a prevalent action for Coach Boyd. Among the different motivational strategies, Coach Boyd frequently encouraged, pushed and challenged the athletes, applied game-like situations, implemented competitions and an award system, and stated examples. Cote, Salmela, and Russell (1995) in examining expert gymnastic coaches found similar coaching strategies. These authors revealed that developing mental skills was a large category in gymnastic coaches' knowledge, and this category in Cote et al.'s interpretation included athletes' motivation. The expert gymnastic coaches applied encouragement, along with supportive, positive criticism and technical input, as strategies to motivate their gymnasts. In addition, simulation, which was defined as "the coach's knowledge of scenarios used in training to simulate the mental and technical demands of competition" (p. 92), was another commonly used coaching strategy among the examined gymnastic coaches. Coach Boyd with creating game-like situations and challenging competitions in his training sessions

used a simulation-strategy to motivate his athletes. Here, he found it essential to treat all athletes and all workout groups equally, and provide motivation to everyone. Coach Boyd's knowledge of motivation was found to be in correlation with his coaching philosophy, where he expected hard work from the athletes and he was willing to work hard for them. He spent most of his working time in the gym and interacted with the athletes the most he could, treated all of them fairly and equally.

Another aspect of Coach Boyd's applied pedagogical strategies was his knowledge of gym management. As the head strength and conditioning coach, he was responsible for gym scheduling practices. As the strength coach of the football team, he was also responsible for scheduling all the athletes in the team, creating smaller workout groups, scheduling those groups and also assigning all the assistant coaches to deal with the various groups. During the workout sessions, Coach Boyd mostly strove for fluent and fast transitions. He achieved this by careful planning, simplified gym management instructions, and having the athletes moving equipment.

The final aspect of Coach Boyd's knowledge pertinent to this category was his awareness of the workout. He was carefully keeping track of the workouts while those took place and instructed his athletes without any paper reminder of the workout plan. Coach Boyd knew the exact workout plans by heart through his careful and thorough planning process, and also by trying out the planned training sessions. This, in addition to helping him memorize the workout formats, provided him an idea of the athletes' pains and struggles that they went through during the strength and conditioning training sessions. With this strategy, Coach Boyd strove to learn the most possible about his own training sessions, by placing himself into the athletes' situation. This, in combination

with his former athletic experiences, made Coach Boyd understand the workout scenarios and the athletes' reactions better. Saury and Durand (1998) reported that expert sailing coaches, similarly to Coach Boyd, attempted to "see things from the athlete's point of view" (p. 263). This coaching action amounted to having a comprehensive attitude toward athletes. In the expert sailing coaches' case, involvement in the training situation was based on reference to past experiences. Authors expressed that the coaches "had lived through comparable situations and experienced the same sensations as their athletes had. Moreover, they all had a great deal of experience as coaches and had been in charge of the same athletes for several years" (p. 263). In Coach Boyd's case, most of these factors were also prevalent, as Coach Boyd heavily relied on his past and recent workout experiences, and on his thorough knowledge of his athletes.

The last category of Coach Boyd's Applied Practical Knowledge cluster was his beliefs of professional improvement, which was found to be part of the practically oriented set of understandings that directed his work. The issue of professional improvement had a central role in Coach Boyd's work and he took various actions to fulfill his quest for professional development. He strove to update his knowledge base, as he put it to "think about the craft." He used various sources to gain new information about strength and conditioning related topics, such as the Internet, books, professional journals and newsletters. In addition, he often experimented on the different aspect of strength and conditioning, figured out new exercises and tried new inventions in the periodized plans. He found it essential to go to conferences, coaching clinics and workshops on a regular basis, to meet other coaches and exchange ideas. Also very importantly, he placed a great emphasis on evaluating his own work and his own

program. He most generally saved and later reviewed his workout and unit plans, and strove to learn from his mistakes comprehensively.

