

Sports Coaching Through the Ages with an Empirical Study of Predictors of Rowing Coaching Effectiveness

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Abstract

Coaching effectiveness is a result of a coach getting the best out of the people and resources in their environment. For coaches, learning from experience is vital in a role that is a complex, dynamic and multifaceted process of balancing fun and winning where one cannot be sure if results will go according to plan. At the Olympic level, due to commercialization more money is being spent than ever before on developing more professional and effective training systems to maximize athletic performances. Medals won determine how a coach is evaluated and with more nations competition at a higher level, success is becoming even more competitive. More qualified and adaptable coaches are required to cope with the demands of international competition. The literature has been extensively examined based on the research question: to what extent is coaching success predicted by a coaches' ability to self-reflect on past experiences? The purpose of this study was to demonstrate that if coaches who are highly self-reflective and have successful athletic and coaching experiences would be more likely to have future coaching success than those who either were not self-reflective or had less success in the past.

Coaching knowledge is acquired through experience and the process of learning and self-reflection is an activity that facilitates this process. This study showed that rowing coaching experience and rowing athletic experience are positive predictors of coaching success, albeit weakly so. While self-reflective activities are not predictors of coaching success, self-reflection is an activity that coaches engage in. This study also identified the challenges in measuring coaching success. But like any domain, deliberate practice, which is a known pathway to developing expertise, is an activity that contributes to the professionalization of sports coaching and its advancement as a profession.

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Table of Contents

Acknowledgements.....	iii
Table of Contents.....	iv
List of Figures.....	vii
List of Tables.....	ix
Chapter 1 OVERVIEW OF THE STUDY.....	1
Coaching, Experience, and Self-Reflection.....	1
Professionalization.....	2
U.S. Olympic Sports.....	2
Commercialization.....	3
The Coaching Context.....	4
Background.....	5
Coaching Through the Ages.....	6
Sports Coaching, Money, and Education.....	6
Elite Rowing Coaching in the United States and Its Environment.....	8
Statement of the Problem.....	8
Purpose of the Study.....	10
Research Question.....	11
Scope of the study.....	11
Assumptions.....	11
Limitations.....	11
Significance.....	11
Outline of the research.....	12
Significance of this Study.....	13
Chapter 2 LITERATURE REVIEW.....	14
Understanding Sport Coaching.....	14
Defining Sport Coaching.....	15
Conceptualizing Sports Coaching.....	16
History of Sports Coaching.....	21
Global Politicization of the Olympic Movement.....	43
A New Era of World Sport.....	50
The Olympic Games and Television.....	53
Professionalization of Sports Coaching.....	56
National Sport Development Case Studies.....	59
Rowing and the United States of America—The athletes, the coaches, and the context.....	74
A Review of the Rowing Literature.....	76
A Brief History of U.S. Olympic Rowing.....	81
Challenges Facing U.S. Rowing at the Olympic Level.....	83
Maximizing Coaching Performance.....	91
Understanding Performance.....	91
Coaching Effectiveness.....	93
Coaching Knowledge.....	95
Athlete Outcomes.....	99
Coaching Context.....	101
Sports Coaching Success.....	103

Assessing Coaching Effectiveness.....	106
Coach Development Profile Interview.....	107
Using the Coaching Development Profile	112
Expert Performance	114
Developmental Profile of an Elite Coach	119
Formal and Non-Formal Coaching Education.....	121
Informal Coach Education	124
Past Experience of an Elite Coach	125
Supervised Learning Experiences.....	128
Competitive Experiences	128
Mentoring.....	129
Self-Awareness	133
Self-Reflection	136
Assessing Self-Reflection	138
Using the Self-Reflection and Insight Scale	141
Critics of Self-Reflection	142
Self-Direction.....	143
Self-Insight.....	144
Intuition.....	147
Chapter 3 METHOD.....	149
Hypotheses.....	149
Participants.....	150
Measures	151
Coach Developmental Profile Interview.....	151
Validity of Retrospectively and Concurrently Collected Data	153
Test and Retest Reliability for Past Experience.....	153
The Self-Reflection and Insight Scale (SRIS)	155
Data Collection	160
Data Analysis	161
Limitations	162
Conclusion	163
Chapter 4 RESULTS.....	164
Participant Profile	164
Type of Athletic Experience	166
Rowing Coaching Success.....	170
Rowing Coaching Experiences.....	171
Coaching Experience in Other Sports.....	173
Self Reflection and Insight of Rowing Coaches.....	175
Relational Variables to Coaching Success.....	175
Relating Research Questions to Results	176
Qualitative Results: Comments about coaching development practices	179
Chapter 5 DISCUSSION, RECOMMENDATIONS & CONCLUSIONS	181
Review of the Literature	181
Research Questions.....	183
Discussion of Research Findings	183
Implications for Practice.....	187

Suggestions for Coaching Development.....	187
Recommendations for Future Research.....	188
Conclusion.....	189
APPENDIX A—Glossary of Terms.....	191
APPENDIX B—Chronology of Sports Coaching Development.....	193
APPENDIX C—Rowing Bibliography.....	210
APPENDIX D—Summary of Coaching Effectiveness Instruments.....	226
Coach Developmental Profile Interview, Côté, Ericsson, & Law, (2005).....	227
The Coaching Behavior Assessment System (CBAS), Smith, Smoll, & Hunt, (1977).....	232
Leadership Scale for Sports (LSS; Chelladurai & Saleh, (1978, 1980).....	236
Arizona State University Observation Instrument (ASUOI) Lacy & Darst, (1984).....	241
Sports Orientation Questionnaire (SOQ) Gill, Dzewaltowski, & Deeter, (1988).....	249
Coach Feedback Questionnaire (CFQ) (Black & Weiss, 1992; Allen & Howe, 1998; Amorose & Horn, 2000).....	252
Coaching Behavior Questionnaire (CBQ), Kenow & Williams, (1993).....	255
The Coach Efficacy Scale (CES), Feltz, Chase, Moritz & Sullivan, (1999).....	260
Coaching Behavior Scale for Sport (CBS-S) Côté, Yardley, Hay, Sedgwick, & Baker, (1999).....	265
The Coach-Athlete Relationship Questionnaire (CART-Q) Jowett & Ntoumanis, (2004).....	269
Coaching Competence Scale (CCS) Myers, Wolfe, Maier, Feltz, & Reckase, (2006).....	274
APPENDIX E—Summary of Self Reflection Instruments.....	277
The Self Reflection and Insight Scale, Grant, Franklin, & Langford, (2002).....	277
The Texas Social Behavior Inventory (TSBI), Helmreich, Spence & Stapp, (1974).....	282
Private Self-Consciousness Scale (PSC) Fenigstein, Scheier, & Buss (1975).....	286
Self-directed Learning Readiness Scale (SLDRS) Guglielmino (1977).....	289
Oddi Continuing Learning Inventory (OCLI) Oddi, (1984).....	296
Reflection in Learning Scale, (RLS) Sobral, (2000).....	302
Reflection Thinking Questionnaire (RTQ) Kember, Leung, Jones, Loke, McKay, Sinclair, Tse, Webb, Wong, Wong, & Yeung, (2000).....	304
Groningen Reflection Ability Scale (GRAS) Aukes, Geertsma, Coehn-Schotanus, Zwierstra, Slaets, (2007).....	307
APPENDIX F—Original Coach Development Profile Interview.....	310
APPENDIX G—Original Self-Reflection and Insight Scale.....	311
APPENDIX H—Coaching Experience Questionnaire and Emailed Letter of Invitation.....	312
APPENDIX I—Permission to use Self-Reflection and Insight Scale, and Coaching Development Interview Profile.....	315
References.....	316

List of Figures

<i>Figure 1.1.</i> Literature review road map.....	12
<i>Figure 2.1.</i> Coaching defined.....	15
<i>Figure 2.2.</i> Conceptualization of Olympic sport.....	20
<i>Figure 2.3.</i> Tsu-chu.....	23
<i>Figure 2.4.</i> Antilochus.....	24
<i>Figure 2.5.</i> Milo of Crotona.....	24
<i>Figure 2.6.</i> Philostratus.....	25
<i>Figure 2.7.</i> Hippocrates.....	25
<i>Figure 2.8.</i> Galen.....	26
<i>Figure 2.9.</i> Brébeuf.....	27
<i>Figure 2.10.</i> Hieronymus Mercurialis.....	28
<i>Figure 2.11.</i> Doggett's Coat and Badge.....	29
<i>Figure 2.12.</i> Guts Muth.....	30
<i>Figure 2.13.</i> Friedrich Jahn.....	30
<i>Figure 2.14.</i> Pierre Coubertin.....	34
<i>Figure 2.15.</i> Jim Thorpe.....	36
<i>Figure 2.16.</i> Coleman Griffith.....	38
<i>Figure 2.17.</i> Hiram Conibear.....	39
<i>Figure 2.18.</i> George Pocock.....	39
<i>Figure 2.19.</i> Paavo Nurmi.....	40
<i>Figure 2.20.</i> Luz Long and Jessie Owens.....	40
<i>Figure 2.21.</i> Steve Fairbairn.....	41
<i>Figure 2.22.</i> Brutus Hamilton.....	42
<i>Figure 2.23.</i> Karl Adam.....	44
<i>Figure 2.24.</i> Hans Seyle.....	46
<i>Figure 2.25.</i> Ben Johnson.....	50
<i>Figure 2.26.</i> Marion Jones.....	51
<i>Figure 2.27.</i> Medal winning nations versus total percentage of medals won by top ten nations.....	52
<i>Figure 2.28.</i> 1960–2012 IOC television rights sponsorship and advertising.....	54
<i>Figure 2.29.</i> United States total gold medal tally and gold medal placing.....	67
<i>Figure 2.30.</i> Medal tally of host nations since 1984–2012.....	69
<i>Figure 2.31.</i> USOC Olympic funding distribution.....	71
<i>Figure 2.32.</i> 1981/1982–2011/2012 NCAA rowing programs—men and women.....	74
<i>Figure 2.33.</i> Rowing styles.....	78
<i>Figure 2.34.</i> Rowing styles power curves.....	79
<i>Figure 2.35.</i> Sport program evaluations.....	88
<i>Figure 2.36.</i> Coaching effectiveness.....	95
<i>Figure 2.37.</i> Perceived ability as a function of actual performance.....	147
<i>Figure 4.1.</i> Age distribution.....	165
<i>Figure 4.2.</i> Highest level of education.....	166
<i>Figure 4.3.</i> Highest level of training as a rower.....	168
<i>Figure 4.4.</i> Highest level of training as an athlete in other sports.....	168
<i>Figure 4.5.</i> Highest level of competition as a rower.....	168
<i>Figure 4.6.</i> Highest level of competition as an athlete in other sports.....	168

<i>Figure 4.7.</i> Highest level of training as a rowing coach.....	173
<i>Figure 4.8.</i> Highest level of competition as a rowing coach	173
<i>Figure 4.9.</i> Highest level of training as a coach of sports other than rowing.....	173
<i>Figure 4.10.</i> Highest level of competition as a coach of sports other than rowing	174

List of Tables

Table 2.1. <i>1960–2012 Revenue and Percentage Change of IOC TV Rights</i>	54
Table 2.2. <i>Australia Medals Tally and Olympic Funding Allocation 1980–2000</i>	63
Table 2.3 <i>British Olympic Funding and Medal Tally 1992–2012</i>	65
Table 2.4 <i>U.S. Medal Tally by Olympics</i>	68
Table 2.5 <i>Total medal tally by host nation—1984–2012</i>	70
Table 2.6 <i>Rowing References by Topic, Author and Date Published</i>	77
Table 2.7 <i>Elite Rowing Physical Characteristics</i>	79
Table 2.8 <i>U.S. Olympic Rowing Medal Tally</i>	83
Table 2.9 <i>2008 Beijing Olympic United States National Governing Body Comparison</i>	87
Table 2.10 <i>International Rowing Program Comparison</i>	89
Table 2.11 <i>Summary of Coaching Effectiveness Instrument</i>	107
Table 2.12 <i>Comparing Key Areas of Coaching and Mentoring</i>	130
Table 2.13 <i>Comparing Roles of Coaches to Mentors</i>	131
Table 2.14 <i>Summary of the Self-Reflection Instruments</i>	140
Table 3.1 <i>Summary of Coach Development Profile Questionnaire Items (25 items)</i>	155
Table 3.2 <i>SRIS–Subscales, number of items, reliability values</i>	159
Table 3.3 <i>Classification of Respondents into Four Groups Based on Coaching Record and Athletic Experience</i>	162
Table 4.1 <i>Demographic Profile of Participants</i>	166
Table 4.2 <i>Athletic Experience in Rowing and Other Sports</i>	166
Table 4.3 <i>Highest Level of Training and Competition as an Athlete</i>	167
Table 4.4 <i>Sports Played Other than Rowing</i>	169
Table 4.5 <i>Number of Sports Participated Including Rowing</i>	170
Table 4.6 <i>Coaching Experience in Rowing and Other Sports</i>	171
Table 4.7 <i>Highest Level of Coaching and Competition in Rowing and Other Sports</i>	172
Table 4.8 <i>Sports Coached Other Than Rowing—By Category</i>	174
Table 4.9 <i>Summary of Self-Reflection and Insight Subscale^a (N=153)</i>	175
Table 4.10 <i>Correlation Matrix</i>	176
Table 4.11 <i>Prediction of Coaching Success Using Rowing and Rowing Coaching Experiences</i>	177
Table 4.12 <i>Comparison of Win/Loss Record for Different Rowing Athletic Levels</i>	178
Table 4.13 <i>Comparison of Win/Loss Record Rowing Coaching Levels</i>	178
Table 4.14 <i>Cross Tabulation of Win/Loss Record by Experience</i>	179
Table 4.15 <i>Distribution of Comments about Coach Development Practices (N = 55) and Comparison to Other Relevant Studies</i>	180

Chapter 1

OVERVIEW OF THE STUDY

Coaching, Experience, and Self-Reflection

Five critical issues are related to the importance of experiential learning for coaching development: Funding challenges, growing numbers of unqualified coaches and increasing pressure within the sports coaching arena, the lack of relevant and practical formal coaching education programs, and lack of coverage of best practices in the literature. Coaching success is facilitated by effective decision making to support athlete development in an environment that optimizes peak performance. The purpose of this study was to explore to what extent experience can be a predictor of coaching success. Coaching development is a fundamental quality of a successful coach, which is measured by one's coaching record. Not all experienced coaches are experts, but all expert coaches have one thing in common, they are experienced (Chi, Glaser & Farr, 1988).

Rowing in the United States is an example that illustrates the challenges facing professional sports in the Olympic context. The number of rowing coaches in the U.S. at all levels—elite, collegiate, high school, and masters levels—is growing at unprecedented rates (Deringer, 2008). Developing a clearer understanding of the required activities in the development pathway from a novice to elite coach is more critical now than ever before. A decentralized system such as U.S. rowing that is challenged financially and lacks a structured formal coaching education program will change slowly if at all. Informal learning, which is how many coaches learn, is a successful and powerful vehicle that help to disseminate coaching knowledge to new coaches (Griffith, 1925). However, the relationships among formal and informal learning, past athletic achievement, and coaching experience are unclear and unstudied.

All of the factors of growth, professionalization, commercialization, and globalization can be observed in the microcosm of elite U.S. Olympic-level rowing. A closer examination of the relationship between past experiences and self-reflection as predictors of rowing coaching effectiveness at the elite level is needed to potentially promote greater levels of coach effectiveness in a changing and challenging environment. By clarifying this relationship between

self-reflection and coaching effectiveness, this may build a clearer pathway to the development of coaches in the future.

Professionalization

The amendment of Article 26 of the Olympic Charter began a gradual liberalization of the amateur rule. Beginning in the 1960s, sport systems technologies stemming from the domination of the former Soviet Union and German Democratic Republic led to the spread of professionalization of sports coaching around the world. These changes resulted in more nations are winning more medals at the Olympic games (Crowther, 2004) and is the major reason for the success of the internationalization of the Olympics (Macaloon, 1991; Wallechinsky & Loucky, 2012). For example, in 1964, 35 nations won medals compared to 2008 when 86 nations won medals. In 1964 the top 10 nations won over 75% of all medals and in 2012 the top ten nations won just over half of the total medals (IOC, 2012).

U.S. Olympic Sports

Understanding U.S. Olympic sports starts with its underlying charter from the 1978 Amateur Sports Act, which promotes amateur competition in sport. This charter illustrates the context of U.S. Olympic sport (Wakefield, 2007). U.S. Olympic history is rich and filled with tradition and success as no nation has domination over Olympic medal tally like the U.S. The pathway to success is very different when choosing from the 28 Summer Olympic sports and 15 winter Olympic sports (Baimbridge, 1998). U.S. Athletics and U.S. Swimming, America's top two medal winning sports, finished first in the world at the 2012 Olympics and have a long history dating back to 1800s, with a vibrant collegiate system and generating a massive revenue stream from individual membership in thousands of clubs around the nation (Wakefield, 2007). Team sports like U.S. Basketball and U.S. Baseball have their professional systems that financially backs their Olympic efforts. These sports have had Olympic successes similar to other US sports like swimming and athletics. Other high medal count sports like U.S. Cycling, U.S. Speed Skating and U.S. Wrestling, do not share the collegiate trends that other sports enjoy, but have a strong club base. U.S. Canoe/Kayak and U.S. Weightlifting also compete for a relatively high number of medals at the games, but are not high profile collegiate sports. Thus these sports share the challenge of developing a systematic pipeline for retaining athletes. U.S. Rowing consistently ranks as one of America's top ten sports for medal count and shared some

of each of these qualities—relatively high medal count, strong collegiate system, strong club base, and challenge of systematic pipeline.

Commercialization

The commercialization of sport has resulted in advertising and sponsorship revenue catapulting the Olympic movement into financial prosperity beginning in the 1960s (Mallon & Buchanan, 2006). Since its inception in 1882, the International Olympic Committee (IOC) has governed the Olympic movement to blend sport with art, education, and culture in pursuit of excellence, friendship, and unity (IOC, 2012). Up until 1960, the IOC struggled financially with a budget of around \$10,000. The decisions to sell the Olympic television rights reflected in Article 49 of the Olympic Charter would not only take the Olympics to the world, but would financially transform the Olympic movement into one of the world's most powerful international organizations promoting Olympic success around the world (Slater, 1998). The IOC received \$394,000 from U.S. broadcaster CBS for the coverage of the 1960 Olympics in Rome, \$100 million in 1980 for the Los Angeles Olympics, and NBC bought a combined package of \$2.2 billion for the 2010 Vancouver Winter Olympics and the 2012 Summer Olympics in London (Fernández Peña, 2009).

The trickle-down effect from the IOC financial success is that it distributes over 90% of its revenue among the National Olympic Committees, International Sport Federations, and Organizing Committees for the Olympic Games. Each individual sport actively advocates through its National Governing Body (NGB) to negotiate with its National Olympic Committee for funds (IOC, 2012). Olympic success leads to allocation of funding that influences training facilities, career choices of coaches and athletes, technology decisions and resource allocation (Andreff & Szymański, 2006; Shughart & Tollison, 1993). Professionalization and commercialization has led to more nations investing more resources to create cutting edge scientific training environments. U.S. Rowing historically is one of the oldest sports in the U.S. but lacks an individual membership revenue stream, as it is a team sport that lacks a traditional professional support system, and is a high medal count sport with a very rich tradition of collegiate support for elite rowing which is the backbone of almost all of its support.

The significance of the relationship between money spent and Olympic success has been well documented (Bernard & Busse, 2000, 2004; Hogan & Norton, 2000). Bernard and Busse (2000) found that “medal winning has become less concentrated, with large and prosperous

nations winning a smaller share of medals, and with more smaller and less prosperous nations among the regular medal winners” (p.23). The United States experience confirms this, with the gold medal tally gradually declining since World War II. At the London Olympics in 1948, the U.S. won 21% of total Olympic gold medals and at the London Olympics in 2012 around 11%.

The structure of each national Olympic program reflects traditions, culture, identity, character and values (Hoffmann, Ging & Ramasamy, 2002). Of the more than 200 nations competing at the Olympic Games, the United States of America is the only nation that does not receive sporting finances from any government sources (Chalip, Johnson & Stachura, 1996; Green & Houlihan, 2005; Koller, 2008). The “*laissez-faire*” approach to U.S. Olympic sports funding means a dependency on individual and corporate sources independently raised by each individual sport. This exposure to the fluctuations in the economy reflects a political milieu in the United States that has never made a priority of winning Olympic gold medals (Clumpner, 1986; Douglas, 1978; Hunter, 2008).

The Coaching Context

The coaching context is defined as a coach’s understanding of the unique setting that impacts an athlete’s performance (Côté & Gilbert, 2009). In the literature on sports coaching, the term concept and context are used interchangeably. The concept of coaching is the balance between competition and participation and takes very different forms within the context of the Olympic setting, compared to a collegiate or high school sporting environment (Côté, 1999; Côté & Gilbert, 2009; Côté, Young, North & Duffy, 2007; Lyle, 2002; Wall & Côté, 2007). At the elite level, coaching context is almost independently focused on competition as a coach is ultimately evaluated on the results of their athletes (Lynch & Mallett, 2006).

The history of sports coaching provides perspective on the complexities of the coaching context and the forces influencing the coaching process (Jones, 2000). The changes in Olympic sport over the last 50 years are indicated in the relationship between sport and internationalization (Arnaud & Riordan, 1998; Thibault, 2009; Weston, 2006), globalization (Houlihan, 2003; Maguire, 1999), commercialization (Amis & Cornwell, 2005; Slack, 2004), growth of state involvement (Houlihan, 1997; Riordan, 1978b) and media expansion (Bernstein & Blain, 2003; Rowe, 2004). Professionalization of coaching, commercialization and internationalization of sport helps describe the ideological, institutional, cultural, ethical and national forces impacting the coaching process.

The elite coaching context is a complex and multifaceted environment with interrelated factors acting simultaneously (Côté, Salmela & Russell, 1995; Jones, Armour & Potrac, 2002; Mallett & Côté, 2006; Martens, 2004; Partington, 1988; Potrac, Jones & Armour, 2002; Saury & Durand, 1998; Woodman, 1993). Côté, Salmela, and Russell (1995) identified organization, competition and training as three components of elite coaching and highlighted that working conditions are a vital dimension of the elite coaching context. All coaches, from beginner to expert, must understand the value the holistic development of athletes, whether a coach is working with beginner athletes with a sole focus on participation or as an experienced and successful Olympic coach (Côté & Gilbert, 2009).

Background

Coaching knowledge about training methods began to evolve, as did the understanding of the physiological responses to different training practices in the mid-1900s (Bourne, 2008; Gerschler, 1963; Matveyev, 1981; Selye, 1950). Several themes emerged in the sports environment coming out of World War II: professionalization, commercialization, globalization, politicization and internationalization. The professionalization of sports coaching gave more structure to the sports world and was facilitated by the commercialization and the use of drugs in sport during the 1960's (Green & Houlihan, 2005). The commercialization of sport resulted in the business expanding its viewing audience. Performance-enhancing substances began to play a critical role in the pursuit of elite sporting success on the global stage. The professionalization of sports led to further splintering of the sporting world in the politicization of sports. An example of this was the way the former Soviet and East German Olympic sporting programs rose to supremacy between 1960 and 1988. This indicated an increased involvement of and became a permanent feature in international sports (Allison, 2005).

More nations began focusing on increasing levels of energy, attention and resources to develop more sophisticated sporting systems. Internationalization of the world of sport was driven by the notion that sport is a business. The business of sport is a most compelling product to its audience when two criteria are filled. There must be an equal amount of talent distributed among all "groups" (teams/ nations) in competition which leads to a healthy uncertainty of which team/ nation may dominate the given competitive environment. The idea was that if one team, group or nation would dominate competition due to superior technology, talent and expertise would be bad for the business of sport (Zimbalist, 2001).

Until the 1960's, the U.S. had dominated the overall medal count in the Olympic games. The rise of the Soviet and East German sporting programs led to a changing of the guard in the overall dominance of the medal tally up until 1988. Since that time, countries like Australia, China and most recently, Great Britain have taken unprecedented measures to set up systems to all but guarantee Olympic success. It is no coincidence that these nations have also hosted the summer Olympics in more recent times. Hosting this major sporting event has led to building new infrastructure, and gaining massive community and financial support.

The new era of sport has seen a proliferation of examples of professionalization of sport and the role coaches play within it. From FIFA's World Cup Soccer Championship, to the Tour de France, or even the NFL's Super Bowl, professional sport has taken a presence on the international stage that is impossible to ignore. Elite sports programs around the world are gaining increasing amounts of attention as more resources and structures are put in place to further increase the chances of success on and off the sporting field.

Coaching Through the Ages

The title of this dissertation includes a historical perspective of the evolution of sports coaching as a profession. The inclusion of this timeline is a reflection of the lack of a comprehensive overview of key events in the literature on sports coaching. While it may appear to be outside of the context of this study, understanding the context of any domain is a critical perspective in developing expertise.

Sports Coaching, Money, and Education

Sports coaching is more than the process of facilitating learning and improving sporting performance: it is a multifaceted process of complex and effective decision-making (Gilbert, 2007). For coaches, Olympic success is linked to future financial support and, relative to other nations' budgets and performance targets, resources in the United States continue to become harder to secure to meet the desired levels for growth and competitive excellence (Green & Houlihan, 2005).

Successful coaches find solutions to address their coach development needs through coach education programs, learning experiences as athletes, and learning experiences as coaches (Côté, 2006). Gould, Giannini, Krane, and Hodge (1990), called for a comprehensive unified U.S. coach education system. The need for coach education is growing. Gilbert, Côté, and

Mallett (2006) wrote that U.S. coaching education is not centralized for approximately 3.5 million coaches and there is a need to have an effective method to educate coaches that fosters coaching effectiveness. Sellers (2008) found when comparing 130 Olympic coaches from 2008 Olympic coaching teams to those from 1988 Seoul Olympic coaching teams, that the 2008 coaches were more experienced, more qualified, attended more coach education programs and were mentored more than their 1988 counterparts.

Coaches not only need to have athletic, coaching and life experience; they must also process and reflect on what they observed, experienced,, and learned. Experience is more than a mere passage of time and longevity; it is the refinement of preconceived notions garnered from rich and meaningful practical learning situations (Gadamer, 1960). Having a clear and well-defined expert development pathway helps advance a deeper understanding of the coaching process and help maximize the coach's performance (Ericsson, 2006). Lynch and Mallett (2006) stated "some coaches experience ten years of accumulated experience through self-reflection and analysis, whilst others may experience the same first year ten times, without any development" (p. 20). These findings, which were based on a quantitative study to identify predictors of successful coaches, highlighted that some coaches learn more during the same time period than other coaches. Successful coach development requires fostering self-reflection through the analysis of one's coaching, athletic and life experiences (Lynch & Mallett, 2006).

Although past experience has an effect on future performance, the transition to coaching requires a new skill set that most former athletes acquire only with time and training (Glaser & Chi, 1988). Development of expertise requires deliberate practice and takes about ten years, or 10,000 hours of coaching experience (Côté, Salmela & Russell, 1995; Ericsson, Krampe & Tesch-Römer, 1993; Ericsson, Prietula & Cokely, 2007; Gladwell, 2008; Schinke, Bloom & Salmela, 1995; Sedgwick, Côté & Dowd, 1997; Simon & Chase, 1973).

Coaching development often begins before a coach receives any formal coaching education. Beginning coaches rely primarily on their playing experience to determine how and what is coached as these coaches are likely still playing and often are early in life experience (Penney, 2006; Salmela, Draper & Desjardins, 1994; Schinke et al., 1995). Coaching experience, mentor coaches and reflection mark the characteristics at the competent stage of coach development (Schempp, McCullick & Mason, 2006; Schinke et al., 1995). The proficient coach spends time reflecting, has acquired a level of compromise, experience and knowledge evident in

an intuitive and instinctive approach to responding to training protocols and trying new ideas (Schempp et al., 2006). The expert coach makes a great effort to improve training systems and increase capacity for self-criticism or depth of self-reflection (Schempp et al., 2006). The expert coach knowledge acquisition reflects redefining experience in unique and complex contexts that are highly personal and difficult to explain (Saury & Durand, 1998).

Elite Rowing Coaching in the United States and Its Environment

In the United States, coaching rowing presents a unique setting that is worth evaluating, particularly since it is given limited attention in the literature. It has a rich history and a complex array of factors adding to a context that is poised with the potential to show future success on the international of the Olympics. At the 2012 London and 2008 Beijing Olympics, the United States finished fourth as a nation in the sport of rowing, building on a fifth place at the Athens Olympics in 2004, reflecting a best finished since the 1984 Olympics when the U.S. finished second. The U.S. Rowing success in 2004, 2008, and 2012 has been attributed to (a) personnel, (b) an increase in athlete retention, (c) an experienced and consistent coaching team, and (d) an organized and stable administrative support staff. However, technological advances in the sport have been transforming and financial instability has led to facilities and resources being in some cases out dated, inadequate, and insufficient for international competition. When margins at the Olympic games come down to fractions of a second, all these details are critical in the day-to-day preparation of aspiring Olympic athletes.

Current funding levels for U.S. rowing athletes does not allow them to be full-time athletes and focus 100% of their attention of training and competing. All athletes have additional interests, but almost all need to have additional sources of income at this time as a means of survival. To further increase athlete retention, a more substantial source of support would help retain athletes for longer, to fulfill their potential rather than end their careers prematurely in order to start their 'other' or professional careers. Additionally, reliable financial support may encourage more athletes to remain in the sport as coaches. A pipeline for coach development begins with the athletes (Gilbert et al., 2006; Young, Jemczyk, Brophy & Côté, 2009).

Statement of the Problem

Developing a broader and deeper understanding of predictors of coaches success is lack in the literature. Factors that predict coaching success need more attention specifically as they

relate to self-reflection and past performances. Coaching effectiveness is defined and assessing coaching is significant aspect of maximizing coaching performance. Coaching expertise is another important aspect of this study in the context of sources of coaching knowledge acquisition and development profile of an elite coach. Formal, non-formal and informal learning strategies are explored including mentoring and self-reflection. Each affects coaching success and are critical for the development of future coaches and for the profession of coaching.

Rowing in the United States is one example of an elite sport program that has experienced dominance at the Olympics since its inception in 1896. From the 1964 Olympics, there was increased international competition on the Olympic stage. Since 1988, the United States, like many nations, attempted to gain new momentum to reassert itself on the international rowing stage. This momentum has led to more sophisticated, structured and organized systems, as all nations on the world stage are focused on achieving at the highest level (Allison, 2005).

U.S. Rowing is experiencing growth and increasing success on all levels and this is one of the contributing factors to why now is a time further academic research is needed to further advance the sport of rowing and the profession of sports coaching. There is a disconnect between the literature and the practice on sports coaching, particularly in determining an accurate measure of coaching success which has also received significant contention in the literature. Bridging the gap in the literature between theory and practice is one of the challenges that is attempted to be addressed here. The challenge is to facilitating ways for practitioners and theorists to come together to develop a better understanding of ways to advance the art and science of sports coaching as a profession.

The literature pays little attention to the area of coaching knowledge and as a result the focus of this study was on identifying and exploring what aspects of coaching knowledge facilitates coaching success. Specifically, within the concept of coaching knowledge are three key elements: professional knowledge, interpersonal knowledge and intrapersonal knowledge.

Intrapersonal knowledge, or introspection, is the one area in the sports coaching literature that has been given the least attention. The self-awareness literature shows that a relationship between self-reflective practices and expert performance and in the sports coaching setting, this relationship needs further research – thus this dissertation. A number of self-reflection instruments were considered. These instruments have not been used in the sports coaching context. The Self-Reflection and Insight Scale by Grant et al. (2002) was selected, as it appeared

to be the most relevant to the sports coaching context. This instrument has been used in a number of studies outside of the sports coaching context.

The Coach Developmental Profile Interview (Gilbert et al., 2006) was selected as the second quantitative instrument. After completing an in-depth assessment of the literature, this instrument provides a quantitative measure of sports coaching success and also included relevant coaching development activities.

The in-depth literature review conducted did not encounter examples of researchers combining measures of self-reflective practices and experience as possible predictors of sports coaching success. The literature review indicated studies that have used only one of these measures. Rowing coaching effectiveness has been covered in other studies such as Neil and Kirby (1979) and Giddings (2009) which looked at athlete's perceptions of coaching behavior. Côté and Sedgwick (2003) analyzed athletes perceptions of effective coaching behaviors. Mageau and Vallerand (2003) found that successful coaches adapt their behavior to meet their athletes' needs. Wiman (2010) highlighted introspection as a major source of developing coaching expertise. No other studies encountered have considered this relationship in the sports coaching domain.

Purpose of the Study

The purpose of this study was to explore predictors of coaching success (as a function of win/loss record). Coaching success was examined in the context of the hypothesis: Coaching success is a function of higher levels of self-reflection and experiences from past performances (in terms of experience as both an athlete and coach). Brewer and Jones (2002) found that little research exists on the required knowledge/ expertise for effectual sports coaching practices. Colclough (2008) and Gilbert, Lichtenwaltdt, Gilbert, Zelezny, and Côté (2009) recommended further attention is required to determine what specific activities contribute to the elite coach development by exploring how coaching knowledge influences athlete outcomes within the coaching context. U.S. Rowing coaches were invited to participate in this research. This group included coaches with varying years of experience and international racing competition. The expert (versus non-expert) group of coaches were examined to develop a better understanding of factors that contribute to predicting rowing coaching success.

Research Question

These research questions define the targets of the study:

1. To what extent does the developmental profile of coaches relate to coaching success (win-loss record)?
2. To what extent are self-reflective activities positively correlated to coaching success?
3. To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic success and three measures of self-reflection?

Scope of the study

Assumptions

Competition internationally will continued to improve and with more countries increasing their financially support to create more effective and sophisticated sporting systems to be successful at the international level of competition. One key assumption which is not accurate is that U.S. Olympic sports are funded to a point where they have all there needs met. Olympic sport in the U.S. is not government supported and most of the financial support comes from individual contributions from the local community.

Limitations

The U.S. Olympic sports coaching context has some unique limitations. Namely, sources of funding can be uncertain and hard to come by. Formal coaching education lacks structure and relevance to provide a reliable and credible approach to sports coaching development.

Significance

Rowing in the United States is an example that illustrates the challenges facing professional sport in the Olympic context. Effective formal and informal strategies for coaching development that not only assess coaching effectiveness is the focus here that provide meaningful solutions for greater coaching success. The purpose of this study is to develop a deeper understanding into the predictors of coaching success.

Outline of the research

Chapter Two defines and conceptualizes sports coaching and explores the history and evolution of the professionalization of sports coaching particularly at the Olympic level. Figure 1.1 outlines a road map of this literature review.

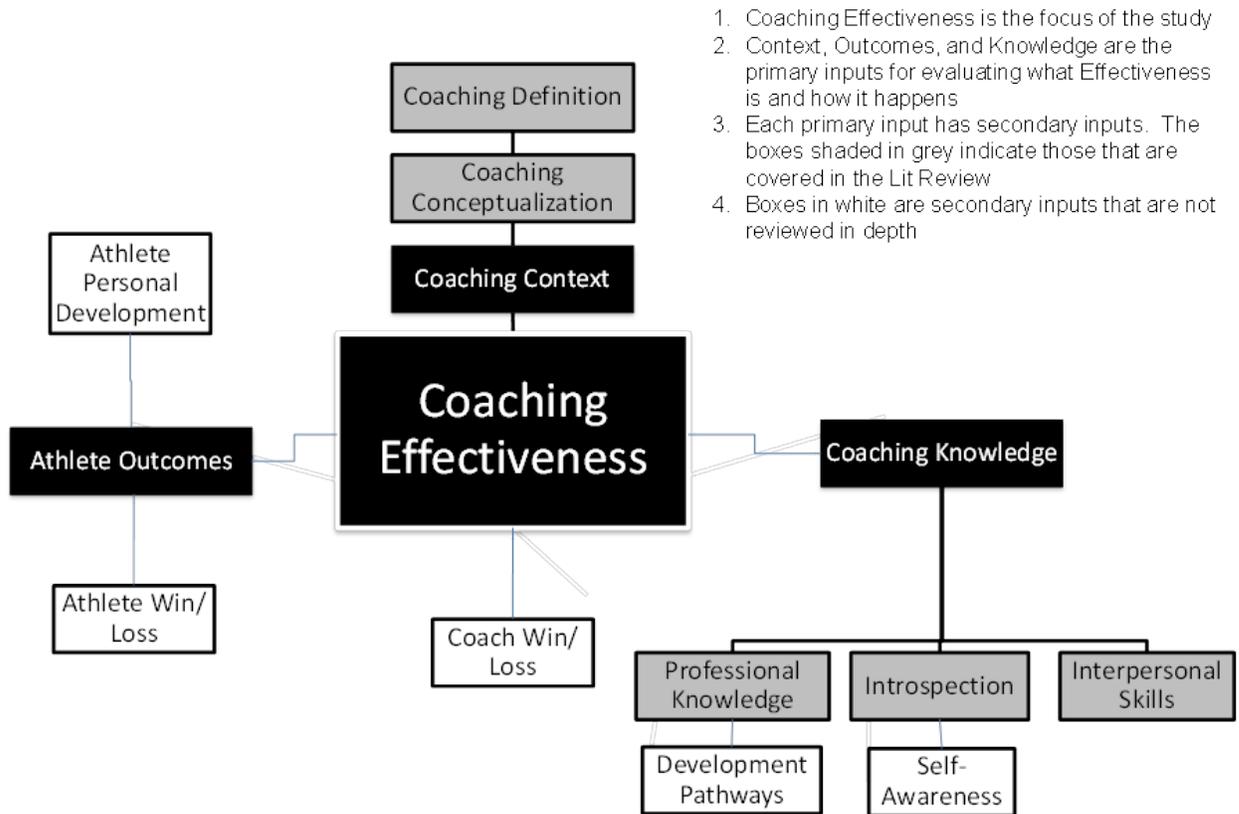


Figure 1.1. Literature review road map

Significance of this Study

A closer examination of the relationship between past experiences and self-reflection as predictors of coaching effectiveness is needed because higher coaching effectiveness is vital in this environment of professionalization, commercialization and globalization. The first part of the literature review focuses on understanding the coaching context, the second focuses on factors that determine the development profile of expert coaches. Chapter Two begins by defining coaching and describing the conceptualization of coaching, then presents a historical perspective of the coaching context from ancient times, the transition to modern times, and the Olympics and their relationship with sport coaching context today. Sport has been a powerful vehicle to transform an individual and organization level, and for communities, nations and the whole world (Ehrmann, Jordan & Ehrmann, 2011; Mechikoff & Estes, 2006; Riordan, 1993).

Effective formal and informal strategies for coaching development that not only assess coaching effectiveness but also provide meaningful solutions for greater coaching success are key aspect of maximizing coaching performance. This process is examined in the second part of Chapter 2 and helps to illustrate how coaches acquire their knowledge.

The study explores the significance of the relationship between self-reflection and athletic and coaching past performances for those coaching and aspiring to coach at the highest level of competition. Chapter Three outlines the data collection process conducted by using two instruments: Coach Development Profile Interview developed by Gilbert et al. (2006) and Self Reflection and Insight Scale developed by (Grant, Franklin & Langford, 2002). U.S. rowing coaches were invited to complete this online questionnaire (see APPENDIX H—Coaching Experience Questionnaire) to determine to what extent a coach's level of self-reflection and past performance helps predict coaching success. This process provided support for analysis of the hypothesis that the more experience a coach has as an athlete and coach this will lead to higher levels of coaching effectiveness based on Côté and Gilbert's (2009) integrative definition of coaching effectiveness and expertise. The purpose of this study was to develop a deeper understanding of and insight into the predictors of coaching success.

Chapter 2

LITERATURE REVIEW

U.S. Olympic sports face major funding challenges, few qualified coaches, no systematic coach education program and increasing professionalization of sports coaching around the world. As a result, developing coach effectiveness is critical as it is not only about having athletic, coaching and life experience but it is also critical how a coach processes those experiences by developing their knowledge, managing their athletes and getting the best out of their environment (Côté & Gilbert, 2009). Without development through self-reflection and analysis a coach may only experience the same year over and over if there is an absence of learning and development in one's coaching practices (Lynch & Mallett, 2006). This study highlights the current gap in the literature in relation to self-reflection and past performance (athletic and coaching) as predictors of coaching success.

The first part of the literature review focuses on understanding the coaching context, by beginning with defining the role and conceptualization of the sports coach then providing a more complete picture of how the coach has evolved over time. Formal and informal learning strategies provide meaningful solutions to adapt to these contextual changes producing greater coaching success and are key aspects of maximizing coaching performance. This is examined in later part of Chapter 2 and help to illustrate how coaches acquire their knowledge. In this chapter, the following themes will be covered:

- Understanding sports coaching—defining and conceptualization of coaching, history and professionalization coaching
- Maximizing coaching performance—past athletic experience, coaching effectiveness, self-reflection, and coach education.

Understanding Sport Coaching

This section attempts to identify some of the key aspects of the literature in defining and conceptualizing sports coaching. Both have received much attention in the literature. This review of the literature attempts to give more clarity and structure to the literature. In the context of this study, the complexity of the role of the coach and the balance between winning and participation can be often overlooked and oversimplified in some areas of the literature.

Defining Sport Coaching

Defining sport coaching has received much attention in the literature with no consensus about a common definition evident (Côté, Salmela, Trudel, Baria & Russell, 1995; Fairs, 1987; Jones & Wallace, 2005; Knowles, Borrie & Telfer, 2005; Launder, 1994; Lyle, 2002; Parsloe, 1999; Saury & Durand, 1998; Webster, 1938). *Coaching* is a process of learning and development to facilitate improvement of an athlete's performance (Fairs, 1987; Lyle, 2002; Parsloe, 1999; Schempp, Webster, McCullick, Busch & Sannen Mason, 2007; Webster, 1938). Great coaches like John Wooden, Vince Lombardi, and Phil Jackson get the most out of their athletes, their staff and the resources around them, this interrelated process is illustrated in Figure 2.1 (Mielke, 2007).

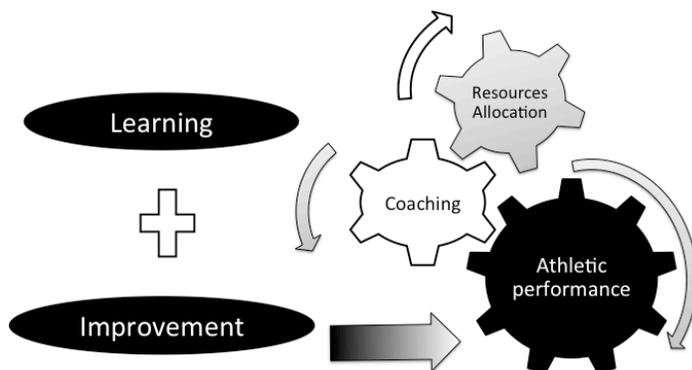


Figure 2.1. Coaching defined

The ancient Greeks defined a sport coach as a person requiring considerable knowledge in anatomy, heritage and nutrition like a medical doctor or psychiatrist (Bompa, 1983; Gardiner, 1930; Philostratus, 1964). A “*gymnastes*” or a coach, was a retired athlete and as a teacher of medical knowledge like a physician imparted their extensive athletic experience and understanding of the “laws of hereditary” to affect sport performance (Athenon, 1976; Gardiner, 1930; Yalorius & Andronicus, 1979). The “*paidotribes*” was the athletic trainer and the practitioner who applied the knowledge of beneficial training effects of sport to the prevailing medical theories where the “*gymnastes*” was the theorist and the teacher (Horstmanshoff, 1996).

According to the Online Etymology Dictionary, *coach*, as a noun, in 1831 was slang for a tutor who “carried” a student through an exam, and in 1861, a coach was first used in the athletic sense as sport trainer or instructor. MacMillan’s dictionary online defined coach as someone who

trains a sports player or team. Trikojus (2003) wrote the root meaning of ‘coach’ is to transform a person from where he or she is to where he or she wants to be.

The rationalistic approach to the definition of a coach is one-dimensional, unrealistic, oversimplified and understates the role of the coach. Critics propose the ecological systems approach that coaching is a multidimensional, complex and continuous decision-making process (Bengoechea & Johnson, 2001; Côté, Salmela & Russell, 1995; Cushion, 2007; Gilbert, 2007; Jones, 2000; Jones et al., 2002; Jones & Wallace, 2005; Kahan, 1999; Knowles et al., 2005; Launder, 1994; Lyle, 2007; Mallett, 2007; Saury & Durand, 1998; Thelwell, Lane, Weston & Greenlees, 2008). Coach, defined as a noun, is a specialist or expert based on previously defined technique, tactical or physical training. Lyle (2002) criticized this definition as being too general. As a verb, coach, is to overvalue the practical act and delivery skills of coaching (such as directing a training session, or managing a competitive event) while understating the cognitive, planning and personal interactions that characterize the coaching process.