Taken all together, the findings of this study indicated that Coach Boyd's overall knowledge base was structured into numerous layers. The very basis of this knowledge aggregation was his disciplinary knowledge, from which some of the practical knowledge categories originated and emerged. This disciplinary knowledge base included knowledge from formal education and textbook learning. The exact content of this knowledge base was not examined, as it was not related to the research question of the present study. Still, it can be assumed that disciplinary knowledge categories such as anatomy, physiology, psychology, biomechanics, kinesiology, basic knowledge of periodization, program design and testing, basic facility management methods, and knowledge of exercises and training principles were included. However, it is imperative to note that most of this knowledge was shaped, modified, reduced or extended, and specialized to the current practices and environment. Thus, some parts of this disciplinary knowledge base became practical. This knowledge, together with another vast portion of knowledge that originated from practice and experience in coaching strength and conditioning constituted Coach Boyd's Foundational Practical Knowledge. This cluster meant to be the basis for the top layer of this knowledge aggregation, the Applied Practical Knowledge cluster, which included knowledge categories that were clearly based on the Foundational Practical knowledge components. Coach Boyd's Applied Practical Knowledge cluster included knowledge that was not learned formally, but picked up on the go, and developed as getting experienced. Also, his own personality greatly shaped the content of this knowledge cluster, as he specifically created, borrowed, modified and applied certain

knowledge types that he believed were important in coaching. This meets the notion of Connelly and Clandinin (1985), as professionals in any fields possess a personal practical knowledge that is shaped to their own individuality. Thus, Coach Boyd’s Applied Practical Knowledge base directly based on his Foundational Practical Knowledge, and indirectly on his Foundational Disciplinary Knowledge and also on experience and practice. This entire knowledge pile was peaked in or focused on the goal of strength and conditioning, the goal of Coach Boyd’s work. This complicated interconnectedness of the various knowledge layers is attempted to be illustrated in a schematic knowledge pattern in Figure 4.

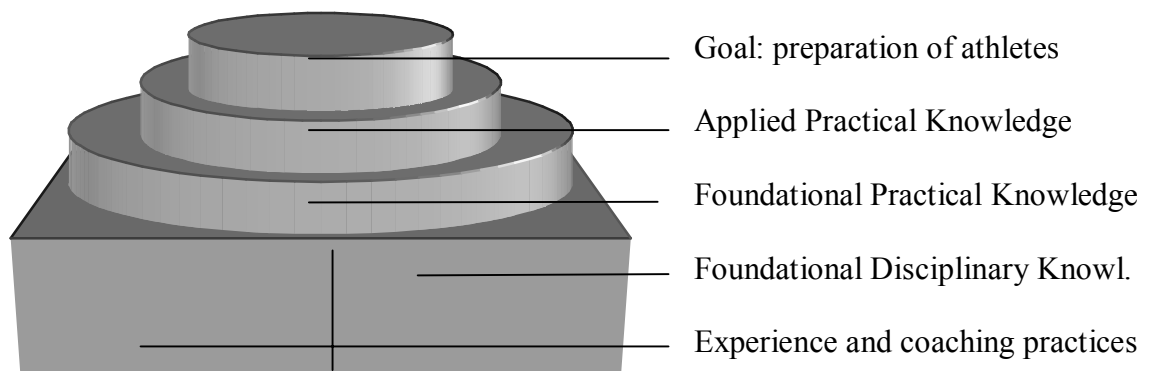


Figure 4 – Relationship of Knowledge Clusters

When summarizing the multidimensional findings of the present study, Dooman’s, Titlebaum’s, and DeMarco’s (1998) hypothesis, as “the strength and conditioning professional must have a lot of knowledge and expertise” (p. 34), appears to be accurate. It is indeed an immense and versatile knowledge that is needed to coach strength and conditioning effectively. To be an expert in this field the knowledge needs are even more demanding. The findings of this study indicated that the examined expert

strength and conditioning coach's practical knowledge was just partly based on his Foundational Disciplinary Knowledge, which was attained from formal education. Some major parts of his practical knowledge (i.e.: knowledge of athletes, knowledge of plan modification) were obtained from experience, real-life practices, or other professionals. Congruently, Dooman, Titlebaum, DeMarco (1998) also concluded that "one of the most important things a strength coach can possess is experience. Some of the best learning takes place during actual hands-on training" (p. 33).

Other major parts, mainly some categories of the Applied Practical Knowledge cluster, including his knowledge of supervision and coaching instructional strategies were pedagogy related knowledge. Unfortunately, coaching formal educational programs often do not focus on these inevitably important knowledge needs. Jones, Housner, and Kornspan (1995) indicated that in most coaching education handbooks important parts of coaching are not represented while some basic and disciplinary aspects of coaching are well covered. Often, these are the full extent of many programs, as Jones and colleagues phrased it, the notion of "well, now that you know about technique and tactics, go and pass that on to your athletes, you should be okay as long as you have the natural flair for the art of coaching" (p 72) still exists. They pointed out that this notion is in decline, and coaching educational programs more regularly focus on the pedagogical needs of the coaching profession than they did before. The present study greatly supports the theory of including pedagogy related courses in coaching educational programs and preparing prospective coaches for the pedagogical demands of this profession.