The many different roles of a sports coach include mentor, counselor, instructor, teacher, trainer and mentor (Gould, 1987; Lyle, 2002; Martens, 2012). The coach maximizes modest control for all possibilities like an orchestrator organizing and overseeing an array of interrelated tasks as change unfolds (Bennie, 2009; Jones & Wallace, 2005). *Orchestration* has been defined as an arrangement or organization for optimal effect and the literature refers to effective management of complex change (Fullan, 2001; Wallace, 2003; Wallace & Pocklington, 2002). Jones and Wallace (2005) described this complexity, as *pathos*, an unbridgeable gap that exists for a “coach” as the would-be influencer of others’ actions but one who cannot be sure if the result will be as planned. Hoyle (1986) defined *organizational pathos* as “the discrepancy between proclaimed organizational goals and their achievement” (p. 51). Nash, Sproule, and Horton (2011) found that coaching is the orchestration of a complex array of variables that requires applying a coach’s knowledge and the use of their skills to contextualize the needed components for any given situation.

Conceptualizing Sports Coaching

In the literature on sports coaching, the term concept and context are inaccurately used interchangeably. This review of the literature on conceptualization is based on the definition that context is the environment within which the concept of coaching is being exercised. The coaching context is an invisible social and cognitive environment of constraints operating with

the ambition of control and rationalism has proved so far to be unsuccessful with many attempts to eliminate the pathos (Bowes & Jones, 2006). Coaching context will be discussed in more detail later as it relates to the integrative definition of coaching effectiveness.

The concept of coaching is the balance between competition (winning) and participation (play) (Côté, 1999; Côté & Gilbert, 2009; Côté, Young, et al., 2007; Lyle, 2002; Wall & Côté, 2007). This balance can take very different forms when comparing the context of the Olympics to collegiate or high school sports to sports as a recreational activity. The conceptual balance between competition and participation is reflected in many aspects of the literature including the philosophy of sport (Herrigel, 1953; Huizinga, 1938, 1955; Osterhoudt, 1973; Suits, 1978; Weiss, 1969), game orientation (Blair, 1985; Lumpkin, 1983; Webb, 1969), amateurism (Allison, 2001, 2005; Reiss, 1994; Wagg, 2006), and Olympism (Guttmann, 1992; Hill, 1992; Hoberman, 1995; Hobsbawm & Ranger, 1992; Loland, 1995; Lucas, 1980; Riordan & Krüger, 1999; Schaffer & Smith, 2000; Segrave & Chu, 1988; Toohey & Veal, 2007; Torres, 2006).

The philosophy of sport is about the interconnectedness between the result and participation in the competitive arena (Osterhoudt, 1973; Suits, 1978). Huizinga (1938, 1955) first established beyond a doubt that sport is a cultural phenomenon. Weiss (1969) legitimized the philosophy of sport as an area of investigation. Agreement in the literature begins with the idea that sport teaches values, but the debate begins with what values does sport teach (Craig, 1998). Sport is a species of game according to Torres (2006). Sports are peculiar activities that are unlike any other human activity as it is a voluntary attempt to overcome artificial obstacles (Kretchmar, 1995; Morgan, 1994; Suits, 1978, 1979). Galton (1869) argued sport is influenced by our genetics and that it is a natural advantage for those who were born with talent and work hard to train to improve their talent. Herrigel (1953) showed that sport teaches self-knowledge through reflection on sport experience. This investigation on sport philosophy splinters into a variety of dimensions after this foundational research. The sport philosophy research includes education (Siedentop, 1994; Webster, 1965), ethics (McIntosh, 1978; McNamee & Parry, 1998; Morgan, 2007), logic (Morgan, 1987), metaphysics (Cole, 1998; Holowchak, 2007), rules (D'Agostino, 1981; McFee, 2004), science (Miah, 2004; Tamburrini & Tännsjö, 2005) and the social and political philosophy of sport (Lenk, 1969).

“Game orientation” is the value placed on winning as opposed to fair play: “Professional orientation” describes placing more value on winning, “play orientation” reflects placing greater

value on fairness (Webb, 1969). Scott (1972) described the *counter-culture* ethic as an approach of “not whether you win or lose, but how you play the game” and Lombardian ethics is the pursuit of winning as the primary reason for competing and stems from the virtue of single-mindedness that exists in all facets of American culture (Figler & Whitaker, 1995; Kew, 1978; Scott, 1972). Blair (1985) confirmed the “professional orientation” as the “winning at all costs approach.” Lumpkin (1983) argued that this approach sacrifices play for work, and human values are lost. Scott (1972) argued that the *radical ethic* is the approach where there is nothing wrong with the essence of competitive sport and with an appropriate balance between cooperation and competition is a healthy, non-fragmented and valuable aspect for the complete human experience.

Stebbins (1977) defined the amateur as one who spends considerably less time in the chosen activity than a professional and earns less than 50% of one’s livelihood from the focal activity. The amateur lacks necessity, obligation and seriousness expressed by an absence of regimentation (e.g., rehearsal, practice) and systematization (e.g., schedule, organization) for the chosen activity that is apart from his ordinary, real life (Huizinga, 1938, 1955). In Kantian terms, amateurism is an activity where the purpose is the end-in-itself rather than a means to an end (Allison, 2005).

Amateurism has its origins in the elite British school system during the 1800s (Allison, 2005; Reiss, 1994; Wagg, 2006). Amateurism flourished during the 1800s but by the turn of the century there was a divergence in paths. The Amateur Athlete Association founded in 1880 and the Amateur Rowing Association founded in 1882 in Britain banned professionalism while cricket and soccer both became professional in 1885 and rugby union remained amateur, splitting with the legalization of professionalism for rugby league in 1895 (Allison, 2005).

In 1894, Coubertin adopted the amateurism code to the Olympic Charter known as by-law 26, excluding any athlete who performed any kind of manual labor, whether or not the work was sports-related (Guttmann, 2002). The Olympic revival in 1896 solidified amateurism by establishing a legitimacy of national cultures by helping people understand the relationship between the state and the people through the invention of tradition of a national sporting identity (Hobsbawm & Ranger, 1992; Loland, 1995; Torres, 2006). Olympism aims to promote the concepts of international understanding, brotherhood and peace as a moral set of values that distinguished the Olympic Games from all other major sporting events (Brown, 2012; Crowther,

2004). Critics argue that as the Olympics has grown, it has developed in different directions and in many ways contradicts the ideals that the Games were meant to represent (Da Costa, 2006; Loland, 2009; Morgan, 1995; Wamsley, 2004).

In the 1960s professionalism began to grow and transformed all aspects of sporting culture (Pope, 1996). Amateurism in sport has been gradually disappearing (Huizinga, 1938, 1955; Stone, 1972). In 1973, by-law 26 of the Olympic charter was amended to allow athletes to make money from their sporting pursuits and again in 1988 to allow professionals to compete in the Olympics reflecting an almost complete return to the ancient Olympics of financial reward for Olympic success (Guttmann, 2002; Lucas, 1992).

Critics of the traditional (one-dimensional) conceptualization of coaching present a similar argument to the rationalist (one-dimensional) definition of coaching stating the subtle idiosyncrasies that make up the conceptualization of coaching are complex, multifaceted, dynamic and messy (Cassidy, Jones & Potrac, 2004; Cushion, 2007; Cushion et al., 2010; Jones, 2000; Jones, Armour & Potrac, 2004; Jones & Wallace, 2005; Lyle, 1999, 2002; Potrac & Jones, 2009). Current conceptualizations of coaching do not reflect the social logic in use in sports coaching (Bowes & Jones, 2006; Potrac & Jones, 2009). Jones and Turner (2006) suggested that social cognitive psychology is a more appropriate starting point for a clearer and workable framework for the conceptualization of coaching. The literature requires a more realistic conceptualization of sports coaching that accounts for the coaching context that is in a constant state of change highlighted by complexity, intricacy and dynamism between competition and participation (Jones et al., 2004). Cushion (2006) recommended that further research is required to determine the patterns inherent in the coaching process.

Expert coaching uses standardized strategies and routines that can cope with the constraining factors of the coaching process that are permitted to be flexible and adaptable to the demands of the coaching context (Saury & Durand, 1998). Coaching appears to be neither solely reason-based nor entirely planned but a continuously adjusting process (Cushion, 2001, 2006; Jones et al., 2004). The forces acting on the coaching process include ideological, institutional, cultural, ethical and national (Jones, 2000). Power dynamics underpin this social system and manifest in competing egos and hidden hierarchical structures (Cushion, 2001; Cushion, Armour & Jones, 2006; Jones et al., 2002; Jones et al., 2004; Potrac et al., 2002; Purdy, Potrac & Jones, 2008). Coaching is not simply dependent on efficient application of a sequential process but

consistent quality interactions between coach, athlete and context (Cushion et al., 2006).

Coaching does not exist in a vacuum and the complex, interrelated realities that are interacting with the modern day sporting environment are influenced by individuals' ages, class, experience, gender, philosophies, race and values (Potrac et al., 2002). Contemporary coaches are expected to strive toward meeting expectations on an official level (to address credentialing standards by gaining more knowledge) and on a moral level (to address social expectations and responsibilities) (Taylor & Garratt, 2010).

Greater balance in the value between personal and performance success is required in assessing coaching evaluation (Amirault & Orlick, 1999; Orlick, 1998). Performance success typically is the win/loss record of a team or individual and personal success refers to achievement of developmentally appropriate tasks across one's life span and the acquisition of personal qualities that contribute to one's wellness and health (Miller & Kerr, 2002). Ultimately, success or excellence is value-laden and reflects the values of our culture (Kowal & Ross, 1999). Evaluating coaching success can be redefined beyond win/loss in the elite coaching context (Barber & Eckrich, 1998). Coaching evaluations of group cohesion, team function, nature of competition, and management duties form a far more methodical and systematic approach (Chelladurai, 1999). Figure 2.2 illustrates some of the key themes to help describe the history of coaching in the context of this conceptualization of coaching.

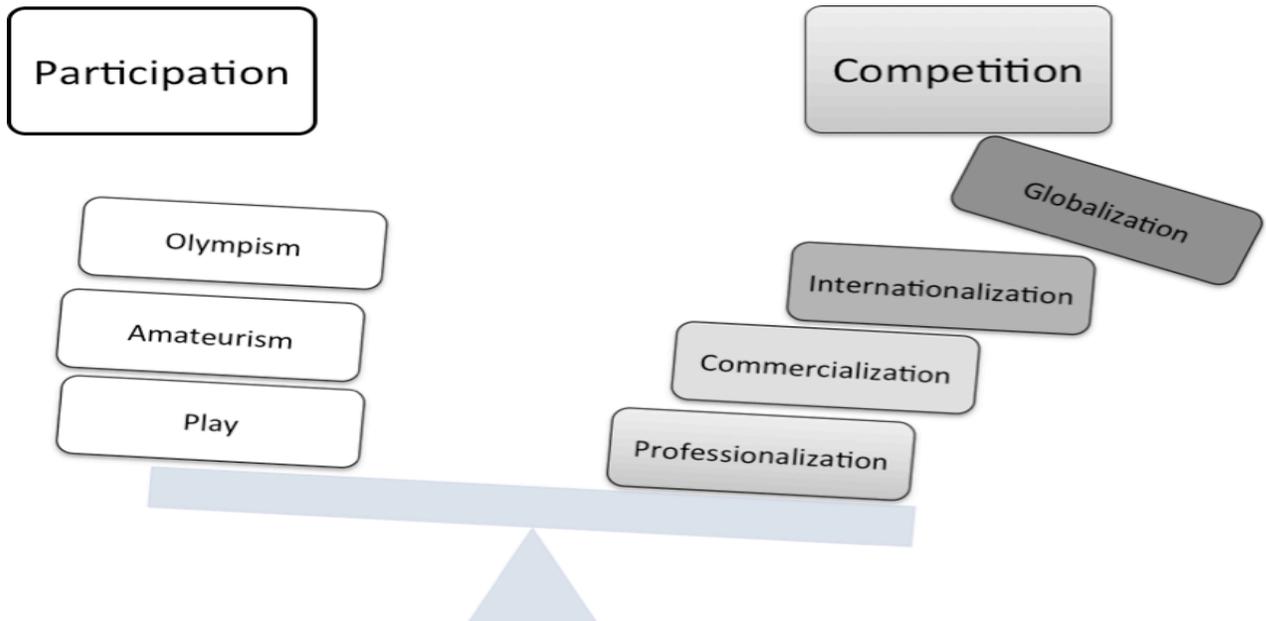


Figure 2.2. Conceptualization of Olympic sport

The next section highlights key sources (such as the economics of sport and sport policy development) and outcomes (professionalization, performance enhancement, commercialization, internationalization) of the complex social environment of coaching (Thibault, 2009).

History of Sports Coaching

While difficult to document, sport has been evident throughout human history and the literature indicates a systematic approach to maximizing athletic peak performance through sports coaching (Betinni, 2002; Bompa, 1999; Bourne, 2008; Lambert, Viljoen, Bosch, Pearce & Sayers, 2009; Mooney, 1891; Philostratus, 1964; Semotiuk, 1981; Swaddling, 2000). Kyle (1983) indicated that the literature on the history of sport is a reflection that the field has emerged as a profession as sport becomes more prominent in modern life. Sport in the literature has been referred to as a mechanism for national defense (Bucher, 1979; Chalip et al., 1996), promotion of health (Bucher, 1979; Horine, 1985), education (Bucher, 1979; Chalip et al., 1996; Horine, 1985), nation-building (Chalip et al., 1996; Clarke, 1993) and economic development (Chalip et al., 1996; Mahoney, 1977).

The history of sports coaching provides a deeper perspective on the complexities in the coaching context and the obvious and hidden forces influencing the coaching process (Jones, 2000). Professionalization of coaching, commercialization and internationalization of sport are some of these key aspects that add to the ideological, institutional, cultural, ethical and national forces impacting sport and sport coaching (Crowther, 2004). This historical perspective of sport and sport coaching creates a greater understanding of the foundations of sport and adds more valuable and meaningful context to our modern setting (Houlihan, 2003; Jarvie & Maguire, 1994).

Sport in its ancient form represented a ritual sacrifice of human energy, in the form that athletes who best expended or sacrificed receive the highest honor (Sansone, 1988). Blanchard and Cheska (1985) reported evidence of sport in the archeological ruins of all primary civilizations around the world from the earliest form of human culture. Ancient civilizations valued athletic ability, physical fitness, competition and play (Mechikoff & Estes, 2006). Huizinga (1938, 1955) wrote "*play*" represents an essential step in socialization as a teaching tool and vital transition in maturation. Sport has been used as a vehicle of broader cultural processes (Keys, 2004; Tylor, 1880). Mooney (1891) highlighted that sport is not played in a social vacuum. Sport has a heavily ritualistic form of masculine expression and a social

mechanism fostering rites of passage and social interactions (Kyle, 2007). Sport has provided a profound influence on the social, cultural, health and psychological spheres of human existence (Chadwick, 2009).

Archaeologist findings from 5800 B.C.—900 B.C. Sport has played an important part in the preparation for war, preparing superb warriors from harsh and physical training (Mechikoff & Estes, 2006). Archaeologists have discovered artifacts that prove the existence of sporting activities with the first representation of a rowing boat dating back to 5800 B.C. in Finland and boats with large oars in the early dynastic period of Sumerian civilization from 3000 B.C. (Olivova, 1984; Volianitis & Secher, 2007). Sumerian civilization, present day Iraq, flourished around 5000 B.C., where cuneiform replaced oral tradition around 3400 B.C. presenting evidence of lion hunting as the popular sport where warriors and aristocrats displayed their courage and athletic abilities (Mechikoff & Estes, 2006). In Egypt, archery, boxing and wrestling date from around 2000 B.C. (Carroll, 1988; Miller, McEwen & Bergman, 1996), fencing from 1900 B.C. (Czajkowski, 2005) and hunting from 1500 B.C (Griffin, 2007; Kyle, 2007).

Yoga is one of many spiritual practices that helps bridge the academic world of sport psychology and the sports coaching community when it comes to areas that limit sporting performance (Bernardi et al., 2001; Cooper, 1998; Gallwey, 1974; Murphy, 1977; Ravizza, 2002a, 2002b; Watson & Nesti, 2005). Archeologist dispute the evidence found about the origins of yoga that date between 3300 B.C and 1700 B.C (Possehl, 2003). In the literature, yoga was first evident around 900 B.C. in the Brahmanas, the seminal work in Hindu philosophy and the first reference was to the *tapas*, the self-discipline required to experience bodily purification and spiritual enlightenment as the essence of union that defines the practice of yoga (Flood, 1996). Patanjali's Yoga Sutras documents some of the most influential yoga traditions dating back to 200 B.C. (Whicher & Carpenter, 2003). Yoga is relevant in developing our greater understanding of the human anatomy and is relevant in the field of optimal physical performance particularly in recovery, injury rehabilitation and injury prevention.

In China, the earliest records of organized sport were seen as a vehicle for promoting health dating back approximately to 2500 B.C. (MacAuley, 1994; Mechikoff & Estes, 2006). Military training was also a key in physical training and athletic skill development and hunting was a popular sport with nobility and peasants in China (Mechikoff & Estes, 2006). The origins of martial arts can be traced back to Chinese surgeon, Hua T'o (ph; Wha Toe) who encouraged

exercises modeled on the movement of animals, principally the tiger (Lyons & Petrucelli, 1978). Kung Fu began as a form of medical gymnastics and may have been adapted from yoga practiced in India (MacAuley, 1994).

Tsu chu (See Figure 2.3) is arguably the most ancient ball game played by the Chinese before 2500 B.C. (Ekblom, 1994). In Japan, *kemari* was a game played using a ball only with one's feet between 300 and 600 A.D. (Guttman & Thompson, 2001).

Episkyros or *phaininda*, in Greece that influenced the Roman game *harpastum*, was the original game of football played in Europe around 2000 years ago (Witzig, 2006). *La soule* was the ball game played in the Normandy area about 1000 A.D..

involving getting a large wood or leather ball into a "goal" of an opposing village, which was often a pond (Witzig, 2006). In

Mesoamerica, *batey* was the ball game played in the

Antilles/Puerto Rico region, the Mexican *tlachtli* and the *pok ta pok* of the Mayas (Alegria, 1951; Blumchen, 2009; Witzig, 2006).

Ulama means playing with a rubber ball; it was a ball game played in the region south of northern Mexico, dating back to 1800 B.C. (Mechikoff & Estes, 2006). The literature is fragmented about the origins of this activity but does support the religious, cultural and competitive elements of the game (Cornell & Allen, 1997). This ballgame was more than a sport, and it was more like a metaphor for movement of the heavenly body and may have also been seen to be a venue for the public reenactment of warfare (Miller, 1996).

Before the Greeks, little is known and documented about the role of the "coach" in these earliest forms of sport. It is hard to imagine that the organization and direction of these group activities was not the responsibility of a community leader or a team of wise elders.



Figure 2.3. *Tsu-chu*.

- Adapted from *Tsu-chu* (n.d.) Retrieved February 1, 2012, from <http://www.footballnetwork.org/dev/historyoffootball/history1.asp>. In the public domain.

1000 B.C.—476 A.D.—Ancient Greece and sporting knowledge. Coaching in chariot racing goes back to 1000 B.C. found in the writings of Homer (Semotiuk, 1981). In Greek mythology, before a chariot race at the Funeral Games, Antilochus' (See Figure 2.4) father Nestor provided his son advice about the importance of technique, motivation, equipment recommendations, and physical strategies required to maximize his performance for racing (Betinni, 2002; Dunkle, 1987; Roisman, 1988). Antilochus did not follow his father's advice, but almost won the chariot race. Then he was accused of using unfair means because he was neither the most talented athlete in the event, nor did he have the best horses (Gagarin, 1983).



Figure 2.4. Antilochus.
Adapted from Antilochus (n.d.)
Retrieved February 1, 2012, from
[http://www.qwiki.com/q/-!
!/Antilochus](http://www.qwiki.com/q/-!/Antilochus))

Many Greek citizens believed maintaining high fitness and liberty depended on strength, endurance and physical prowess (Gardiner, 1910). From just after the inception of the Ancient Olympic 776 B.C. to 146 B.C., the ancient Greeks were at war among state, factions and foreign invaders (the First Messian War, Battle of Marathon, Peloponnesian Wars, Persian Wars, Macedonian Wars) (Young, 2004). This culture of military service was seen as a rite of passage to becoming a Greek citizen and having the right to vote (Spivey, 2004).

Although the ancient Egyptians, Chinese and Indians and other early peoples practiced resistance training credit traditionally goes to the ancient Greeks for producing the forerunner to modern weight training (Todd, 1966). Milo of Crotona (See Figure 2.5) was known as the father of resistance training the myth says that he would carry a calf every day above his head as a part of his resistance training in the fifth century B.C. and he was also a six-time ancient Olympic champion (Willoughby, 1970). Milo was known for utilizing three lifting apparatus, the “*diskos*”, the “*javelin*” which were both thrown for distance and the

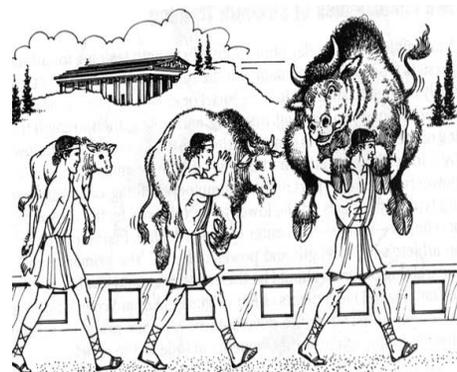


Figure 2.5. Milo of Crotona
Adapted from Milo (n.d.) Retrieved
August 21, 2010, from
<http://nuscapoeira.blogspot.com/2010/10/milo-of-crotona.html>. In the public domain.

“*halteres*” used just like dumbbells as jumping aids (Gardiner, 1930). Galen wrote about the “*halteres*” and their use for different types of broad, high and side jumps along with bearing the weight above the head and shoulders and these writings managed to keep the idea of resistance training alive past the fall of the Roman Empire (Todd, 1966).

Philostratus II (170-240 A.D.) (See Figure 2.6) first documented training methods that included training procedures, physical signs of poor conditioning, equipment, weightlifting programs and clothing (Bompa, 1999; Bourne, 2008; Gardiner, 1930; Lambert et al., 2009; Robinson, 1955; Yalorius & Andronicus, 1979). Philostratus demonstrated an understanding of hereditary factors that influence the likelihood of an athlete’s potential or future condition (Robinson, 1955). His understanding of the human body included skin analysis for coloration and quality as they relate to overtraining or potential onset of sickness and he was also aware of the importance of massage and other therapies to enhance performance (Bourne, 2008).

Credit of the importance of physical activity and nutrition was given to Herodicus of Selymbria around 500 B.C. (Georgoulis, Kiapidou, Velogianni & Stergiou, 2007). Herodicus laid the foundations for the work on diet and hygiene as he was the mentor of Hippocrates (See Figure 2.7) (460—380 B.C.) (Blundell, 1864). Nutrition and physical activity work together to produce health: exercise can both build and reduce muscle and food provides good remedies (Hippocrates, 1978).

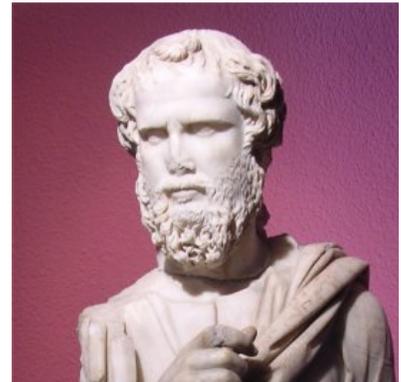


Figure 2.6. Philostratus
Adapted from Philostratus (n.d.)
Retrieved August 23, 2010, from
<http://all-history.org/philosophy5.htm>. In the public domain.

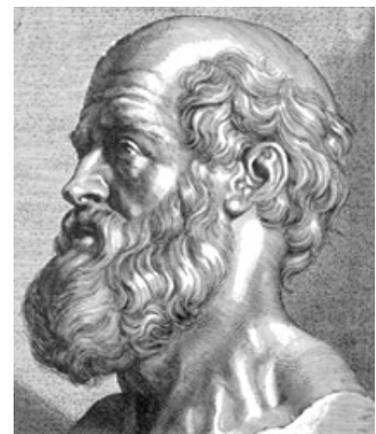


Figure 2.7. Hippocrates
Adapted from Hippocrates (n.d.)
Retrieved August 20, 2012,
from
<http://www.thefamouspeople.com/profiles/hippocrates-120.php>.
In the public domain.

Galen (See Figure 2.8) (131—201 A.D.) was considered a student of Hippocrates and was significant as he extended this work of nutrition and health that was recognized until the Renaissance period (Park, 1901). The ancient Olympians developed a deeper understanding of diet and nutrition, sports psychology, and optimal training methods to maximize athletic performance (Swaddling, 2000).



Figure 2.8. Galen.
Adapted from Galen (n.d)
Retrieved August 20, 2012, from
<http://www.thefamouspeople.com/profiles/hippocrates-120.php>. In the public domain.

476—1800 A.D.—Post ancient sport and pre-modern sport coaching context. For about 500 years, from 476 A.D. no sport-related activity was documented in the literature (Klug, 2011). In the Middle Ages (900—1400 A.D.), feudal knights introduced physical conditioning to help them defend their territories by improving their skills in a range of activities including riding, swimming, climbing, and combat activities such as vaulting, fencing, wrestling, jousting, and archery (Delleck & Kravitz, 2005; Dishman, Washburn & Heath, 2004; Mechikoff & Estes, 2006). The cultural and social impact of the crusades from 1096 to 1270 led to the French organizing the first fencing competition in 1066 A.D. and fencing teachers taught from their own experiences as there were no formal schools (Bellotto, Kubesh & McNeil, 2007). Original work linking health and exercise may be traced back to The Canon of Medicine written by Ibn Sina by his death in 1037 A.D. (Khan, 2005) and Tacuinum Sanitatis completed in 1068 A.D. by Ibn Butlan, both physicians from Baghdad (Barrett, 2006). These texts formed the basis of some of the founding research conducted at the world's first known medical school in Salerno, Italy toward the end of the 11th century (Dishman et al., 2004).

The origins of lacrosse go back to the 12th century in various communities in North America by the Native American tribes of the Great Lakes, eastern Canada, the Southeastern United States, and the Mississippi Valley (Gorn & Goldstein, 2004; Mooney, 1891; Vennum, 1994). From the 1100s the traditional game was played with a deep spiritual involvement to tribes as the spirit of combat for those who took part did so in the role of warriors, with the goal of bringing glory and honor to themselves and their tribes (Fisher, 2002). The game was not only for recreation but was also a means of training young warriors as the roughness of conditions resembled that of close combat and helped develop endurance for war and hunting parties (Scott & Scott, 1978). Among all cultures, the game was traditionally a surrogate for war because communities arranged a match to resolve territorial conflict (Vennum, 1994). Lacrosse had a close significance with gambling that also helped resolve territorial disputes by promoting economic equality and frequency of play meant for player parity through movement of players within and between tribes (Fisher, 2002). In 1636, French Jesuit Brébeuf (seen in Figure 2.9) named lacrosse after the crosier carried by a bishop (Fisher, 2002; Scott & Scott, 1978). It was not until the late 19th century when lacrosse began to appear as an activity with organized structure in the formal sport setting and rapidly grew in the 20th century to have a presence early in the 21st century in over 1400 high schools and 500 universities across North America (Fisher, 2002).



Figure 2.9. Brébeuf.
Adapted from Brébeuf (n.d.) Retrieved August 31, 2012, from <http://www.sjweb.info/jesuits/saintShow.cfm?SaintID=73>. In the public domain.

In 1274, the word “*regate*” first appeared in Venetian text, in reference to the “Regatta Storica” known as a boat race introduced by the government of Venice as a military exercise to train oarsmen for war and a parade of the evolution of the famous medieval and renaissance boats in the region (Dodd, 1992). The “Regatta Storica” or the Historical Regatta held on the first Sunday in September ends with a ceremonial event with a competitive race among the fastest boats in the region (Agencies, 2005). According to Volianitis and Secher (2007), in Venice Doge

Giovanni introduced the gondola race to the rowing festival to celebrate the glory of Serenissima, meaning very or most serene and the name for the Republic of Venice.

In 1354, Petrarca was one of the first to write about and revive Galenic medicine and the view that exercise was an essential part of the complete development of “self” (Struever, 1993). In 1569, Hieronymus Mercurialis (see Figure 2.10) (1530—1606), an Italian physician, epitomized the intellectual revival by extending the definition of exercise stating it protects health and develops fitness (Berryman, 1989; Blundell, 1864; Dishman et al., 2004; Joseph, 1949; McIntosh, 1984; Mercurialis, 1569; Struever, 1993). This was a time of no organized sport Mercurialis promoted exercise for health (a



Figure 2.10. Hieronymus Mercurialis.
Adapted from Mercurialis (n.d.)
Retrieved August 21, 2012, from <http://de.academic.ru/dic.nsf/dewiki/614101>. In the public domain.

form of gymnastics) and not entertainment or vanity a criticism of the bodybuilding culture of the period that focused on a torpid, dull and sluggish body (Todd, 2002). Mercurialis was the major source of information about exercise and correct use of exercise in therapy and prevention in the classical period (Blundell, 1864). This period of the 1800s was the foundation for the revival of the physical training methods of the ancient Greeks which took shape in two forms dependent on individual constitutions, exercise was either preventative or therapeutic (Joseph, 1949).

In 1568, Joseph Duchesne, in *Ars Medica Hermitica* wrote that exercise regulates the body, strengthens the muscles and organs, and enhances circulation (Dishman et al., 2004). In 1572, De Monteux, a French physician, wrote about the positive benefits of exercise to enhance physical and intellectual development (Arcangeli, 2000). Montaigne (1533—1592) wrote of organized activity resembling gymnastics/exercise, running, fencing, hunting along with dance in the 16th century in France (Staley & Lowery, 2009; Todd, 1966). Montaigne recalled his father’s regular resistance training exercises and described equipment his father used to build strength for his upper body and legs (Gide, 1939).

In 1715, the oldest continuous rowing race in the world was first held on the river Thames in London (Dodd, 2000; Holt, 1989; Volianitis & Secher, 2007). It has always been a very prestigious race, and the prizes that included the Doggett's Coat and Badge (see Figure 2.11) would always attract entries from more rowers (Wigglesworth, 1992). This race has continued since 1715 and had races of up to six watermen over a 4 mile 5 furlong distance (7.4km) with the current along the Thames that includes passing under 11 bridges (Halladay, 1990).



Figure 2.11. Doggett's Coat and Badge. Adapted from Badge (n.d.) Retrieved February 1, 2013, from <http://acrosstheuniverse.forumotion.com/t4163-messing-about-in-boats>. In the public domain.

1800–1840—The origins of modern sports coaching context. The sporting club fosters community-building through social inclusion, socialization and discipline and was a major strength of the 19th century's pursuit to permanency in the social fabric around the world (Rader, 1983, 1994; Zauhar, 2004). Inspired by the formation of the London Athletic Club in 1863, the New York Athletic Club was formed in 1868 and its player-centered orientation led to the sponsorship of the first national amateur championships in track and field in 1876, swimming in 1877, boxing in 1878 and wrestling in 1878 (Rader, 1983). Clubs represent the implementation component of a sports system as a setting where athletes engage in sports with coaches and other adults contributing to athletic development (Heinemann, 1999). Sports clubs are settings that arrange sporting activity for athletes and create a social environment in which different levels of participation exist for all (Kirk & MacPhail, 2003). Sports club have a positive impact on athlete developments (Brettschneider, 2001; Wigger, 2001) and help foster an athlete's life skills (Fraser-Thomas, Côté & Deakin, 2005; Gould, Collins, Lauer & Chung, 2007; Priest, Armstrong, Doyle & Waters, 2008). Sports clubs today have a global presence that began in the early 1800s (Zauhar, 2004).

In Western Europe, by the 1800s advocates for sport and exercise emerged through the development of modern gymnastics (Werner, 2004). Guts Muth's (see Figure 2.12) gymnastics spread from Germany to English, French and American schools from the 1800s and his movements were the forerunner to modern rhythmic gymnastic dance (Staley & Lowery, 2009).

Friedrich Ludwig Jahn (See Figure 2.13) (1778–1852) was a pioneer for the spread of gymnastics around the world (Kaimakamis, Kirialanis & Albannidis, 2008). He developed a nationalized form of gymnastics in Germany starting in 1808 called Turnen, a term to emphasize its uniqueness (Guttman, 1992). Jahn was influenced by Guts Muth and the Greek athlete training models to build his style of gymnastics in every school and thousands of private clubs and associations across Germany and was primarily motivated by his opposition to the repression of the Napoleonic French during this time (Kaimakamis et al., 2008). Jahn's contribution to modern sport included the horizontal and parallel bars, and the balance beam (Werner, 2004). German migrants introduced this system of physical training around the world (Kaimakamis et al., 2008). In 1848, Jahn's former students Beck, Follen and Lieber started the first Turnen Society in the United States (Pfister, 2009).

Nachtegill studied with Guts Muth to introduce gymnastics to Denmark and was the director for Denmark Military Gymnastic Institute for military training that started in 1804 (Pfister, 2009). Henrik Per Ling (1766–1839) who studied with Nachtegill, and like Jahn was also motivated by nationalism, developed the young military minds and bodies of the future Sweden through gymnastics at the Royal Gymnastics Center Institute started in 1814 (Eugene, 2009). Muth and Jahn's most significant contribution was their work, which marked the beginning of what we recognize today as Olympic gymnastics (Werner, 2004). These institutions were the foundation of modern sport around the world, as they became the development centers for future athletes, teachers, coaches and sporting leaders.

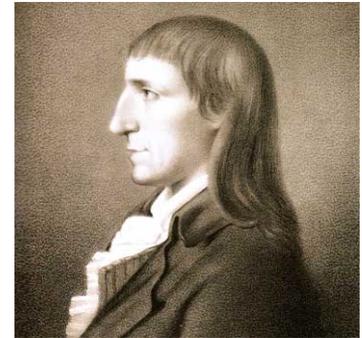


Figure 2.12. Guts Muth
Adapted from Guts Muth
(n.d.) Retrieved August 30,
2012, from
<http://www.starkcenter.org/research/web/questforvictory/timeline/>. In the public domain.



Figure 2.13. Friedrich Jahn.
Adapted from Friedrich Jahn
(n.d.) Retrieved February 1,
2012, from
http://fr.wikipedia.org/wiki/Fichier:Friedrich_Ludwig_Jahn.jpg. In the public domain.

Ex-university athletes played the role of coaches for boxers and runners in British public schools in the early 1800s (Lambert et al., 2009; McNab, 1990). A national survey on coaching and training methods of boxers, runners and racehorses from 1806 determined that success in high performance sport was based on two factors. Athletes had a predisposition to sport and second, the coach had a disciplined approach to training. This survey was not scientific as it was based on coaches' anecdotes and personal experiences (Lambert et al., 2009).

The development of rowing clubs around the world is a good example of how sport evolved in these Pre-Modern times. Founded in 1818, Leander Rowing Club is one of the world's oldest rowing clubs. Re-located from the Tideway to Henley-on-Thames in the 1870s; it was seen in the early days as just as much of a social association as a competitive rowing club and the first rowing club where most amateurs took advantage of becoming professional rowers (watermen) to coaches and prepared crews for racing (Wigglesworth, 1992). In 1823, the Knickerbocker Club was the first rowing club established in the United States in New York (Dodd, 1992; Freyer, Rucker & Thorn, 2005). This sparked a wave of excitement due to the regatta and general boating activity that came from the formation of an additional five rowing clubs each with about ten to twelve amateurs. They were all based near Castle Garden in New York (including Wave, Gazelle, Gull, Aerial and Pearl Rowing Clubs) and by 1834, lead to the formation of the Castle Garden Rowing Association (Putman & Roberts, 1858). According to Freyer et al. (2005), rowing was America's first modern sport, in that competitions were marked by record-keeping and prizes yet also provided spectator interest for those with no pecuniary interest. In 1836, rowing started at the Hamburg Rowing Club, Germany as the first club on continental Europe, and marked the spread of amateur rowing as an organized sport with clubs forming around the world, France 1838; Belgium, 1846; Sweden, 1851; Denmark, Japan, Portugal, 1855; Australia, 1859; Russia, 1860; South Africa, 1861; Austria, Italy and Switzerland, 1863; New Zealand, 1866; and Argentina, Peru, and Poland, 1873 (Dodd, 1992). In 1893, the first European rowing championships were held in Italy, with three events, and only ten entries as no professionals were allowed to participate (Volianitis & Secher, 2007).

1840–1880—Pre-Modern sport—establishing coaching within an organizational setting. From the 1840s sport had transformed from an informal and social activity, to an integrated part of life through industrialization, technological innovation and a new social and cultural order (Eitzen, 2001; Gorn & Goldstein, 2004; Guttmann, 1978; Hardy, 1981; Noverr &

Ziewacz, 1983; Rader, 1994; Riess, 1995, 1998; Wiggins, 1995). The wave of socialization in sports in the 19th century was in technically specific sports (like rowing, cricket, golf and boxing) that required learning formalized skills and a coach/trainer (Jones, Hughes, & Kingston, 2007). The aristocracy attended these events and their gambling proceeds became income for organizers used to pay the athletes and their coaches who were normally of lower social status. This was a critical beginning to the foundations of the development of professional sports. Participation in sport for most required sacrificing training time to make a living and becoming professional would make them ineligible for competitions such as the Olympics (Wilson, 1993). During this period coaches were seen as a semi-skilled artisan (Jones et al., 2007).

A critical debate surfaced during the 1840s and 1850s over the participation of professionals in the Oxford-Cambridge boat race that began in 1829 (Riess, 1995). Professional rowers were known as “*watermen*” who raced in well-attended events resulting in great prize money and while their skills may be admired, some believed the professionals were objects of praise and envy and emphasis on cheating and large earnings based on gambling (Wigglesworth, 1992). In 1866, the Amateur Athletic Club of Oxbridge excluded manual workers from competition and was the first indication of amateurism prevailing within the elite ranks of the Oxford and Cambridge sporting establishment (Holt, 1989). In 1873, the two universities agreed the Boat Race was only open to amateurs (Halladay, 1990). In 1878, a meeting of ‘old amateurs’ led by London Rowing Club President, Francis Playford and other local rowing club leaders to draw up a definition of the amateur resulted in the Playford Report (Woodgate, 2010). The Henley Royal Regatta in 1879, the largest international regatta at the time, established its own amateur rule (Riess, 1994). The national rowing governing body, the Amateur Rowing Association founded in 1882 institutionalized an adaptation of the Playford Report, which resulted in the national amateur policy that would impact the entire British rowing community (Allison, 2005; Halladay, 1990; Pope, 1996; Woodgate, 2010). Other sports faced professionalism during this period included athletics, boxing, cricket, golf, soccer and tennis (Vamplew, 2004). This strong position on amateurism led to decisions for rowing that would impact eligibility for rowers in countries around the world such as Australia in 1896 (May, 1970), Canada in 1880 (Metcalfé, 1987), New Zealand, France in 1891 and the United States in 1876 (Rader, 1990). In these locations, during this period, professional rowing was growing

quite rapidly (Coopridner, 2008). The strength of the amateur ethic was a unique British sporting tradition during this period (Mangan, 2006).

The rise in the Pre-Modern sport in the 1840s was due to people being attracted to the ritual and ceremony of modern sport (*secularization*) and many were treated fairly across gender, race and age (*equality*); athletes specialized in one sport and one position (*specialization*); training went from play to practice with more sophisticated training methods being implemented (*rationalization*); more sporting organizations were being formed, (*bureaucratization and record keeping*); and measuring performance became scientific (*quantification*) (Guttmann, 1978). More exposure in public, newspapers, national sports journal, magazines and guidebooks was coupled with a transition from attending local events to more national and international events (Adelman, 1986).

This social transformation was evident by the formation of these sporting organizations, such as the Henley Royal Regatta established in 1839 (Volianitis & Secher, 2007), YMCA was founded in 1844 (Zald & Denton, 1963), Turner Societies in 1848 (Rader, 1994), U.S. intercollegiate sports began in 1852 including rowing between Harvard and Yale at Lake Winnepesaukee in New Hampshire (Riess, 1995), NYAC founded in 1866 (Rader, 1994), U.S. baseball's first professional club started in 1869 (Guschoy, 1998), the first collegiate track and field event hosted at Princeton in 1873 (Leitch, 1978), in 1882 the Amateur Rowing Association (ARA) was founded, in 1885 the American Association for the Advance of Physical Education (AAAPE) was founded (Dyreson, 1998), basketball was invented in 1891 (Naismith, 1996), World Rowing Federation (FISA) founded in 1892 (Meuret, 1992), modern Olympics were revived in 1896 (Guttmann, 1992), the first American football club Chicago Cardinals (now the Arizona Cardinals) founded 1898 (Ziemba, 1999), the first baseball World Series in 1903 (Benjamin, 1998), inaugural Tour de France in 1903 (Mignon, 2003), and the Intercollegiate Athletic Association (NCAA) started in 1905 (Fleisher, Goff & Tollison, 1992). This diverse yet relevant collection of organizations has set in motion a foundation of professionalization in sport and provides a meaningful example to the rest of the world to the challenges and to the opportunities they face today (Rader, 1994).

Modern sport, reviving the Olympics and the birth of Olympism. The founding of the Olympic Movement marked a significant starting point of sport philosophy in the modern era (Guttmann, 1992; Hill, 1992; Hoberman, 1995; Hobsbawm & Ranger, 1992; Lucas, 1980; Riordan & Krüger, 1999; Schaffer & Smith, 2000; Segrave & Chu, 1981; Toohey & Veal, 2007; Torres, 2006). In the 1880s, Pierre de Coubertin (See Figure 2.14) found support for his vision of Olympism with these sporting developments in Britain and the United States. His numerous visits helped to formulate his concept of Olympism; including visits to Oxford and Cambridge, the Royal Henley Regatta, the Rugby School and a variety of other public schools (Wassong, 2002). After reporting on developments of the British public school system, the French government charged him with investigating the merits of physical education in schools (Loland, 1995). During his visits to the United States, he was intrigued by the value of intercollegiate sports as an instrument to mature the character of the future intellectual elite (Guttmann, 1992).

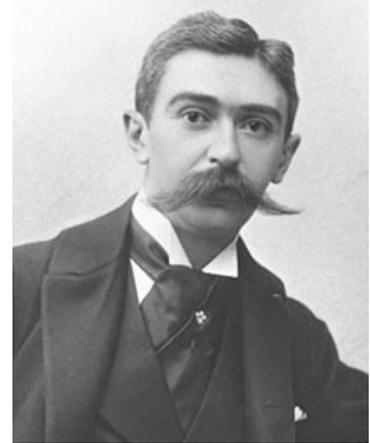


Figure 2.14. Pierre Courbertin. Adapted from Coubertin (n.d.) Retrieved February 1, 2013, from <http://www.olympic.org/content/museum/m-treasures/pierre-de-coubertin/>. In the public domain.

The vision of the Olympics was based on Coubertin's humanism of fair play, participation for sport's sake, and moral development and aims to enrich life experience and lead to a fully integrated individual (Coubertin, 1967). Leiper (1976) described the integrated individual as one possessing physical robustness, keen intellect, and sublimity of spirit. Coubertin (1967) believed sport developed an individual's virtues by focusing on participation with the possibility of reforming society through individual education. He argued from the outset that the modern games should be as the ancient Olympians were, participants for the sake of sport and victory not "valued prizes" (Anthony, 1997).

The ancient Olympics were never amateur (Andreff, 2008; Kyle, 1983; Wels, 1995; Young, 1984) and Finlay and Plecket (1976b) argued that the prestige of winning and prizes were all that was motivating the ancient Olympians as it also would have given them the leisure time to train. Opposition to Coubertin's idea of Olympism included those from his IOC Congress, including his French and German peers, Philippe Tissié, who was a French physician and the medical advisor to the IOC (Da Costa, 1997). At the 1897 IOC Le Harve Olympic

Congress, it was Tissié (advocating serious sport) and Henri Didon (supporting cultural reflection) who argued about their different approaches to humanism (Coubertin, 1902). This stands as a significant point in the light of today's ethical responsibilities of coaches regarding the coaching context and the conceptual balance between participation and commitment to competition (Côté, 1999; Côté & Gilbert, 2009; Côté, Young, et al., 2007; Lyle, 2002; Wall & Côté, 2007).

Coubertin was not the first person to attempt to revive the Olympics, but it was his organization and perseverance that prevailed (Da Costa, 1997). He initially was inspired by the 1889 Paris expo and then proposed the renewed games sports conference in 1892 but it was rejected then he called his own conference in 1894 recommending still more work was needed before it was approved (Davenport, 1996). But Greek support was so strong, led by first IOC president Vikelas. So, despite the plan to host the first Olympics in Paris in 1900, it was moved up to 1896 to be hosted in Athens (Krüger, 1999).

In 1896, Athens celebrated the revival of the modern Olympics after more than 1500 years since the last ancient Olympic Games (Davenport, 1996). In the 1896 Olympic Games there were fewer than 500 athletes representing 13 nations but by 1988 in Seoul the Games drew entries from a record total of 160 countries. While the number of athletes who competed did not surpass 10,000 until 1996 in Atlanta, the 1984 games set records for the largest total attendance almost 5.8 million people and the United States winning 83 gold medals, the most ever for one country. In Sydney 2000, a record 80 countries won medals and the Games returned to Athens after 108 years in 2004 and in Beijing 2008 for the first time 204 countries were represented (Wallechinsky & Loucky, 2012).

On April 6, 1896, 245 athletes from 14 nations and 60,000 spectators heard King George I of Greece open the 1896 Olympic Games (Barney, 2007). The Greek Organizing Committee lacked any financial support and raised money by selling stamps and medals, and a donor gave one million drachmas to reconstruct Athens' Panathenaic Stadium originally built in 330 B.C. (Davenport, 1996). The modern Olympics were a success with the crowning of U.S. triple jumper, James Connolly, as the first Olympic Champion in 1527 years (Mallon & Buchanan, 2006). The Americans dominated the track and field events and Greek Spyridon Louis won the marathon becoming the toast of Greece (Barney, 2007). In 43 events including swimming, weightlifting, shooting and gymnastics, winners were given a medal made from silver, a crown

of an olive branch and a diploma. Due to bad weather rowing and sailing were both cancelled (Roza, 2007).

From 1896 through to 1912, the Games enjoyed increased success with level of participation, organization and international credibility as a legitimate sporting event. The early years were not without challenges particularly sharing location with the World's Fair in Paris in 1900 and St. Louis in 1904 made it difficult to follow events over the 5 month long event and relocation of the 1908 from Rome to London due to the explosion of Mt. Vesuvius (Wallechinsky & Loucky, 2012). Despite these challenges, the modern Olympics was making progress to becoming a permanent event on the international sporting calendar.

At the 1912 "Sunshine Games," the Swedish team topped the medal tally a reflection of superior team management. The Swedes were motivated to make the 1912 Olympics a success. They were at home: their King Gustav V was present for all of the events in their new stadium that was funded by a very supportive government through a special lottery and their results reflected that the Swedes had created the first known state-sponsored sporting system (Chatziefstathiou, 2005). This system came out of the great gymnastics and sporting system set up by Ling in the 1800s, which allowed for the pool of athletes from the army to be selected into the Swedish Olympic team (Krüger, 1999).

American Jim Thorpe (see Figure 2.15) was arguably the greatest athlete of the 20th century who won gold medals in the first modern pentathlon and the decathlon (Murray, 1993). But Thorpe lost his 1912 medals as he had played two seasons of semi-professional baseball, and this was a breach of the amateurism rules for all Olympic athletes at this time (Guttmann, 1992). His performance in the decathlon would have won him a silver medal in the 1948 Olympics. In 1983, his medals were re-awarded posthumously as the athletes' amateurism rules changed (Cahill, 1998).

Avery Brundage, an all-round U.S. athlete in the decathlon (6th place) and pentathlon (16th place) behind Thorpe in Stockholm would go on to become the first president of the U.S. Olympic Committee in 1929 and the IOC president from 1952 to 1972. As IOC president, he would lead during a period of professionalization of sport, global politicization of the Games,

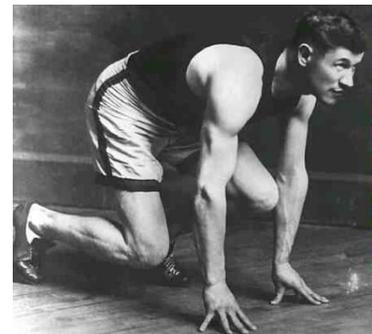


Figure 2.15. Jim Thorpe. Adapted from Thorpe (n.d.) Retrieved August 21, 2012, from http://www.myclassiclyrics.com/artist_biographies/Jim_Thorpe_Biography.htm. In the public domain.

terrorism that significantly changed the Olympic movement and was also a part of the decision to reinstate Thorpe's 1912 medals (Wallechinsky & Loucky, 2012).

From 1850 to 1920, coaching knowledge about training methods was still evolving with no universally accepted standards of best practices. Coaches did not share of information and details about what worked and what did not (Bourne, 2008). Preparation periods for events were very short (10–12 weeks), which resulted in overexertion and overtraining through forcing sweat and restricting fluids (Park, 1994). MacLaren (1866) recommended specific training methods and advocated for cross-training methods like gymnastics as an important way to contribute to athletic performance. He was a strong advocate for water to hydrate and replenish the system, which was not a consensus at this time in training practices by his peers. Morgan (1873) studied 255 athletes who raced from 1829 to 1869 in the Oxford/Cambridge boat race showing that athletes outlived the average member of the population disproving popular claims at the time by physicians like Da Costa and Skey that the effects of the boat race caused disease and premature death (Morgan, 1873; Whorton, 1982). Morgan's study also confirmed rowing coaching practices included nutritional guidelines, medical testing, injury prevention and recovery, crew selection, technical instruction and training program design and these remain the fundamental foundations to current practices (Halladay, 1990; MacLaren, 1866; Morgan, 1873). Morgan (1873) also referred to evidence that athletes with coaching experience tended to be more skillful athletes compared to those who had not.

Triplett (1898) found cyclists racing on their own (time trial format) did not perform as well compared to when they raced in competition with other cyclists as social facilitation enhances performance (more efficient and faster) when well-practiced individuals perform in the presence of others. Camp (1921) Yale football coach known as the "Father of Football" and inventor of American football, wrote about specialized training for sports like rowing, track, baseball and football advocating being very mindful of overworking, especially before competition to prevent "going stale"/overtraining.

Two noteworthy scholars of the 1920s, unlike their peers during this era who generally only conducted a single study, produced sustained research programs and multiple publications on sport performance (Green & Benjamin, 2009). Coleman Roberts Griffith, (See Figure 2.16) an American sports psychologist, is widely quoted as the first to research the optimal coaching performance (Bäumler, 1997; Benjamin, 1993; Bennie, 2009; Fletcher, 2006; Gould & Pick, 1995; Green & Benjamin, 2009; Kroll & Lewis, 1978; Singer, 1989; Swoap, 1998, 2000). Griffith (1925, 1926, 1928) wrote about the coaches' influence on elite athletes. Griffith's contributions included developing a meaningful and relevant scientific method for disseminating information relating to dealing with challenges in the field of training and competition and sharing this with less experienced coaches and athletes (Greenleaf, Gould & Dieffenback, 2001). Robert Werner Schulte (1897–1933), a psychologist at the German Prussian College in Berlin, worked with Griffith to set up the first sport psychology laboratory in Germany in 1924 and a second laboratory in the United States in 1925, to study the effects of elite athlete performance (Bäumler, 1997). Schulte's and Griffith's work was anticipatory rather than foundational as there were no students to carry on their work, so there were no intellectual ties to the work until the 1960s (Bennie, 2009; Fletcher, 2006; Green & Benjamin, 2009; Walker, Kremer & Moran, 2006). Kremer and Scully (1994) believed this gap may have had something to do with sport not being considered worth serious scrutiny, especially with its connotation as a leisure pursuit. Walker et al. (2006) wrote that it may also have something to do with some old-fashioned academic snobbery.



Figure 2.16. Coleman Griffith. Adapted from Griffith (n.d) Retrieved February 1, 2012, from <http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=2003-99805-004>. In the public domain.

Few influenced the development of the sport of rowing during this formative period as significantly as Hiram Conibear (See Figure 2.17) and George Pocock (See Figure 2.18) both from the University of Washington, in Seattle. Hiram Conibear, an American athletic trainer, took over the rowing program at the University of Washington and developed the American Conibear style (Volianitis & Secher, 2007). The Conibear style was characterized by an extremely fast and hard way of placing the blade into the water and a fast and exaggerated movement at the finish of the stroke with the arms (Gates, 1961).

George Pocock was British born and moved to Seattle with his brother Dick Pocock in 1913 to help Conibear with the University of Washington program. His famous adage was that “oarsmen must row with the speed of the boat” for optimal speed, the athletes must move no faster or slower (Volianitis & Secher, 2007). Pocock’s innovations extended to boat building and the U.S. Olympic champion men’s eights in 1936, 1948 and 1952 revolutionized boat building setting the gold-standard around the world. Conibear and Pocock influenced many prominent U.S. coaches of the 20th century (Volianitis & Secher, 2007).



Figure 2.17. Hiram Conibear.

Adapted from Conibear (n.d.) Retrieved August 31, 2010, from http://content.lib.washington.edu/cdm4/item_viewer.pl=/uwcampus&CISOPTR=10862&CISOBX=1&REC=7.

In the public domain.



Figure 2.18. George Pocock.

Adapted from Pocock. (n.d.) Retrieved August 23, 2010, from

<http://www.pocock.com/about/pocock-rowing-boats-history/>. In the public domain.

Paavo Nurmi, (See Figure 2.19) the flying Finn, born in Turku, Finland, won 9 gold and 3 silver Olympic medals, he won three gold and silver in 1920, five gold in 1924 in Paris and won a gold and two silver medals at the 1928 Amsterdam Olympics (Wallechinsky & Loucky, 2012). His 12 Olympic medals contributed significantly to the literature on training intensity and volume as no other athlete during this period came close to matching him (Wilt, 1959).



Figure 2.19. Paavo Nurmi.
Adapted from Nurmi (n.d.) Retrieved August 23, 2010, from <http://runningtherapist.blogspot.com/2010/06/paavo-nurmi-run.html>. In the public domain.

Jessie Owens (See Figure 2.20) may be remembered as one of the greatest athletes of all time but he will always be cherished for his special friendship with Luz Long at the Berlin Olympics (Wallechinsky & Loucky, 2012). Owen's training log reflected a very laid back approach indeed and he was relaxed even for the era: he seemed to have little regard for the importance of science in training (Baker, 1986). He produced four world records in the 100 yard, 200 yard, long jump and hurdles on May 25 1935, a feat never produced before or since (Bourne, 2008). According to Wallechinsky and Loucky (2012), if there is one clear memory for us to ponder about Jessie Owens it is these words, "You can melt down all the medals and cups I have and they wouldn't be plating on a twenty-four carat friendship I felt for Lutz Long on that moment" (p. 136).



Figure 2.20. Luz Long and Jessie Owens.
Adapted from Long (n.d.) Long, O. a. (n.d.) Retrieved August 23, 2010, from <http://burketokirk.blogspot.com/2010/09/jesse-owens-and-luz-long.html>. In the public domain.

For coaching knowledge, the great debate during this era was to utilize the benefits of interval training or *'fartlek.'* *'Fartlek'* is Swedish for speed-play and is defined as a systematic use of altered running pace (sprinting, striding and walking) or variable distances and time developed by Swedish coach, Gosta Homer (Nurmi's coach) in 1937 (Doherty, 1980). Considered one of the first forms of interval training, *'fartlek'* allowed athletes the freedom to self-select intensities providing the benefit of being enjoyable and reducing the monotony of training (Howe, 2006). Fartlek has migrated into training programs from endurance to power

sports and every discipline in between (Billat, 2001; Billat et al., 2001; Laursen, Shing, Peake, Coombes & Jenkins, 2005).

The German track coach Wolfgang Gerschler, a critic of *'fartlek,'* claimed it lacked a speed component and there was too much slow long distance training and not enough specific maximum speed work and this was found after studying Nurmi's and other related training programs (Bourne, 2008). Interval training can be defined as a technique that alternates short bouts of high exertion with periods of low intensity recovery (Sharkey & Gaskill, 2006). Interval training alternates measured work (in time or distance at a measured pace/speed with easy recovery (or rest) for a measured period of time over a number of repetitions (Doherty, 1980). Heart rate is also an important indicator during these intervals: 90% of maximal heart rate is to be reached during the working period and the heart rate should lower to around 60% of its maximum by the end of the recovery period (Gerschler, 1963). Interval training is a significant coaching innovation of this period and is prominent today as the foundation of competitive training program design.

Steve Fairbairn (1862–1938) (see Figure 2.21) was an Australian born rower who coached from 1904 until 1938 at Jesus College, Cambridge and revolutionized rowing; His coaching had an immense influence on the sport (Serle, 1949). Fairbairn's first principle of coaching the rowing stroke was that the legs were the strongest part of the body and thus the beginning of the stroke must be characterized by a good leg drive and have the rower concentrate not on the body movements but on correct blade movements and keep the blade well clear of the water during the recovery (Volianitis & Secher, 2007). Fairbairn discussed his approach to coaching in detail in four books: *Rowing Notes* (1926), *Slowly Forward* (1929), *Some Secrets of Successful Rowing* (1931), and *Chats on Rowing* (1934). He was an innovator, masterful at times, an overpowering yet



Figure 2.21. Steve Fairbairn. Adapted from Fairbairn (n.d.) Retrieved September 1, 2012, from <http://www.rowinghistory-aus.info/the-boat-race/index.php>. In the public domain.

sympathetic coach and will be remembered for this famous Fairbairnisms which include “enjoy your rowing; win or lose,” “hear the boat sing” and “miles make champions” as he was a believer in distance training (Serle, 1949).

Brutus Hamilton, (see Figure 2.22) was an Olympic silver medalist in the decathlon in 1920, Olympic track and field coach in 1932 and 1936 and head coach in 1952, and spent 33 years as head track coach at the University California Berkeley, his athletes broke 2 world records, seven Olympic records and seven team national collegiate titles. He has been compared with some of the greatest philosophers of coaching like John Wooden, Vince Lombardi, Woody Hayes, James “Doc” Councilman and Percy Curetty (Walton, 1992). Hamilton was a humanist as he saw sport as an extension of self and as a result coaching was most about the person, he was a coaches coach. While never putting pen to paper, his legacy may be best put by Archie Williams, 1936 Olympic Champion 400m, “When Hamilton coached he made his athletes feel good about themselves, he was a coaches coach and he knew how to get the best out of people” (Bourne, 2008).



Figure 2.22. Brutus Hamilton. Adapted from Hamilton (n.d.) Retrieved February 1, 2012, from <http://www.ustfccca.org/ustfccca-hall-of-fame/ustfccca-hall-of-fame-special-inductees>. In the public domain.

Clyde Littlefield, track coach for the University of Texas, 1920–1961, was one of the great U.S. track coaches of all time with 25 southwest championships and he coached on the 1952 U.S. Olympic Track team. He believed athletes race exactly as they performed in practice, so he was a systematic planner, and his moderate approach to the training was all in preparation for racing and an avid record taker (sleep quality and quantity, weight, diet and heart rates), which are all relevant practices for today (Littlefield, 1933).

These coaching philosophies reflected by these three high performance coaches share extraordinary achievements and legacy as commonality and this reflects some of the general principles to the profession of coaching. Fairbairn had a cavalier but understanding approach to coaching, innovation and teaching; Littlefield was very detailed-oriented and approached training just like it was competition; and Hamilton was a humanist who believed in specialized training and played down the role of nit picking about things like technique.

Global Politicization of the Olympic Movement

Sports' coaching has developed significantly as an accepted and credible profession (Woodman, 1989). This is evident in the distinction of a specialized body of knowledge, publications, professional associations, practices and education programs (Taylor, 2008). Professionalization began to take shape in the 1960s with evidence of academic, disciplinary apparatus in the form of increased college offerings, textbooks, scholarly journals, and professional associations (Green & Benjamin, 2009; Walker et al., 2006). The United States had established itself as a dominant force on the international athletic stage, especially at the Olympics. The 1960s were a perfect time for sport-related research to prove their might to the doubting academic community and to the public at large (Green & Benjamin, 2009). One challenge in moving forward was that the U.S. Olympic effort needed a prevailing political climate to make an all-out attempt to maximize the gold medal tally.

The modern Olympics would reconvene in London in 1948, after the Berlin 1936 Olympics, marking the beginning of a period involving more international political intrusion, and issues relating to professionalization but also increased popularity and success in the Olympics. With more athletes from more nations garnering more global attention, some very difficult times were ahead for the International Olympic Committee: Namely, how to move the Olympics forward from the original Olympic ideology in a bipolar world that had emerged from World War II. This included the communist Soviet Union who returned to the Olympics in 1952. And a divided Germany with the German Democratic Republic storming onto the Olympic stage in 1968 and the terrorist attacks of the 1972 Munich Olympics (Rathke & Woitek, 2007; Wallechinsky & Loucky, 2012). During this period performances continued to improve as records continued to be broken whether from more systematic training programs, greater competition or improvements in technology of equipment or sports science (Ericsson et al., 1993).

Bannister was a highly studied subject who had a sound track career despite finishing a disappointing 4th at the 1952 Helsinki Olympics and from that experience he set his sights on breaking 4 minutes (Wallechinsky & Loucky, 2012). By 1954, competition was fierce, American Santee had already gone 4:02.4 and Australia Landy had gone 4:02.0. On May 6, 1954 in Oxford, the wind was blowing at 25 miles/hour and just before Bannister was scheduled to race and just as he was about to pull out of the race knowing these were record-breaking conditions

and to conserve his energy for the next opportunity, the wind suddenly calmed and he decided to race. Bannister ran 3:59.4. Then on June 21, 46 days later in Finland Landy ran 3:57.9. Then in August, Landy raced Bannister at the Commonwealth Games Landy went 3:59.6 and Bannister went 3:58.8. The quest to run under four minutes for the mile had been realized 4 times in 3 months. This achievement formed the foundation for research on training and planning moving forward toward a new pinnacle of human performance.

Austrian coach, Franz Stampfl was Bannister's only advisor on his campaign to break the four-minute mile. Stampfl's contributions to systematic and scientific training programs design and cross-training techniques were significant to the literature but he agreed his scientific advances to physiology were still elementary (Stampfl, 1955). Percy Cerutti from Australia distinguished himself as a coach for his naturalistic approach from his highly individualized training methods to a focus on raw and unprocessed nutrition, forward thinking weight training programs and he was best described as a coach more for the art than the science of coaching (Freeman, 1975). Mihaly Igloi from Hungary advocated huge amounts of interval training based on sets of short distances run quickly to permit a greater total training stimulus (Karp, 2000). Arthur Lydiard from New Zealand used principles of high volumes aerobic training mixed with long intervals, fast reps, sand hill running, long-term athlete development and planned recovery and rest (Freeman, 1975). Bill Bowerman integrated the work of Stampfl, Igoli, Cerutti, and Lydiard to tailor his program to meet each individual athlete (Freeman, 1975).

Karl Adam (1912–1976) (See Figure 2.23) was a professor of rowing and a coach and had a major impact on one of the most successful eras in West German rowing history starting at the end of the 1950s. He co-founded the Ratzeburger Rowing Club in 1953 and was a great innovator of rowing and training techniques and introduced methods that had a major impact on the further development of rowing known in the rowing world as the "Ratzeburger" style (Nolte, 2005). In the 1960s, Karl Adam's pioneered advances such as speed play, interval training, oars design, longer stroke emphasis and other unorthodox rigging



Figure 2.23. Karl Adam. Adapted from Adam (n.d.) Retrieved August 21, 2012, from <http://www.hall-of-fame-sport.de/galerie/portrait>. In the public domain.

approaches (Rogers, 1984). Adam's systematic crew selection from rowers across Germany is argued as the reason why his boats won no less than seven titles at World and European championships from 1959 to 1967 (Barrow, 2009). In addition, the West German eight won an Olympic gold medal in 1960 in Rome and 1968 in Mexico introducing the title of "Deutschlandachter" translated to The German Eight. Nothing since has matched the impact of the sudden explosion of Ratzeburg and Karl Adam onto the rowing scene (Volianitis & Secher, 2007).

The concepts of periodization, training organization, biomechanics and exercise physiology were the result of Matveyev's research in 1962, *The Fundamentals of Sports Training* (Matveyev, 1981). Coaches in the Soviet Union had spent hundreds of hours studying and learning about the general theory of sport and the fundamentals of training and this was all in tandem with their scientists and their athletes in an effort to produce world dominance in Olympic sport (Bourne, 2008). Periodization was the paradigm shift that changed the basis of how every serious athlete trains (Bompa, 1983; Harre, 1982; Ozolin, 1971). Thousands of top athletes performances and profiles were studied from sports like track and field, weightlifting and swimming that resulted in the general theory of sport (Bourne, 2008). Periodization was Matveyev's defining contribution: he described it as essentially the lifecycle of an athlete by specifying cycles that athletes need in preparation to be at their best level of condition to produce their best physical performance (Matveyev, 1972). Sabin and Chudinov (1966) extended training theory by determining suboptimal performance was a result of insufficient technical preparation and competition in combination with a lack of physical, tactical and individual preparation. Peak performance required philosophical, methodological, social, psychological, biological, metrological and medical dimensions (Matveyev, 1981). Matveyev credited Selye's General Adaptation Syndrome arguing that an accurately executed training program could prepare an athlete for peak performance on a specified day of competition (Fry, Morton & Keast, 1992).

Austro-Hungarian endocrinologist, Hans Selye (See Figure 2.24), studied the adaptations to stress that contributed significantly to the sport coaching literature (Wilt, 1960). Selye advanced the work of studies on constancy of biological systems; “*milieu intérieur*” (Bernard, 1965) and “*homeostasis*” (Cannon, 1915). Selye’s General Adaptive Syndrome (GAS) is the adaptive changes made by an organism measured by the changes in the nervous system and internal organs (hormones secreted into the blood system) (Selye, 1937, 1950, 1956). The initial “*alarm*” phase is created by an extreme change in environment resulting in an elevated heart rate and lactate levels in the blood and adaptation to the shock normalizes these levels but with continued stress there is the “*resistance*” phase increasing the vulnerability to other stresses, with prolonged stress without adaptive capacity lead to “*exhaustion*” from the prolonged shock and will lead to death (Selye, 1956). For coaches, understanding an athlete’s response to stress and the adaptation process is critical to maximizing human performance (Fleck, 1999).

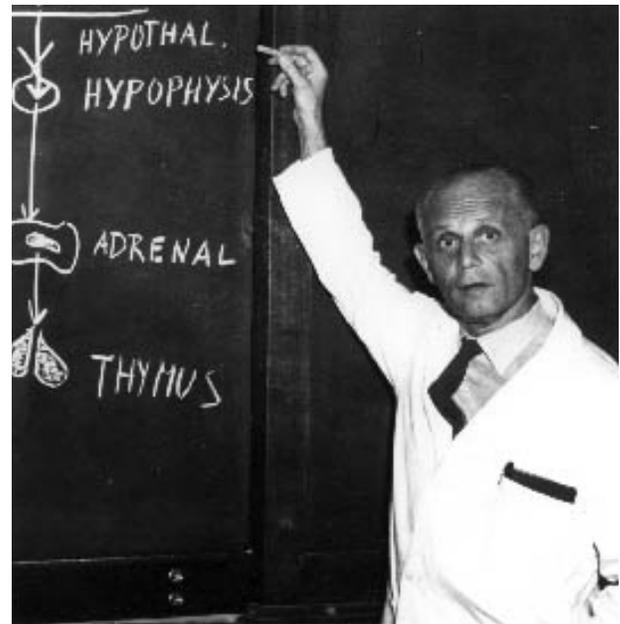


Figure 2.24. Hans Selye. Adapted from Selye (n.d.) Retrieved February 1, 2012, from <http://home.cc.umanitoba.ca/~berczii/page2.htm>. In the public domain.

The spread of periodization began as the translations of Matveyev’s work circulated. This first translation was complete in the Soviet Union in 1965; in 1968, West German throwing coach, Peter Tshiene translated Matveyev’s work into German. In 1971 Arnd Krüger revised Tshiene’s translation and Frank Dick from Britain translated the work into English in 1975, marking a watershed moment in the history of sport training (Bourne, 2008). Many believed and attempted to make replications and adaptations of the system in a variety of sports including discus (Riveri, 1986), figure skating (Poe, Pitsos & Provost-Craig, 2000), football (Burgener, 1987), golf (Knight, 2000), heptathlon (Myer, 1988), high jump (Myer, 1988), judo (Blumenstein, Lidor & Tenebaum, 2005), mountain biking (Willis & Jones, 1999), pole vault

(Jagodin & Tshunganov, 1981), rowing (Van Ort, 1977), synchronized swimming (Flynn, 1993), weightlifting (Fritz, 2001), and wrestling (Burns, 1983).

Periodization critics believed that the true implementation was not possible without the complete system that it came from which would include performance enhancing substances (Cassik, Hedrick & Barnes, 2008). The successes of African distance athletes (particularly Kenyans and Ethiopians) whose competitive advantage is explained by psychological, physiological and genetic characteristics, have been cited as reasons to reject the theory of periodization and that not one single factor such as the theory of periodization in the planning of training is responsible for athletic success (Pitsiladis, Onywera, Geogiades, O'Connell & Boit, 2004; Verkhoshansky, 1999). The significant contribution of this work was that training methods designed by coaches and others in all sports around the world became far more systematic and scientific in theory and practice.

The use of performance enhancing substances—a lasting ethical “legacy”. Both the GDR and USSR masterminded many facets of a systematic infrastructure of exceptional performance (Green & Houlihan, 2005). The identification and development of the genetic predisposition of each athlete was groundbreaking, the prioritization of training design to the unique needs of individual athletes to produce optimal performance was record breaking and the professional management of coaches and sport staff, incentives and performance rewards for athletes produced results that created an unprecedented transformation in world sport (Riordan, 1993). These ‘models’ of future sporting institutions and infrastructure also had a lasting negative impact that can never be forgotten (Braun, 2007).

Documentation on the use of performance enhancing substances dates back to antiquity (Hoberman, 1990; Mangi & Jokl, 1981; Prokop, 1970; Strauss & Curry, 1987; Williams, 1974). In India, as early as 1400 BC, ingestion of testis tissue was considered a cure for impotence (Hoberman & Yesalis, 1995). The ancients learned empirically about the functions of the organs by observing the effects of castration on domesticated animals (Newerla, 1943). Athletes in the ancient Olympics improved their performance with diet (Finlay & Plecket, 1976a). One example was Dromeus from Stymphalos, who won the dolichos race (1-3 miles) by eating a diet solely of meat (Pausanias, 1959). Stimulants such as wine and brandy were also used by the ancient Greeks as performance enhancing (Voy, 1991). The Andean Native Americans of Peru chewed

coca leaves and drank cocoa tea to increase endurance and protect against mountain sickness (Jokl, 1968).

Since the 1970s, research publications on the use of performance enhancing substances have increased significantly (Dimeo, 2007). Beginning in the 19th century, stimulants like caffeine, cocaine and amphetamines were common with endurance athletes to give them a kick before or during an event/race (Burke, 1981). In 1869, a combination of heroin and cocaine called “*speedballs*” was used to enhance endurance (Goldman, Bush & Klatz, 1984). In 1894, Philippe Tissié, a French physician, the first to document extreme exertion experimenting on a cyclist found doping improves the psychological and physiological performance during his test of an athlete performing continuously for 24 hours (Hoberman, 2002). In 1896, Arthur Linton, a Welsh cyclist and to some the “father of cycling” became the first known death of an athlete due to the use of drugs (Goldman et al., 1984). The 1904 Olympic champion in the marathon from the U.S., Thomas Hicks, collapsed at the finish line due to strychnine and brandy used during the race despite this he didn’t lose his medal (Todd, 1989). Italian, Dorando Pietri, crossed the line first in the 1908 marathon, but was disqualified for receiving assistance to finish after he collapsed due to strychnine abuse (Maughan & Shirreffs, 1997). An IOC investigation into drug use found that the period up to the 1936 Olympics reflected radical changes toward more scientific approaches to training and the modernization of sport with it, however, drug use was one issue to contend with moving forward (Boje, 1939).

Cyclists Knud Enemark Jensen died from excessive amphetamine use during competition at the Rome 1960 Olympic Games (Houlihan, 1999). Boxer Billy Bello in 1963 died of a heroin overdose, in 1967 British Tour de France cyclist Tommy Simpson overdosed on amphetamine, and in 1968, American, Dick Howard, bronze medal winning hurdler died of a heroin overdose and French cyclist Yves Mottin also died of an amphetamine overdose (Todd & Todd, 2001).

The post-WWII period resulted in more prevalent use of drugs but in addition to stimulants, anabolic steroids were introduced. According to Schultheiss, Bloom, Wefer, and Jonas (2000), Fred Koch from the University of Chicago in 1927, advanced the work of Hunter (1771), Berthold (1849) and Brown-Sequard (1889). Koch’s work focused on isolating a highly toxic but highly potent form of testosterone from bulls’ testicles producing nearly miraculous qualities (Gallagher & Koch, 1929; Todd, 1989). In 1935, the molecular structure of cholesterol was altered to produce a synthetic testosterone (Butenandt & Hanisch, 1935; David,

Dingemans, Freud & Laqueur, 1935; Kochakian & Murlin, 1935; Ruzicka, Wettstein & Kaegi, 1935). A number of studies documented use of steroids and testosterone during World War II by the Germans including tests on storm troopers to increase their aggression (Arndt, 1939; Wade, 1972).

In 1952, the Soviet weightlifters dominated competition at the Helsinki Olympics and claims were made that the Soviet coaches partnered with U.S. pharmaceutical company, Ciba, to produce an anabolic steroid that would help athletes train longer. It is known to increase muscle mass, increase aggression and decrease libido and the product was called Dianabol (methandrostenalone) (Todd & Todd, 2001; Zeigler, 1984). In 1958, Dianabol (or dbol) was released by Ciba for the medical treatment of burn victims and geriatric cases exclusively (Hoberman, 2005).

The 1960s were a period of innovation, experimentation and contradictions as athletes believed that science improved their athletic performance and illegal drug use was socially accepted (Todd, 1989). The IOC established a doping inquiry in 1961, which led to the IOC condemning athlete doping in 1964 (Todd & Todd, 2001). A group of British scientists who collected data from the 1965 Tour de France and the 1966 FIFA World Cup established the tests for the 1968 Olympics (Dimeo, 2007). The only meaningful test used was the chromosome check to determine if a woman athlete was biologically female because there was still not enough research to prove that steroids improved performance and no test could detect if a banned substance was in the system (Todd, 1989). The first formal test did not occur until the 1972 Munich Olympics, but no official samples were taken (Donike & Stratmann, 1974). The use of anabolic steroids as a performance enhancing substance was banned for the 1976 Olympics in Montreal (Schänzer, & Donike, 1993). Despite advances in testing for anabolic steroids by 1976, only 275 of the 1800 samples were analyzed with the majority of samples failing due to the complexity of the procedures (Bertrand, Masse & Dugal, 1978).

At the 1980 Moscow Games, the IOC remained convinced drug usage was not an issue at the Olympics as no positive drug cases had been reported (Todd & Todd, 2001). Professor Manfred Donike, the German member of the IOC medical commission, took unofficial urine samples from athletes competing in Moscow including 16 Olympic champions and he found all had more than 6 times the normal ratio for testosterone in their bodies (Wilson, 2001). In 1982,

the IOC decided to ban the use of testosterone due to these unsafe levels as a lead up to the 1984 Olympics in Los Angeles (Donike, 1993).

A New Era of World Sport

Public interest in the Games exploded in 1988 following the Ben Johnson (See Figure 2.25) doping incident (detection of the anabolic steroid, Stanozolol). The subsequent Dubin Inquiry resulted; they investigated the use of drugs and banned practices intended to increase athletic performance (Dubin, 1990). The 1988 Olympics was the last games for the GDR and USSR and marking the end of history's largest pharmacological experiments with the



Figure 2.25. Ben Johnson.
Adapted from Johnson (n.d.) Retrieved August 28, 2012, from http://pdngallery.com/20years/sports/19_ronald_modra.html. In the public domain.

administration of drugs to athletes to enhance performance (Franke & Berendonk, 1997).

The 1990 Dubin Inquiry marked a new era in sport with increased cooperation between international sport governing bodies and various government agencies when it came to drugs in sport (Fraser, 2004; Hunt, 2007b). In 1999, the IOC convened the World Conference on Doping in Sport and the Lausanne Declaration on Doping in Sport resulted in the creation of The World Anti-Doping Agency (WADA) on the basis of equal representation from the Olympic movement and public authorities (Hunt, 2007b). WADA was to harmonize the Olympic antidoping code creating international standards (IS) for laboratories, testing, the prohibited list, and for therapeutic use exemptions (TUE)—permission to use for therapeutic purposes a drug or drugs, otherwise prohibited in sporting competition (Fraser, 2004).

In 2000, investigations began into use of performance enhancing substance in the former GDR where reports had indicated that physicians, scientists and professors performed doping research using prescribed and unapproved experimental drug preparations involving hundreds of athletes (Franke & Berendonk, 1997). U.S. track athlete Marion Jones (See Figure 2.26) was stripped of her Sydney 2000 three gold and two bronze medals in October 2007 after confessing that she had taken tetrahydrogestrinone (THG) (Mallon & Buchanan, 2006).



Figure 2.26. Marion Jones.
Adapted from Jones (n.d.) Retrieved August 28, 2012, from <http://www.nytimes.com/2007/10/05/sports/othersports/05balco.html>. In the public domain.

In 2008, the International Olympic Committee stripped the gold medal from the U.S. men's 4x400-meter relay team, after Antonio Pettigrew, twins Alvin and Calvin Harrison, and preliminary round runner Jerome Young, admitted or tested positive for performance enhancing drugs (Berning, Adams & Stamford, 2004). Substances such as human growth hormone (HGH), erythropoietin (EPO), beta-blockers, stimulants or diuretics are being used more and more to enhance performance (Wilson, 2001).

Historians have pointed out that drug use in sport has been in existence since antiquity (Berning et al., 2004; Hoberman, 2002; Mueller, 2010; Prokop, 1970; Savulescu, Foddy & Clayton, 2004; Wilson, 2001). As long as drugs are illegal for use in competition, a fight will exist between those attempting to catch the cheaters and the users and abusers of illegal performance enhancing substances (Hoberman, 2002).

Internationalization of the Olympic Games. After the 1988 Seoul Olympics, the IOC declared all professionals eligible to compete at the Olympics, removing amateur and amateurism from all official Olympic publications (Staudohar & Mangan, 1991). The liberalization of this concept of amateurism was to facilitate greater representation of countries appearing on the medal podium at the Olympic Games by giving athletes the opportunity to expand the earning capacity particularly for those who were previously not paid. This indirectly identified coaching as a key aspect of Olympic success by an increase in the number of full-time opportunities for coaches in Olympic sports around the world. This significantly advantaged

countries with strong central oversight. Additional Olympic funds were allocated to economically developing nations through grants from the Olympic Solidarity Commission.

The greatest way the Games have changed since 1988 is best described by Bernard and Busse (2000) who stated that “medal winning has become less concentrated, with large and prosperous nations winning a smaller share of medals, and with more smaller and less prosperous nations among the regular medal winners” (p.23). Illustrated in Figure 2.27, the number of nations winning medals since 1964 increased by over 100% from 41 to 86 in 2008, and the percentage of medals won by the top ten nations has decreased from 76% to 56% (IOC, 2012). Hoye, Smith, Westerbeek, Stewart, and Nicholson (2006) claimed that as a result the international sporting context has created a competitive environment for nations to rise into the international limelight like never before in history.

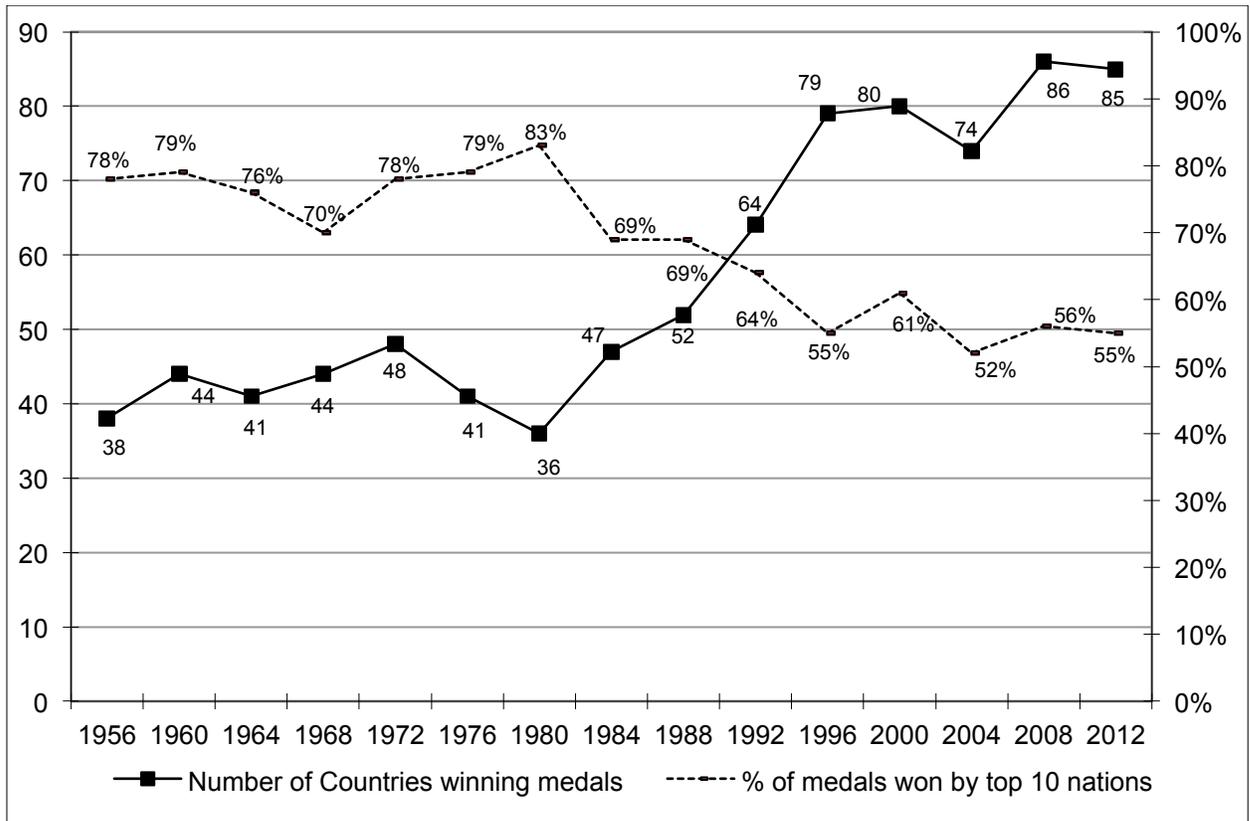


Figure 2.27. Medal winning nations versus total percentage of medals won by top ten nations

Source: IOC (2012). Medal count Retrieved September 1, 2012, from <http://www.olympic.org>

The Olympic Games and Television

Avery Brundage, IOC president from 1952 to 1972 realized the importance of television in advertising the Olympic Games. In the 1950s Americans were buying their first televisions, professional sporting team franchises were expanding across the United States and the International Olympic Committee was not in the financial state it is today (Bourne, 2008). In 1936, the Berlin Olympic Games were broadcast on live closed circuit television that could be accessed with a 15-kilometer radius; in 1948 the London officials paid around \$4000 to regional homes 80 miles away targeting around 80,000 people (Alaszkiwicz & McPhail, 1986; Slater, 1998; Whannel, 1984). The first international telecast of Olympic competition took place at the 1956 Winter Olympics in Cortina, Italy with viewers from only eight countries (Billings, 2008).

In Melbourne in 1956, Australian Olympic Committee officials offered \$500,000 for the live television rights determining the Olympics as entertainment and broadcasting impacted attendance to live events (Billings, 2008). The U.S. media disagreed saying that the Olympics was news and news footage is free (Jobling, 1996). In 1958, Rule 49 of the Olympic Charter was written after this argument and it stated that live television broadcast rights of the Olympics for entertainment will be sold by the IOC and this prepared the way for a future of high payments for the rights of exclusivity to broadcast the Olympics (Alaszkiwicz & McPhail, 1986; McCoy, 1997; Wenn, 1993). The IOC budget in 1960 was \$10,000, and the rights to the 1960 Olympics were sold to CBS for \$394,000 coverage was viewed live in 18 nations. In Tokyo 1964, \$2 million, 1972 Olympics television revenue replaced ticket sales as top revenue earner, \$100 million in 1980 and half a billion dollars in 1996, \$1.27 billion for Sydney and Salt Lake City, \$793 million for 2004, \$613 million for 2006, \$894 million for 2008 (Elcombe & Wenn, 2011; Slater, 1998) and \$950 million for the London 2012 (Blair, 2011).

Table 2.1 and Figure 2.28 illustrate this rate of change in IOC revenue for Olympic television rights, sponsorship and advertising.

Table 2.1.

1960–2012 Revenue and Percentage Change of IOC TV Rights

Year	Revenue	% change
1960	\$394,000	
1964	\$1,500,000	280.7%
1968	\$4,500,000	200.0%
1972	\$13,500,000	200.0%
1976	\$25,000,000	85.2%
1980	\$87,000,000	248.0%
1984	\$225,000,000	158.6%
1988	\$300,000,000	33.3%
1992	\$401,000,000	33.7%
1996	\$456,000,000	13.7%
2000	\$705,000,000	54.6%
2004	\$793,000,000	12.5%
2008	\$894,000,000	12.7%
2012	\$950,000,000	6.3%

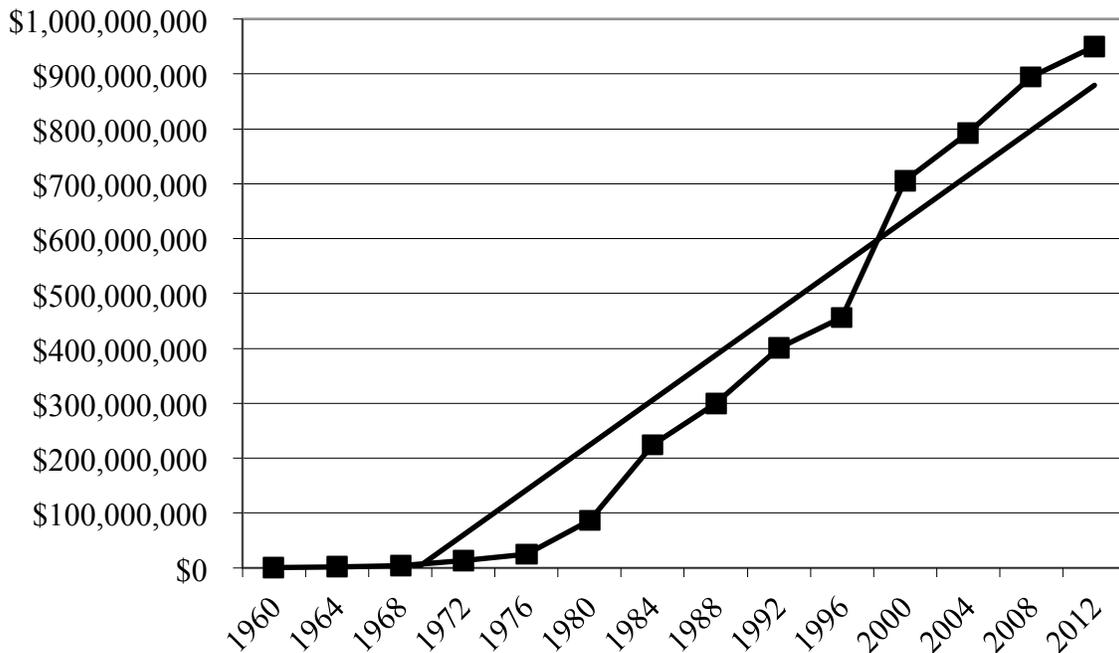


Figure 2.28. 1960–2012 IOC television rights sponsorship and advertising

Note. Source: Elcombe, T., & Wenn, S. R. (2011). A path to peace: Thoughts on Olympic revenue and the IOC/USOC divide. *SAIS*, 31(1), 118–134.