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APPENDIX A

BACKGROUND QUESTIONNAIRE

Strength and Conditioning Coaching Study – Background Questionnaire

Name: _____

Address: _____

Phone number: _____ Email: _____

Experience in Coaching Strength and Conditioning: _____ years.

Coaching honors and awards won: _____

Coaching record: _____

Education: Please list all educational institutions and certification programs attended after high school and degree/certification received.

Institution	Dates attended	Degree/Certification
-------------	----------------	----------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

Work Experience: Please list strength and conditioning related work experiences.

Employer/Organization	Dates	Position	Full/Part Time
-----------------------	-------	----------	----------------

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Athletic Experiences: Please list sports you practiced at competitive level and dates.

Sport	Dates	Team/Institution	Level
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APPENDIX B

INFORMED CONSENT FORM

I agree to participate in the research entitled AN EXPERT STRENGTH AND CONDITIONING COACH'S PRACTICAL KNOWLEDGE, which is being conducted by Sandor Dorgo, Sport Instruction Research laboratory, Department of Physical Education and Sport Studies, 300 River Rd., University of Georgia, Athens, GA. 30633, Tel. (706) 542-4210, under the supervision of Dr. Paul Schempp, Department of Physical Education and Sport Studies. I understand that this participation is entirely voluntary; I can withdraw my consent at any time without penalty and have the results of the participation, the extent that it can be identified as mine, returned to me, removed from the experimental records, or destroyed.

The following points have been explained to me:

- 1) The reason for the research is to analyze and report the practical knowledge used by an expert strength and conditioning coach. In particular, the study strives to reveal the content of an expert strength and conditioning coach's practical knowledge. The benefits that I may expect from this study are: first, sharing the research results, and second, having some insights into my own coaching practices and knowledge used in practice.
- 2) **I understand that I will be asked to be involved in the following things:**
I will fill out a questionnaire covering my background information. I will coach my training sessions as normal, while the researcher will observe them. The researcher will observe 1-5 training sessions per week, for a 10-15 weeks period. Following the training sessions, I will be involved in open-ended interviews with the researcher, who will address questions with the purpose of revealing the content of my practical knowledge of strength and conditioning. The interviews will last between 30 and 90 minutes. All interviews will be audiotaped and later transcribed.
- 3) My individual information obtained from the questionnaire will be known only by the researcher. Audio tapes will be transcribed and analyzed by the investigator only for research purposes. My name and any details that might identify me will be changed in any written reports in order to protect confidentiality, and audio tapes of the verbal reports, interview transcripts, and written descriptions will be kept in a secured and locked place and destroyed three years after completion of the research study.
- 4) There will be no harmful use of the data collected in this study.
- 5) No discomforts, stresses, or risks are expected during this research.
- 6) The result of this participation will be confidential or anonymous. My name will NOT be included in the study and the write-up.

7) The investigator will answer any further questions about the research, either now or during the course of the project. You may contact the researcher via phone: 706-542-4210.

My signature below indicates that the researcher has answered all of my questions to my satisfaction and that I consent to volunteer for this study. I have been given a copy of this form.

PLEASE SIGN BOTH COPIES OF THIS FORM. KEEP ONE AND RETURN THE OTHER TO THE INVESTIGATOR.

Date:

Date:

Signature of Investigator
Tel: (706) 542-4210
E-mail: sdorgo@arches.uga.edu

Signature of Participant

Research at the University of Georgia that involves human participants is overseen by the Institutional Review Board. Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address: IRB@uga.edu

APPENDIX C
INTERVIEW GUIDE

The total list of questions used for the open-ended interviews can be summarized in six categories, each covering an important aspect of coaching strength and conditioning:

1. Nature and theory of strength and conditioning, trends and developments in theory, and goal in coaching strength and conditioning
2. Strategies and instructional methods in coaching strength and conditioning to athletes, actions taken for professional evaluation and improvement
3. Athletes' characteristics, developments, training processes and differences in athletes' training skills
4. The coach's role in managing, instructing, and monitoring athletes, and in facilitating and evaluating athlete's development
5. Planning, preparation for seasons, periods and sessions and reasons for selection
6. Environment, community, surrounding individuals, colleagues, coaches