The sale of the rights to the 1960 Rome Olympics transformed the Olympic movement forever and commercialism took over the world of sport (Davies, 1996). The IOC began receiving much needed financial support from the mass media revenue but this opened the door to media influence on the Games. That was a high price to pay after the media boycott of the 1956 Melbourne Olympics (Slater, 1998). In 1964 the communications satellite led to the first live coverage of the Olympic Games to the world, and by 1974, 98% of the IOC revenue was from the mass media (Slater, 1998). In 1972, the IOC became a profit maximizing organization and took advantage of the high competition for bidding on the Games by allowing bidding go as high as possible (Preuss, 2004). This led in escalating the cost of the Olympics and 1976 was the first time complaints were received about the number of commercials held during live Olympic broadcasts (Diamond, 1992).

1992 marked a new era as the IOC embracing the idea of making sure the Olympics reached the widest audience possible and this policy would lead to the period of greatest prosperity (Levin, 1995). Sponsorships and licensing revenue in 1992 and 1996 outstripped anything seen prior and more host cities began and continue to bid for the Games (Spa, Rivenburgh & Larson, 1995). In 1998, NBC signed a \$2.3 billion deal with the IOC to secure the rights for the 2004, 2006 & 2008 Games and lead to subsequent deals with broadcasters in Australia, Canada and in Europe (Kelly, 1998) and NBC extended this deal for an additional a \$2.2 billion deal for the 2010 & 2012 Olympics and bidding for the 2014 & 2106 games is expected sometime after 2010 (Billings, 2008). IOC president from 1980–2001, Samaranch successfully promoted commercialization of the Olympics by liberalizing the amateur regulation fundamentally changing the financial stability of the Olympic movement (Preuss, 2004). Since 2001, the mandate of IOC President Rogge is to bring competition back to bidding for the Olympics and promotion of the Olympic values and symbols to television (Fernández Peña, 2009).

The trickle-down effect is that the IOC distributes over 90% of its revenue to between the National Olympic Committees, International Sport Federations and Organizing Committees for the Olympic Games, and each individual sport actively advocates through its National Governing Body (NGB) to negotiate with its National Olympic Committee for funds (International Olympic Committee, 2010). The IOC distributed \$305 million to NOC's that sent teams to the 2002 and

2004 Olympics and \$190 million to the 28-summer sport International Federations for the 2000 Olympic Games (Rosner & Shropshire, 2004).

Professionalization of Sports Coaching

The Olympic movement has experienced unprecedented success with greater financial and organization stability reflecting the development of sport around the world (Kidd, 2009). The changes in the nature and context of Olympic sport that have taken place over the last 50 years indicate the relationship between sport and internationalization (Arnaud & Riordan, 1998; Thibault, 2009; Weston, 2006), globalization (Houlihan, 2003; Maguire, 1999), commercialization (Amis & Cornwell, 2005; Slack, 2004), growth of state involvement (Houlihan, 1997; Riordan, 1978a) and expansion of the media (Bernstein & Blain, 2003; Rowe, 2004). The internationally diverse audience is an important consideration for the future of the Olympic games. Television has taken the Olympics Games and sport to the world (Wenn, 2000). As the cultural and sociologic status of sport in general changes with increased professionalization and commercialization of all Olympic sports this has enabled athletes to compete longer (Volianitis & Secher, 2007). Today more nations are investing in training facilities and financial support for elite athletes (Whitson, 1998).

As an example in rowing, British rower, Jack Beresford's career span and achievement of five medals in successive Olympic Games from 1920 to 1936, was unprecedented for his time but today several international rowers have succeeded in combining a professional career and a rowing career, with the average age of Olympic rowers in the late twenties. At the Sydney Olympics, Steven Redgrave at the age of 38 won a fifth successive gold medal. Similarly, James Tomkins of Australia, the only rower to win World Championship titles in all 5 sweep oar events (men's pair, men's coxed pair, men's four, men's coxed four and men's eight) and Elisabeta Lipa of Romania, who holds the rowing record for most Olympic medals won (eight, five of them gold), were both at end of their late thirties (Volianitis & Secher, 2007). Today financial support is producing a more professional and full-time athlete who is training systematically in accordance with cutting edge technology in sport science that is superior to his or her predecessors. Appendix B summarizes events in the sport coaching development timeline from 5800 B.C. to 2008 A.D.

Critics of professionalization of sport question the impact of the market philosophy on the sporting environment (Garrett, 2001; Nichols & Garrett, 2001; Taylor, 2007). If resources

and funds are unfairly and uneven distributed, this can impact the opportunities for athletes and coaches to participate (Nichols, Shibli & Taylor, 1998). Understanding the complex coaching culture is a critical element to transition the sporting world into a more professional environment (Taylor & Garratt, 2010).

Determining Olympic success. Not all nations have an equal ability to participate in the Games let alone equal ability to win medals (Johnson & Ali, 2004). Since the 1952 Helsinki Olympics, studies have built on the idea that GDP is the single best predictor of Olympic success as it is a measure of available resources to train athletes, build and maintain training facilities and better develop training methods (Jokl, Karvonen, Kihlberg, Koskela & Noro, 1956). The foundations of economics in sport can be traced back to the premise that comparative advantage is the key to success (Rottenberg, 1956). The determinants of Olympic medal winning success include political, economic, social, geographic, demographic, and cultural factors (Bernard & Busse, 2000, 2004; Churilov & Flitman, 2006; Condon, Golden & Wasil, 1999; Diem, 1912; Hoffmann et al., 2002; Hogan & Norton, 2000; Johnson & Ali, 2000; Kiviaho & Mäkelä, 1978; Krüger, 1984; Kuper & Sterken, 2001; Matros & Namoro, 2004; Moosa & Smith, 2004).

The first trend in the research on determinants of Olympic success highlighted that population alone was not enough to produce Olympic medals. Jokl (1964) established the relationship between socio-economic factors and Olympic success. Novikov and Maximenko (1972) determined that the highest correlating socioeconomic factors that helped predict Olympic success included per capita GNP, caloric consumption, average life expectancy, percentage of literacy, percentage of urban population and number of inhabitants. Ball (1972) and Levine (1974) identified a positive relationship between demographic, economic and political factors and predicting Olympic success. Grimes, Kelly, and Rubin (1974) determined that of 48 countries competing at the 1972 Olympics, communist countries made better use of their population and economic resources for sport than non-communist countries.

The second trend in the research has been the importance of available resources and economic development. Shaw and Pooley (1976) found in western nations 63% of Olympic success was predicted by population and GNP, in communist countries Olympic success was explained by military expenditure, per capita GNP, school enrollment ratio and the number of Olympic sports taught in schools, and for third world countries the most favorable factors of Olympic success were population size, GDP, military expenditure and the number of Olympic

sports taught in schools. Pekka and Pekka (1978) found that Olympic athlete success is best predicted by economic, demographic and social factors. Sombat (1987) concluded that for ASEAN countries Olympic success was a function of cultural variables, geographic size in relation to population size and political and scientific factors. Gärtner (1989) found that an economy producing \$6 billion per year in aggregate income was necessary to support the successful quest for a single Olympic medal. Seppanen (1989) concluded that greater Olympic success was due to more rational training practices and greater use of scientific applications. Halsey (2009) found population, the Human Development Index (HDI) and GDP per capita to demonstrate more meaningful predictors of medal success, describing a measure of “overachievement” to indicate additional factors outside of previous models.

Competitive advantage is the third key factor to predicting Olympic success. Bernard and Busse (2000, 2004) employed a determination of medals confirming population size and GDP per capita (a reflection of resources enabling athletes to train) as being highly significant and the general model for predicting Olympic success. This approach is being integrated into other mega-sporting events such as the Tour de France (Torgler, 2007) and World Cup soccer (Torgler, 2006). Olympic success leads to allocation of funding that influences training facilities, career choices of coaches and athletes, technology decisions and resource allocation (Andreff & Szymański, 2006; Shughart & Tollison, 1993).

The economics of sport are grounded in the foundation of competitive balance and have exploded in the literature since the 1990s (Zimbalist, 2001). The literature has evolved since the work of Taylor (1911) on scientific management of work systems. Rottenberg (1956), Neale (1964) and Sloane (1971) address the key economic operations of professional sporting markets. According to Rottenberg (1956), sport competition is driven by talent management. Neale (1964) stated that competition is driven between the management of the teams in the competition. Jones (1969) suggested profit maximization is the driver to competition in sport. Sloane (1971) claimed that team utility not profit was the driving force behind competition in sport. El-Hodiri and Quirk (1971) established a theoretical framework for the concept of competitive balance in professional sport. Demmert (1973) explored the competitive balance and the discussion of parity in competition as valuable to keeping the spectators engaged. Daly and Moore (1981) presented the position that salary cap was the underlying driver to competitive success. A number of

arguments exist presenting a variety of cases on how revenue sharing contributes to competitive balance (Humpreys, 2002; Kesenne 2000; Marburger, 1997; Vrooman 1995).

The discussion on the economics of sport is spilt into two discussions; one is based on the business of competition and its effect on teams and the “league” that runs the competition or the “*analysis of competitive balance (ACB)*.” The second is the impact that competition has on its fans or “*uncertainty of outcome hypothesis (UOH)*.” A summary of the ACB literature is provided by Fort and Macy (2003) and a comprehensive review of the UOH literature is presented by Dobson and Goddard (2001) and Garcia and Rodriguez (2002). In short, the economics of sport is driven by monopolistic powers limiting teams and athletes in the competition and forcing the price of playing above market value increasing profit to the monopoly that get redistributed to wherever is needed to maximize competitive balance and spectator demand.

National Sport Development Case Studies

Sport policy development that creates and sustains a suitable system to meet the unique needs of the culture and resources of the given country will foster Olympic success. The literature on sport policy is quite extensive (Baka, 1976; Bramham, Hylton, Jackson & Nesti, 2001; Chalip et al., 1996; Da Costa, 1997; Hogan & Norton, 2000; Macintosh, Bedeck & Franks, 1987; Oakley & Green, 2001; Olafson & Brown-John, 1986; Riordan, 1993; Semotiuk, 1981; Thoma & Chalip, 1996; Woodman, 1989). Less attention exists in the literature on comparative studies because of the difficulty of comparing similar data accurately, that is, making sure to compare two sets of like data (Chalip et al., 1996; Green & Houlihan, 2005; Landry, Landry & Yerles, 1991).

According to Green and Houlihan (2005), since the 1960s there has been an increased awareness among governments of the value of elite sporting success as it can be a valuable resource to help achieve a wide range of non-sporting objectives (including economic benefit, diplomatic utility or political ideology). More nations are advancing their sport systems to implement more systematic, professional and scientific approaches to coaching and athletic development in pursuit of Olympic success (Chalip et al., 1996; Green & Houlihan, 2005; Oakley & Green, 2001; Whitson, 1998). From the macro level, analysis of sport policy decisions and financing is vital to feed the micro level decision about ways to implement and improve necessary human and non-human systems to produce peak human performance (Levine, 1974).

When coaching development becomes a priority at the Olympic level, success follows and this is illustrated in the significant role each National Olympic committee plays in setting the vision, expectations and standards for performance.

The Soviets and the East Germans dominated from the 1960s exploiting sport as the doctrine of communism to establish a systematic and scientific approach to elite sport development (Green & Houlihan, 2005). The Australian and American systems went through a major restructure after failure to perform at the 1976 Games as did the Canadians. The Chinese reentered the Olympics in 1984 and consistently prepared for a successful 2008 Olympics and since 1997, the British system has gained momentum leading up to the 2012 London Olympics that is all based on the lessons learned from systems prior. These cases represent a diverse range of sport policy with one common theme when sports development becomes the primary focus results follow.

The Soviet Union—A new paradigm for world sport—1952–1988. In the Soviet Union, prior to World War II, most of the athletic competitions occurred within Eastern Europe and Soviet aligned states. Sport after the war became a political tool deflecting the attention of workers from the class struggle as the Cold War indirectly created an arena for international sporting competition (Riordan, 1993). The Soviets attempted to illustrate the strength of the communist ideals on the international sporting stage. The Soviet sports budget prioritized funds to Olympic sport as the political vehicle that would prove communist superiority over the rest of the world (Allison, 2005). This was the case no matter what the price, even though much of the population at this time was living below the poverty line. This approach to prioritizing Olympic sport destroyed the harmony between the rest of the sport community and began to tarnish the image of Olympism in the Soviet Union. At the Helsinki Summer Olympics in 1952, the USSR finished second behind the U.S. on the medal tally and in 1956 the USSR won more medals than any other nation (Wallechinsky & Loucky, 2012). This domination by the USSR of Olympic sport through a win at all cost approach ended at the 1988 Seoul Summer Olympics. From 1952 in Helsinki, after nine Olympics, the Soviets had amassed 1010 Olympic medals, 395 gold, 319 silver and 296 bronze medals (IOC, 2012).

German Democratic Republic—Twenty years of dominance—1968–1988. The German Democratic Republic entry onto the world stage after the war and at the Olympic in 1968 was neither smooth nor graceful, but left a lasting imprint on all aspects of sport (Riordan, 1993). In

the 1960s, the GDR was in relative obscurity behind the mystery of the “iron curtain”. Then the Socialist Unity Party took control of GDR national spirit and pride through sport to produce the 1972 Olympics performance in Munich (Carr, 1974). If there was ever a way to quantify the scale of operations in the GDR when it came to Olympic sport, Houlihan and Green (2008) stated that in the GDR about 1% of the annual GDP was allocated to sports totaling a haul of 409 Olympic medals haul over 5 Olympics between 1968 and 1988 (153 gold, 129 silver, 127 bronze) (IOC, 2012). It is clear that hundreds of millions of dollars were spent on guaranteeing Olympic success for the GDR. If in 1990, GDP was 250 billion East German Deutschmark, and the conversion to \$USD was 20:1, the GDR was allocating over \$100 million/year into the Olympic effort.

Australia—Centralization, government support and Olympic funding—1976–2000. In the literature, evidence about sport development in Australia and the involvement of the federal government dates back to the 1930s (Lynch & Veal, 1996). The government had plans to develop a coaching accreditation system back to the late 1930s but this period was mainly driven by next to no federal financial involvement in sport development (Jobling, 1991; Phillips, 2000; Sotiriadou, 2005). For the first time in Australian history sport was recognized as an integral part of Australian life and in 1972 this became a turning point in the federal government’s involvement in Australian sport (Cashman, 1995; Jobling, 1991; Sotiriadou, 2005). This led to the creation of the National Sports Organizations (NSO) in 1978 to research strategies for elite sport’s development and the development of a centralized systems beginning with the Australian Institute of Sport in 1981 and the Australian Sports Commission in 1985 as response to the failure to capture any gold medals in the 1976 Montreal Olympic (Adair & Vamplew, 1997; Farmer & Arnaudon, 1996; Green & Houlihan, 2005; Houlihan, 1997; Woodman, 1989). Implementation was not immediate and this was reflected in results (Armstrong, 1988).

Prior to 1976 Olympic sport was largely independent of government support and was driven by sporting clubs established across the nation dating back to 1850s (Cashman, 1995; Stewart-Weeks, 1997). These centers of community development are for young aspiring athletes for current high performing athletes and for retired athletes to give back in some way to their community (Heinemann, 1999). The changes in the international sporting community in the 1960s and 1970s impacted the nature of how the best talent was being developed around the world.

From the mid-1980s changes began as the new centralized system took shape but in its initial form looked like an exact mirror of the former Eastern bloc approaches (Green & Houlihan, 2005; McKay, Lawrence, Miller & Rowe, 1993). Six key principles became the priority in the development of this system; sporting culture, federal funding, elite sport institutes, talent identification, sport science and well qualified coaches (Green & Houlihan, 2005). Australia's deeply rooted cultural predisposition to sport allowed sport to be a defining element in Australian identity (Adair & Vamplew, 1997). Athlete and coach development continue to be the primary reasons why Olympic sports receives support in Australia (Hoye et al., 2006). By the early 1990s, the system had adapted and regional units from the national institute of sport began to appear as part of the State Institutes and Academies of Sport as venues that sourced funding and support for athletes and coaches, and as centers of sport science and talent identification (Green & Houlihan, 2005). This regionalization of the sports institutes was deemed a form of decentralization to provide more opportunities for more athletes in a wider selection of sports. By the 1992 Barcelona and 1996 Atlanta Olympics, Australian sport began experiencing unprecedented Olympic success.

Hogan and Norton (2000) reported that an Olympic gold medal, in 1998 Australian dollars funding terms, equated to \$38 million and an Olympic medal was about \$8 million, stating a significant relationship between money spent and total medals won. Government support almost doubled from \$5 million in 1980 in Moscow to \$10 million AUD in Los Angeles. There was no change for Seoul in 1988; it almost tripled to \$27 million AUD in Barcelona (seven gold, 27 medals). Atlanta (nine gold, 41 medals) around \$40 million AUD, and around \$52 million in Sydney (16 gold, 58 medals) (Pyke & Norris, 2001).

Table 2.2 shows the success of the Barcelona and Atlanta Olympics was directly related to funds allocated from the 1994-2000 Olympic Athlete Program that focused resources toward improving sport services, employing coaching expertise, participating in more international competitions, and the prioritization of selected Olympic sports (rowing, athletes, basketball, canoe, cycling, hockey, gymnastics and swimming) (Pyke & Norris, 2001). The Sydney 2000 Olympic was successful in terms of medals won, 4th in the overall medal tally and proved sport development became an integral part of political power and ideology (Armstrong, 1988).

Table 2.2.

Australia Medals Tally and Olympic Funding Allocation 1980–2000

	1984	1988	1992	1996	2000
Funding allocation (million)	\$10	\$10	\$27	\$40	\$52
Olympic medals	24	14	27	41	58

Note. Source: Pyke, F., & Norris, K. (2001). *Australia from Montreal to Sydney: A history of a change of model*. Paper presented at the 2nd International Forum on Elite Sports Centre d'Alt Rendiment of Sant Cugat, Catalonia, Spain.

China—Preparing for the 2008 Beijing Olympics. Western style sport spread through the Republic of China from 1912 through the efforts of the YMCA (Kolatch, 1972). The Chiang Kai-Shek government joined the Olympic movement in 1923, but didn't become active until 1928. Then, in 1929 the formation of the China Amateur Athletic Federation and the National Physical Education Law followed with the first Chinese athlete participating in the 1932 Olympics in Los Angeles and 107 athletes participating in the 1936 Olympics in Berlin. With the death Chiang Kai-Shek in 1975 and Mao Tse-Tung in 1976, China struggled with internal political problems resulting in no participation until the Olympics in the 1984 Olympics in Los Angeles.

China's impressive advance in sport development in preparation for the 2008 Beijing Olympics began with their return to the 1984 Olympics that resulted with 15 gold medals and 4th place in the overall medal tally. In Seoul in 1988, China's 5 gold medals reflected the dominance of the USSR and the GDR of the major medals. In 1992, 16 gold in Barcelona set high expectations for 1996 resulting in 16 gold medals in Atlanta as a Chinese disappointment. There was a huge lift in 2000, with 28 gold medals in Sydney and then 32 gold medals in Athens (Hong, Wu & Xiong, 2005). Expectations leading into 2008 were very high once again after the Sydney and Athens gold medal winning haul with over \$150 million being allocated for the 2004 Athens Olympics and at least \$250 million for Beijing (Hong et al., 2005).

If American Olympic success was tied to economic power, and the Russian sporting success depends on rich resources and experience in training athletes, then the Chinese believed their success was linked to the whole country support for their elite athletic success (Houlihan & Green, 2008). The Chinese added ten new sports to the traditional sixteen events at the National games and these additional sports were in preparation for the Beijing Olympics (Houlihan & Green, 2008). The rules of these events, structure, and governance followed the Olympic model to give Chinese athletes maximal chance of Olympic success (Hong et al., 2005). Young athletes

with a chance of Olympic success were also sent to the World Student Games and the Asian Games in 2006 for further international preparation for the demands of Olympic performance. China consistently took advantage of this slogan “whole country support for elite athletes” to systematically produce more Olympic athletes in order to hopefully advance their position in the medal tally in 2008 (Hong et al., 2005). China’s most transparent commitment was to ensure they had the best coaches in China to train Olympic athletes along with the best sport scientists working with the national, youth and resource teams to improve the abilities of athletes. There was mixed emotion in China with the success in 2008 despite all the expectations. China won 51 gold medals more than any nation at the 2008 Olympics but 10 fewer overall medals than the U.S. who won 110, placing China in second on the overall medal tally (IOC, 2012).

Britain—Lottery funding and importing from the rest of the world—1994–2012. The British have joined the Australia and China in developing their own systems to achieve impressive results on the international stage. The introduction of the British lottery funding in 1994 enabled sport funding not only to match government policy to increase Olympic sporting success but resulted in an unprecedented increase in financial support to British Olympic sports in preparation for the 2012 Olympics (Binns, 2009). The main characteristic of the British government’s sport policy in the 1990s was increasing the importance placed on Olympic sport and elite sport performance (Oakley & Green, 2001). Formal support from the UK sport council for sport began in 1988 with a total of £4 million being invested into sport for a ten-year period or £400,000 per year then the World Class Performance Program from 1997 until the 2000 Sydney Olympics allocated £58.9 million specifically to support 13 Olympic sports leading to 28 medals including 11 gold medals. Table 2.3 shows how this has changed (Nevill, Balmer & Winter, 2009). For the Athens 2004 Olympics, the UK government allocated £70 million directly to finance 16 sports with a medal tally of 30 medals, summing to about £2.3 million per medal (Green & Houlihan, 2005). In Beijing, the total allocation looked more like £235 million in 27 sports with 47 medals and the allocation for 2012 in London will exceed £550 million for the 30 Olympic sports (Nevill et al., 2009).

Table 2.3

British Olympic Funding and Medal Tally 1992–2012

	1992	1996	2000	2004	2008	2012
Revenue (million)	£1.6	£1.6	£58.9	£70	£235	£550
Medals	20	15	28	30	47	65
Rank	13	36	10	10	4	3

Note. Source: Nevill, A. M., Balmer, N. J., & Winter, E. M. (2009). Why Great Britain's success in Beijing could have been anticipated and why it should continue beyond 2012. *British Journal of Sports Medicine*, 430(14), 1108–1110.

Canada—A centralized government system from 1961 to the present. Canadian sport development has been substantially influenced by the government agency Sport Canada (Chalip et al., 1996). During the 1950s and 1960s, Canadian sport experienced declining international success including poor performances at the Olympic Games (Baka, 1976; Macintosh et al., 1987; Morrow & Wamsley, 2005). After the Fitness and Amateur Sport Act of 1961 greater federal control was accompanied by a sharp increase in government investment in Canadian Sport (Macintosh et al., 1987). In the 1970s, the Canadian government established a framework that would develop a cadre of medal winning athletes (Macintosh & Whitson, 1990). This initially created an increasingly complex bureaucracy, a cycle of increased dependency of sports on government funds created more government controls (Macintosh et al., 1987; Olafson & Brown-John, 1986).

The results orientation culture of the 1980s and the Ben Johnson drugs affair at the 1988 Seoul Olympics led to significant inquiry into values and belief system underpinning the Canadian sport (Blackhurst, Schneider & Strachan, 1991; Dubin, 1990; Whitson, 1998). In the 1990s, Sport Canada shifted to a less autocratic and centralized system to expand support for all Canadians and has successfully developed a system that focuses on future success by supporting elite athlete development through sport science and support for athletes, coaching and training centers (Sotiriadou, 2005). From 2005–2010, \$117.52 million was allocated by all Canadian Olympic organizations to launch the Own the Podium 2010 national initiative designed to help Canadian Winter athletes with the most number of medals at the 2010 Vancouver Winter Olympics. The summer sports initiative attempts to push Canada into a top 12 medal winning position in London 2012 with \$211.65 million being allocation from 2006–2012 (Zussman, 2009).

The United States of America—The past, present and future of decentralization. Sport in the United States is explicitly non-governmental, so U.S. Olympic success has had much to do with the development of athletes through the collegiate ranks (Chalip et al., 1996; Shulman & Bowen, 2001). Lewis (1970) claimed that the collegiate athlete system prior to the 1970s separated the United States as a unique sporting system seen in the international sport arena. Jones et al. (2007) argued the NCAA established in 1905 to preserve student-athlete eligibility, has become one of the most professional sport systems providing many benefits to sports development in the United States. From the outset, American colleges have supported their student athletes to attend university through awarded scholarships as one of many means of support (Fleisher et al., 1992). U.S. colleges have been world renowned for having world-class infrastructure and facilities, support services, researchers and laboratories and competitive environment athletically and academically (McPherson & Schapiro, 2006).

Historically, in the United States, most of the best coaches are employed in the collegiate system as it provides more financial security, more sustainable performance expectations, holistic athlete development and lifestyle within an established, loyal and supportive community (Jones et al., 2007). The college sport system was the driving force behind Olympic success. U.S. collegiate coaches coached U.S. Olympic athletes: James “Doc” Councilman is one example. As the head swimming coach at University of Indiana for 23 years, they won 20 consecutive Big Ten championships and six NCAA titles and as a U.S. Head Olympic swimming coach from 1964 to 1976 won 21 out of 24 gold medals and he also coached Mark Spitz. His significant contribution to the literature was influenced by the work of Selye on using science and technology to enhance performance by transforming practices through power and strength training techniques, interval training monitoring, skill acquisition and sport psychology (Councilman, 1968).

At the Olympic level, the United States dominated the 25 Summer Olympic Games, with its total medal count finishing first on 18 occasions, second on 5 occasions, and third in 1976 and 1988. Of the 13,752 medals awarded in the modern Olympics, in the overall medals won by country, the United States dominates with 2,298 medals (16.7%), USSR with 1,010 medals (from only 9 Olympics), and Great Britain is third with 715 medals (IOC, 2012). The gradual decline in percentage of gold medals won by the U.S. since the 1948 Olympics is noted in Table 2.4 and Figure 2.29.

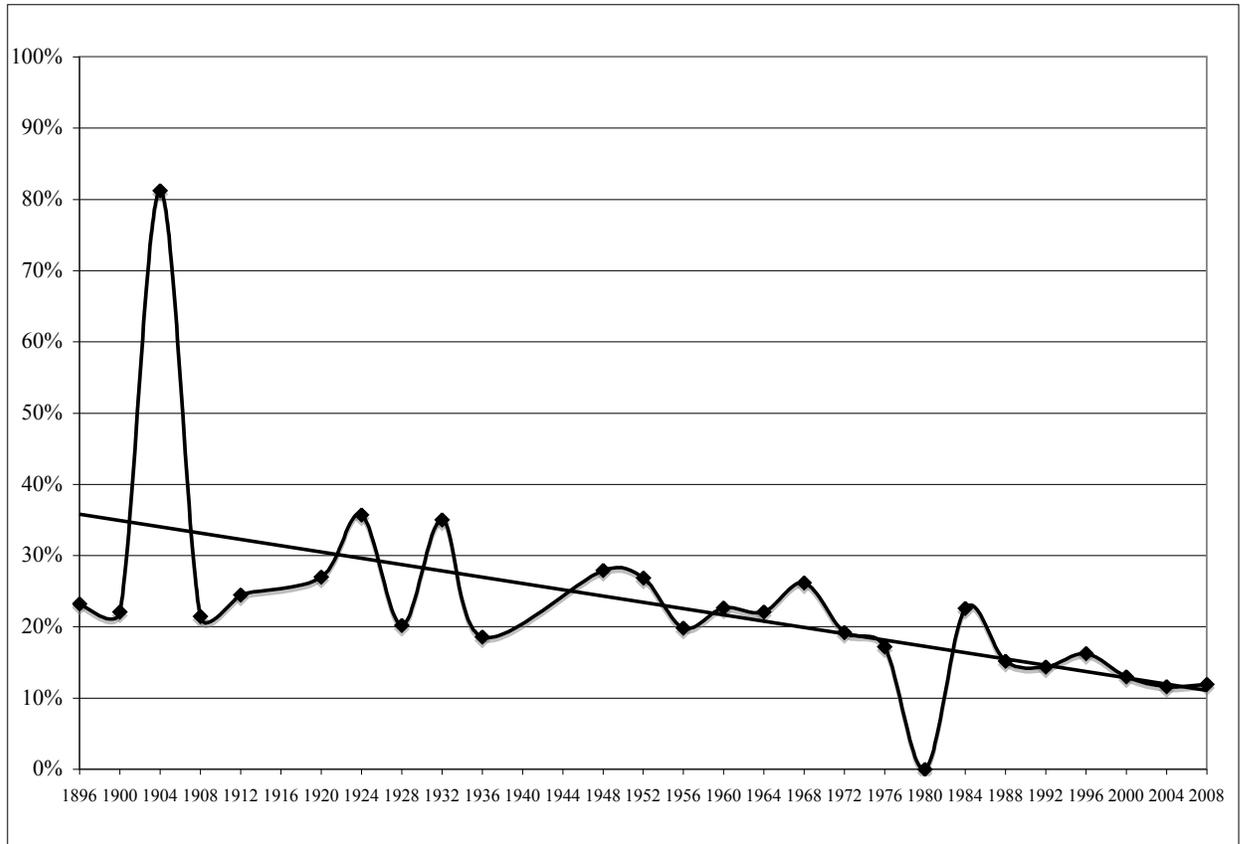


Figure 2.29. United States total gold medal tally and gold medal placing.

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>.

Table 2.4

U.S. Medal Tally by Olympics

Year	Location	% Gold by USA	Place by total medal tally
1896	Athens	23%	1 st
1900	Paris	22%	1 st
1904	St. Louis	80%	1 st
1908	London	21%	2 nd
1912	Stockholm	25%	1 st
1920	Antwerp	27%	1 st
1924	Paris	36%	1 st
1928	Amsterdam	20%	1 st
1932	Los Angeles	35%	1 st
1936	Berlin	19%	2 nd
1948	London	28%	1 st
1952	Helsinki	27%	1 st
1956	Melbourne	20%	1 st
1960	Rome	23%	1 st
1964	Tokyo	22%	2 nd
1968	Mexico City	26%	2 nd
1972	Munich	19%	2 nd
1976	Montreal	17%	3 rd
1980	Moscow	Boycott	
1984	Los Angeles	23%	1 st
1988	Seoul	15%	2 nd
1992	Barcelona	14%	3 rd
1996	Atlanta	16%	1 st
2000	Sydney	13%	1 st
2004	Athens	12%	1 st
2008	Beijing	12%	1 st
2012	London	11%	1 st

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>

Tallies dropped from 28% gold medals won in 1948 to around 12% in Beijing. No medals were won in 1980 due to the boycott. Two exceptions were in the 1984 and 1968. At the 1984 Olympics in Los Angeles, the United States topped the medal tally, with 23% of gold medals won. In 1968 at the Mexico City Olympics, the United States reached 26% of total gold medals won. Both results can be explained by the host effect (Bernard & Busse, 2004). Up to the 2012 London Olympic Games, eighteen countries have hosted the Olympic, four countries twice

(Greece, 1896 & 2004; Australia, 1956 & 2000, France 1900 & 1924, and Germany, 1936 & 1972), London is the only city to have hosted three times (1908, 1948 and 2012) and the U.S. has hosted four Summer Olympics: more than any other nation (St Louis, 1904; Los Angeles 1932, 1984; and Atlanta 1996). Schwartz and Barsky (1977) set the foundation for the research on home (host country) advantage in professional sport and Courneya and Carron (1992) set a conceptual framework to what is now well established in the literature:

- American Professional Football (Edwards, 1979; Schwartz & Barsky, 1977)
- Australian Rule Football (Clarke, 1993)
- Basketball (Agnew & Carron, 1994) (Baumeister & Steinhilber, 1984; Schwartz & Barsky, 1977; Varca, 1980)
- Baseball (Adams & Kupper, 1994) (Baumeister & Steinhilber, 1984; Edwards, 1979; Schwartz & Barsky, 1977)
- Handball (Gutiérrez, Saavedra & Fernández, 2012)
- Ice hockey (Moore & Brylinsky, 1993) (Gayton, Matthews & Nickless, 1987; Schwartz & Barsky, 1977)
- Olympics (Balmer, Nevill & Williams, 2003)
- Rugby (Kerr & Vanschaik, 1995; Thomas, Reeves & Bellhome, 2008)
- Soccer (Dowie, 1982; Nevill, Newell & Gale, 1996; Pollard, 1986)

Of those countries who have hosted the Summer Olympics, 17 host countries have won more medals than ever at their home Olympics. West Germany boycotted in 1980, but East Germany won their most medals at the 1980 Olympics in Moscow with 126 total medals (See Figure 2.30). All host countries have increased their medal tally at the Olympics prior to their home Olympics. Table 2.5 shows that except for U.S. at the 1996 Olympics, all host countries have increased their medal tally when hosting the Olympics.

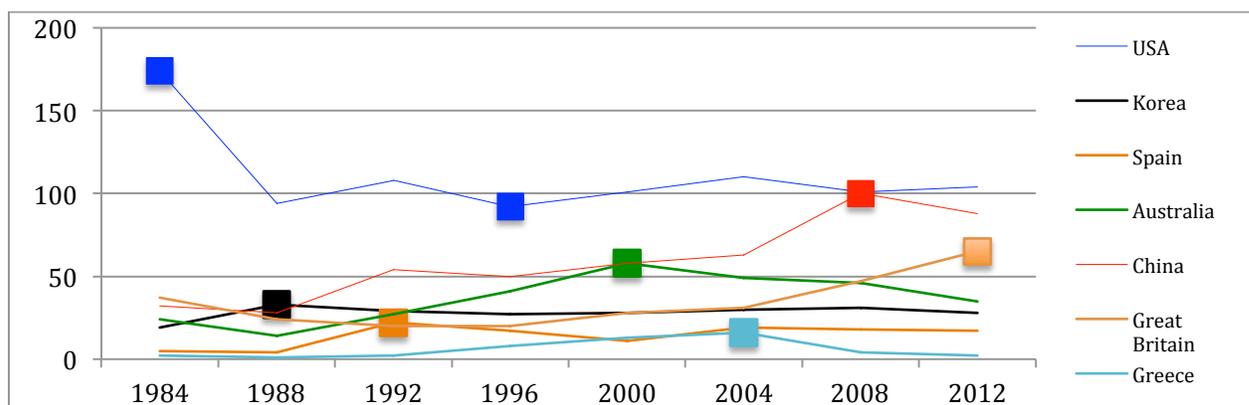


Figure 2.30. Medal tally of host nations since 1984–2012

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>

Table 2.5

Total medal tally by host nation—1984–2012

	1984	1988	1992	1996	2000	2004	2008	2012
USA	174^a	94	108	92	101	110	101	104
KOR	19	33	29	27	28	30	31	28
ESP	5	4	22	17	11	19	18	17
AUS	24	14	27	41	58	49	46	35
GRE	2	1	2	8	13	16	4	2
CHN	32	28	54	50	58	63	100	88
GBR	37	24	20	20	28	31	47	65

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>

* Shading indicates games that the host nation.

^a Although the U.S. boycotted the 1980 Olympics, at the previous Olympics in 1976 won 94 Olympic medals.

Dominance of the largest and wealthiest countries in the gold medal and total medal tallies has eroded over time (Bernard & Busse, 2000). In the 1960 Olympics, the concentration of medal-winning among the top countries has generally been falling; with the top 10 countries won 78% of the awarded medals, compared with the top 10 in 2000 winning only 55% of the awarded medals (Bernard & Busse, 2004). This is consistent with poorer countries over the same time having improved their standard of living and thereby having improved their chances of sharing in Olympic glory. This trend has led to a greater number of countries winning medals and lower medal shares for the top countries such as the U.S. and Russia (Bernard & Busse, 2004).

The “*laissez-faire*” approach is the sport policy domain in the USA (Clumpner, 1986; Douglas, 1978). No legislation specified the structure of U.S. Olympic sport before the 1972 Munich Olympics (Chalip, 1995). The Ted Stevens Olympic and Amateur Sport Act 1978 was chartered and granted monopoly power status to the U.S. Olympic Committee stemming from the American team’s poor performance at the 1972 Munich Olympics (Hunt, 2007a). The Act specified requirements for its member national governing bodies, and was claimed as the single most important decision enacted on U.S. amateur sport (Delmont, 1983; Nafziger, 1983). This charter promotes participation in sport which conflicts with the USOC’s mission to achieve sustained competitive excellence through development and support of elite athletes (Chalip et al., 1996; Woodman, 1993).

No reference in the charter was made to sources of funding for future U.S. Olympic sports success (Bitting, 1998; Wilson, 1993). The act inferred that private corporations would help the USOC achieve its goals (Houlihan & Green, 2008; Nafziger, 1983). The USOC is claimed to make over 45% of its revenue from the IOC through contributions from NBC, and

from its own sponsorship and fundraising efforts, 10% from the U.S. Olympic Foundation, 18% from other Olympic Games related revenue and the remaining 27% from corporate sponsors illustrated in Figure 2.31 (Schantz & Gilbert, 2009). The U.S. receives more IOC money than all of the other NOCs combined but due to the USOC's staggering overheads it has been unable to get out of the red up to the period through the Athens Olympics in 2004 (Rosner & Shropshire, 2004).

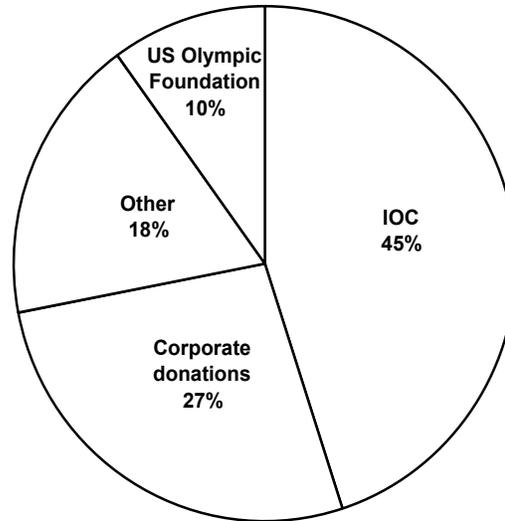


Figure 2.31. *USOC Olympic funding distribution.*

Note. Source: Schantz, O. J., & Gilbert, K. (2009). *The Paralympic Games: Empowerment or sideshow*. Aachen: Meyer & Meyer Verlag.

The underutilization of talent and resources remained despite the restructuring of the United States Olympic Committee with America's world-class coaches and vast capital stock of sporting facilities (tracks, fields, pools), U.S. Olympic sport was decentralized and disorganized (Wilson, 1993). Since 1983, over 200 individuals and seven teams have been recognized as inductees into the USOC Hall of Fame. Up until 2012, only three of those individuals are coaches. Dating back to 1982 the U.S. employed its first full-time track and field coach while in East Germany thirteen full-time track coaches were employed (Riordan, 1986). This period through the 1980s reflected little progress on the funding sources for the USOC despite the IOC liberalizing participation to all professionals allowing full funding to go to all athletes (Wilson, 1993). Funding for athletes increased from 1988 to 1992, with USOC's increasing allocation from \$2.2 million in 1988 to \$21 million in 1992 and \$30 million in 1996, but most athletes

received no more than \$15,000/year unless it is earned through prize money (Bitting, 1998). And while it is commonly recognized that being an aspiring Olympic athlete is a full-time job with requirements that are more than a traditional job, which many also hold, these levels of support make it very difficult for most athletes to survive without additional support.

The U.S. Olympic Committee has been referred as the “wealthiest and most powerful” of all the National Olympic Committees (Barney, Wenn & Martyn, 2002). Despite this, limited analysis exists on how U.S. Olympic sports effectively utilize their financial resources. Dittmore (2007) examined the process of how each of the 37 national governing bodies allocates its funds within a framework of fairness. This U.S. based research stemmed from some research looking at the systematization and professionalization of amateur sporting organizations in Canada (Slack & Hinings, 1987). Other relevant studies to sport program analysis include:

- Organizational effectiveness (Arnold, Fletcher & Molyneux, 2012; Chelladurai & Quek, 1995; De Bosscher, 2011; De Bosscher, De Knop & Heyndels, 2003; De Bosscher, De Knop, Van Bottenburg & Shibli, 2006; De Bosscher, De Knop, Van Bottenburg, Shibli & Bingham, 2009; Papadimitriou & Taylor, 2000);
- Program attractiveness (Thibault, Slack & Hinings, 1993);
- Participation rates and media exposure (Berrett & Slack, 2001);
- Strategic allocations of resources (Olberding, 2003, 2004); and,
- Systems approach (Chelladurai, Szyszlo & Haggerty, 1987; Vail, 1985).

The U.S. competitive advantage over the rest of the world at the Olympics is more recently in women sport. Title IX of the Civil Rights Act of 1964, the Educational Amendments of 1972 states “any institution receiving federal funds may not discriminate against anyone by gender” but is best known for its impact on high school and collegiate sports which is not mentioned in the original statutes. The Equity in Disclosure Act of 1994 resulted in institutions having to annually disclose all program information (rosters, budgets, scholarships, and coaches’ salaries) to assist in improving compliance procedures for Title IX (Anderson, Knowles & Gilbourne, 2004). This legislation has contributed to U.S. Olympic successes by increasing the athletes participating; there are more programs, hiring more coaches and with more resources in U.S. Olympic women’s sports (Brake, 2001). In the 1981/1982 season, a total of 1187 women rowed in the 42 U.S. university programs. By 2011/2012, over 140 programs with more than 7200 women rowing in U.S. colleges (NCAA, 2012).

Figure 2.32 shows Title IX has had an opposite effects on men’s sport development for United States collegiate programs (Anderson et al., 2004; Houlihan & Green, 2008). Some

universities have responded to Title IX by eliminating some Olympic sports for men in order to obtain percentages of participation that appear equal for both sexes affecting the sport's potential for success in international competition by shrinking the pool of programs through which elite athletes are cultivated (Gavora, 2002). Between 1981 and 1999, universities eliminated 171 men's wrestling teams, 84 men's tennis teams, and 56 men's gymnastics teams (GAO, 2001). In men's rowing, since 1981/1982 there has been a 42% increase in the number of university programs offering sports in the U.S., but there has been a slower growth rate of men's programs with division 1 and 2 programs getting smaller with fewer athletes rowing per program than in 1981/1982 (from 42.8 to 37.3 athletes/program). In 2007/2008, men's rowing programs reflected between 5-6% of sporting programs in U.S. colleges in this 27-year period where women's rowing almost tripled from around 5% in 1981/1982 to over 13% in 2007/2008, totaling over 7000 women rowing in U.S. colleges with just under 2400 of their male counterparts (NCAA, 2012).

Many nations are developing more sophisticated systems to foster Olympic success (Chalip et al., 1996). U.S. collegiate sport has less and less impact on Olympic sport performances, acting as a direct feeder of athletes into the pre-elite arena for many but not all sports. If the U.S. solely relies on the college systems for Olympic success this is one major reason why the rest of the world will continue to develop systems that are more sophisticated. Today, American professional sport only has a small direct impact on the 28 sports hosted at the Summer Olympic Games (soccer, basketball and tennis) and ice hockey at the Winter Olympic Games.



Figure 2.32. 1981/1982–2011/2012 NCAA rowing programs—men and women

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>

Of the 29,137 Olympic gold medals ever won at the Olympics, Jim Thorpe (1912), Jessie Owens (1936), Mark Spitz (1976) and Michael Phelps (2004, 2008, 2012) are members of the group of 975 U.S. Olympic champions. All were extraordinarily talented athletes from a famous, successful and respected decentralized system. Their success was a result of being better than their competition on that day of that Olympic final. Today, every other nation has more examples of the exceptionally gifted potential gold medalists that in the past. U.S. athletes would be successful mostly because of their extraordinary individual talent regardless of whether they were from a well-organized system within a college, national governing body, or professional sport. National sports systems prepare their exceptional athletes in exceptional environments enhanced by their national traditions and values in pursuit of maximizing their genetic capacity and chance of experiencing Olympic success (Ericsson et al., 1993).

Rowing and the United States of America—The athletes, the coaches, and the context

In London 2012 and in Beijing at the 2008 Olympics, the United States finished 4th as a nation in the sport of rowing, reflecting their best finish since the 1984 Olympics in the sport of rowing when the U.S. finished 2nd and before that in 1964 when the U.S. was the top rowing nation in the world. The London success was attributed to athlete retention and building on medals won at the Beijing and Athens Olympics, coaching development with a cohesive and

more professional team of coaches, and better organization of the national team program. Recent success has come from athlete development as athletes are able to remain in rowing for longer in the United States, but it is still not a full-time career for most U.S. athletes (Bitting, 1998).

Technological advances in sport science and equipment also have a long way to go in development in the United States to meet the competitive advantage in countries like Australia and Britain. All of these factors impact performance as the level of competition continues to rise each and every Olympics.

Coaching is about dealing with increasing levels of pressure and competition that exist in sport. At the Olympic level, competition is driven by more nations doing more on every level imaginable to produce Olympic success. However, each national system faces its own obstacles and challenges and subsequent pathway to achieving this success. In the United States, Olympic sports are fighting for a piece of the same financial resources from corporate America that will help facilitate athlete development, provide more state of the art resources and help to promote the most effective environment to facilitate maximal performance for U.S. athletes (Houlihan & Green, 2008). The unique issues facing U.S. Olympic rowing coaches in addition to major funding challenges, no systematic coach education program and an increasingly professionalized and competitive international racing environment is a question of: how to foster aspiring coaches into the profession of elite coaching? For aspiring U.S. rowing coaches the question is: what is the best pathway to improve skills to become a better coach to begin developing toward becoming an Olympic level rowing coach?

U.S. Rowing, the national governing body for rowing shares statistics on the state of rowing claiming to serve 13,500 members of the association, reflecting around 150,000 active rowers in over 1000 clubs around the nation (USRA, 2010). Membership may be the greatest issue facing the association and proving its benefit and relevancy to the wider rowing community is one of the challenges facing U.S. Rowing as rowing in the United States is growing at a rapid rate. Deringer (2008) found that in the sport of rowing in the United States, there was an unprecedented increase by 100% in the number of rowing coaches (from around 6,000 to over 12,000) from 2004 to 2008. It has been a fairly even growth across all settings; high school and juniors (about 30% of the rowing programs in the United States), club and masters programs (28%), university (20%), non-affiliated (18%) and elite rowing (4%) (Deringer, 2008). Rowing as a sport in the United States is growing with potentially over 200,000 active rowing

participants (Deringer, 2008). More detail about this group will be discussed in Chapter three as it relates to the participants of this research proposal. U.S. Rowing caters to hundreds of thousands of Americans at all levels across the nation serving multiple demographics to promote participation in accordance with the Amateur Athletic Act 1978, and fostering Olympic success is a part of this charter.

U.S. Olympic rowing success has been distinct, and described over three time periods. Prior to 1964, with the dominance in the men's eight reflecting the strength of the collegiate system, and individual athletes emerging during this era. Second, the period from 1964 to 1988 saw the domination of the eastern bloc and communist nations and the introduction of women's rowing and from 1988 to the present we see a more competitive system with attempts at a number of different approaches producing international success on the world rowing scene. Professionalization has been a period of increased success from all nations (Staudohar & Mangan, 1991). From coaching approaches to selection structures, the history of the professionalization of coaching has been complex and the result has seen more nations are being more successful with more resources creating a more competitive environment that is highly structured, well-funded and very well organized. This research attempts to highlight some of issues that face U.S. rowing at present namely, more stable funding sources are required to provide necessary resources to develop athletes and coaches to facilitate future Olympic success.

A Review of the Rowing Literature

The first representation of rowing dates back to 5800 B.C. in Finland and in the Sumerian civilization from 3000 B.C. (Olivova, 1984; Volianitis & Secher, 2007). Ancient rowing history dates back to around 46 B.C. with the Naumachia or "naval combat" organized by Emperor Augustus (Coleman, 1993) and enormous rowing races organized by Emperor Claudius in 52 A.D.. (Dal Monte & Komor, 1988).

Rowing from the times of the first rowing clubs and races in 1800s, to the ultimate stage of the Olympic games has been a part of the sporting fabric at all levels of the sporting milieu (Nisonger & Meehan, 2007). U.S. Rowing is the oldest national governing body in sport dating back to 1872, rowing is the oldest collegiate sport in the United States starting in 1852 and rowing's international sport federation FISA, founded in 1892, is the oldest in the Olympic movement.

Walker (1834) wrote the first rowing textbook explaining technical aspects of the stroke, equipment needs and requirement along with safety aspects of the sport. MacLaren (1866) is one of the first to have investigated the theory and practice of rowing as a competitive sport. Morgan (1873) and Bradford (1877) investigated the health impacts of the sport of rowing and the condition known as athlete's heart. Crowther and Ruhl (1905) provided the first complete description of the sport including training methods and equipment needs. Table 2.6 indicates the extensive attention given to the sport of rowing in the literature.

Table 2.6

Rowing References by Topic, Author and Date Published

Rowing topics	Authors
History of rowing	(Brittain, 1938; Cleaver, 1957; Dodd, 1992; Kelley, 1932; Mendenhall, 1981; Weil, 2000; Wigglesworth, 1992)
University rowing	(Blackie, 1869; Dodd, 1983; Durick, 1988; Fidler, 1977; Mathews, 1960; Meehan, 2007; Mendenhall, 1981; Miller, 2006; Moore, 1958; Taylor, 2005; Vaughan, 1975; Whitton, 1901)
Biographies	(Boyne, 2000; Cuyler, 2006; Halberstam, 1985; Lewis, 1990; Look, 1989; Newell, 1987; Pinsent, 2004)
Rowing guides and text books	(Bourne, 2000; Fairbairn, 1990; Kiesling, 1990; Korner & Schwanitz, 1987; Lehmann, 1919.; Nolte, 2005; Paduda, 1992)
Rowing biomechanics	(Angst, 1984; Angst, Gerber & Stussi, 1985; Christov, Ivanov & Christov, 1989; Dal Monte & Komor, 1988; Davenport, 1988, 1992, 2002; Di Prampero, Cortili, Celentano & Cerretelli, 1971; Duchesnes, Borres, Lewillie, Riethmuller & Olivari, 1989; FISA, 2002; Fothergill, Harle & Holden, 2010; Fukunaga, Matsu, Yamamoto & Asami, 1986; Gerber, Jenny, Sudan & Stussi, 1985; Klavora, 1977; Kleshnev, 1999; McGregor, Bull & Byng-Maddick, 2004; Sanderson & Martindale, 1986; Spinks & Smith, 1994; Zatziorski & Yakunin, 1980; Zhang et al., 2003)
Rowing physiology	(De Rose, Crawford, Kerr, Ward & Ross, 1989; Di Prampero et al., 1971; Droghetti, Jensen & Nilsen, 1991; FISA, 2002; Hagerman, Connors, Gault, Hagerman & Polinski, 1978; Hartmann & Mader, 1996; Secher, 1983; Seiler, 2003; Steinacker, 1993)

For a more complete rowing bibliography see Appendix C.

No comprehensive study has been conducted of the rowing coaching literature as far as this author could identify. Nilsen (1987) provided the foundational work on coaching in the International Rowing Federation (FISA) coaching education program setting a framework for coaching education around the world that has influenced over 4000 coaches worldwide in their coaching development. Rowing coach education programs typically include the following

subject matter. Biomechanics and physiology are sport-specific and as a result will be covered briefly. Training methodology, strength and conditioning, sport psychology, general fitness, and learning methodology are sport general topics that can be found extensively in the literature. These will not be explored here to avoid repetition and to not explore outside the scope of this study Lambert et al. (2009). The rowing-specific research has been covered in the areas of biomechanics and physiology.

The biomechanics of rowing investigates the biology of athletes while rowing with the mechanics of the rowing equipment as a propulsive unit (Dal Monte & Komor, 1988). The first studies on the biomechanics of rowing focused on the force applied to the oar and evaluating the efficiency of the stroke (Alexander, 1925, 1930; Atkinson, 1896, 1898; Lefeuvre & Paillotte, 1904). Since the 1970s, hundreds of rowing biomechanics studies have been completed ranging from the general (Edwards, 1963; Herberger, 1970; Schroeder, 1978) to the detailed (Nolte, 1985; Schneider, 1980; Williams, 1967; Zatziorski & Yakunin, 1980) in pursuit of limiting factors in the rowing motion, the ideal rowing motion and causes, prevention and treatment of injury with particular reference to ribs (Karlson, 1998) and lower back (Roy et al., 1990; Thorpe, O'Sullivan, Burnett & Caneiro, 2009). Klavora (1977) described three styles of technique, the Rosenberg style (strong leg extension), the Adam style (simultaneous use of legs and trunk with emphasis on trunk) and the DDR style (strong use of trunk). Kleshnev (2006) introduced a fourth style called the Grinko style (simultaneous use of legs and trunk with emphasis on legs). Figure 2.33 and 2.34 provide a visual display of these four rowing styles.

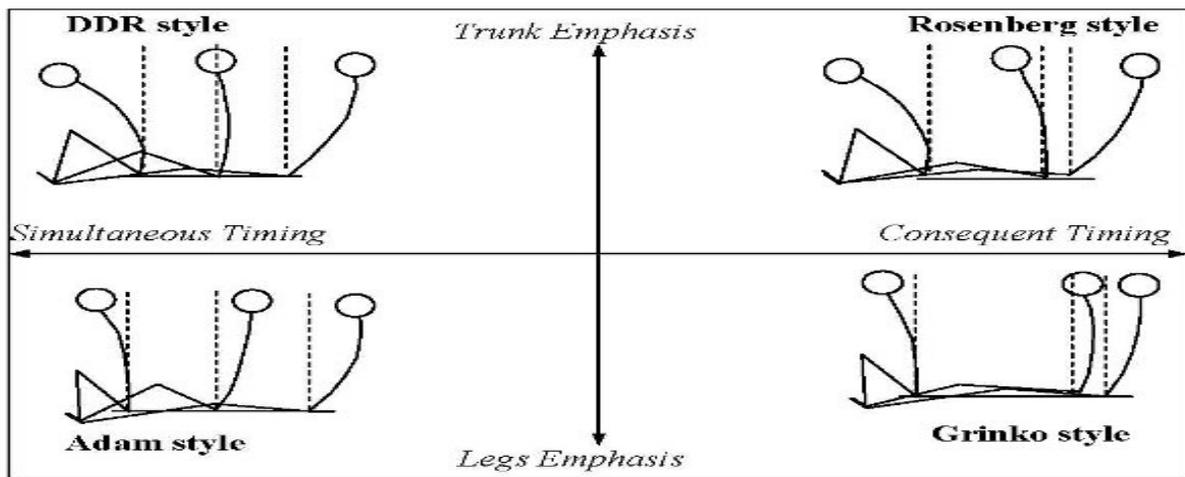


Figure 2.33. Rowing styles

Note. Source: Klavora, P. (1977). Three predominant styles: The Adam style, the DDR style, the Rosenberg

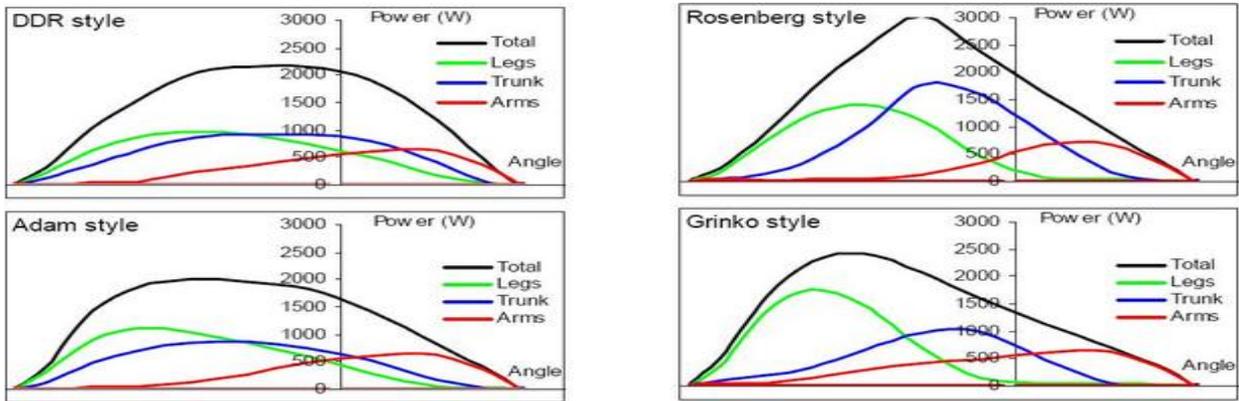


Figure 2.34. Rowing styles power curves

Source: Curves (n.d.) Retrieved February 1, 2012, from <http://concept2.co.uk/forum/viewtopic.php?f=4&t=11643&start=45>.

Rigging allows for adjustments to the equipment to meet each individual’s needs in the boat, the type of racing and the anticipated racing conditions in order to maximize efficiency and boat speed (Davenport, 1988, 1992, 2002).

Rowing is a strength endurance sport that demands superior technique, physical condition, specific physical characteristics, individual discipline, teamwork and power (Hartmann & Mader, 2005). Studies of the physical characteristics of over 3000 United States elite athletes since 1964 found that heavyweight male oarsmen have the following characteristics: average age of 26, 6 foot 3.5 inches and 194 pounds (1.92m and 88kg) with 8.7% body fat, and their female counterparts average age of 24, 5 foot 11 inches and 169 pounds (1.8m, 77kg), 15.4% body fat (See Table 2.7) (Hagerman, 1984; Hagerman et al., 1978; Hagerman, Jacobs, Backus & Dudley, 2006). In a competitive rowing event, excluding the single scull, it is the only predominately aerobic physical event where athletes compete as teams and where a crew goes as fast as their weakest link (Hagerman et al., 2006).

Table 2.7

Elite Rowing Physical Characteristics

	Age	Height	Weight	Body fat
Male	26	6’3.5”	194	8.70%
Female	24	5’11”	169	15.4%

Source: Hagerman, F. C., Jacobs, P., Backus, D., & Dudley, G. A. (2006). Exercise responses and adaptations in rowers and spinal cord injury individuals. *Medicine & Science in Sports & Exercise*, 38(5), 958–962.

Liljestrand and Lindhard (1920) pioneered the measurement of oxygen uptake, heart rate and cardiac output recorded during rowing. Henderson and Haggard (1925) examined energy expended during the rowing stroke by measuring magnitude of pull against the tow boat and performed indirect oxygen analysis during stationary rowing machine testing. A 2000m competitive rowing race that lasts between five and one-half minutes to about eight minutes requires about 80% utilization of the aerobic energy system and about 20% utilization of the anaerobic energy system (Hagerman et al., 2006). Highly trained elite rowers have extremely well developed maximal oxygen consumption, for men over 7.0 liters/min, and for women over 5.0 liters/min compared to the average untrained male who could be around 3.5 liters /min (Hagerman, 2000; Hagerman, Addington & A., 1975; Hagerman, Addington & Gaensler, 1972; Hagerman et al., 1978; Nowacki, Krause & Adam, 1969; Satlin & Astrand, 1967; Secher, 1983; Secher, Vaage & Jackson, 1972). Due mainly to their training, rowers possess an abundance of slow twitch fibers in their muscles and develop a high threshold to lactic acid (Garrett & Kirkendall, 2000). The physiological demand on the body for rowers is extreme but the unique physical characteristics of the elite rower are well equipped to excel in events that require substantial aerobic energy supply (Hagerman et al., 2006).

Athlete's heart is the enlarging of the heart due to exercise and one of the first to study this was Morgan (1873), to address claims made by Da Costa and Shew that athletic competition was harmful to one's health. Pluim, Zwindermann, Can der Laase and Van der Wall (2000) found that rowers have the highest calculated effect of left ventricular wall thickness (hypertrophy) due to adaptations to static and dynamic (strength and endurance) training when comparing almost 1000 athletes from 27 sports. Morgan (1873) and (Pluim, Zwinderman, Van der Laarse & Van der Wall, 2000) both found that there is no relationship between athlete heart and the shape of the heart, but increases in training leads to increases in blood pressure load and cardiac output.

Limited research has been conducted on rowing coaching effectiveness (Côté & Sedgwick, 2003; Giddings, 2009; Mageau & Vallerand, 2003; Neil & Kirby, 1979). Neil and Kirby (1979) conducted the first known rowing coaching effectiveness study on coaching styles and behaviors by looking at gender influenced coaching behavior and instruction preferences of elite and novice rowers. Côté and Sedgwick (2003) analyzed athletes perceptions of effective coaching behaviors in training, competition and the organizational setting highlighting elite

rowing: successful coaches plan proactively, facilitate goal setting, build athlete confidence, teach skills effectively, recognize individual differences, establish rapport with athletes and create an optimal training environment. Mageau and Vallerand (2003) found that athletes adjust their need for autonomy based on satisfying their coaches' expectations; some outstanding athletes are able to adjust their needs to meet their coaches' needs but highlighted that motivation is enhanced when coaches adapt their needs to the athletes need for autonomy, competence and relatedness. Giddings (2009) used the Leadership Scale for Sport (LSS) to determine perceptions of rowing coach behaviors by women's NCAA division 1 rowers. This study identified that coaching knowledge, athlete management, shared values and team engagement as critical coaching characteristics in leading a successful rowing program. Wiman (2010) examined coaching expertise and ways to develop expertise over time and highlighted introspection as a major source of developing coaching expertise as it helps gain self-awareness. These studies highlighted the general nature of rowing coaching but not specifically unique to the sport of rowing.

A Brief History of U.S. Olympic Rowing

Rowing has been an Olympic sport since the first modern Olympics although the first regatta of 1896 in Athens was cancelled due to bad weather. The U.S. dominated from the outset of Olympic rowing winning the men's eight from Vesper Rowing Club in 1900, and 1904, not sending boats to the 1908 and 1912 games, the next success was in 1920 with the Naval Academy eight (Saint Sing, 2004). This would begin a succession of wins including Yale in 1924 and 1956, Cal-Berkeley in 1928, 1932 and 1948, Washington in 1936, and Navy in 1952, marking a domination of an Olympic rowing event by one country that has not since been equaled. Jack Kelly won his first of two gold medals (1920 and 1924) with Paul Costello (who was the first to win three consecutive gold medals 1920, 1924, and 1928) in men's double. Continued success in the men's eight through 1948 was added to by a gold medal in the Men's Coxed four in 1952 a win in the men's pair by novice 19 year old Thomas Price from Rutgers a reflection of the strength of the collegiate program. In 1956, three U.S. gold medals were awarded in the men's eight, coxed and coxless pair.

At the 1960 Olympics, in Rome, the United States team only won the men's coxless four and domination by Germans and Soviets emerged. In 1964, the United States won the eight and the coxed four: this was the last time the United States topped the rowing medal winning tally. In

1968, 1972 and 1976, the U.S. team won no Olympic gold medals. In Munich, the East Germans won a medal in all seven events. U.S. won silver in 1972 in the men's eight. This was the first time a national selection process was established by Harvard Coach and Olympic team coach, Harry Parker. Until 1976, there were seven men's rowing events at the Olympics, with the addition of women's rowing to the Montreal games, rowing has remained at 14 events. In 1976, the East Germans won 9 out of the total 14 gold medals, no U.S. medals were won in 1980 due to the U.S. boycott of the Moscow Olympics. In 1984, the women's eight and men's double won gold and in 1988 the East Germans dominated the regatta for both men and women winning eight gold medals.

In 1992, the U.S. won a bronze and two silver medals and in 1996, the U.S. team won three silver medals and a bronze. In Sydney despite high expectations for the men's eight who had won the previous three world championships, with no medals in either the men's or the women's eight, a silver and two bronze medals ranked the U.S. 12th. In 2004, the U.S. men broke the 40-year drought winning the men's eight and the women's eight won silver and 22 nations won medals. In Beijing, the women's eight won gold for the first time since 1984, Michelle Guerette won silver in the women's single and the men's eight finished with a bronze. In London at the 2012 Olympics, the U.S. women's eight won, recorded an unprecedented 7 consecutive wins, a feat never done at the Olympics by any crew. In addition, the men's four and the women's quad both won bronze medals. In Olympic history, the United States is ranked second behind the East Germany for the most gold medals won in rowing and in Olympic history 40 different nations have won rowing medals. Table 2.8 shows these periods, of Olympic dominance prior to the 1964's and then fall in ranking from 1964 to 1984 and then the increase in number of countries winning medals.

Table 2.8

U.S. Olympic Rowing Medal Tally

	Gold	Silver	Bronze	Ranking	#countries
1896	Regatta cancelled				
1900	1			3 rd	7
1904	5	4	4	1 st	2
1908	No crews				5
1912	No crews				6
1920	3	1			7
1924	2	1	2	1 st	7
1928	2	2	1	1 st	9
1932	1		1	3 rd	9
1948	2		1	2 nd	8
1952	2		1	1 st	11
1956	3	2	1	1 st	10
1960	1		1	3 rd	11
1964	2	1	1	1 st	11
1968		1	1	7 th	12
1972		1		6 th	11
1976		2	1	6 th	11
1980	Boycott				9
1984	2	4	1	2 nd	15
1988		2	1	7 th	14
1992		2	1	6 th	16
1996		3	1	11 th	16
2000		2	1	12 th	20
2004	1	1		5 th	23
2008	1	1	1	4 th	20
2012	1		2	4 th	18

Source: IOC. (2012). Medal count. Retrieved September 1, 2012, from <http://www.olympic.org>

Challenges Facing U.S. Rowing at the Olympic Level

Today the challenge is to find ways to develop the best athletes through talent identification, strengthen funding sources, utilize the technological innovation through sport science and equipment advances, and foster coaching development in order to produce a systematic world-class training program that can advance of U.S. Olympic rowing successes.

In 2000, in an attempt to manage financial accountability and improve medal performance the United States Olympic Committee (USOC) adopted a performance-based

funding program grounded in Balance Scorecard and Management by Objectives theory (Woodley, 2005). Each National Governing Body (NGB) submits an annual high performance plan to the USOC to meet the following requirement objectives for all jobs, vision and strategy of the NGB, strategic objectives and measures, plan and targets for each initiative, measurement and controls, feedback and learning, and link of measures to rewards (Binns, 2009).

U.S. Rowing provides ongoing opportunities to achieve competitive excellence in rowing in the United States by setting standards in safety and fair of racing, improving Olympic performance, managing fiscal responsibility, increasing awareness of the sport, promoting participation and education. Stability within U.S. Rowing is also another major factor, the administrative staff is small; therefore any changes to the staffing have a large impact on operations. On a macro level, updates to the bylaws, governance, board structure and mission to reflect organization development and growth in the sport on all levels. On the Olympic level, *U.S. Rowing* aims to compete successfully at the 2012 Games; attention is prioritized to athlete and coaching development, competition, sport science, facilities, equipment, funding and organization. Funding and athlete development are the two critical aspects of the U.S. Rowing pathway to success in 2012.

An athlete development system is defined as the organized group of interacting elements (such as funding, facilities, personnel, competition) required to progress an athlete from introductory level through to Olympic success (Stotlar & Wonders, 2006). Success at the under-23 (U23) World Championship is vital for future athlete identification and development leading into future senior national team athletes. Talent identification with the U23 selection has been a successful process for selecting top collegiate athletes to race internationally during their collegiate careers dating back to 1981, with a fourth place men's coxed four. The U23 international regatta dates back to 1975 in Europe, and grew in 1994 to be renamed the Nations Cup and has produced success for U.S. crews in the past including a win in the U23 men's eight in 1996, 1999, 2011 and 2012 men's and women's eight in 2008. Since 2004, the U23 regatta became a designated World Championship resulting in more international attention being given to this category. Now it is officially recognized by each NGB and NOC as the development event for all rowers. In the United States, this athlete development pathway has fostered a tight link in the past between the national team and collegiate rowing programs and is a primary and the only real source of development of athletes.

The collegiate athletics programs have been a feeder system unique to the United States as like no other nation. It has acted as a ready built competitive advantage for thousands of athletes competing at a top level during their college 4-year college experience (Caro, 2012). This system has seen American dominance in the medal tally since the start of the modern Olympic Games. More recently, increasing numbers of international students are studying in the United States to continue their athletic careers while receiving an internationally renowned education. Identification camps for current rowers, and freshman camps for athletes newly identified are the developmental pathways available to athletes to access the national system while in college. The club system is small and underutilized but provides opportunities for athletes who are not immediately invited to join the national team after graduation. It gives the opportunity to train while living and for most working in a major national center; Clubs centers like Boston, New York, Philadelphia, San Francisco, Seattle, and Washington D.C. Junior development are an initial part of national team development which are for athletes under the age of 18. While there is a World Championships for this age group, it is primarily the focus of the collegiate coaches for one of their recruiting strategies, and it is also a program that U.S. Rowing does allocate national team resources towards.

Underlying all obstacles to Olympic success is the funding source of the U.S. national rowing team (Spavero, Chalip & Green, 2008; Stotlar & Wonders, 2006). Lack of financial resources is the number one negative factor influencing Olympic performance (Gould et al., 1990). The USOC provides these grants based on success and medals produced at international level competition and in 2000 the USOC adopted the performance-based funding method of allocation. Performance-based funding essentially allocates funds based on performance and medals won and is a system that was established to improve performance at the Olympics and in addition provide financial accountability for each national governing body (Woodley, 2005).

Unlike all other international Olympic sport programs, the United States does not receive any government money and as a result other U.S. national governing bodies can look to U.S. Rowing as a model of success. This is a challenging task as well as there are a number of different models of sports to choose from when comparing to other U.S. Olympic sports.

Sports like U.S. athletics and U.S. swimming, have a very long history, vibrant collegiate system and are individual-based sports, therefore generating a revenue stream from individual members. Team sports like U.S. basketball and U.S. baseball have their professional system that

financially backs the history that they shared with other sports like swimming and athletics. Other high medal count sports like cycling and wrestling, don't share the collegiate trends that other sports enjoy, but have a strong club base. U.S. Canoe/Kayak and weightlifting also compete for a similar number of medals at the Games as rowing, but are not high profile collegiate sports, but each sport shares the challenge of developing a systematic pipeline for retaining athletes. Shooting, judo and equestrian are high medal-yielding sports but were not included in this analysis due to their incompatibility when compared to rowing.

Rowing, in comparison to each of these sports, is summarized in the Table 2.9 and includes the highest medal winning sports—not including shooting (15), judo (14), equestrian (14) (*) this indicates the number of Olympic medals. Rowing is one of the oldest sports in the collegiate ranks along with athletics and swimming. Cycling and wrestling offer similar financial offerings from the USOC, along with a similar international ranking after performances at the Beijing 2008 Olympics. Kayak/Canoe have the offering of the fewest medals on offer from this list. Kayak/Canoe, cycling and wrestling each have a similar number of medals won per nation, which is around 2 medals per country. Rowing only has two individual events the men's and women's single scull and almost all of these sports are also individual sports. The only team events considered in this list in addition to the 12 other rowing events are four of the Kayak/Canoe events (K2, K4 for men and women).

Table 2.9

2008 Beijing Olympic United States National Governing Body Comparison

	Rowing	Athletics	Swimming	Cycling	Wrestling	Canoe Kayak	Weightlifting
Year started	1878	1888	1888	1882	1888	1880	1888
NCAA started	1852	1873	1897	None	1928	None	None
Members	16000	100000	300000	60000	159000	5000	5800
Clubs	1100	2500	2800	1500	2900	300	180
Coaches	12000	10000	26000	5500	16000	500	2300
2008 USOC Grant	\$1,356,596	\$3,233,464	\$3,444,028	\$1,247,398	\$1,623,161	\$920,382	\$404,273
2008 Ranking	4 th	1 st	1 st	3 rd	6 th	No ranking	No ranking
2008 Total Medals	3	23	34	5	3	0	0
\$/medal	\$452,198.67	\$140,585.39	\$101,294.94	\$249,479.60	\$541,053.67		
# countries medals	20	42	21	20	28	19	18
# Olympic Medals	42	138	96	54	54	48	45
# Olympic Events	14	46	32	18	18	16	15
Average medal/country	2.1	3.3	4.6	2.7	1.9	2.5	2.5

Source: (USACycling, n.d.; USAKayakCanoe, n.d.; USARowing, n.d.; USASwimming, n.d.; USATrack&Field, n.d.; USAWrestling, n.d.)

*Note: 2012 USOC Grant data was not available at the time of writing.

This analysis of U.S. Rowing's national team programs follows a conceptual framework evaluating the effectiveness of elite sport programs. The analysis follows a comprehensive and broader account of the many variables that contribute to the final performance at events like the Olympic Games (Carney, Smollanov & Zakus, 2012; Chelladurai, 1985; Chelladurai & Haggerty, 1991; De Bosscher, 2011). The finances of high performance sports program is a foundational element to its success (De Bosscher et al., 2006; De Bosscher et al., 2009). The organization and structure of sport policies is the next step to foster elite sporting success (De Bosscher, 2011). A successful sporting system also requires a blend of sporting participation and athlete identification systems (De Bosscher, 2011). Support systems for athletes and their post athletic lives, training facilities, coaching provisions and development systems, competition (internationally and domestically) and scientific research are all critical factors in a multidimensional approach to evaluating elite sport program effectiveness (Chelladurai, 1985; De Bosscher et al., 2006). These criteria are illustrated in Figure 2.35.

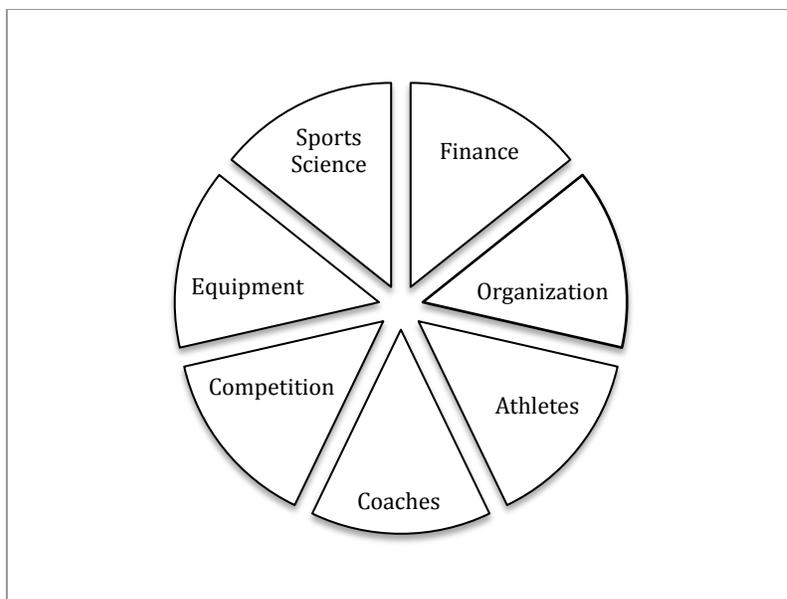


Figure 2.35. Sport program evaluations

Half of the U.S. Rowing national team budget is based on donor support, and so any fluctuations in economic activity significantly impact the stability of the Olympic campaign. Efforts to stabilize this foundation through the USOC, the National Rowing Foundation and U.S. Rowing High Performance committee are being made. The solution is to establish an independent, reliable and stable funding source that supports all the aspects of developing a world-class program from state of the art of equipment, domestic and international travel needs, athlete support and coach development. The roles of the USOC, U.S. Rowing and the National Rowing Foundation are three critical bodies in the development of this essential aspect of stability for the future success of U.S. Rowing at the Olympic level.

Athlete funding is a critical issue that continues to go through new stages of development, in order to provide the appropriate incentives and rewards to athletes currently in the national team system. Athletes are also provided incentives and rewards for performance at international competition (Bitting, 1998). The reality is that for most athletes, those who are not consistently finishing in the medals, the modest earnings of \$15,000 a year is the average that a full-time athlete will be receiving from the USOC. Health insurance is also offered but this is not guaranteed for U.S. athletes, each NGB is responsible for designating athletes into the USOC health insurance program (Stotlar & Wonders, 2006).

The U.S. national rowing team currently employs two national team head coaches, and two national team assistant coaches for the men and women. For 14 Olympic boat classes, there are a total of six coaches. The U.S. national team has relied on volunteer coaches contributing to the national team effort. College coaches volunteer in the summer. Selection of their coaching credentials and expertise often reflect those with similar coaching beliefs as the professional full-time coaching staff, and are motivated by the opportunity to contribute to the national team but a downside is the high rate of turnover due to the time commitments required (Hastings, 1987). Expanding the size of the national team coaching team is planned, but lack of financial resources is the obstacle. Looking at an international comparison of coaching teams (see Table 2.10), the U.S. is one of the smallest full-time national coaching teams at international level competition despite having the largest number of athletes.

Table 2.10

International Rowing Program Comparison

	USA	Australia	Britain	Canada	Germany
NGB Started	1878	1925	1882	1880	1883
Number of rowers	1500	15000	23000	15000	20000
Number of clubs	1000	300	550	400	600
2012 Medals won	3	5	9	2	3
2012 Ranking	4 th	2 nd	1 st	7 th	3 rd
2012 Qualified	12	13	13	7	14
NT Coaches (full-time)	6	12	13	8	10

Source: DeutscherRuderverbande.V. (n.d.). Retrieved February 1, 2012, from <http://www.rudern.de/>, GBRowing. (n.d.). Retrieved February 1, 2012, from <http://www.britishrowing.org/gb-rowing-team>, RowingAustralia. (n.d.). Retrieved February 1, 2013, from <http://www.rowingaustralia.com.au/>, RowingCanada. (n.d.). Retrieved February 1, 2012, from <http://www.rowingcanada.org/home>, USARowing. (n.d.). Retrieved February 2, 2012, from <http://www.usrowing.org>

Coaching education is another key area of development for the national team coaching staff. Each year national team head coaches, and some assistant coaches present at the U.S. Rowing national team conference on best practices and current trends in international coaching. In addition, coaches do attend coach programs to extend their own sport-specific and general knowledge about the latest innovations in coaching around the world. Coaching presentations subject areas including biomechanics, cross-training, tapering, nutrition, rigging and physiology are some of the topics that have been covered in presentations delivered by the U.S. Rowing coaching staff. Development of online resources through synchronous and asynchronous

technologies is also a way that more information is being disseminated to the wider U.S. Rowing coaching community.

International competition is one of the greatest learning tools for developing experience in international athletes. Resources to participate are scarce as racing internationally is an expensive and time-consuming process. The goal for U.S. Rowing is to increase the number of athletes able to race at international races in order to increase the race experience they have prior to racing at the world championships and Olympic Games.

The innovation of sport science is a dimension that has emerged through technology. Innovation is critical for success not only on the sport science side of development. Support from sport services at the USOC is a fundamental aspect of this development, through biomechanics, nutrition, and physiological studies. Hagerman's contribution to the rowing literature and specifically to the development of future U.S. rowing talent has been significant. Sport science is where the cutting edge of performance is focused. The support and partnership with the USOC Performance Services is one of the areas that has received most attention in the literature, particularly in the areas of biomechanics, nutrition, physiological testing—lactate threshold testing, strength and conditioning support and additional medical and physical therapy treatment support.

The Princeton Training Center, supported to some extent by Princeton University, has been a central location for the U.S. national team particularly since 1996, with many other locations that have been utilized in the history of U.S. Rowing, from Augusta, Georgia; Occoquan, Virginia; Indianapolis, Indiana; Oak Ridge, Tennessee; and Chula Vista, California, to name a few. There has also been increasing use of the USOC training centers, particularly in Chula Vista, San Diego. Since 2008, major financial and administrative initiatives have led to the development of a training center in Oklahoma City as well. This has increased energy, resources and the profile into the sport of rowing by a sizable amount.

Equipment is a primary aspect of the sport and particularly the use of the latest technology, that is, access from manufacturers around the world. Resources to take advantage of the cutting edge resources have been limited and efforts continue to increase the access to more opportunities to use more equipment.

All successful programs, rowing or otherwise, require leadership, the infrastructure and people (Gurney & Renton, 1995). Consensus in almost all corners of the U.S. Rowing

community exists over best practice for the process of the selection of athletes to compete at the Olympics. Namely, developing all U.S. athletes into a unified national “*camp*” system is the best approach to achieving Olympic success. Previous practices have seen athletes separated into different camps to then race for selection at “*trials*,” the crew that wins goes to the world championships or Olympic Games, leaving athletes from other boats unable to compete internationally who may have been able to make the winning boat even faster (USRA, 2005, 2008). This debate has exhausted hundreds of hours in U.S. Rowing staff and coaches’ time, and has cost hundreds of thousands of dollars in legal fees since 2005. U.S. Rowing has only strengthened by moving forward and by putting this issue into the past.

Funding is the critical factors in the success of U.S. rowing in the future at the Olympic Games. Overcoming this challenge will give more attention toward athlete development, coaching advances in sport science and technological innovation so that the U.S. rowing program can resemble the scientific and professional organization that it can become. No longer is being one of the largest rowing nations in the world a guarantee for rowing success at the international and Olympic levels. Attention to details of greater efficiency to maximize performance is the focus of all leading rowing nations today.

Maximizing Coaching Performance

Understanding Performance

Much has been written in an attempt to define *performance* such as goal achievement (Etzioni, 1964) and *effectiveness* from the systems resource approach (Seashore & Yuchtman, 1967); both have been used interchangeably in the literature (Campbell, 1977; Connolly, Conlon & Deutsch, 1980; Goodman & Pennings, 1977; Hannan, Freeman & Meyer, 1976; Kirchoff, 1977; Steers, 1977; Thompson, 1967; Venkatraman & Ramanujam, 1986). Stogdill (1948) argued that performance involves a set of behaviors that are most appropriate for the given environment. An individual may perform effectively under one set of circumstances but poorly under others (Ghiselin, 1955). The multidimensional and complex perspectives of performance have a basis in the conceptualization of organizational effectiveness that included organizational profitability, value of its employees and value to society (Bass, 1952).

Performance evaluations have been traced back to Farish and his quantitative student performance evaluations at Cambridge University in 1792 (Anon, 1837; Hilken, 1967; Hogan,

2007, 2010; Hoskins, 1968; Madaus & Kellaghan, 1992; Madaus & O'Dwyer, 1999; Soh, 2010; Sou, 2008; Stray, 2001). Following Farish (1796, 1822), the U.S. Army standardized production processes in 1815 (Smith, 1987), and Horace Mann supplanted the oral exam with the written examination in 1845 (Madaus & O'Dwyer, 1999). Formal teacher effectiveness evaluations were established late in the 19th century (Rice, 1897). Current assessment practices link their origins to the Chinese examination system of the Ming and Tsing dynasties of the 14th century (Miyazaki, 1976; Wilbrink, 1997), but Nitko (1983) found performance assessments on civil and military personnel dating back to the Han Dynasty in 210 B.C..

Sport performance represents some unique features and characteristics when compared to other settings such as business, military, government and other corporate environments (Ball, 1975; Chelladurai & Carron, 1978; Crust & Lawrence, 2006; Smith & Westerbeek, 2007; Stick, 2005; Terry & Howe, 1984). Sport is a power social influencer (Smith & Westerbeek, 2007), with unequivocal identity (Ball, 1975; Chelladurai & Saleh, 1980), an exact roster of positions and status (Chelladurai & Saleh, 1980), planned and structured activities (Ball, 1975), division of labor to achieve these goals and procedures for replacing members (Ball, 1975). Sport epitomizes the sociological issues of class and power (Bourdieu, 1978). Sports require a physical environment and protecting this is critical (White, Duda & Keller, 1998). Sport sets a standard of performance so that there is a level playing field to ensure that the rules of fair play are followed, sport is inclusive and fosters a healthy balance of participation and recreational sport (Stewart, Nicholson, Smith & Westerbeek, 2004) with competition at the highest level (Mondello & Maxcy, 2009). Transparency of governance upholds safety to protect the authenticity of the competition of sport by creating safeguards against issues like cheating, illegal gambling and match fixing and use of banned performance enhancing substances (Ball, 1975).

Chelladurai and Saleh (1980) distinguished a sporting organization in three ways: delayed gratification, reward for superior performance, but also involving some luck and chance. Each of these three points is explained;

- Delayed gratification—spends disproportionate time in training for a competition that may last up to a maximum of one hour, (some put their life on hold to compete in an event where they will go quicker than anyone else in history),
- Reward of team sport in pursuit of superior performance is winning, where at least one of the contestants will be denied, where the material gains are insignificant. The winner comes a way with a medal or a trophy and the loser with a lot less,

- Success can involve chance or luck for groups that are normally only together for very short periods.

Pathways for development are critical for optimal sporting performances and this provides a pivotal dimension of social cohesion by addressing social needs of community development (Currie & Oates-Wilding, 2012; Lyons, Rynne & Mallett, 2012; Morris, Sallybanks, Willis & Makkai, 2004). The message of wellness and health that sport espouses incorporate the holistic development of the individual on a physical, personal and social level (Priest et al., 2008). Sport develops leaders so that athletes can participate and compete in these teams (coaches), organizations (administrators) and communities (parents and many others). Sport leaders require some direct experience, insight, knowledge of the profession and intuitive understanding of how best to motivate the performers (Stick, 2005).

Coaching Effectiveness

Published research on coaching effectiveness has dominated the sports science and coaching literature over the last 35 years (Gilbert & Rangeon, 2011). Over 600 articles, in almost 200 journals reflect an expanding body of knowledge in the sports coaching domain (Gilbert & Trudel, 2004). Despite this growth in research, a lack of precision in any conceptual understanding of the coaching process means that coaching effectiveness also appears in the literature with terms such as ‘creative’ (Lynch, 2001), ‘effective’ (Bennie, 2009; Lyle, 2002; Woodman, 1993), ‘efficient’ (Webster, 1938); ‘excellent’ (Woodman, 1993), ‘experienced’ (Matsakis, 2002), ‘expert’ (Côté, Salmela & Russell, 1995; Ericsson & Charness, 1994; Ericsson et al., 1993), ‘good’ (Cassidy et al., 2004), ‘great’ (Becker, 2009), ‘holistic’ (Jones & Turner, 2006), ‘quality’ (Cassidy et al., 2004; Gearity & Murray, 2010), ‘respected’ (Pyke, 1980), and ‘successful’ (Kidman & Hanrahan, 2004; Sabock, 1973).

Grusky (1963) explored playing experience as a predictor of coach effectiveness and found those who played positions with high interaction with others were more likely to become baseball team managers. Ogilvie and Tutko (1968) found that successful coaches are intelligent, stable, well organized and sociable but dominant, inflexible and not very trusting. Ogilvie and Tutko (1968) determined that characteristics of successful coaches compared to the general population are high in achievement trait, and low in interpersonal and sensitivity skills. Hendry (1968) found that successful swimming coaches were intelligent but anxious, insecure and aggressive. Hendry (1974b) highlighted that coaching personality profiles for different types of

sports were similar: team sports (basketball, soccer), individual sports (swimming, athletics, gymnastics, cycling, rowing and canoe), combat sports (archery, rifle) and racquet games (badminton, table tennis, tennis). Hendry (1974a, 1974b) referred to rowing and canoe as individual sports that is coaching rowers competing in the single scull (a one person boat) as opposed to the eight person boat, but does not mention the outline for these sport classifications in his study.

Tharp and Gallimore (1976) built on Flanders (1963) work on instructional observation to set the stage for behavioral-based studies on successful coaching. Rushall (1980) described the characteristics of coaching effectiveness as a complex pursuit of requirements that if not balanced the quality of coaching will have a detrimental impact on the athlete's performance and development. Successful coach profiles offer valuable information on different aspects of coaching from philosophy to coaching strategies (Kimiechek & Gould, 1987; Mechikoff & Kozar, 1983; Schuh, 1984; Walton, 1992; Wooden, 1988; Wrisberg, 1990). Coaching behavior represents more specific instruction, encouragement and praise than non-sport-related behaviors (Côté, Salmela & Russell, 1995; Tharp & Gallimore, 1976) and in sport there is a greater emphasis on corrective, supportive and technical feedback (Crust & Lawrence, 2006).

Hastings (1987) highlighted three dimensions of coaching effectiveness; personality traits, behavior and perception (athletes-coach). No evidence supports that the personality trait research helps predict the successful coaching profile due to the difficulties in measuring personality but the behavioral research has been more successful (Crust & Lawrence, 2006; Turman, 2001; Weinberg & Gould, 2003). Parallel studies on leadership, decision-making and problem solving outside of the sporting context failed to support theories within the sporting context (Horn, 2002).

An integrative definition of coaching effectiveness synthesizing 35 years of research and discussion by identifying three common variables that affect coaching effectiveness; coaching knowledge, athlete outcomes, and coaching context, according to Côté and Gilbert (2009) (Figure 2.36). Côté and Gilbert (2009) proposed that coaching effectiveness and expertise is "the consistent application of integrated professional, interpersonal and intrapersonal knowledge to improve athlete's competence, confidence, character and connection in specific coaching contexts." (p. 316). In this context the model coach aims to maximize athlete outcomes in the coaching context, by mastering professional and interpersonal skills while reviewing one's own

practices and being a master of constant introspection (Côté & Gilbert, 2009; Fairs, 1987; Kidman, 2001; Knowles et al., 2005; Knowles, Gilbourne, Borrie & Nevill, 2001; Nash, 2003).

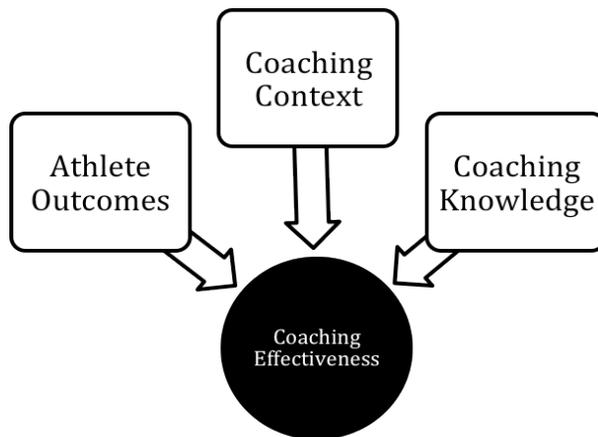


Figure 2.36. Coaching effectiveness

Coaching Knowledge

Coaching knowledge reflects the domains of understanding through *professional, interpersonal and intrapersonal knowledge* (Abraham, Collins & Martindale, 2006; Bloom, Durant-Bush, Schinke & Salmela, 1998; Bowes & Jones, 2006; Cassidy et al., 2004; Côté & Gilbert, 2009; Cushion, 2006; Gould et al., 1990; Jones & Wallace, 2005; Nash & Collins, 2006; Tharp & Gallimore, 1976). Effective coaching requires the integration of the holistic approach of athlete development by developing all three areas of knowledge not just expertise sport-specific knowledge (Bergmann, 2000; Cassidy et al., 2004; Jones & Turner, 2006; Potrac, Brewer, Jones, Armour & Hoff, 2000; Smoll & Smith, 2002).

Professional knowledge. Coach effectiveness requires the acquisition of professional knowledge in three key areas; sport-specific knowledge, pedagogical content and the science of coaching (Abraham et al., 2006; Kreber & Cranton, 1997). Professional knowledge reflects mastery of declarative knowledge of sport science, sport-specific skill and pedagogical skill along with procedural knowledge (Abraham et al., 2006; Cassidy, Potrac & McKenzie, 2006; Nash & Collins, 2006). The adaptive and mental functions include declarative and procedural knowledge (Ten Berge & Van Hezewijk, 1999). The human brain is a complex system (Edelman, 1993). The four perspectives of behavior patterns and mental functions are; biological

(ontogenetic) and evolutionary (phylogenetic), physiological mechanisms, adaptive functions and mental functions (Tinbergen, 1952).

Russell (1912) defined procedural knowledge as that which is gained by truth and declarative knowledge that which is acquired by description. Procedural (implicit) knowledge is that which we know how to do and can be difficult to put into words (Anderson, 1982; Rosenblatt, 2004). Declarative (descriptive) knowledge is knowledge gained by learning facts or events (Ten Berge & Van Hezewijk, 1999; Willingham, Nissen & Bullemer, 1989).

Declarative knowledge is factual information about a concept and element and its relationship to other subjects (Anderson, 1982). Declarative knowledge can be divided into episodic knowledge (time stamped) and semantic knowledge (generalized knowledge of nonspecific events) (Ten Berge & Van Hezewijk, 1999). Sport-specific knowledge (declarative knowledge) reflects tactics and techniques of each particular sport. Sport science information includes anatomy, biochemistry, biomechanics, nutrition, psychology, physiology, kinesiology, strength and conditioning training, sports medicine, talent identification, training organization and information and communication technology (Woodman, 1993).

Procedural knowledge involves the steps requiring reasoning to perform a task (Tulving, 1985). Pedagogical content of coaching professional knowledge (procedural knowledge) includes coaching behavior, critical thinking and motor and cognitive learning (Abraham et al., 2006).

Interpersonal knowledge. The interpersonal aspect of coaching is a complex process of reciprocal influential systems of social interaction that require well-refined communication skills (Bloom et al., 1998; Bowes & Jones, 2006; Carron, 1978; Cushion, 2006; Gould, Guinan, Greenleaf, Medbery & Peterson, 1999; Jones & Wallace, 2005; Pocwardowski, Barott & Henschen, 2000). The complex nature of the interpersonal interactions highlighted by Lewin (1935) who identified the antecedents to behavior includes the important role of a person's traits and states and environment. Extensive studies have detailed the complex dynamic of interpersonal interactions in the sporting context (Argyle, 1969; Carron, 1975; Hendry, 1969; Sage, 1975).

Carron (1975) was one of the first who characterized the coach-athlete relationship to require inclusion, control and affection. The conceptual model of the coach-athlete relationship is based on Kelley et al. (1983) definition that a two-person relationship is when the members'

emotions, cognitions and behaviors are interrelated. Most of the sports coaching research on interpersonal knowledge focuses on the coach-athlete relationship (Wylleman, 2000). Studies on the coach-athlete relationship have taken a variety of different approaches:

- Evaluating the coaches' leadership behaviors (Chelladurai & Saleh, 1980; Jowett & Ntoumanis, 2004);
- Systematic observation of coaching behaviors (Lacy & Darst, 1984; Rushall, 1977; Tharp & Gallimore, 1976);
- Investigating coaching knowledge development (Côté, Salmela & Russell, 1995);
- Interpersonal behaviors (Wylleman, 1995).

An effective coach strives for their athletes to perform competently by displaying sport-specific technical and tactical skills performance skill and improved health, fitness and healthy training habits and will confidently display a strong sense of self-worth, to connect with others through a positive bond and social relationships with people in and outside sport with the character reflecting respect for the sport, morality, empathy and responsibility (Côté & Gilbert, 2009).

Bloom et al. (1998) explained that often coaches' relationships with athletes are reciprocal, trusting, genuine, and helping in nature and go beyond merely teaching and instructing skills, techniques and tactics. Pocwardowski et al. (2000) found that the athlete-coach relationship was underlined by respect, belief in, knowledge of, and contribution to the other's goals, needs, and wants. Gould et al. (1999) revealed that even in the context of athletes' preparation leading up to the 1996 Olympic Games in Atlanta there are critical issues such as lack of trust, support, communication, and respect that affect coaches and athletes. The coach athlete relationship is best served by the coach balancing one's concentration on developing the athlete as a performer, and as a person (Jowett & Cockerill, 2002; Ryan, 1996). The interpersonal relationship between coach and athlete is an important factor that contributes to the athlete's development (Bloom & Salmela, 1998; Gould et al., 1999; Hemery, 1986; Jowett, 2003; Jowett & Cockerill, 2003; Jowett & Meek, 2000; Jowett, Paull & Pensaard, 2005; Lafreniere, Jowett, Vallerand, Donahue & Lorimer, 2008; Lyle, 1999; Pocwardowski et al., 2000).

The coach-athlete relationship can play a central role in athletes' physical and psychosocial development (Jowett & Cockerill, 2002). The age, gender and experience of the athlete and coach are the antecedents in the quality of the coach-athlete relationship that produces a perceived level of closeness, commitment and complementarity (Jowett &

Poczwardowski, 2007). Clyde Hart and Michael Johnson (1992, 1996 and 2000 U.S. Olympic Champion sprinter), Bob Bowman and Michael Phelps (2004 and 2008 Olympic Champion), Chris Carmichael and Lance Armstrong (7-time Tour de France winner and 2000 Olympic bronze medalist), and Béla Karolyi and Mary Lou Retton (1984 Olympic champion gymnast) are examples of the impact a coach-athlete relationship can have on performance accomplishments (Jowett, 2009). Although there is no conclusive evidence suggesting a casual relation exists between the quality of the coach-athlete relationship and performance accomplishments, there is some evidence to indicate that successful relationships are likely to include positive interpersonal qualities such as trust, respect, commitment and understanding (Greenleaf et al., 2001; Hemery, 1986; Jowett & Cockerill, 2003; Vernacchia, McGuire, Reardon & Templin, 2000). In addition to athletes, successful coaches interactions with parents (Jowett, Timson-Katchis & Adams, 2007), family (Coppel, 1995), their assistant coaches and other professionals are important in developing self-awareness as a coach (Martens, 2004).

Intrapersonal knowledge. Intrapersonal knowledge refers to one's self-understanding and ability for introspection and reflection. A coach who develops intrapersonal knowledge fosters coaching development (Knowles et al., 2005; Knowles et al., 2001; Nelson & Cushion, 2006). Coaching reflection can facilitate experience into knowledge and skills (Gilbert & Trudel, 2001, 2004, 2005). Gilbert and Trudel (2001) linked self-reflection and coaching effectiveness as a critical relationship for coaches who are problem-centered learners. Learning through experience is often highlighted as a key component of coach development (Cushion, Armour & Jones, 2003; Gould et al., 1990; Jones, Armour & Potrac, 2003; Lemyre, Trudel & Durand-Bush, 2007). The process of reflection in and on experience has been identified as central to experience-based learning theories and has been translated to the coaching literature as a mechanism through which these experiences produce learning (Gilbert & Trudel, 2001, 2005; Trudel & Gilbert, 2006). Gilbert and Trudel (1998) stated that the common thread with self-reflection is that it is grounded in the activity, context or culture or experiential learning.

Successful sports coaching is the underlying art in problem solving. Tacit knowledge acquisition is a fundamental pathway to utilizing this knowledge of which it is difficult to transfer an explanation in the written or verbal form (Saury & Durand, 1998). Learners explore a deeper understanding of their actions and the impact this has on self and others. Developing a deeper sense of meaning from an experience facilitates the learning process and this occurs from

processing the same experience in different and more meaningful ways (Ramos, Grace, Juarez & Silva, 2011).

Athlete Outcomes

Athletic performance is a multiplicative function of intrapersonal (e.g., coping skills, intrinsic motivation) and interpersonal (e.g., coach–athlete relationship, support system) factors (Iso-Ahola, 1995). The observation of peak athletic performance research dates back to the pioneering physiology research of (Hill, 1925, 1926). Understanding athletic performance extended into areas of energy systems (Henry, 1954; Lietzke, 1954; Riegel, 1981), competition strategy (Ryder, Carr & Herget, 1976), predicting future performances (Keller, 1973). The literature on the development of athletic success has expanded and is wide-ranging. It includes research in the following areas:

- *Anthropometric, biological and physiological characteristics* (Calo & Vona, 2008; Cureton, 1951; Eynon, Moran, Birk & Lucia, 2011; Kohlraush, 1929; Spieler et al., 2007; Tanner, 1964);
- *Deliberate practice* (Deakin & Coble, 2003; Ericsson & Charness, 1994; Ericsson & Hill, 2010; Ericsson, Roring & Nandagopal, 2007; Ford, Ward, Hodges & Williams, 2009; Spieler et al., 2007; Starkes, Deakin, Allard, Hodges & Hayes, 1996; Thomas & Thomas, 1994);
- *Knowledge* (De Swardt, 2008; French & Thomas, 1987; Gibbons, McConnel, Forster, Riewald & Peterson, 2003; Mann, Williams, Ward & Janelle, 2007; McPherson & Thomas, 1989; Starkes, 1987; Thomas & Thomas, 1998; Williams & Ford, 2009);
- *Maturation* (Baxter-Jones, Helms, Maffull, Baines-Preece & Preece, 1995; Boucher & Mutimer, 1994; Brewer, Balsom, Davis & Ekblom, 1992; Spieler et al., 2007);
- *Perceptual ability* (Abernethy, 1989; Abernethy, 1990a; Abernethy, 1990b; Abernethy, 1991; Marteniuk, 1976; Marteniuk & Roy, 1972; Spieler et al., 2007);
- *Psychological characteristics* (Booth, 1958; Frey, Laguna & Ravizza, 2003; Gould & Maynard, 2009; Haberl, 2007; Hendry, 1968; Heusner, 1952; Orlick & Partington, 1988; Spieler et al., 2007; Taylor, Gould & Rolo, 2008); and
- *Self-efficacy beliefs* (Bandura, 1977, 1986, 1990, 1997; Feltz & Lirgg, 1998).

The literature on importance of athlete capacities in predicting performance spans a number of different sports including:

- American football (Spieler et al., 2007);
- Baseball (Crockett et al., 2002; Schulz & Curnow, 1988);
- Figure skating (Deakin & Coble, 2003);
- Golf (Ericsson & Hill, 2010; Schulz & Curnow, 1988);
- Gymnastics (Law, Côté & Ericsson, 2007);
- Ice hockey (Soberlak & Côté, 2003);
- Handball (Pieper, 1998);

- Rowing (Kendall, Fukuda, Smith, Cramer & Stout, 2012; Riechman, Zoeller, Balasekaran, Goss & Robertson, 2002);
- Soccer (Ford, Le Gall, Carling & Williams, 2008; Helgerud, Engen, Wisløff & Hoff, 2001; Holt & Dunn, 2004);
- Swimming (Ferreira, Penna, Costa & Moraes, 2012; Hodges, Kerr, Starkes, Weir & Nananidou, 2004; Schulz & Curnow, 1988);
- Tennis (McPherson & Kernodle, 2003; McPherson & Thomas, 1989; Schulz & Curnow, 1988);
- Track and field (Schulz & Curnow, 1988; Vernacchia et al., 2000);
- Triathlon (Hodges et al., 2004);
- Volleyball (Afonso & Mesquita, 2011; Deakin & Cobley, 2003);
- Water polo (Falk, Lidor, Lander & Lang, 2004); and
- Wrestling (Hodges & Starkes, 1996).

Predicting athlete successes at the Olympic level is also a focus in the literature (Gould, Guinan, Greenleaf & Chung, 2002; Gould et al., 1999; Greenleaf et al., 2001; Haberl, 2007; Heazlewood & Lackey, 1996; Klissouras et al., 2001; Taylor et al., 2008; Williams & Ford, 2009).

The positive psychology literature provides a useful framework to understand athlete outcomes for coaching effectiveness (Jelicic, Bobek, Phelps, Lerner & Lerner, 2007). The desired outcomes for the coach-athlete interactions in any sporting environment were conceptualized by the five Cs; competence, confidence, connection, character and caring/comparison (Côté, Bruner, Strachan, Erickson & Fraser-Thomas, 2009). Due to the overlap in the literature on character and caring/compassion, the 5 Cs have been condensed to 4 Cs (Shields, Bredemeier & Power, 2002).

An athlete's level of competence in sport is the most obvious outcome of coaching (Becker, 2009). *Competence* is defined as sport-specific technical and tactical skills, performance skills, improved health and fitness, and healthy training habits (Côté & Gilbert, 2009). Coaches also provide guidance to help coaches become more confident and self-reliant (Horn, 1987; Smoll & Smith, 2002). *Confidence* is defined as internal sense of overall positive self-worth (Côté & Gilbert, 2009). Confidence is one of the most important characteristics a coach can hone in athlete development (Gould, Hodge & Peterson, 1987; Grove & Hanrahan, 1988; Hall & Rodgers, 1989). *Character* is seen as respect for the sport and others, morality, integrity, empathy, and responsibility (Côté & Gilbert, 2009). Coaches also play a crucial role in developing the character of their athletes so they can become constructive and caring member communities (Côté et al., 2009; Shields et al., 2002). *Connection* is the positive bonds and social

relationships with people inside and outside of sport (Côté et al., 2009). Coaches should have expertise in the development of athletes' competence, confidence, connection, and character (Côté et al., 2009). Coaching expertise implies a coach has the capability to produce the best athlete outcomes on a consistent and repeated basis, with all kinds of athletes under strongly contrasting conditions over an extended period of years (Dodds, 1994).

Coaching Context

The coaching context reflects unique settings to improve athlete performance through consistent application of coaching knowledge (Côté & Gilbert, 2009). The three main levels of competition categorized are (a) beginners, recreational or novice, (b) development, intermediate; and (c) elite (Trudel & Gilbert, 2006). In the recreational sport coaching context, participation and basic skill development is emphasized over competition, participation is open to all athletes, and there is a low level of commitment and intensity. The developmental sport-coaching context typically restricts participation based on skill tryouts, includes a formal competitive structure that often requires travel to other regions, and requires increasing commitment from athletes and coaches. The highest levels of sport competition comprise the elite sport coaching context (Trudel & Gilbert, 2006). This level includes college athletics in many countries, national and Olympic teams, and professional sport.

Conceptually, not to be confused with the context of developmental coaching, sport coaching is based on the competitive level of the athletes: participation and performance (Lyle, 2002). Participation coaching is distinctive because competition performance is not emphasized, and participants are less intensively engaged with the sport, goals are short term, activities are fun and outcomes are health-related. Performance coaching is a more intensive commitment to a program preparing for competition and requires influencing variable to produce peak performance.

On the conceptual participation-performance continuum, context requires relating to athletes' level of development (Côté, Young, et al., 2007). Athletes have different needs across their development spectrum based on their level of commitment (Côté, 1999; Côté & Gilbert, 2009; Theberge, Curtis & Brown, 1982; Wall & Côté, 2007; Webb, 1969). The sampling stage, coaches work with children within a participation-focused context with a variety of fun activities. The recreational stage for adolescents and adults is also participation-focused, like the sampling stage. The specializing stage is when coaching performance-oriented, with fewer activities than

the sampling stage and practice reflecting deliberate play (Côté & Hay, 2002). The investment stage resembles commitment of elite athletes to deliberate practice (Ericsson et al., 1993). Wall and Côté (2007) identified that program designers could give athletes the option to progress from recreation to investment stage to complete the process. Wall and Côté (2007) found numerous factors delineating each developmental stage, such as designing the practice (number of activities and athletes, location, time and length of practice), involvement of others (e.g. assistant, guest coaches, parents), and influence of parents. Each of these dimensions provides a different emphasis to the coach's role (Côté, 1999).

The development of coaching effectiveness is difficult to transfer characteristics of one coaching environment to others (Côté & Gilbert, 2009; Lyle, 2002). Determinants of coaching success include coaches' behavior, dispositions, education and experience (Côté & Gilbert, 2009). Participation coaching involves flexible membership, transient participation, and a focus on positive affective outcomes, such as perceptions of competence and enjoyment and in contrast, elite coaching is characterized by higher levels of commitment, more stable coach-athlete relationships, and greater focus on medium- to long-term planning, monitoring, decision-making, and management skills to facilitate control of performance variables (Lyle, 2002).

The elite coaching context is an environment with many complex interrelated factors acting simultaneously (Côté, Salmela & Russell, 1995; Jones et al., 2002; Mallett & Côté, 2006; Martens, Vealey & Burton, 1990; Nash et al., 2011; Partington, 1988; Potrac et al., 2002; Saury & Durand, 1998; Schinke et al., 1995; Woodman, 1993). Côté, Salmela, and Russell (1995) identified organization, competition and training as three components of elite coaching and highlighted that working conditions are a vital dimension of the elite-coaching context. Elite level coaches require a competence and confidence in applying their coaching knowledge that needs to be constantly advancing to stay competitive to address the ongoing challenges that are required to pursue Olympic success (Partington, 1988). Interpersonal expertise is also a requirement for the elite coach to manage, guide and develop aspiring and elite athletes (Bloom et al., 1998; Bowes & Jones, 2006; Cushion et al., 2006; Gould et al., 1999; Jones & Wallace, 2005; Poczwadowski, Barott & Henschen, 2002). In addition to the communications needed to share the appropriate coaching knowledge to manage athlete logistics, elite coaches have an administrative and political responsibility that is far reaching and a significant aspect of producing international and Olympic success (Martens et al., 1990).

It is important to note in practice coaching effectiveness involves and interaction between these three variables that (Côté & Gilbert, 2009) have described. Each of these interrelated factors feed back into each other. For example, an elite coach, working as a consultant with developing coaches and developmental athletes will influence the context that this coach is working within and impact the expectations of all involved. This could be compared to this same elite coach working within a high performance environment with a single focus on medal winning performance within strict budgetary constraints.

This literature review began by highlighting in detail the dimensions of the complexity of elite coaching in defining coaching, conceptualizing coaching and providing a comprehensive history of sports coaching as an illustration of the evolution, perspective and dimensions of the elite coaching context facing Olympic coaches. Attempts to accurately describe coaching success have been well documented (Buford, Bukhalter & Jacobs, 1988; Deets & Tyler, 1986; Ilgen & Bames-Farrell, 1984; Maclean & Chelladurai, 1995; Murphy & Cleveland, 1991; Torrington, Weightman & Johns, 1989). Evaluating a coach performance is a difficult task traditionally avoided because of the complexity of collecting data and implementing the evaluative process (Bennice, 1990). Coaching has been analyzed from two perspectives: first, the result of coaching and second, the activities and tasks involved in the process of coaching (Cangelosi, 1991; Keeley, 1978; Murphy & Cleveland, 1991).

Sports Coaching Success

According to the Online Etymology Dictionary, *success*, comes from the Latin, *successus*; from the 1530s was defined as “a desired result, advance succession, or a happy outcome.” Stogdill (1950) discussed success in the context of leadership by making the distinction between an organization and a group. An organization consists of two or more people, with at least one who is the leader who exerts influence in the pursuit of a specific goal. The organization has a common goal and purpose and each member has clear roles and responsibilities in pursuit of its outcome(s).

Sports coaching success is not covered in the literature like career success: which has a comprehensive range of issues covered that is relevant to this discussion. Career success is defined as the positive psychological or work-related outcomes or achievements one accumulates (Seibert, Crant & Kraimer, 1999). Upward mobility is a function of contest-mobility (getting ahead by performance and adding-value) or sponsor-mobility (getting ahead by who you know)

(Turner, 1960). The conceptualization of career success includes the objective measures of success (such as, responsibilities, salary and promotion) and the subjective criterion, starting with satisfaction, as important elements of judging career achievement (Stebbins, 1970), and also includes:

- Knowing why one is successful, (Ng, Eby, Sorensen & Feldman, 2005);
- Knowing how one is successful, (Gunz, Evans & Jalland, 2000); and
- Knowing with whom one is successful with including network, mentors and contacts (Arthur, Inkson & Pringle, 1999).

Success in a boundary-less career is more than the traditional assumptions. Career success is more than accomplishments within a single organization, or single position but transcends organizational membership and consists of a sequence of experiences across organizations and jobs (Arthur, Khapova & Wilderom, 2005; Arthur & Rousseau, 1996; Eby, Butts & Lockwood, 2003; Ng et al., 2005).

Grusky (1963) offered an important perspective on sports coaching success in terms of winning percentage of games played in his research of major league baseball managers and the cost and disruption from management turnover on organizational effectiveness. The foundation literature on succession planning originates from Gouldner (1954) who documented scenarios when changes in management disrupt operations and organizational efficiency.

The origins of the theories that exist in the literature relating to managing sports coaches' evaluation, succession planning and management of sporting organizations in times of changing leadership stem back to Grusky (1963). The "*common sense*" theory, the decision to change is normally taken following a series of negative sporting results and a change in leadership will result in an improvement in the sporting performance of the team (Kesner & Sebor, 1994). The "*vicious-cycle*" theory, upholds that a change of management disrupts the team and has a negative impact on performance, and if changing leadership is made, it is in order to change strategy that requires time for the team to learn and adapt to (Rowe, Cannella, Rankin & Gorman, 2005). The "*ritual scapegoating*" theory, contends that the role of the manager is not as relevant as the quality of athletes when it comes to explaining sport performance of teams and removing the coach is more to appease stakeholders and the wider community (Gamson & Scotch, 1964). The literature on professional sports performance evaluations has extensive coverage in sports such as American football (Hadley, Poitras, Ruggiero & Knowles, 2000; Mondello & Maxcy, 2009; Smart & Wolfe, 2000), baseball (Fabianic, 1994; Kahn, 1993; Porter

& Scully, 1982; Singell, 1993; Smart, Winfree & Wolfe, 2008; Smart & Wolfe, 2003), basketball (Fizel & D'itri, 1996; Giambatista, 2004), ice hockey (Audas, Goddard & Rowe, 2006) and soccer (Dawson & Dobson, 2002; Dawson, Dobson & Gerrard, 2000; Picazo-Tadeo & Gonzalez-Gomez, 2010; Tena & Forrest, 2007).

When a coach's performance is evaluated by his or her athletes' achievement in terms of win and loss records, as a result the coach in the elite coaching context will be assessed personally and publicly by the relevant individual(s) for rehiring purposes (Mallett & Côté, 2006). Ultimately, coaching success is a function of many factors that include in the coaching context, the athletes and the coach's knowledge but ultimately medals won in competitions is the underlying evaluation (Potrac & Jones, 2009). Even the number of athletes selected onto the national and Olympic teams aren't as an important measure as medals when used to evaluate the elite coach's performance (Mallett & Côté, 2006).

Coaching success has been measured by athlete achievement (win-loss record) (Côté, Salmela & Russell, 1995; Grusky, 1963; Horn, 2002; LeUnes & Nation, 1989; Tharp & Gallimore, 1976; Woodman, 1993), athlete experience (Becker, 2009; Johnson, 1998), athlete satisfaction (Horn, 2002), expertise in years of experience (Côté, Salmela, Trudel, et al., 1995; Erickson, Côté & Fraser-Thomas, 2007; Ericsson et al., 1993; Ericsson, Prietula, et al., 2007), performance at the highest level of coaching (Côté, Salmela, Trudel, et al., 1995), recognition of expertise by their peers (Côté, Salmela, Trudel, et al., 1995), recognition of coaches' past athletic performances and experience (Saury & Durand, 1998) and group achievement (Chelladurai & Quek, 1995).

Elite coaching is characterized by higher levels of time and emotional commitment, and greater focus on planning, monitoring, decision-making, and management skills to facilitate control of performance variables in the short, medium and long-term (Lyle, 2002). Côté and Gilbert (2009) stated that "coaching success as measured by team or athlete success is highly dependent on a multitude of unstable variables (athlete skill level, injury rates, competition schedules, officiating, etc.)" p. 428. Mallett and Côté (2006) stated elite coaches are often held completely responsible for competition results; however, sometimes the coach cannot control some external factors (e.g., inexperienced players, injury/illness) that can adversely impact on competition performance. Mallett and Côté (2006) continued by saying;

The evaluation is result driven and clearly focuses on the expected return (medals) on the amount of investment. The evaluation of that investment is understandable in light of the context of high performance sport and its accountability to publicly funded organizations. (p. 214).

Assessing Coaching Effectiveness

According to Gilbert (2002), since 1970, over 424 studies have used a data collection method of questionnaire/scale and 80% of the coaching science research has been quantitative research. Since the groundbreaking work on coaching behavior observation by Tharp and Gallimore (1976), assessing coaching effectiveness has received extensive attention: the literature examples include:

- Anxiety (Martens, 1977);
- Behavior (Côté, Yardley, Hay, Sedgwick & Baker, 1999; Kenow & Williams, 1993; Smith, Smoll & Hunt, 1977; Trudel, Côté & Bernard, 1996);
- Competence (Myers, Feltz, Maier, Wolfe & Reckase, 2006);
- Confidence (Vealey, 1986);
- Efficacy (Feltz, Chase, Moritz & Sullivan, 1999);
- Evaluation (Rushall & Wiznuk, 1985);
- Feedback (Amorose & Horn, 2000);
- Instruction (Lacy & Darst, 1984);
- Leadership (Chelladurai, 1993; Chelladurai & Saleh, 1980; Smith & Smoll, 1991; Smoll & Smith, 1989);
- Orientation (Gill, Dzewaltowski & Deeter, 1988);
- Past experience (Côté & Hay, 2002);
- Relationships (Jowett & Ntoumanis, 2004); and
- Self-esteem (Helmreich, Stapp & Ervin, 1974; Rosenberg, 1965).

A comprehensive analysis of the most relevant coaching effectiveness instruments has been evaluated according to the definition of coaching knowledge (professional, intrapersonal and interpersonal knowledge), athlete outcomes and coaching context (Côté & Gilbert, 2009). An analysis of each of the following instruments has been included because of their relevance to this study on the extent to which self-reflection and experience are predictors of coaching effectiveness (see Appendix D).

Table 2.11

Summary of Coaching Effectiveness Instrument

Coach Developmental Profile Interview, Côté and Hay (2002).
Coaching Behavior Assessment System (CBAS), Smith et al. (1977).
Leadership Sport Scale (LSS), Chelladurai and Saleh (1978); Chelladurai and Saleh (1980)
Arizona State University Observation Instrument (ASUOI), Lacy and Darst (1984).
Sports Orientation Questionnaire (SOQ), Gill et al. (1988)
Coach Feedback Questionnaire (CFQ), Allen & Howe, (1998); Amorose and Horn (2000); Black and Weiss (1992)
Coaching Behavior Questionnaire (CBQ), Kenow and Williams (1993)
Coach Efficacy Scale (CES), Feltz et al. (1999)
Coaching Behavior Scale for Sport (CBS-S), Côté et al. (1999)
The Coach-Athlete Relationship Questionnaire (CART-Q), Jowett and Ntoumanis (2004).
Coaching Competence Scale (CCS), Myers et al. (2006).

Coach Development Profile Interview

The long-term retrospective reflection-on-action instrument was developed by Gilbert et al. (2006). The Coach Developmental Profile Interview looks at a coach's history both as an athlete and coach. This structured quantitative instrument was designed by Côté and Hay (2002) to systematically assess significant activities coaches are involved with at various stages of their coach development. The instrument provides a retrospective and detailed account of a participant's performance as an athlete and as a coach and has been used in a number of different studies (Côté, Baker & Abernethy, 2007; Côté, Ericsson & Law, 2005; Erickson, Côté, et al., 2007; Erickson, Wilson, Horton, Young & Côté, 2007; Gilbert et al., 2006; Koh, Mallett & Wang, 2011; Wall & Côté, 2007; Young et al., 2009). Côté et al. (2005) wrote that the instrument was designed assuming individuals would recall past episodic experiences, which is more accurate and reliable than answering general questions. The goal of the instrument is to gather longitudinal data on performance and types and amounts of activities that are engaged in through one's development.

Theoretical underpinnings of the coach development profile. The Coach Developmental Profile Interview has some key theoretical foundation based in the literature that include activities that promote sport expertise throughout the lifespan (Bloom, 1985; Hodges & Starks,

1996), the Developmental Model of Sport Participation (Côté, 1999), assessing deliberate practice within the expert-performance framework (Ericsson & Smith, 1991) and retrospection on action (Schön, 1983, 1987).

Bloom (1985) interviewed international successful athletes, their parents and coaches, attempting to uncover underlying theories to develop a pattern to reach elite performance. Elite athletes reported having access to high quality coaches from an early age and superior training environments and this differed dramatically from average children (Bloom, 1996).

Hodges and Starkes (1996) assessed activities that wrestlers engaged in to develop their sporting expertise and found that over a six year period future international wrestlers were training more frequently per week than club wrestlers. This finding suggested that across the different domains weekly practice gradually increases during the development of an expert performer (Starkes et al., 1996).

Côté (1999) investigated the development profile of elite athletes which led to the development of the Development Model of Sport Participation (DMSP) that focused on early diversification of sport experience and later deliberate practice. The DMSP has three outcome of participation; elite, recreational or dropout, and four stages; sampling years from age six through twelve, specializing years from 13 through 15 years, the investment after 16 years of age and the recreational years from 13 years old (Côté, 1999; Wall & Côté, 2007).

Ericsson et al. (1993) analyzed the development histories of highly accomplished musicians. When assigned a problem or goal to attain, all musicians engaged in solitary practice to control the structure, detail and duration of the practice and this type of practice was called deliberate practice, which is how experts achieves their tasks (Ericsson et al., 1993). Deliberate practice is a consequence of attaining a sequence of challenging goals and is the key to the development of an expert performer in many domains including music and sport (Ericsson et al., 1993).

Schön (1983, 1987) defined reflection-on-action as the process of thinking back on past action and discovering lessons learned, it is an exploration into why we did what we did, and is a way to set up ideas about our activities and practices. The process of retrospective reflection on action is a process of breaking down experiences to build new meaning and responses that may be appropriate to adapt to more current situations and challenges. Retrospective reflection-on-action represents the most common conception of reflection and provides the opportunity for

dramatic, extensive structural change and is more likely to take place in the cognitive realm (McAlpine & Weston, 2000).

Convergent validity. Weston, Petosa, and Pate (1997) found 90 students were able to very consistently recall their physical activity from the previous day ($r = 0.98$) when asked to recall the same information an hour later their recall had high agreement ($r=0.8$) with concurrent data on physical activity collected on pedometers worn by a subset of 48 students. Levels of diary entries and practice may vary substantially during an athlete's career and therefore noting poor reliability for estimates in practice during the same period and estimated practice in different periods of an athlete's development. High correlation was found between diary estimates of practice for a current week with the total amount or estimated practice accumulated during development (Helsen, Starkes & Hodges, 1998) but failed to find a reliable correlation between diaries and estimated total practice during one's development (Hodges & Starkes, 1996). It is important to differentiate poor reliability of estimates of duration of practice for the same period from variability of amount of weekly practice during different periods of development (Côté et al., 2005).

Convergent validity of estimates of engagement in practice. Family and friends know how much time that is invested in the sport by their athletes and coaches. Interviews can assess the validity of the information shared. An Australian study showed parents were able to recall training times for their children between the ages of 12 and 19 and the correlation between athlete and parent assessments of training hours were statistically reliable; after 19 years old most of the athletes left home (Côté et al., 2005). Elite coaches and athletes are able to reliably estimate time spent in the respective athletic and coaching activities during their development (Côté et al., 2005). Interviewing family and friends along with reviewing training logs of athletes, coaches or even family members are two approaches to gaining reliability and validity of these measures.

Wall and Côté (2007) adapted the coach developmental interview protocol for parents to assess their son's involvement in organized sport. Wall and Côté (2007) formulated a hypothesis: dropout athletes will have sampled fewer sports, spent less time in deliberate play activities and spent more time in deliberate practice activities during childhood sport involvement but found that both the dropout and active players sampled a variety of different sports and this is

consistent with the Development Model of Sport Participation (DMSP) (Wall & Côté, 2007). These findings suggest sport at the youth level 6–13 years should not focus on fitness through intense and routine training, but rather on sport-specific practice, games and play activities that foster fun and enjoyment (Wall & Côté, 2007).

Erickson, Côté, et al. (2007) investigated the involvement of immigrant youth sport coaches using the structured youth sport coaching interview and found two distinct profiles existed. Leisure-oriented coaches those who had not coached prior to immigration and career-oriented coaches, those who had coached prior to immigration. Immigrant coaches to Canada who were career-oriented rather than leisure-oriented coaches were overqualified for the initial positions they found but the longer they stay the more the gap reduced (Erickson, Wilson, et al., 2007). For this study, the interview question targeted the experiences of immigrant coaches participants were specifically asked pre-set questions about their athletic and coaching experiences (both prior to coming to Canada and while in Canada) and their occupational and community involvement/volunteering experiences, as well as their own children's involvement in sport (Erickson, Wilson, et al., 2007).

These immigrant coaches reported some past playing experience in the sport they now coach, though not necessarily at the elite level (Erickson, Wilson, et al., 2007). Only about half reported some form of formal coach training, and most are currently coaching (or have in the past coached) their own child. Some slight differences were noted, in that the immigrant coaches in our sample averaged slightly more than 10 years of coaching experience, which is toward the high end of previous coaching experience reported in naturalized Western samples. As well, a slightly greater proportion of these immigrant coaches reported having a post-secondary degree (in any discipline) than naturalized Western coaches (but this is most likely an aspect of Canadian immigration selection policies). Given the high prevalence of coaching their own children, shared with naturalized Western coaches who report their own children's participation as a main reason for their involvement in coaching, immigrant coaches in this group might be considered *leisure-oriented coaches* (Gould & Martens, 1979).

Those who had coached prior to immigration represented a very different profile, as these coaches were highly qualified, most had been elite-level athletes and commonly reported a sport-related, post-secondary degree (Erickson, Wilson, et al., 2007). They were overqualified for their current positions coaching youth sport in comparison to the qualifications of naturalized Western

coaches at the same level, as they often served in a volunteer capacity at the recreational level (Trudel & Gilbert, 2006). The coaches themselves frequently reported a desire to coach at a higher competitive level than their current position. Given their previous sport credentials and the fact that only one third of these coaches reported coaching their own child, it would seem that they are more inclined to invest highly in coaching sport in their new homeland; as a result they might be considered *career-oriented coaches* (Erickson, Wilson, et al., 2007).

The retrospective instrument collected information about activity involved and different career milestones relating to expert coach development (Côté, Robertson-Wilson, Gilbert & Gilbert, 2002; Gilbert et al., 2006). The retrospective survey quantifies the cumulative activities, experiences and interactions that competitive Canadian track and field coaches experience in formal education, active coaching experience, mentoring and athlete experience (Young et al., 2009). Participants were asked the demographic information as well as their formal levels of education and coaching certification, and highest coaching level achieved using the Canadian national sport coaching development model (Canada, 2006). The skill ladder was conceived by members of the coaching development committee for the sport's national governing body in concert with active coaches, thus has face validity, and as coaches could relate to roles it was used to facilitate participants accurate self-identification with a skill level (Young et al., 2009).

Participants completed a timeline of their coaching experience indicating each year either as the primary coach (writes workouts and prescribing training) or as an assistant(s). Participants record their active coaching months and the average time (hours) per week they spent interacting with athletes. Participants recalled the performance for their best-ever athletes including age, gender and event and the number of athletes who they had been the primary coach for who attained a top-five national ranking (Young et al., 2009).

Participants recorded their mentors, their assistant and support coaches and how many former athletes went on to coach. Participants recalled how many coaching education courses they attended and the number of times that they had attended provincial championships. In terms of the retrospective data, only data up to and including the year of highest level of coaching achievement were used. Finally, participants indicated their athletics experiences, career length, own performance level and their experiences with coaches (Young et al., 2009).

A preliminary framework of accumulated experience in the developmental contexts begins with a prior athletic career not necessary at the local club level, according to Young et al.

(2009). Coaches have 7 years of experience and spend 2105 hours/year interacting with athletes: they have two assistant coaches and usually attend one coach course every two years. A senior club coach has ten years' experience, interacts around 3875-hours/year and has three assistants, attending 1 coach education course/year. Provincial coaches have 15 years of experience and spend almost 20 hours week interacting with athletes, they have 6 assistants and attend two coach education courses per year, and a national team coach has 23 years of coaching experience and spends 12736 hours/year or at least 3 hours/day with athletes, managing 15 assistant and sport staff and go to attend or present at more than 3 coaching courses a year.

The Coaching Development Profile Interview provides the data and analysis on past athletic experience, coaching education, active coaching and mentoring similar to the Young et al. (2009) study. Gilbert et al. (2006) modified this procedure for use with coaches increasing the usefulness of this instrument for this study. The modified interview contains questions designed to collect demographic information and assess coaches' previous experiences as athletes, as coaches, and in formal education, with questions based on the principles of reliable and valid retrospective data collection outlined by Côté et al. (2005). These data are objective, quantifiable and verifiable and are gathered in the simplest units possible in an attempt to make recall as objective and straightforward as possible. For example, to determine the total number of games played or coached for each team or level, participants were only asked to recall the number of seasons played or coached and the number of games per season, thus requiring some calculation on the part of the interviewer.

Using the Coaching Development Profile

The criteria for selecting the instruments for this study included coverage in the literature, relevance to sports coaching and contributing in a meaningful way to the literature on self-awareness and sports coaching. The Coaching Behavior Assessment System (CBAS), (Smith, Smoll, & Hunt, 1977) has been one of the most used instruments in terms of coaching behavior and feedback. As compared to the Coaching Development Interview Profile it didn't appear to be able to provide the same quantitative analysis in terms of prediction to coaching success. This instrument focuses more on the coaching context than on coaching knowledge and experience.

The Leadership Scale for Sports (LSS), (Chelladurai & Saleh, 1978, 1980) is an instrument that focuses on assessing leadership style. It was a consideration as it looks at coaching behavior, but was not going to provide the same details in terms of a coach's

experience both as an athlete and as coach when compared to the Coaching Development Interview Profile.

The Arizona State University Observation Instrument (ASUOI) (Lacy & Darst, 1984) is popular and frequently used instrument looking at coaching behavior and instruction. It was not used in this study primarily because it is a time consuming process of data collection when observing coaching behavior. In order to observe 153 coaches as was the case with the study would have required considerable resources that would have been outside the time allowed to complete this study.

A measure of achievement in the context of level of competitiveness, such as the Sports Orientation Questionnaire (SOQ) (Gill, Dzewaltowski, & Deeter, 1988) would be a very interesting comparison to coaching success. Based on Gilbert et al. (2006), it was decided in this study to look more specifically at coaching experience than a coach's competitiveness when considering predictors of coaching success.

Coach Feedback Questionnaire (CFQ) (Black & Weiss, 1992; Allen & Howe, 1998; Amorose & Horn, 2000) is feedback instrument and was a consideration for this study as coaching behaviors are a critical element of coaching success. The CFQ was not used because it does not measure experience as a predictor of coaching success.

The Coaching Behavior Questionnaire (CBQ), (Kenow & Williams, (1993) provides a way to collect data to better understanding athletes responses to coaching behavior and while it looks at personal characteristics of coach was not close enough to the needs consider important for this study on predictors of coaching success.

The Coach Efficacy Scale (CES) (Feltz, Chase, Moritz & Sullivan, 1999) would be another interesting construct to look at as a predictor of coaching success. One of the know antecedents of coaching efficacy is coaching experience and as a result, coaching experience seemed to be a more appropriate measure to use in the context of predictors of coaching success.

Like the coaching efficacy scale, the Coaching Competence Scale (CCS) (Myers, Wolfe, Maier, Feltz, & Reckase, 2006) is another aspect of coaching that relates to predictors of coaching success. This instrument would help us better understand a coach's ability to influence learning and improve performance, but was not as closely linked to the notion of predicting coaching success as coach's athletic and past coaching experience.

The Coaching Behavior Scale for Sport (CBS-S) (Côté, Yardley, Hay, Sedgwick, & Baker, 1999) provided the foundations to develop the Coaching Development Interview Profile. Looking at the behaviors of high-performance coaches was considered as a possible approach to this study. A more general approach was taken for this study and thus included more coaches in this study than to just specifically look at high performance coaches.

The Coach-Athlete Relationship Questionnaire (CART-Q) (Jowett & Ntoumanis, 2004) looked at the coach-athlete relationship and was a consideration for this study as it looked at the interpersonal relationship related to sports coaching. The intrapersonal aspect of coaching has received far less attention in the literature and for this reason was decided not to use this instrument.

The related self-reflection instruments considered for this study have been covered in further detail and can be found in Appendix E.

Expert Performance

Understanding factors to predict performance dates back to the first social scientific study on genius and greatness (Simonton, 1994). Galton (1869) explored how excellence in diverse fields and domains has a common set of causes and found exceptional performance is virtually an inevitable consequence of natural ability but training and practice are a requirement to reach maximal levels of performance in any domain. Mendel (1865) should be credited as the first to write about mechanism of heredity in biology and thus the birth of the study of genetics. Understanding the genetic basis of expert performance in sport is in relative infancy, but genetic contribution to performance is enormously influential in an athlete's sporting experience (Côté, Baker, et al., 2007; Howe, Davidson & Sloboda, 1998; Johnson & Tenenbaum, 2006; Singer & Janelle, 1999).

From ancient times, the understanding of the value of heredity for exceptional athletic performance was evident with the successes of the Diagoras family who were winners of 9 ancient Olympic boxing crowns (Christopher, 2008; Findling & Peele, 2004; Green, 1918). Even with genetics, deliberate practice is required to produce maximal performance in the ideal environment (Ericsson et al., 1993). The expertise literature in sport views the following as complementary rather than competing factors in the development of athletic success; knowledge (French & Thomas, 1987; Mann et al., 2007; McPherson & Thomas, 1989; Starkes, 1987; Thomas & Thomas, 1998), perceptual ability (Abernethy, 1989; Abernethy, 1990a; Abernethy,

1990b; Abernethy, 1991), biological and physiological characteristics (Thomas & Thomas, 1998; Thomas & Thomas, 1994), psychological characteristics (Thomas & Thomas, 1998), maturation (Baxter-Jones et al., 1995; Boucher & Mutimer, 1994; Brewer et al., 1992), self-efficacy beliefs (Bandura, 1977, 1986, 1990, 1997; Feltz & Lirgg, 1998) and practice (Ericsson & Charness, 1994; Starkes et al., 1996; Starkes & Helsen, 1998; Thomas & Thomas, 1994).

The expertise literature is extensive and relevant to this study as it focuses on optimal human performance, measurable improvement and getting the best out of oneself and others (Allen, 2007; Anderson, 1981; Baker, Horton, Robertson-Wilson & Wall, 2003; Bloom, 1985; Bryan & Harter, 1897, 1899; Chase, 1973; Chi et al., 1988; Clancey & Shortliffe, 1984; Cornford & Athanasou, 1995; De Groot, 1965; Duncker, 1945; Ericsson, 1996; Ericsson & Smith, 1991; Feltovich, Ford & Hoffman, 1997; Galton, 1869; Germain, 2011; Hoffman, 1992; Klissouras, 2001; McPherson & Thomas, 1989; Starkes, 2000; Starkes & Allard, 1993; Starkes & Ericsson, 2003). The expertise literature dates back to Münsterberg (1892), a protégé of William Wundt, who developed more efficient workplace processes leading to the foundations of task analysis. Binet (1894) identified that knowledge was a key part of expertise. Bryan and Harter (1897, 1899) found that if skill acquisition plateaus but with suitable incentives and rewards maximal performance is produced. Taylor (1911) conducted a scientific workplace management time motion study through designing more efficient shovels. Thorndike (1921) observed that adults can perform far lower than their maximum even when tasks are frequently carried out.

Claparède (1917) is credited for the thinking out loud method of problem solving. De Groot (1946, 1965) extended Binet's work on knowledge and Claparède's problem solving by determining expert performers make better decisions despite having no difference in thought speed, basic memory capacity, and solutions considered by weaker performers. Thinking out loud during the completion of tasks in ones domain of expertise remains a key to mediating superior performance (Chi et al., 1988; Ericsson & Smith, 1991; Starkes & Allard, 1993). Duncker (1945) was responsible for the foundations of the core concepts of modern reasoning. Miller (1956, 1994) wrote about chunking large amounts of information into between five and nine smaller "*chunks*." French and Raven (1959) and Collins and Raven (1969) described the notion of expert power, or influence due to the perception of superior knowledge or experiences. Tichomirov and Poznyanskaza (1966) established the concept of investigating the importance of

the visual search in experience-based problem solving. Simon and Barenfeld (1969) analyzed expert behaviors through eye movement to understand the importance of their perceptions in successful decision-making. Chase and Simon (1973) extended Miller (1956, 1994) findings on expert memory, suggesting that expert perception is superior to other performers by creating larger chunks (or ways of organizing relevant information) to recode information to make effective decisions. Chi (1978) found that the expert performer has metacognitive skill superior to the novice performer when executing effective behaviors. Ericsson and Charness (1994) defined expert performance as an acquisition of complex skills and physiological adaptations. Expert performance is viewed as an extreme case of skill acquisition (Proctor & Dutta, 1995; Richman, Gobet, Staszewski & Simon, 1996; Van Lehn, 1996).

Ericsson and Lehmann (1996) identified three characteristics of expert performance. First, the general capacities of an expert may provide no evidence to predict success in a domain. Second, the superior performance of experts is often very domain specific and transfer outside their narrow area of expertise is surprisingly limited (Djakow, Petrowski & Rudik, 1927; Ericsson, 2006; Ericsson & Lehmann, 1996; Glaser & Chi, 1988). Last, systematic differences between experts and less proficient individuals nearly always reflect attributes acquired by the experts during their lengthy training and deliberate practice.

“Deliberate practice” is planned, highly structured, and effortful activity with an expressed desire for improvement (Ericsson et al., 1993). This concept differentiates itself from play and includes four criteria:

- Critical reflection of the activity;
- Focusing on the weaknesses of the performance;
- Specifics on when difficulty is encountered or when there are unexpected problems; and
- Driven by the goal of improvement (Mamede & Schmidt, 2004).

In general, the amount of deliberate practice has been linked to the performance level of experts of different fields such as music, mathematics and several sports (Ericsson, 1996). Coaching effectiveness is fostered by coaching experience and the development of expertise through deliberate practices is estimated at about ten years, or 10,000 hours (Erickson, Côté, et al., 2007) (Ericsson et al., 1993). Simon and Chase (1973) found that the “10-year rule” is supported by data from a wide range of domains. These sport form a benchmark of optimal performance:

- Archery (DeWeese, 2012);

- Bobsled (DeWeese, 2012);
- Biathlon (DeWeese, 2012);
- Canoe & kayak (DeWeese, 2012);
- Field hockey (Helsen et al., 1998);
- Figure skating (Starkes et al., 1996);
- Karate (Hodge & Deakin, 1998);
- Long-distance running (Wallingford, 1975);
- Music (Hayes, 1981; Sosniak, 1985);
- Mathematics (Gustin, 1985);
- Ski jumping (DeWeese, 2012);
- Soccer (Helsen et al., 1998);
- Sport coaching (Baker, Côté & Abernethy, 2003; Côté, Salmela & Russell, 1995; Erickson, Côté, et al., 2007; Sari & Soyer, 2010; Sedgwick et al., 1997; Wiman, 2010);
- Swimming (Kalinowski, 1985);
- Tennis (Monsaas, 1985);
- Weightlifting (DeWeese, 2012); and
- Wrestling (Hodges & Starkes, 1996).

Little transfer exists from high-level proficiency in one domain to proficiency in other domains even when the domains seem, intuitively, very similar (Djakow et al., 1927; Ericsson, 2006). Reaching an elite level in more than a single domain of activity is very rare (Ericsson & Lehmann, 1996). An expert in one domain only with extensive training may reach a similar level in another domain only with extensive training and this has proven to be one of the most enduring findings in the study of expertise (Glaser & Chi, 1988).

The difference between expert and less skilled subjects is that knowledge is stored differently, not only in terms of quality or quantity of accumulated knowledge but the organization of the knowledge and its representation allows for rapid and reliable retrieval (Chi et al., 1988). Novice performance improves until an acceptable level of performance is attained and further improvements are unpredictable and the number of years of experience in a domain is a poor predictor of attained performance (Ericsson & Lehmann, 1996). Continued improvement only occurs with deliberate practice activities designed, typically by a teacher, for the sole purpose of effectively improving specific aspects of an individual's performance (Ericsson et al., 1993). The accumulated amount of deliberate practice is closely related to the attained level of performance of many types of experts, such as musicians (Ericsson et al., 1993; Sloboda, Davidson, Howe & Moore, 1996), chess players (Charness, Krampe & Mayr, 1996) and athletes (Starkes et al., 1996).

Three limits to expert performance are limit of attention, working memory, and long-term working access (Ericsson, 2006). A non-expert performer is only able to work on one unfamiliar task and make decisions about that one task at a time. Non-expert performers may rapidly move from task to task, but still are only working one task at a time. Non-expert performers, limited by their environment and access to long-term memory, needs more data and knowledge to perform a task than an expert performer. Access to long-term memory for non-expert performers is typically called the “tip of your tongue” phenomenon in which you know something but you cannot retrieve it (Brown, 1991; Brown & MacNeil, 1966).

Experts appear to derive more from their experiences than non-experts (Berliner, 1994; Selinger & Crease, 2003). A desire for improvement must exist on the part of the expert (Bloom & Salmela, 1998). The construction of professional knowledge is the responsibility of the individual (Jones et al., 2003). Self-reflection is essential for expert performers to monitor and evaluate their own performances and they must design their own training and assimilate new knowledge in order to continue improving (Ericsson, 1996; Flavell, 1979; Glaser, 1996; Wiman, 2010).

In the sport coaching context, expertise is developed by learning from past coaching experiences and mentoring from expert coaches (De Marco & McCullick, 1997; Sari & Soyer, 2010). While no universally agreed measures test expertise, variables such as performance record, world rankings, experience and some behaviors are evidence of expertise in the sports coaching context (Horton & Deakin, 2008). Some of the antecedents of expertise in the sports coach context include valuing education and expert coaches are highly educated (Schempp, You & Clark, 1999). De Marco and McCullick (1997) extended the sources of developing expertise of coaches to include making coaching automatic by being more perceptive, recognizing problems quicker and resolve them immediately, identifying the important, gaining more knowledge, regular self-evaluation, and improving short-term and long-term memory. According to Sari and Soyer (2010), the following activities are key to developing expertise in the sports coaching context:

- Mentoring;
- Self-evaluation;
- Deliver clear and proper instruction;
- Focus pre-event talk – to priority strategies;
- Set desired goals;
- Conduct thorough post event analysis before drawing concrete conclusions;

- Observe masterfully and analysis with completeness;
- Believe in your athletes ability to achieve;
- Consider the diversity of your athletes in your training program design;
- Set enjoyable and learner friendly training sessions;
- Continue to develop your own coaching style;
- Understand your athletes feelings;
- Ask for feedback;
- Make plans and control them;
- Develop your athletes leadership skills;
- Seeking your own coaching learning opportunities – seminars and resources that cover the latest research and best-practices;
- See similarities and links in opportunities and make decisions quickly and effectively; and
- Experience is important for developing expertise.

Developmental Profile of an Elite Coach

The developmental path of becoming an elite coach has been well documented (Abraham et al., 2006; Bell, 1997; Berliner, 1994; Bloom, Salmela & Schinke, 1995; Côté, 1999; De Marco & McCullick, 1997; Ericsson et al., 1993; Ford, Coughlan & Williams, 2009; Jiménez, Lorenzo & Ibáñez, 2009; Jones et al., 2003; Jones et al., 2004; McCullick, Cumings & DeMarco, 1998; Salmela, 1995; Salmela et al., 1994; Schempp et al., 2006). The stages of development from beginner, competent, proficient to expert coach have been identified but need more information about what level and type of experiences are required at each stage (Côté, Baker & Abernethy, 2003; Côté, Baker, et al., 2007; Ericsson, Prietula, et al., 2007; Salmela, 1995; Salmela et al., 1994; Schinke et al., 1995).

Gilbert et al. (2006) found that team sport coaches accumulated thousands of hours as participants and performers in a number of sports before coaching. Over 90% of elite coaches were competitive athletes and head coaches had spent at least five or more years as an assistant coach before becoming a head coach (Gilbert et al., 2006). Erickson, Côté, et al. (2007) developed a five stage developmental pathway for coaches; stage one, diversified early sport participation from age six to twelve, stage two, competitive sport participation from ages 13–18, stage 3, highly competitive participation and introduction to coaching from ages 19–23, stage 4, part-time early coaching ages 24–28, stage 5, elite or high performance head coaching from age 29.

Erickson, Côté, et al. (2007) and Salmela (1995) both found elite athlete experience is not a pre-requisite for becoming a coach. Much learning comes from on-the-job and informal mentors and reflective practice also contributes to the acquisition of coaching knowledge (Erickson, Côté, et al., 2007). Walsh (2004) explored, in a qualitative study on expert coaching knowledge acquisition, the relationship between coaches who could articulate their coaching function and their ability to apply this knowledge. Colclough (2008) conducted an interview with expert golf coaches and found that expert coaching knowledge is constructed through interactions with other coaches, student and athletes.

Coach development is driven by developing four main coaching qualities; decision-making, problem-resolving ability, organizing knowledge, self-evaluation and reflection capacity (Bell, 1997; Jones et al., 2004; McCullick et al., 1998; Schempp et al., 2006; Schinke et al., 1995). Beginning coaches rely primarily on their playing experience to determine how and what is coached as these coaches are likely still playing and often are also early in life experience (Penney, 2006; Schinke et al., 1995). Coaching experience, mentor coaches and reflection mark the characteristics at the competent stage of coach development (Schempp et al., 2006; Schinke et al., 1995). The proficient coach spends time reflecting, has acquired a level of compromise, experience and knowledge evident in an intuitive and instinctive approach to responding to training protocols and trying new ideas (Schempp et al., 2006). The elite coach makes a great effort to improve training systems and increase capacity for self-criticism or depth of self-reflection (Schempp et al., 2006). The expert coach's knowledge acquisition reflects redefining experience in unique and complex contexts that are highly personal and difficult to explain (Saury & Durand, 1998). Coaching expertise is developed through introspection and gaining self-awareness (Wiman, 2010). Further research is recommended to investigate quantifying the specific developmental experiences that a high-performance coach needs to experience at each of these stages and what facilitates the transition (Erickson, Côté, et al., 2007; Gilbert et al., 2006).

Coaching knowledge construction can be grouped into five categories:

- Formal and non-formal education (specific courses, sports clinics, seminars) (Gould et al., 1990);
- Informal learning and the accumulation of coaching knowledge from experience (Trudel & Gilbert, 2006);
- Reflecting on experiences (Saury & Durand, 1998);
- Competition itself (Cregan, Bloom & Reid, 2007; Hardin, 2000; Schinke et al., 1995);
- and

- Interactions with an experienced mentor or some sort of structured mentoring program (Abraham et al., 2006; Bloom et al., 1995; Jones et al., 2003).

Formal and Non-Formal Coaching Education

The importance of coach education has been evident in the literature by the increase in the development of new programs (Gowan & Thompson, 1986; Griffith, 1925; Laberge, 1992; Lyle, 1986; McLean & Chellandurai, 1995; Milne, 1990; Pyke & Woodman, 1986; Rushall & Wiznuk, 1985). Griffith (1925) indicated the value of using scientific methods to answer practical issues facing coaches and athletes and then disseminating this information. A vital aspect of coaching is sharing research findings so they will directly impact the performance of other coaches (Gould et al., 2002). Dewey (1933) was one of the first to write that genuine knowledge acquisition came from experience. The development of coaches at the elite level in the United States is based on experiential knowledge and informal learning (Gould et al., 1990).

Coombs and Ahmed (1974) defined formal education as an institutionalized, chronologically graded and hierarchically structured education system. The literature tends to consolidate all forms of formal and non-formal provisions under headings such as coaching course (Cushion et al., 2010; Erickson, Bruner, MacDonald & Côté, 2008; Irwin, Hanton & Kerwin, 2004; Schempp, Templeton & Clark, 1998). Coaching education has attracted the attention of a lot of research (Abraham & Collins, 1998; Cassidy et al., 2006; Culver & Trudel, 2006; Cushion et al., 2003; Demers, Woodburn & Savard, 2006; Gilbert & Trudel, 1999; Hammond & Perry, 2005; Jones & Turner, 2006; Knowles et al., 2005; Knowles et al., 2001; Knowles, Tyler, Gilbourne & Eubank, 2006; Lyle, 2007; Malete & Feltz, 2000; McCullick, Belcher & Schempp, 2005; McCullick, Schempp & Clark, 2002; Nelson & Cushion, 2006; Vargas-Tonsing, 2007; Wiersma, 2005).

Over the last 20 years, coaching in the United States has changed and this is critical for the future implications of coach education. According to Sellers (2008) who found that from 130 United States national team coaches that the changes and possible opportunities ahead for coaching in the United States by comparing data from a United States national team coaching survey conducted in 1988. This report stated that coaches were more diverse, were slightly older, and had more Olympic experience in 2008 than when United States national team coaches were surveyed in 1988. There are more professional coaches in the United States in 2008 than in 1988, with more qualifications and more coaches employed outside of the collegiate ranks. U.S.

coaches in 2008 had attended more formal coaching education programs and over 87% of these coaches develop their coaching style from modeling or observing coaching of successful coaches.

Sellers (2008) found that the 2008 U.S. elite coaches spent less time in their coaching career developing younger athletes and more time coaching athletes at the elite level. United States National team coaches reported they were highly knowledgeable in sport-specific knowledge of skills, strategies, teaching and sport psychology. Their knowledge of biomechanics, physiology and medicine was at a moderate level, and their understanding of sports law was the lowest on the scale measured for this survey. These results from 2008 are consistent with the results from the 1988 United States National team coaches. This provides a picture of the United States national team coach education needs for coach education planning.

While formal coach education programs began back in the late 1970s and in most cases are still at a formative stage of development with their effectiveness in producing expert coaches yet to be established (Gilbert & Trudel, 1999; Siedentop & Tannehill, 2000). Gould et al. (1990) found less than 30% of coaches complete formal coach education in the United States. Jones and Turner (2006) identified that only a small percentage of coaches gained their coaching expertise from formal coach education programs. Formal coach education doesn't fully meet the learning needs of coaches that informal learning situations do, which is what coaches spend most of their time doing (Erickson et al., 2008; Gould et al., 1990; Irwin et al., 2004; Nelson & Cushion, 2006; Schempp et al., 1998; Trudel & Gilbert, 2006).

Critics of formal coach education. Critics suggest when professional knowledge (sport specifics, sport science or pedagogical knowledge) is the only coach education content, no meaningful pathway can exist toward coaching effectiveness (Côté & Gilbert, 2009). Formal coach education courses may increase the knowledge base of the coach, but increased knowledge will rarely improve the overall coaching effectiveness (Abraham & Collins, 1998). Abraham et al. (2006) found most coach education courses reinforce basic understanding that is a starting point for coaches. As most coaches know what is already covered attendance leads to little new knowledge being gained (Gilbert & Trudel, 1999; Irwin et al., 2004). Often, theory is presented at a formal coach education course and is considered too abstract to be given any consideration for practical application (Gilbert, Dubina & Emmett, 2012; Lemyre et al., 2007).

Erickson et al. (2008) found the third-most frequently reported source of coaching knowledge was formal coach education. The top two were learning by doing and interacting with coaching peers which are not explicitly part of the current formal coach education process in Canada. Critics highlight the ineffectiveness of such formal settings for coach learning (Abraham & Collins, 1998; Nelson & Cushion, 2006). Complaints of formal coach education courses include a lack of interaction between coaches and an inability to transcribe the complexity of coaching into a brief course of coaching science (Côté, 2006; Demers et al., 2006). Stone, Sands, and Stone (2004) contended that the failing of formal coach education has been the decreased emphasis on sports science. Formal coach education courses can be of little importance in the development of coaching knowledge and expertise (Erickson, Wilson, et al., 2007; Gilbert et al., 2006; Lynch & Mallett, 2006; Nelson & Cushion, 2006).

Coaches find it almost impossible to attend any formal education program and opt for self-learning to gain knowledge in the areas they considered basic for their coaching skills, using various sources including books, Internet, and magazines (Cushion et al., 2010; Gilbert et al., 2006; Jiménez et al., 2009). An example from rowing, most head coaches work mostly in isolation with freedom to implement their program absent of supervision or mentoring in order to understand the needs and desires of their athletes. Most rowing head coaches develop their own individual approach to emphasizing particular core competencies, for example, winning, skill development, participation or social interaction. In turn the hiring of assistant coaches is primarily based on those that can quickly and effectively adopt the head coaches style and approach to coaching.

Due to a lack of competent delivery systems, the U.S. fails to disseminate critical information to coaches despite supporting more sports science research than any other nation (Toner, 2004). If coach education is to a benefit to practicing coaches, then the components and variables need to change significantly (Côté, 2006). Unless formal coach education can change fundamentally to allow coaches to embrace all of the elements of coaching, coaches succeeding through luck lead to even more failing to fulfill their potential and prevent the profession from developing (Nash, 2008). At present, coach education seems to be serving those with limited understanding and experience in coaching (Werthner & Trudel, 2006).

Coach education programs must begin with compelling and meaningful content from engaging and knowledgeable presenters (Irwin et al., 2004; McCullick et al., 2005). Coaches are

highly receptive to practical application of materials that include case studies and examples in the course presentation and course materials (Wright, Trudel & Culver, 2007). Coach education can be an ideal opportunity to meet and engage with other coaches (Irwin et al., 2004; Lemyre et al., 2007). Coach education can be effective with assessment of knowledge acquired (Burton & Gillham, 2012; Malete & Feltz, 2000). Strategies need to focus better facilitation of social development and growth of athletes (Conroy & Coatsworth, 2006) and increase coach retention (Frey, 2007). Coaching development is best fostered in a supportive context where the aspiring coach can be given the space to make mistakes but to learn through in-action and on action reflection (Cushion et al., 2003). According to Gilbert and Trudel (2005), the reflecting practices of coaches' experiences are essential elements of coach education programs.

Formal coach education can play an important role in coaches' development (Erickson, Côté, et al., 2007). Coaching education should be about advancing the current best practices, standard and structures in sport (Erickson et al., 2008). Chelladuria (1986) and Campbell (1993) argued that if coach education content were designed in a coherent and sound manner it would contribute to the claims of the coaching profession. Coach education courses require practical ways for coaches to improve their athlete's performance by developing a procedural knowledge base that helps coaches improve reflection and problem solving skills (Nash & Collins, 2006). The development of any profession is shaped by the investment put into future practices (Lyle, 2002). The development of future coaches however, cannot be left up to experience alone (Langan, Blake & Lonsdale, 2013). Informal education strategies like self-reflection and mentoring are discussed in more detail in the following section as strategies to enhance the current state of coach education (Cushion et al., 2003).

Informal Coach Education

Elite coaches gain coaching knowledge through a number of different means; experience of playing at the collegiate varsity level and having formal athletic leadership experiences in the sport coached (Anderson & Gill, 1983; Richardson, 1981; Schinke et al., 1995), minimum threshold of sport experience (Erickson, Côté, et al., 2007), entry coaching position at the high school level (Latimer & Mathes, 1985), undergraduate degree in physical education (Anderson & Gill, 1983; Latimer & Mathes, 1985; Richardson, 1981), previous athletic experience (Côté, 2006; Gilbert et al., 2006; Irwin et al., 2004; Jones et al., 2003; Jones et al., 2004), practical coaching experience and interactions with peer coaches and athletes (Abraham et al., 2006;

Erickson et al., 2008; Fleurance & Cotteaux, 1999; Schempp et al., 1998; Wright et al., 2007) and mentoring by a more experienced coach (Bloom et al., 1998; Cushion, 2001).

Coaches engage in informal learning practices that include Internet (Erickson et al., 2008; Lemyre et al., 2007; Reade, Rodgers & Spriggs, 2008; Schempp et al., 2007; Wright et al., 2007), books (Abraham et al., 2006; Lemyre et al., 2007; Nelson, Cushion & Potrac, 2006; Schempp et al., 2007; Wright et al., 2007), journal articles and magazines (Nelson et al., 2006; Reade, Rodgers & Hall, 2008; Reade, Rodgers & Spriggs, 2008; Schempp et al., 1998; Schempp et al., 2007), education sport science videos (Nelson et al., 2006; Reade, Rodgers & Hall, 2008; Reade, Rodgers & Spriggs, 2008; Wright et al., 2007), footage of coaching sessions (Irwin et al., 2004; Schempp et al., 2007) and recordings of performances of their own and other coaches' athletes (Irwin et al., 2004; Schempp et al., 1998; Schempp et al., 2007). The development of expertise in coaches involves experience, dedication, study and reflection, along with interactions among these factors (Jiménez et al., 2009).

Past Experience of an Elite Coach

The experience of a coach as an athlete can provide significant amounts of valuable coaching knowledge for a person even before beginning coaching (Abraham et al., 2006; Cushion et al., 2003; Erickson et al., 2008; Irwin et al., 2004; Jones et al., 2003; Jones et al., 2004; Lemyre et al., 2007; Randolph & Posner, 1988; Sage, 1989; Salmela, 1995; Schempp et al., 1998; Wright et al., 2007). This knowledge includes; basic understanding of rules, procedures and drills (Bloom et al., 1998; Lemyre et al., 2007) allowing them to experience and learn from different coaches (Lemyre et al., 2007; Wright et al., 2007), gain an understanding of how athletes feel during training and performance (Irwin et al., 2004; Schempp et al., 1998), and facilitated their ability to better relate to their athletes by empathically understanding things from the athletes' perspective (Irwin et al., 2004; Jones et al., 2003; Schempp et al., 1998). Further research is recommended on the gains athletic experience can have on coaching performance (Crust & Lawrence, 2006; Cushion et al., 2010).

Past performance influences expectations and future performance (Ericsson & Charness, 1994; Feltz, 1988; Gilbert, 1978; Hendry & Whiting, 1968; Wernimont & Campbell, 1968). Feltz et al. (1999) highlighted past performance of a coach as important sources of a coach's belief of his/her capacity to affect learning and performance of their athletes. Wernimont and Campbell (1968) described the behavioral consistency principle, as past performance is the best

predictor of future performance. Past performance is based on one's mastery of experience or accomplishment (Chase, Lirgg & Feltz, 1997).

In the construction of coaching knowledge the coach-athletes relationship can be heavily influenced by the coach's own experience as an athlete (Jones et al., 2003; Saury & Durand, 1998). Coaches may be better able to interact with athletes if they were performers in that sport (Nash & Collins, 2006). Developing rapport with athletes is a vital aspect of coaching, but balancing this with a clear coach/athlete relationship is an important balance and boundary to maintain (Sedgwick et al., 1997). Extensive and diverse sport experiences can aid coaches' development by acting as unmediated learning situations (Sage, 1989; Werthner & Trudel, 2006).

Irwin et al. (2004) found elite coaches identified that experience as a performer was a very important resource to elite coaching performance and past performance helped coaches have a better working relationship with athletes. One limitation that exists is if a coach previously experienced success as a performer this may result in a lack of compassion for others in the case when an athlete is unable to complete a task that the coach as an athlete could. Past performance is perceived as an even more important resource to coaches than coaching education programs, coaching and squad meetings, manuals, videos and observations and international travel. Experience is a necessary but not a sufficient condition for expertise (Maetozo, 1971; Siedentop & Eldar, 1989). Experience is more than a mere passage of time and longevity it is the refinement of preconceived notions garnered from rich and meaningful practical learning situations (Gadamer, 1960). Lynch and Mallett (2006) stated "some coaches experience ten years of accumulated experience through self-reflection and analysis, whilst others may experience the same first year ten times, without any development" (p. 20). Mentoring and the working through experimentation were the most important variables to developing coaching knowledge from the Irwin et al. (2004) study.

In professional sport 60% of coaches played within that level of their sports in baseball (MLB), basketball (NBA) and soccer (English Premier League) (Mielke, 2007). Few American Football (NFL) head coaches had professional playing experience and coaching development that included time as an NFL assistant head coach and collegiate head coach (James, 2007). Playing at the professional level is not necessary but a desirable qualification for NBA head coaches, but in Major League Baseball and English Premier League soccer, very few head

coaches have not played at that level, and even fewer coached at a lower level (James, 2007). While different sports have different developmental pathways to becoming a head coach, great coaches get the most out of their talented athletes and staff and maximize their resources (Mielke, 2007).

The higher level of interaction of a player in their position, the more likely there would be a future in leadership in a variety of team sports domains: American football (Anderson, 1993; Massengale & Farrington, 1977), basketball (Klonsky, 1977), baseball (Grusky, 1963; Leonard, Ostrosky & Huchendorf, 1990), field-hockey (Tropp & Landers, 1979), ice-hockey (Roy, 1974), rugby (Loy, Curtis & Sage, 1978; Melnick & Loy, 1996), soccer (Crust & Lawrence, 2006) and softball (Klonsky, 1977). Research in areas of Olympic sports has not been found by this author, who recommends that an investigation into team sports such as rowing and the likelihood of pursuing and coaching position and coaching success depending on position rowed in a boat would be a valuable contribution to the literature. Research conducted outside of the sports domain on the level of interactions as a predictor of leadership potential in environments included classroom students (Byrne, 1961), housing units owners (Festinger, Schachter & Back, 1950), factory lines (Turner, 1957), sorority houses residents (Willerman & Swanson, 1952) and B-29 bomber pilots (Kipnis, 1957).

Grusky (1963) introduced this research into the sports coaching world to research an individual's level of interaction with others and player centrality as key predictors of coaching success. In American football, those who played on the offense (quarterback, offensive line, running back or wide receiver) were more likely to have a future career as a coach compared to those that played on the defense (Anderson, 1993; Braddock, 1981). Fabianic (1993) found that baseball managers with little or no playing experience were the most successful. Tropp and Landers (1979) proposed that rather than the position played and level of interaction of the individual, the nature of the task may be of greater importance to the future leadership potential of an athlete. Weese and Nicholls (1986) found that years of experience and popularity were significant indicators of leadership potential. Gilbert et al. (2009) found a positive link between time spent as an athlete and coaching (training and administration) to the greater the likelihood for coaching success.

Supervised Learning Experiences

The primary source of coaching knowledge comes from practical coaching experience and observing other coaches (Culver & Trudel, 2006; Cushion, 2001; Gould et al., 1990). The most significant factors for the development of coaches are an informal education and knowledge acquired through experience (Cushion et al., 2003; Gould et al., 1990). Learning through experience is often highlighted as a key component of coach development (Culver & Trudel, 2006; Cushion et al., 2003; Gould et al., 1990; Lemyre et al., 2007). Learning by doing facilitates the process of reflection *in* and *on* experience and has been identified as central to experience-based learning theories (Erickson et al., 2008; Gilbert & Trudel, 1998, 2001, 2005; Trudel & Gilbert, 2006).

Adult learning frameworks such as supervised field experiential learning experiences can help reflection on the broader social context of coaching and fosters individual development pathways that are a key for coaching education programs to advance (Irwin et al., 2004; Kolb, 1984; Schön, 1991). Irwin et al. (2004) highlighted the individuality that exists in the development pathways of coaches. A framework from adult learning practitioners to provide guidelines for program designers will help this transition to reduce useless presentation of knowledge to experiencing a learning environment that solves problem for each individual learner.

Kolb (1984) advocates development of active experimentation that starts with experiences and existing knowledge to facilitate the learning process. According to Salmela (1995), coaches follow a diverse learning pathway in their development. Experience is a coach's primary learning medium, and formal education courses need to be supplemented with engaging in the ongoing practice of learning from experience (Knowles et al., 2005). High order interactions, debate and critical discussion, between elite and non-elite coaches may facilitate active experimentation through shared experiences (Gould et al., 1990; Kolb, 1984; Martinez, 1993).

Competitive Experiences

The competitive arena involves coaches' being at their very best to apply their knowledge to help athletes reach optimal performance and this is one of the main reasons why coaches coach (Debanne & Fontayne, 2009). Competition facilitates a level of uncertainty that engages the learner in the intentional effort to discover specific connections to improve certainty (Dewey,

1916). Coaches focus on this process by preparing for multiple scenarios and incorporate facilitating anticipation between coaches and athletes and other adjustments. Coaches attempt to develop a recognized hierarchy of strategies to implement in order to maximize performance in competition (Debanne & Fontayne, 2009). Post-competition analysis is a critical component of coaching knowledge acquisition by reviewing lessons learned, things done well and things for the future that would be done in a different way (Carter & Bloom, 2009). Competition strategy is the top area that coaches want to learn about most but find difficult to locate in the literature: interpreting the information is sometimes time consuming as it is not presented with relevant theoretical perspectives in a practical manner. Coaches often face a cost and time barrier as there are many other very high priorities for coaches (Reade, Rodgers & Spriggs, 2008). Almost all coaches believe they gain most out of experience working alongside of expert coaches while networking and attending various competitions (Wilson, Bloom & Harvey, 2010).

Mentoring

Homer (1937) told the story of a man named Mentor who was placed in charge of King Odysseus' son Telemachus to educate and to build a relationship of trust and affection as a tutor and counselor. Fenelon (1699/1994) wrote about Telemachus' trusted advisor, friend, teacher and experienced person, Mentor. Roberts (1998) argued Fenelon embellished the magnitude of the role of Homer's Mentor who was actually an old friend of the king rather than a sage like educator. Daloz (1983) stated that Mentor was a minor figure but agreed with Fenelon's Mentor as half male, half female. Levinson, Darrow, Klein, Levinson, and McKee (1978) initiated interest in the notion of mentoring in the contemporary literature. Klein (1967) conferred the etymology of mentor coming from *men* or 'one who thinks', and *tor*, the masculine suffix.

For sports coaches, the mentor helps engage in reflection in order to facilitate coach development (Lauder, 1994). Mentors who promote reflection, critical enquiry and interaction between elite and non-elite coaches may provide a high order learning situations (Martinez, 1993). One of the most effective ways of developing domain-specific knowledge is from successful coaches (Nash & Collins, 2006). Irwin et al. (2004) found 91% of coaches identified mentoring as very important in the development of elite coaching knowledge. It is not just the sports coaching setting the literature supports mentoring to enhance work effectiveness (Kram, 1985) and career success (Fagenson, 1989; Hunt & Michael, 1983; Roche, 1979; Stumpf & London, 1981). Further research is required to understand the protégé-mentor relationship and in

particular how learning occurs from the mentor to the protégé (Perna, Zaichlowsky & Bockneck, 1996). Bloom (2012) added that further research is also needed to identify better systems for mentoring programs of sports coaches. Sport coaching mentors need to focus more on career progression for the mentees and the mentors need to be organized, knowledgeable, respectful and are up-to-date with current trends and best practices.

Mentoring is another way to facilitate coach development (Bloom, 2002; Bloom et al., 1998; Cushion et al., 2003; Irwin et al., 2004; Lyle, 2002; Moreno, Moreno, Iglesias, García & Del Villar, 2007; Salmela et al., 1994). Cushion (2007) added that the mentoring that exists in this context is “unstructured, informal, and uneven in terms of quality and outcome, uncritical in style and, from the evidence, serves to reproduce the existing culture and power relations found in existing coaching practice” (Cushion, p. 131). The mentor can help to facilitate coaching development (Irwin et al., 2004; Jiménez et al., 2009). Gilbert and Trudel (2001) demonstrated that mentoring generally occurs only in an unstructured and informal manner.

Lyle (2002) highlighted that the mentor is a practitioner expert in the area being learned by the mentee and the sports coach may have been a former athlete in that sport but being a former sportsperson is not essential. Lyle (2002) posed the question, is the holistic role of the sports coach better described as a sports mentor? His response was that the sports mentor role is the one in charge of educating athletes and to building a relationship of trust and affection. Table 2.12 compares mentoring and coaching with the list of characteristics based on the work adapted by Clutterbuck and Megginson (2005).

Table 2.12

Comparing Key Areas of Coaching and Mentoring

	Coaching	Mentoring
Focus	Performance	Individual's development
Role	Specific performance or result	Facilitation of growth and awareness
Arena	Task specific	Life focused implications beyond the task
Return on Investment	Teamwork and performance focused	Learning
Time frame	Short term and defined /outcome focused	Long term somewhat unclear end point as it is life oriented
Feedback	Explicit	Implicit and intuitive

Source: Clutterbuck and Megginson (2005)

Clutterbuck and Megginson (2005) defined a mentor as a person who contributes to a transition in knowledge, work, or thinking. This relatively clear definition perhaps is oversimplified and one-dimensional. Kram (1985) found mutuality and reciprocity as key aspects of the mentoring relationship. The mentoring and coaching literature has progressed to the complex and dyadic nature of respective relationships. Table 2.12 presents some aspects in which the role of the coach may differ from other roles that focus on improvements in performance and learning.

Table 2.13

Comparing Roles of Coaches to Mentors

Role of a coach (Feltz et al., 1999)	Role of a mentor (Kram, 1985)
• Performance (win/loss record)	• Sponsoring the protégé towards career advancement
• Developing sport skills	• Exposing protégé to wider professional network
• Developing the all-around individual	• Provide challenging assignments
• Communicating	• Coaching new skill development in new contexts
• Motivating	• Protecting the protégé from career failure
• Teaching organization skills	• Providing psychosocial support – increasing self-esteem and counseling

In the sports coaching literature, there are overlaps with other professions, like mentoring, as they both facilitate lasting change (Lyle, 2002). The concurrent themes appear in the mentoring literature:

- Empowerment (Beech & Brockbank, 1999);
- Moving from novice to expert (Maynard & Furlong, 1995);
- Two way communication (Jones, Reid & Bevins, 1997);
- Commitment of the mentor; (Jones et al., 1997); and
- Bonding between the mentor and the mentee (Mawer, 1996).

Coaching and mentoring, in a variety of contexts, focus on change through learning and as a result overlap can extend to other professions. This overlap with other professions does not provide a complete picture of the complexity of sports coaching but does outline some of the challenges that are faced in other environments (Potrac & Jones, 2009). Coaching is one of the roles of mentoring (Kram, 1985; Pegg, 1999). Like most diverse leadership roles, additions could

be easily made to both lists to include facilitator, organizer, event planner, nutritionist, physiologist, engineer, psychologist and counselor depending on the context (Borrie & Knowles, 1998; Gould, 1987). Lyle (2002) added that counseling also has overlap for coaches, and there is also a strong element of teaching in coaching. A good distinction is if a coach's primary goal is to facilitate improvement in performance, the teacher is primarily focused on facilitating learning, although these are not mutually exclusive (Potrac & Jones, 2009).

Critics of the effectiveness of mentoring suggest that the unstructured and uncritical format of informal mentoring only reproduces the coaching culture rather than a progressive and three dimensional developmental spiral (Cushion et al., 2003). Formalized sports coaching mentoring in Australia (Nash, 2003), Canada (Nash, 2003), Germany (Campbell & Lavalley, 1993; Kozel, 1997) and the UK (Cushion, 2006) provided roadmaps for the grounded structure and format that is often the criticism of mentoring programs. Jones, Harris, and Miles (2009) found that mentoring programs require insightful qualitative observation complemented by reflective in-depth interviews that facilitate inquiry, questioning and reflection.

An effective mentor can help a coach avoid the pitfalls of mimicry and develop his/her own coaching style and philosophy (Erickson et al., 2008). Salmela et al. (1994) and Bloom et al. (1998) concluded that the most formative means of mentoring was one who widened knowledge through observation. An informal apprenticeship of observation can also provide a powerful source of coaching knowledge (Cushion et al., 2003; Sage, 1989).

Informal learning, such as the learning that occurs in shared communities of practice, is a function of collaboration and is a social process (Lave & Wenger, 1991). Communities of practice is an example of informal learning where important sharing of knowledge and learning occurs between coaches (Culver & Trudel, 2006, 2008; Harris, 2011; Nelson & Cushion, 2006; Trudel & Gilbert, 2004). Much of what a new coach learns is through ongoing interactions in the practical coaching context, as well as a variety of informal sources (Cushion, 2007). Balance between the extreme individual focus of mentoring and the self-direction of observation, would occur from interacting with other coaches within communities of practice (Barnson, 2010). This sustained interaction helps coaches collectively negotiate meaning in order to learn from one another (Culver & Trudel, 2006, 2008; Trudel & Gilbert, 2004). In summary, an effective mentor provides a valuable source of acquired knowledge to assist in problem solving. Coaching

knowledge is a function of experience, meaningful experience is directly related to one's ability to self-reflect.

Self-Awareness

Self-awareness in the literature dates back to James (1890). Increased attention to improving self-awareness can lead to improved self-esteem that is driven by exploration and curiosity to create more extensive and efficient processing of self-relevant information and autonomy (Carver & Scheier, 1981; Chow, Lam, Leung, Wong & Chan, 2011; Froming & Carver, 1981; Gibbons, 1983, 1990; Hixon & Swann, 1993; Nasby, 1985, 1989; Porterfield et al., 1988; Scheier, Carver & Gibbons, 1979). Martens (2002) argued that increasing self-awareness requires self-reflection and interaction with others. The process of improving self-awareness can be contrasted with rumination described as negative, intrusive and repetitive thoughts that can lead to lack of certainty or confusion about self-concept (Brockner, 1984; Campbell & Lavalley, 1993; Hixon & Swann, 1993; Lyubomirsky, Sousa & Dickerhoof, 2006; Nolen-Hoeksema, McBride & Larson, 1997; Nolen-Hoeksema & Morrow, 1991).

Improving self-knowledge, the study of comparing explicit and implicit processes, is the source of improving decision-making (Harries, Evans & Dennis, 2000). Decision theory identifies the values, uncertainties and other issues relevant in optimal decision-making (Condorcet, 1793, 1847; Dewey, 1910, 1978; Kahneman & Tversky, 1973; Resnik, 1987). The study of judgment analysis and behavior prediction dates back to the work of Pascal (1670, 1966) and Bernoulli (1738) on how people make decisions. Pascal (1670, 1966) was the first to explain choice under uncertainty. Bernoulli (1738) described how values toward risk impact decision-making. The study of decision-making has focused on choices involving basic attitudes about values and probability (Dillon, 1971; Kahneman & Tversky, 2000; Neumann & Morgenstern, 1944; Pratt, Raiffa & Schlaifer, 1964; Savage, 1954; Summers, Taliaferro & Fletcher, 1969).

Self-reflection and self-insight, and other concepts of self are referred to in many domains in the literature. According to London (2002), these concepts of self can be defined in the literature:

- *Self-insight* is a multidimensional concept of recognizing and differentiating between one's strengths and weaknesses;
- *Self-understanding* that is recognizing how our past experiences effect how present one views oneself;

- *Self-conscious* is the uncontrolled act of going within;
- *Self-awareness* is internal understanding of how externally one's behavior is perceived by others;
- *Self-assessment* is a determination of one's capabilities and abilities;
- *Self-definition* comprises goals, values and beliefs that are self-expressive and personally committed to;
- *Self-evaluation* is a judgment about the capabilities and abilities one possesses;
- *Self-monitoring* is looking at one's behavior and comparing to one's standards for our behavior and adjusting accordingly;
- *Self-esteem* is how we feel about one's self; and
- *Self-confidence* is our belief about the positive capabilities and abilities we possess.

London (2002) argued that a person who has high degrees of self-insight has high-levels of all of these qualities (self-understanding, self-awareness, self-assessment, self-definition, self-evaluation, self-monitoring, self-esteem, self-confidence and self-control).

Research on human behavior has focused on why we do what we do, and is extensive in the literature including studies on decisions made relating to career decisions (Lazarsfeld, 1931); criminal behavior (Burt, 1925); graduate school options (Davis, 1964); marital choices (Goode, 1956); seeking medical support (Kadushin, 1958) and voting for political candidates (Gaudet, 1955). Literature that focus on the concept of self include:

- *Self-assessment* (Hammond & Kern, 1959; Linn, Arostegui & Zeppa, 1975; Tracey, Arroll, Richmond & Barham, 1997);
- *Self-attention* (Carver, 1979; Fenigstein, 1979; Gibbons, 1990);
- *Self-awareness* (Duval & Wicklund, 1972; Scheier et al., 1979; Shrauger & Osberg, 1982);
- *Self-concept* (Campbell & Lavalley, 1993; Shavelson, Hubner & Stanton, 1976);
- *Self-consciousness* (Carver & Scheier, 1981; Froming & Carver, 1981);
- *Self-control* (Kanfer & Karoly, 1972);
- *Self-definition* (Waterman, 1985);
- *Self-efficacy* (Bandura, 1977, 1990, 1997; Feltz, 1988; Feltz & Lirgg, 2001);
- *Self-esteem* (Brockner, 1984; Campbell & Lavalley, 1993; Helmreich & Stapp, 1974; Lammers & Becker, 1992; Sears & Sherman, 1964);
- *Self-evaluation* (Holt, 1951; Sedikides & Strube, 1997; Stuart, Goldstein & Snope, 1980);
- *Self-insight* (Bandura, 1956; Dunning, Heath & Suls, 2004; Grant et al., 2002; London, 2002; Wright, 1977);
- *Self-monitoring* (Schempp et al., 2007; Snyder, 1974);
- *Self-observation* (Gallup, 1982; Hatcher, 1973);
- *Self-perception* (Bem, 1967; Robins & John, 1997);
- *Self-presentation* (Baumeister, 1982);
- *Self-prediction* (Shrauger & Osberg, 1981; Wilson & LaFleur, 1995);
- *Self-reflection* (Grant et al., 2002; Harrington & Lofferedo, 2010; Schön, 1983);

- *Self-regulation* (Carver & Scheier, 1981; Froming & Carver, 1981; Gröschke & Schäfer, 2012; Kopp, 1982; Nadel, 1953); and
- *Self-schema* (Cacioppo, Petty & Sidera, 1982; Markus, 1977; Nasby, 1985).

Historically, the study of self in western society is highlighted by four trends according to Baumeister (1982). First, the exploration into self-knowledge (Carver, 1979; Fenigstein, Scheier & Buss, 1975), second, the pursuit of fulfillment and achieving human potential (Maslow, 1968), third, contributing to society and relatedness with others (Baumeister, 1982; Schlenker, 1980; Tedeschi, 1981) and last, self-definition and identity development (Erikson, 1968; Marcia, 1966). The ancient Greeks espoused the principles of self-knowledge and knowing thyself as a pathway to happiness (Hassad, 2002). In eastern philosophy, the study of self is highlighted by concepts such as *atman* is self, *saksin* is the conscious mind, knowable and self-awareness, *jiva* is self-conscious or soul, and *maya* is ignorance from the Baghwad Gita, a Hindi scripture, dating back to around 500–200 B.C. (Sharma, 1999). In China, the study of Confucian philosophy was a most notable influence starting from around 500 B.C. and guided by the principles of harmony was achieved through a love of humanity, knowledge of the classics and emulating the virtues of the sages (Natale & Fenton, 1997). The study of Taoism was derived from the way of nature and distinguished by spontaneous and authentic self-development. Confucianism and Taoism converge at the point of wellbeing for people.

In the context of the decision-making processes, self-insight, has received some attention in the literature (Brehmer, Kuylenstierna & Liljergren, 1974; Oskamp, 1967; Slovic & Lichtenstein, 1971). Nisbett and Wilson (1977) explained most decision-making has little to do with self-understanding or the introspection process. Decision-making is generally a result of culturally learned rules relating to the following factors:

- Lack of awareness (Arkes, 1981; Brehmer & Joyce, 1988; Brehmer et al., 1974; Lyke, 2009; Nisbett & Wilson, 1977; Oskamp, 1967; Summers et al., 1969; Ward & Jenkins, 1965);
- Giving greater weight to positive cues rather than to negative cues known as covariation misestimation (Arkes & Harkness, 1980; Arkes, Harkness & Biber, 1980; Meehl & Rosen, 1955; Nisbett & Ross, 1980; Smedslund, 1963);
- Preconceived notions (Bruner & Tagiuri, 1954; Chapman & Chapman, 1967; Lord, Ross & Lepper, 1979; Mahoney, 1977; Newcomb, 1929; Ross, Lepper, Strack & Steinmetz, 1977; Shweder et al., 1977);
- Hindsight bias (Arkes, 1981; Fischhoff, 1975, 1977; Wood, 1978); and
- Overconfidence (Einhorn & Hogarth, 1978; Holsopple & Phelan, 1954; Koriat, Lichtenstein & Fischhoff, 1980; Oskamp, 1965; Snyder, 1981).

Problem solving has also been covered in relevant literature on self-awareness and decision-making. Problem solving is essentially completely hidden from conscious view (Eskey, 1958; Ghiselin, 1955; Maier, 1931; Morgan & King, 1966; Nisbett & Wilson, 1977). The stimulus and process is often unknown to the problem-solver (Nisbett & Wilson, 1977). Maier (1931) claimed that problem-solving using insight (when reflecting on two or more experiences comes together to create new relations) is regarded as being qualitatively different from problem solving using trial and error (uses a combination of different experiences resulting in a sudden change of meaning).

Self-Reflection

Self-reflection is defined as the process of looking inward critically on one's life experiences in applying knowledge to practice (Boring, 1953; Carver & Scheirer, 1998; Dewey, 1933; Duval & Wicklund, 1972; Freeman, Mahoney & Devito, 2004; Hullfish & Smith, 1961; Janis & Mann, 1977; Kolb, 1984; Koriat et al., 1980; Langer, 1978; Lewin, 1951; Mezirow, 1981; Moon, 1999b; Raiffa, 1968; Schön, 1983; Van Manen, 1977). In the literature, different types of reflection are distinguished and promoted:

- Mindful practice (Epstein, 1999);
- Coping with ill-structured problems (King & Kitchener, 1994);
- Awareness of emotions (Boud, 1993);
- Assumptions (Van Manen, 1990);
- Morality (Kohlberg, 1984);
- Learning from experience (Schön, 1987);
- Deep learning (Marton, Hounsell & Entwistle, 1984);
- Critical learning (Mezirow, 1992); and
- Assessment of integral learning outcomes (Shumway & Harden, 2003).

The literature on how the mind observes its own processes dates back to Aristotle and Plato (Boring, 1953; Boud, 1993; Boud, Keogh & Walker, 1985). Descartes (1641) wrote about the dualism between introspection and self-conscious. A distinction was made between the deliberate and non-deliberate act of looking within or inner observation from inner perception (Ach, 1905 ; Brentano, 1874; Bühler, Griffin & Ross, 1995; James, 1890; Titchener, 1898; Wundt, 1912). In other words, self-reflection is the deliberate act of inner observation, and the uncontrolled act was self-conscious. The self-reflection (reflective practices) research is divided as it has become an increasingly larger body of literature due to its cross-disciplinary nature (Moon, 1999a). The literature presents self-reflection in a number of domains; medicine (Baliant,

1964; Epstein, 1999), nursing (Mann, Gordon & MacLeod, 2009), education (Osterman & Kottkamp, 1993), sports psychology (Anderson et al., 2004), and sports coaching (Irwin et al., 2004; Saury & Durand, 1998).

Dewey (1933) defined reflection as “active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends” (p. 9). Lewin (1951) wrote about reflection in the organizational setting as that which reinforces learned behavior and leaders to new or higher levels of abstraction. Habermas (1973) highlighted ‘critical intent,’ to investigation of one’s environment to achieve a free mind, as the driving force of reflection. He also significantly influenced the work by Mezirow (1981) on transformation that looks at critical reflection and awareness as the vehicle to assessing the relevance and meaning these experiences have to an individual’s life. Boud et al. (1985) defined reflection as an intellectual and affective activity to explore experience that leads to new understanding and appreciation.

Schön’s work on reflection stands apart and is the most relevant to sports coaching because of its focus on the construction of domain-specific knowledge in the context of professional practice (Gilbert & Trudel, 1998). Schön (1983) defined the reflective practice as a tool to revisit experiences both to learn from and for framing complex problems of professional practice. Schön (1987) asserted that professional knowledge is facilitated by critical inquiry, stimulated out of unexpected outcomes.

Schön (1983) looked at the process of reflection, knowing in-action, surprise, reflection in-action (during a learning event), reflection on-action (after learning event) and long-term retrospective on-action. Schön (1983, 1987) defined reflection on-action as the process of thinking back on past action and discovering lessons learned, it is an exploration into experiences to reframe our current and future activities and practices. Freud (1923, 1961) found the use of retrospective on-action reflection as a way to assess unconscious processes by examining past experiences. Retrospective reflection on-action breaks down our experiences to build new meaning and responses that may be appropriate to adapt to more current situations and challenges (Schön, 1983, 1987). Retrospective reflection on-action represents the most common conception of reflection and provides the opportunity for dramatic, extensive structural change and is more likely to take place in the cognitive realm (McAlpine & Weston, 2000).

Schön's model is an example of the *iterative* (process) dimension of reflection as it describes an event that triggers new understanding leading to a different response to future experiences (Mann et al., 2009). The *vertical* (levels) dimension of reflection includes deeper levels of quality of reflection on experience. Surface level reflection is descriptive and beyond this, the harder the level of reflection is to access, the less frequently it is demonstrated and reflects deeper levels of analysis and critical synthesis. Boud et al. (1985) wrote that the reflective process is about revisiting the experience, connecting to the feelings, and then re-evaluating the meaning of this experience. This process involves both the iterative dimensions and vertical dimensions of reflection (Mann et al., 2009).

Schön (1991) wrote about the value of thoughtful consideration of one's life experiences in applying knowledge to practice. Self-reflection in practice is an unstructured approach to directing understanding and learning. Engaging in a practice of self-reflection can promote improvement in quality of performance stimulating personal and professional growth and bridging the gap between theory and practice (Ghaye, 2010). RobertsonCooper (2008) emphasized the significant benefit the reflective process of increasing meaning and purpose to one's life can have on one's wellbeing. The benefits of the reflective practices are linked to the literature on flow state, as the optimal experience reflecting balance of challenge and skill (Csikszentmihalyi, 1975, 1990).

Assessing Self-Reflection

Grant et al. (2002) created a 20-item, self-reporting scale comprised of two subscales: (a) a self-reflection scale (SRIS-SR) and (b) an insight-scale (SRIS-IN). 12 of these 20 items assess self-reflection, six items measure "engagement in self-reflection" and the other six measure "need for self-reflection." The remaining eight items measure insight. These items are rated on a six-point Likert scale ranging from one (strongly disagree) to six (strongly agree). The SRIS has two subscales. One assesses an individual's propensity to reflect on one's own thoughts, feelings and behaviors from 12 items. The second is their level of insight into one's thoughts, feelings and behaviors from eight items.

The Self-Reflection and Insight Scale was selected for a number of reasons. Based on the work of Côté and Gilbert (2009), their definition of coaching effectiveness includes a focus on introspection. This led to exploration of all relevant self-reflection measures and this instrument seemed to be the most relevant for the purpose of this study. Finally, this instrument has not been

used in any research relating to sports coaching. This instrument has been used in a number of studies in domains that include:

- business executives (Moen & Shaalvik, 2011);
- college students (Harrington & Lofferedo, 2010);
- general population (Lyke, 2009; Sauter, Heyne, Blote, Van Widenfelt & Westenberg, 2010);
- leadership development (Chan, 2010);
- life coaching (Grant, 2003; Spence & Grant, 2005);
- medicine (Silvia, 2011b);
- mental health (Pijnenborg, Van der Gaag, Bockting, Van der Meer & Aleman, 2011; Richards, 2010);
- nursing (Yu, Collins, Cavanagh, White & Fairbrother, 2008);
- other health professionals (Lowe, Rappolt, Jaglal & MacDonald, 2007);
- pastoral care education (Jankowski, Vanderwerker, Murphy, Montonye & Ross, 2008);
- psychology (Butler, 2009; Silvia, 2011a; Xu, 2011);
- social work (Chow et al., 2011; Leung et al., 2011);
- teacher training (Klug, 2011); and
- wellness (Haga, Kraft & Corby, 2009).

Chapter Three provides a more comprehensive analysis of this and other instruments. The following instruments were reviewed as potential tools for this study and have contributed significantly to the literature on sports coaching. These instruments have been listed in order of their first publication but the SRIS was the selected instrument. See Table 2.14 for an overview of the self-reflection instruments and a more detailed description on each instrument can be found in Appendix E. Each instrument is reviewed in terms of relevance to this study.

Table 2.14

Summary of the Self-Reflection Instruments

Name	Year	Relevance to this study	Summary of instrument
The Self Reflection and Insight Scale, Grant et al. (2002)	2002	Self-Reflection and Insight	Grant et al. (2002) created the SRIS assesses individuals' propensity to reflect on, and their level of insight into, their thoughts, feelings and behavior. Insight and self-reflection are central to the self-regulatory process and individuals who regularly monitor their thoughts, feelings and behaviors should have higher levels of insight and self-reflection.
The Texas Social Behavior Inventory (TSBI), Helmreich and Stapp (1974)	1974	Self-esteem	The TSBI is an objective measure of an individual's feelings of self-esteem or social competence, constructs. This scale is used to operationalize self-esteem (Helmreich & Stapp, 1974; Lammers & Becker, 1992). TSBI was the first measures to consider the athletic realm of self-esteem (Robinson, Shaver & Wrightsman, 1991).
Private Self-Consciousness Scale (PSC), Fenigstein et al. (1975)	1975	Self-consciousness	The PSC assesses individuals' tendency to direct attention inwards (Fenigstein et al., 1975). Assessing and understanding the impact of different levels of self-consciousness is the major reason for devising this instrument (Fenigstein et al., 1975).
Self-directed Learning Readiness Scale, Guglielmino (1977)	1977	Self-direction	The Self-Directed Learning Readiness Scale (SDLRS) provides details about an individual's future learning approaches and efforts measuring eight factors; openness to learning opportunities, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility for one's own learning, love of learning, creativity, positive orientation to the future, and ability to use basic study skills and problem-solving skills. Higher scores represent higher readiness for self-directed learning (Guglielmino, 1977).
Oddi Continuing Learning Inventory Oddi (1984).	1984	Self-direction	Oddi's Continuing Learning Inventory (OCLI) measures the personal characteristics of self-directed learning and higher scores mean greater characteristics of a self-directed continuing learner. OCLI's four factors are: learning with others, learner motivation/self-efficacy/autonomy, ability to be self-regulating, and reading avidity (Harvey, Rothman & Frecker, 2006).
Reflection in Learning Scale (RLS), Sobral (2000)	2000	Self-Reflection, Critical reflection	Sobral (2000) created the Reflection in Learning Scale to appraise self-reflection in learning.
Reflection Thinking Questionnaire, Kember et al. (2000)	2000	Self-Reflection, habitual action, understanding, reflection, critical reflection	Kember et al. (2000) developed the Reflection Thinking Questionnaire that measures reflective thinking, based principally on Mezirow work on critical thinking.
Groningen Reflection Ability Scale (GRAS), Aukes, Geertsma, Cohen-Schotaus, Zwierstra, and Slaets (2007).	2007	Self-Reflection, Empathetic reflection, Reflective communication	Groningen Reflection Ability Scale (GRAS) measures personal reflection ability with three factors self-reflection, empathetic reflection and reflective communication. It focuses on the important and multi-faceted construct of reflection, which contains cognitive-emotional and meta-cognitive processes which have frequently been described both theoretically and empirically in the literature.

Using the Self-Reflection and Insight Scale

The criteria for selecting the instruments for this study included coverage in the literature, relevance to sports coaching and contributing in a meaningful way to the literature on self-awareness and sports coaching. While Helmreich and Stapp's (1974) Texas Social Behavior Inventory (TSBI), looked at self-esteem, it is one of the original instruments in looking at self-awareness. Exploring self-reflection and self-insight seemed to be more relevant constructs to explore for this study due to its lack of coverage in the literature.

Using self-consciousness was considered as a possibility for this study as the Private Self-Consciousness Scale (PSC) (Fenigstein et al., 1975) is a well-known and extensively used instrument. The SRIS was developed from the PSC. However, the SRIS is a more relevant and useful instrument for the purpose of this study as it looks specifically at self-reflection and insight and not just self-awareness

If self-directed learning was the focus, Self-directed Learning Readiness Scale, (Guglielmino, 1977) and the Oddi Continuing Learning Inventory (Oddi, 1984) would be suitable instruments to collect data about a sports coach's learning styles. Self-reflection and self-insight was selected for this study as it is a topic that needs more attention in the literature.

The Groningen Reflection Ability Scale (GRAS), (Aukes, Geertsma, Cohen-Schotaus, Zwierstra, and Slaets (2007) looks at self-reflection, empathetic reflection, and reflective communication. The GRAS and the SRIS had many similar merits when looking at the goals of this study. The GRAS has been used in similar fields to the SRIS and also it's has some similar coverage in the literature. However, this instrument was originally developed in Dutch. I was not able to find evidence in the literature on the reliability and validity of this instrument in English.

The Reflection Thinking Questionnaire, (Kember et al., 2000) looks at self-reflection, habitual action, understanding, reflection, critical reflection which are relevant when considering the intrapersonal knowledge needed for sports coaching. This instrument did not seem as well referenced in the literature, and lacks research on the validity and reliability of this instrument.

The Reflection in Learning Scale (RLS) (Sobral, 2000), looks at self-reflection and critical reflection. It is similar to the GRAS, the RTQ and the SRIS as relevant instruments when considering the introspective construct for this study. Most of the literature using this instrument was in the medical field. While the SRIS had also not been used in sports coaching, more cross

over was evident in the SRIS to sports coaching that the RLS.

Critics of Self-Reflection

Comte (1866) argued it is not possible to split the mind into deliberate and non-deliberate processes and assessing this process is unreliable as it relies on self-validation that doesn't meet the rigors of scientific research. One well-documented limitation of the self-retrieval process is that it can be misleading (Robins & John, 1997; Schooler, Foster & Loftus, 1988). Behavioral research falls into one of three categories; observation of laboratory-based behavior, self-reporting of daily behavior and objective measures of life outcomes. Criterion-based studies introduce a bias between the accuracy of the criterion and those being evaluated. Daily behavior of a performer is dependent on multiple factors (Vazire & Mehl, 2008). External validity, which is vital for accuracy, requires a random sampling of laboratory based-behaviors, daily life behavior and objective measures of life outcomes (Brunswick, 1956).

Schooler, Ohlsson, and Brooks (1993) found that thinking aloud disrupted verbal insight problem solving. Ericsson and Simon (1984) found that thinking aloud blocks the memory retrieval process. People who were unknowledgeable changed their attitudes after analyzing their reasons where knowledgeable people did not (Wilson, Kraft & Dunn, 1989). Thinking aloud can reduce one's capacity to evaluate compared to the written process as it is easier to articulate reasoning especially in the case of logical problem solving (Lane & Schooler, 2004; Sieck, Quinn & Schooler, 1999).

Self-reflection can have unintended negative consequences (Wilson & LaFleur, 1995; Wilson & Schooler, 1991). Focusing on feelings can strengthen those feelings, focusing on the reasons for having them can be harmful as it disrupts a person's attitude (Millar & Tesser, 1986; Wilson & Dunn, 1986). When a person is asked to reflect on why they are feeling the way they feel about something, his/her attitude often sways to the extreme direction of the attitude implied by their reasons (Wilson, 1990; Wilson, Dunn, Kraft & Lisle, 1989; Wilson & Hodges, 1992). For example, if someone is looking at a painting and they have a positive reaction it when they are asked how he/she feel about the painting those feeling become intensified. This is known as the verbal overshadowing effect (Westerman & Larsen, 1997). Nisbett and Wilson (1977) found low self-reflection skills can reduce quality of behavior, attitudes, performance and decision-making and those with weak or ambiguous internal resources tend to rely on external cues for

favorable descriptions of self. Recovered memories can be false, particularly when other people suggest that the events might have occurred (Loftus, 1997; Mazzoni, Loftus & Kirsch, 2001).

One practical barrier to engaging in the process of self-reflection for all professionals is making time. From the medical literature, a suggestion is offered to schedule specific meetings to engage in reflective practices (Knowles et al., 2006; Titchen & Binnie, 1993; Tribble & Newburg, 1998). Another solution is to incorporate reflective practices into formal or non-formal interactions with peers so that it becomes a natural and organic part of interaction.

Self-reflection with a '*negative focus*' or a failure to focus on the positive could be another barrier (Knowles et al., 2001). Knowles et al. (2006) suggested that reflecting on both the positive and negative is a more rounded approach, but solely focusing on the negative at times is not a barrier to the self-reflective process. If the reflective process is being handled effectively, a negative starting point will reach a resolution through self-reflection to become positive over time.

Without some limits, this analysis on self-reflection and development could spiral into an endless exploration into different aspects of the self that may not be fruitful to this literature review. There is, however, relevance in exploring the concepts of self-direction and self-insight as both will contribute to one's understanding of self-reflection, sense of self and one's development. The following definitions are relevant to reinforce clarity with definitions relating to self-reflection. The goal here is to highlight the difference between self-insight and self-direction.

Self-Direction

Self-direction has been used in many different ways in the literature from: autonomous learning (Houle, 1962; Miller, 1964), self-teaching (Tough, 1967), self-planned learning (Tough, 1971); self-directed inquiry (Long & Ashford, 1976), self-initiated learning (Penland, 1979), and self-directed continuing learning (Oddi, 1984). In addition, the self-directed learner has been called the proactive learner (Knowles, 1975), autodidact (Tough, 1967), autonomous learner (Houle, 1961), continuing self-learner (Penland, 1979), and self-directed inquirer (Knowles, 1980; Long & Ashford, 1976). Self-directed learning is described as a process (Brockett & Hiemstra, 1991; Candy, 1991; Cavaliere, 1992; Griffin, 1978; Guglielmino, 1977; Knowles, 1975; Mezirow, 1985; Oddi, 1984; Spear & Mocker, 1984; Tough, 1967, 1971), as a goal of learning or learning characteristic (Brockett, 1985; Brookfield, 1981; Cafferella, 1993; Chene,

1983; Fellenz, 1985), and as a combination of both (Brockett & Hiemstra, 1991; Long, 1989). Brockett et al. (2001) conducted a content analysis of 122 articles on self-directed learning published in fourteen periodicals between 1980 and 1998.

Tough (1971) built on the work of Houle (1961) providing the first comprehensive description of self-direction as a learner taking responsibility for the planning and direction of one's own learning. Knowles (1975) contributed to the self-directed learning literature by explaining the concept and this outlined how to implement it through learning contracts and is also the first assumption in his concept of andragogy.

Brockett (1985) and Cafferella (1983) described self-direction as a personality-related variable. Brookfield (1981) contributed to our understanding by looking at self-directed learning during adulthood. Candy (1991) is credited for identifying that self-direction is not transferred from situation to situation. So, if a learner is self-directed in one area, it does not mean this will be the case in a new area of learning. Two instruments have been used in a number of studies to assess self-direction, one measuring readiness (Guglielmino, 1977), and one measuring personal characteristics (Oddi, 1986) and both have been used in a number of studies (Harvey, Rothman & Frecker, 2003; Harvey et al., 2006; Pachnowski & Jurczyk, 2000; Straka, 1996).

Self-Insight

Self-insight is a function of development of self-awareness: the greater one's self-awareness, the greater is one's self-insight (Dunning et al., 2004; London, 2002; Trapnell & Campbell, 1999). Self-insight is the process of discerning the difference between perception and reality regarding the concept of self (Allport, 1921; Dymond, 1948; Estes, 1938; Freud, 1981; Gross, 1948; Hart, 1935; Hatcher, 1973; Hogan, Johnson & Briggs, 1997; Holt, 1951; Jahoda, 1953; Maier, 1931; Maslow, 1950; Mueller, 1963; Richfield, 1954; Sears, 1936; Taylor, 1983; Taylor & Brown, 1988; Wylie, 1974). Self-insight was first linked to the field of psychoanalysis and defined as the recognition of one's own behavior in relation to one's mental health and referred to the conscious recovery of repressed memories (Amador & David, 2004; Breuer & Freud, 1955; Freud, 1905). Neubauer (1979) defined insight as the expansion of self-awareness through self-observation, memory recovery, and cognitive participation and reconstruction in the context of affective reliving.

Self-insight is argued to be a more effective skill than self-reflection as it refines the impact of one's effectiveness (Grant et al., 2002; Hixon & Swann, 1993; Schooler et al., 1988).

Allport (1937) defined self-insight as the difference between self-perception and perception by others. In other words, a person with a self-perception that closely matches the perception of others has a higher level of self-insight. Bandura (1956) defined self-insight as behavior that is discriminative, planned and voluntary. The object of self-reflection is quite fruitful and will foster self-insight, as self-relevant information is highly accessible (people have more information about themselves than about other people or things) and more accessible than other information (Hixon & Swann, 1993). If a person's ability to self-reflect is low, this will hinder their ability to access self-concepts and undermine self-insight (Hixon & Swann, 1993). Even the greatest critics of self-reflection agree that high levels of self-reflection can foster self-insight as a way to improve learning and performance (Nisbett & Wilson, 1977; Reber, 1989). The Self-Reflection and Insight Readiness Scale (SRIS) was created by Grant et al. (2002) and developed from theories of meta-cognition and self-regulation. The SRIS measures self-reflection and self-insight and the readiness of individuals for purposeful behavior change (Roberts & Stark, 2008). This instrument was selected for this study and a more comprehensive analysis is in Chapter Three.

Richfield (1954) extended the work of Russell (1912) on declarative and procedural knowledge by defining emotional insight as experience gained first hand and intellectual insight as knowledge gained by description. Kris (1956) isolated only one type of insight as "true" self-discoveries. Everything else is defined as "pseudo-insight" (Jaspers, 1913). Myerson (1965) distinguished psychoanalytical insight from reality-oriented insight. Taylor and Brown (1994) claimed self-insight is the level that an individual manages his/her perception of self versus reality in the areas of sense of self, control over environmental factors and the view of future events.

Self-insight has been researched in a variety of domains including business (Grant et al., 2002), education (Hansford & Hattie, 1982), finance (Mear & Firth, 1987; Wright, 1977), nursing (Severinsson, 1998), psychology (Freud, 1905; Reid & Finesinger, 1952; Rosenblatt, 2004) and medicine (Crawshaw, 1979; Harries et al., 2000) (Hays et al., 2002). Self-insight is the highest virtue to be attained in mental health (Allport, 1937). Self-insight is required in professions where expertise is communicated verbally (Joyce, 1976). According to Mear and Firth (1987), level of self-insight is a critical aspect in predicting human behavior. Shrauger and Osberg (1981, 1982) found that people are able to predict their own behavior based on objective

measures. Reilly and Doherty (1989) found a strong positive correlation between levels of self-insight and the cues used to determine one's holistic judgments; in other words, the higher the level of self-insight the more cues are used to make life decisions.

Hollingworth (1916) set the foundation for this definition of self-insight explaining that individuals tend to overestimate their social valuable qualities and undervalue their socially undesirable qualities. Allport (1921) suggested that higher self-insight is reflected in the smaller deviation between self-rating to rating of that individual by one's associates. Self-assessment of desirable behaviors to achieve favorable outcomes by the average population will perceive that they are above average which is spastically impossible (Dunning et al., 2004). The notion that people feel more confident of their own competence than is warranted is extensively covered in the literature (Ajzen, 1977; Bar-Hillel & Fischhoff, 1981; Buehler, 1991; Buehler, Griffin & MacDonald, 1997; Buehler et al., 1995; Crosby & Yarber, 2001; De Paulo, Charlton, Cooper, Lindsay & Muhlenbruck, 1997; Dunning et al., 2004; Ehrlinger, Johnson, Banner, Dunning & Kruger, 2008; Fischhoff, 1977; Gollwitzer, Heckhausen & Steller, 1990; Gollwitzer & Kinney, 1989; Kahneman & Tversky, 1973; Krüger, 1999; Kruger & Dunning, 1999; Kunda, 1987, 1990; MacDonald & Ross, 1999; Marteau, Johnston, Wynne & Evans, 1989; Nisbett & Borgida, 1975; Riggio, Widaman & Friedman, 1985; Stuart et al., 1980; Taylor, 1989; Taylor & Brown, 1988; Tracey et al., 1997; Weinstein, 1980).

Kruger and Dunning (1999) studied the difference between perceived and actual ability of a group divided into four based on their level of performance. Figure 2.37 shows that the top 25% of performers' actual ability exceeded their perceived ability; the middle 50% of performers' perception is closer to the actual ability; while the bottom 25% of performers' perception of their ability far exceeded their actual ability. Individuals with high self-perception are more apt to attain success (Sternberg & Kolligian, 1990). Overconfidence demonstrates a lack of connection with reality by having overly favorable estimation of one's skills, ability and knowledge (Dunning et al., 2004; Pulford, 1996; Weinstein, 1980).

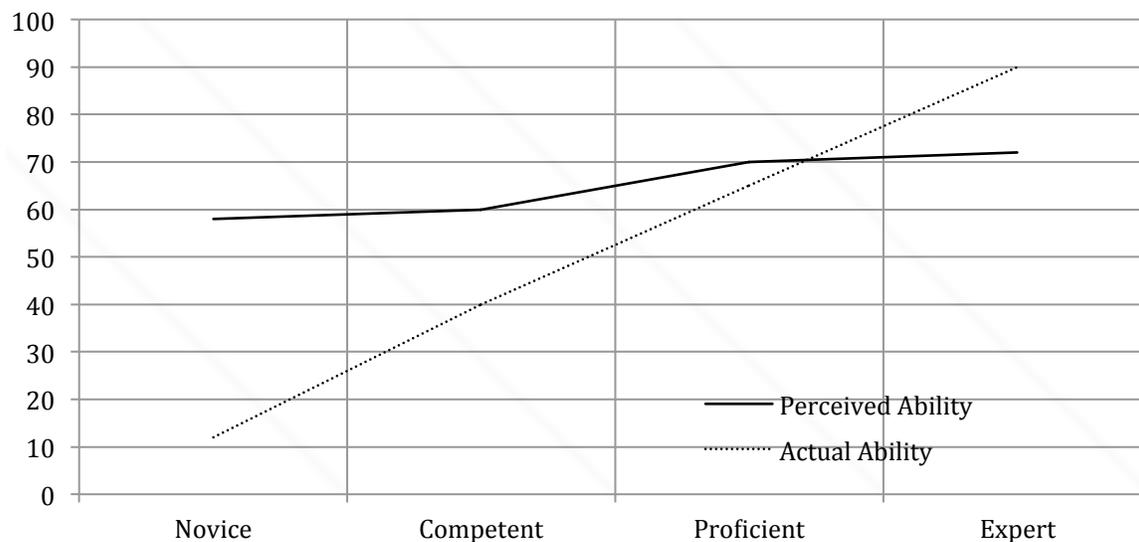


Figure 2.37. Perceived ability as a function of actual performance

Source: Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 776, 1121–1134.

The literature on developing self-awareness to increase competence for non-expert performers is comprehensive but the research on expert performers is not as complete. Former great athletes are examples of those with unconscious knowledge but as coaches they may struggle to communicate what they previously performed unconsciously. Coaches value the importance of utilizing their implicit and tacit knowledge (Nash & Collins, 2006).

Intuition

Most expert coaches face complex situations that are not easy to solve with logical analysis. Intuitive mental process is often a more suitable qualitative approach to problem solving (Bastick, 1982). Scholars have attempted to define intuition and as a result have contributed to the literature on cognitive behavior (Bastick, 1982; Bowers, Regehr, Balthazard & Parker, 1990; Dane & Pratt, 2007; Dreyfus & Dreyfus, 1986; Jung, 1933; Salas, Rosen & Diaz, 2010; Shirley & Langan-Fox, 1996; Simon, 1987).

Intuition is the process that involves the acquisition of complex implicit knowledge (Bergson, 1913; Croce, 1922; Jung, 1926; Polanyi, 1958; Reber, 1989; Westcott, 1968). Hodgkinson, Langan-Fox, and Sadler-Smith (2008) argued that intuition may be the result of implicit knowledge acquisition. The expert performer will typically relinquish a level of quantitative reasoning in decision-making to engage in the more qualitative analysis of intuition

in problem solving (Chi, Feltovich & Glaser, 1981; Jankowski et al., 2008). Intuition can be categorized into either an external experienced-based phenomenon or by an internal physical sensory affect (Boucouvalas, 1997; Shirley & Langan-Fox, 1996). Simon (1987) suggested that a balance of quantitative cognitive analysis and intuitive insights form the complementary elements of effective decision-making. Quantitative analysis decision making based on mental reasoning and a focus on detail and intuition is making a qualitative decision on a feeling and adoption of a global perspective (Allinson & Hayes, 1996; Ornstein, 1977).

Koestler (1964) characterized intuition as the sudden emergence of a new unconscious insight. Hodgkinson et al. (2008) distinguished intuition from insight as intuition is accompanied by a somatic awareness which influences decision choices but the subject may be not consciously aware of the source. In contrast, insight is typically a more lengthy process involving a logical and conscious connection between question and answer (Dane & Pratt, 2007; Hogarth, 2001; Lieberman, 2000; Shirley & Langan-Fox, 1996; Sternberg & Davidson, 1995).

Much of the research on the concept of self, self-awareness, self-reflection and self-insight is not covered in the sport coaching literature (Grant et al., 2002). This gap in the literature is to be addressed by looking at self-reflection through long-term retrospective reflection on-action and the development of intrapersonal skills as a predictor of coaching effectiveness from Côté et al. (2009).

This literature review describes the multidimensional facets of defining and conceptualizing sports coaching. A historical context on the professionalization of coaching has provided an evolution of this complex and ambiguous interaction between the coach, athlete and the sporting and non-sporting environments in the hope of developing a better understanding of sports coaching. The performance and effectiveness literature set the stage for examining coaching effectiveness and expertise and a more specific exploration into past performance and self-reflection as potential predictors of coaching success with an attempts to create a clearer picture of ways to better maximize performance better for sports coaches. This study makes a contribution towards changing the paradigm on sports coaching in a way that will move this profession forward.

Chapter 3

METHOD

The purpose of this study was to explore the hypothesis that coaching success (win/loss record) is predicted by high levels of self-reflection and success from past performances (athletic history and past coaching experiences) and to determine what specific activities contribute to the elite coach development (Gilbert et al., 2009). These questions were the basis for this study:

- To what extent does the developmental profile of coaches relate to coaching success (win-loss record)?
- To what extent are self-reflective activities positively correlated to coaching success?
- To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic experience and three measures of self-reflection?

Two instruments were used, a published quantitative instrument to measure the extent of a coach's level of self-reflection and an adapted qualitative instrument to measure past performance in order to predict coaching effectiveness. The *Coach Development Profile Interview* developed by Gilbert et al. (2006) is a long-term retrospective recall tool to evaluate different aspects of coaching effectiveness and coaching development profile such as the level of success a coach had from their past athletic experiences and past coaching performances. The second instrument is the *Self Reflection Insight Scale* (SRIS) developed by Grant et al. (2002) to measure self-reflection (engagement in self-reflection, engagement in self-insight and need for self-reflection), and to evaluate these independent variables as predictors of coach effectiveness.

Hypotheses

Coaching effectiveness is a function of developing a better understanding of a coach's behavior depending on their level of experience and expertise in the context of their coaching knowledge, which involves professional knowledge, interpersonal interactions and intrapersonal actions. Evaluating the extent of self-reflection and past performance are predictors of coaching effectiveness is based on the Côté and Gilbert (2009) integrative definition of coaching effectiveness and expertise. These indicators aim to provide levels of experience of coaching, levels of success relating to win loss record, and levels of self-reflection.

Coaching effectiveness and coaching experience relate to work by Wernimont and Campbell (1968) stating that past performance is the best predictor of future performance.

Hypothesis 1: Years of experience as an athlete will be positively correlated with proportion of wins as a coach.

The more experience a coach has as an athlete, the higher the level of coaching effectiveness.

Hypothesis 2: Level of reflection will be positively correlated with proportion of wins as a coach.

High levels of self-reflection positively relates to high levels of coaching success. This may also give more information about the type of self-reflection that coaches are engaging in (need for further self-reflection or engages in self-insight). It is assumed that the higher the levels of self-reflection, the higher the levels of coaching effectiveness.

Hypothesis 3: The proportion of variability in coaching success, as measured by proportion of wins, is predictable by athletic experience and three measures of self-reflection.

This hypothesis looked at the variables collected with each of the instruments. The focus is to determine whether a coach who has high levels of experience and has high levels of self-reflection the extent to which these attributes contribute to being a more successful coach, as it relates to win-loss ratio.

Participants

In order to create a clearer picture of some predictors of coaching success of U.S. rowing coaches, a targeted approach seemed most effective. A list of all the past international U.S. coaches is held in the U.S. Rowing records and permission was granted to use this list to contact these coaches via email to invite them to be part of this study. The 2012 U.S. Rowing coaching roster contains around 2,000 U.S. Rowing coaches who range between ages 20 and 60. Based on the last 20 years of U.S. national teams, dating back to 1990, with U23, Junior, World Championship, Pan American and Olympic teams, it is estimated that there are about 300 coaches on this list.

Invitation of participants was open and non-exclusive. They were all invited to participate in this research. Around 30% of them coach at the college level, 30% high school, less than 2% are national team coaches, and the remainder is club coaches. This group also includes coaches

with varying years of experience and with or without international coaching experience. Aspiring coaches are the most difficult to identify from this group. High school and collegiate coaches (i.e., those who haven't coached at the Olympics, to include other groups of U.S. rowing coaches) are included to add depth to the data collection process. Some of these coaches have no interest in coaching at elite level. Another group included are those high performance coaches who are not coaching at the international level but who had very successful backgrounds as athletes and are coaching at the high school and collegiate levels.

Measures

The first measure used was an adaptation of the *Coach Developmental Profile Interview* (Gilbert et al., 2006), originally created to measure development profile of coaches by looking at their coaching and athletic background. The second measure used was the *Self Reflection and Insight Scale* (Grant et al., 2002) that, not surprisingly, is a measure of self-reflection and self-insight. Along with these two measures, a set of demographic questions was asked to gain more insight into the participant's background.

Coach Developmental Profile Interview

The Coach Developmental Profile has been used since 2006 as a structured interview process designed by Gilbert et al. (2006) to systematically assess significant athletic and coaching activities coaches participate in at different stages of their coach development. The face-to-face interview provides a longitudinal and detailed account of a participant's performance as an athlete and as a coach (Erickson, Côté, et al., 2007). This instrument has been used in the following studies (Côté et al., 2005; Erickson, Côté, et al., 2007; Gilbert et al., 2006; Young et al., 2009). While this data collection process has been conducted as a face-to-face interview in past studies the intent in this study was to reformat the interview questions into an online survey as described below.

The original interview protocol allowed the coaches to recall facts relating to activities they engaged in throughout their development. The interview gathered quantitative information that could be verified using external sources, specific to each developmental activity (Côté et al., 2005). The interview design assumed individuals would recall past episodic experiences, more accurate and reliable than answers to general questions (Ericsson et al., 1993). The goal of the interview was to collect longitudinal data on performance, types of activities and time spent at

those activities that a coach engages in through his or her development (Côté et al., 2005). The development profile of expert performers is different according to their domain (Ericsson et al., 1993), and as a result, it is difficult to capture relevant information in a standardized questionnaire. Therefore, this protocol allows for adjustments to be made in the background and development, and yet collect information in a standardized manner (Côté et al., 2005).

The 60-item, Coaching Developmental Profile Interview, includes a demographic section of 7 items, an athlete profile of 4 items, athlete background of 8 items, coaching profile of 28 items, and a coaching background sub-scale of 13 items (see Appendix F for an overview of the items and, where applicable, their reliabilities). Coaches are asked about their education background and level of coaching accreditation in the demographic section. Then coaches are asked to list all of the sports they have participated in, including starting year, finishing year and total time spent involved with the sport as an athlete. The coaches are asked about their athlete background to give a comprehensive account of their athlete experience including level of participation, assigned leadership responsibility, frequency of competitions and training. Coaches are asked to determine the number of hours/week and the number of months per year training and competed. This information is used to calculate how many hours per year an athlete competed and trained. This section provided detail that builds the development profile of the athlete, as it includes age and level of performance gained to help identify objective performance criteria for various levels of expertise (Côté et al., 2005).

A profile is recorded of the coach's background and time spent coaching each sport. Then the coach is asked to account for the total number of athletes coached, the number of finalists coached, and the number of championships won at each level of competition. The levels of competition range from club level, regional, state, national, professional, international and Olympic. Finally the coach is asked to detail the role of the coaching staff and number of coaches on the staff, age and gender of athletes coached, time spent coaching, frequency of competition through the year, times spent through the year with administration and amount of formal coach education and contact with a mentor made through each year. The interview protocol shows evidence of how performance changes over time, and that differences in performance can be predicted. Data show a comparison of different activities that the performer engages in as he or she transitions from stage to stage (such as time it takes to transition from regional to state competition) and one also sees how, at each stage, different performers perform

compared to each other (time spent training at national team level) (Côté et al., 2005). This can help build a more comprehensive understanding of the characteristics of coaching activities as they develop into expert performers.

Validity of Retrospectively and Concurrently Collected Data

Retrospectively recalled information cannot simply be assumed to be valid (Côté et al., 2005). Longer retention intervals lead to lower accuracy of recall (Bahrick, Hall, Goggin, Bahrick & Berger, 1994; Rubin & Wenzel, 1996). Information about a coach's individual performance can almost always be verified in public records (Côté et al., 2005). For example, almost all national rowing websites (like Rowing Canada and U.S. Rowing) provide a record of athlete performances and coaching history that validates information obtained about performers (Sedgwick, Ericsson, Beamer & Côté, 1999). If records are not found in the public domain, other coaches and athletes can help to validate information at various stages of their career and investigators can compare the recalled information to assess convergent validity (Baker, Yardley & Côté, 2003; Soberlak & Côté, 2003). No evidence of this validation process was evident in these two previous studies and a thorough validation of the data would be interesting to carry but it is not the intent here as this is an anonymous questionnaire.

Test and Retest Reliability for Past Experience

For the test and re-test reliability using the Coach Development Profile Interview, there are a number of relevant studies. Helsen et al. (1998) assessed retrospective estimates of weekly duration of individual and team practice activities to a sample of 10 soccer players administering the same Coaching Developmental Profile Interview questionnaire, six months apart and found the test-retest reliability was uniformly high and reached statistical significance in spite of the small sample. High reliabilities for estimated amounts of cumulative and current training (average $r = 0.84$) and when they re-tested a sub-sample of 18 rhythmic gymnasts within 10 weeks of the original administration of the questionnaires (Hume, Hopkins, Robinson, Robinson & Hollings, 1994). Ropponen, Levälähti, Simonen, Videman, and Battié (2001) found that lifetime exercise history of 150 middle-aged adults showed that the mean hours of exercise per week had the highest reliability (intra-class correlation coefficients around 0.8) of all the information elicited at the re-test several years later. Another large sample study ($n = 115$) reported for lifetime exercise activity correlations in the 0.7 range for test-retest reliability (Friedenreich, Courneya & Bryant, 1998). After conducting a comprehensive re-test reliability

analysis using the Coach Developmental Profile Interview (See Appendix F). Young et al. (2009) found a significant in-class correlation on years of coaching ($r=0.99$) and hours interacting with athletes in training and competition ($r=0.74$). The intra-class correlations were significant with a $p < .05$ as follows: total years of coaching ($r=.99$), total years as primary coach ($r=.98$), total hours of coaching in each sport year ($r=.74$), number of mentors ($r = .62$), number of assisting coaches served under oneself ($r=.79$), number of university or college coaching courses ($r=.73$), number of coaching workshops and clinics ($r=.77$), number of former athletes who went on to coach ($r=.86$) and number of state championships attended in a coaching capacity ($r=.73$) (Young et al., 2009).

Adapted Coach Developmental Profile Questionnaire.

For the purpose of this research, the original open-ended interview protocol has been adapted to an online questionnaire. This online instrument presents the questions in a closed format using a Likert scale for responses. The online format is a more convenient and effective method of sharing the instrument with a large number of potential respondents and will allow for more participants to complete the instrument. The online instrument aimed to not only increase access, but also provide more quantitative data on a coach's developmental profile. Coaches were asked one open-ended question at the end of the instrument to encourage participants to reflect on effective strategies for coaching development. A pilot study was conducted, 23 coaches responded to the pilot. Minor changes were made for the final version that related to formatting to simplify the content on each page for respondents. Table 3.1 summarizes the developmental profile and demographic sections included in the questionnaire. The actual questionnaire that respondents received and completed is found in Appendix H.

Table 3.1

Summary of Coach Development Profile Questionnaire Items (25 items)

A. Rowing athletic experiences

- Rowing athletic experience in years (metric)
- Rowing athletic experience by level
- Rowing athletic experience by highest level of competition

B. Other non-rowing athletic experiences

- Any Non-rowing athletic experience?
- List of sports with non-rowing athlete experience – open ended question
- Non-Rowing athletic experience in years (metric)
- Non-Rowing athletic experience by level
- Non-Rowing athletic experience by highest level of competition

C. Non-rowing coaching experiences

- Any non-rowing coaching experience?
- List of sports coached
- Non-Rowing coaching experiences in years
- Non-Rowing coaching experiences by level
- Non-Rowing coaching highest level of competition coached
- Roles filled as in non-rowing coaching experiences

D. Rowing Coaching experiences

- Rowing coaching experiences in years
- Rowing coaching experiences by level
- Rowing coaching highest level of competition coached
- Roles filled as a rowing coach
- Years of rowing coaching experience in the U.S.

F. Rowing Coaching Success

- Total number of crews coached against at the highest level
- Overall ranking against those crews raced at the highest level

G. Coaching development Practices

- List coaching development strategies (open ended)

H. Demographics

- Year of birth
- Gender
- Highest level of education completed

The Self-Reflection and Insight Scale (SRIS)

The SRIS helps researchers measure and understand more about the processes of self-reflection and insight in the context of development. Insight is related to the motive or need for reflection, but the process of reflection does not lead to insight. The process of recalling past

experience for present and future learning is an important and integral aspect of self-reflection and insight. Effective strategies are needed to develop insight as one reflects on their development (Roberts & Stark, 2008). Evidence of the use of this instrument has been mainly found in the medical and business coaching literature.

The Self-Reflection and Insight Scale (SRIS) is based on theories of meta-cognition and self-regulation and aims to measure the readiness of individuals for purposeful behavior change (Roberts & Stark, 2008). Grant et al. (2002) defined self-reflection as the inspection and evaluation of one's thoughts, feelings and behaviors (Grant et al., 2002). They created a 20-item, self-reporting scale comprised of three subscales: (a) engagement in self-reflection (six items), (b) need of self-reflection (six items), and (c) an insight-scale (eight items). These items are rated on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree). Self-reflection items include: "It is important to me to try to understand what my feelings mean," and "I frequently take time to reflect on my thoughts." Insight items include: "I usually know why I feel the way I do," and "My behavior often puzzles me" (Grant et al., 2002). A copy of the original Self-Reflection Insight Scale is found in Appendix G.

Reliability. The total score, which measures overall self-reflection and self-insight, has a reported Cronbach alpha of 0.81 and a test-retest reliability of 0.78 (Grant et al., 2002). Each subscale had internal reliability (> 0.8). A strong relationship between the need for reflection and those who kept diary entries ($r=0.77$) was found. Insight was weakly related to the need for reflection (0.22) but not to the process of engaging reflection (0.06). Insight was related to the motive or need for reflection, but the process of reflection did not lead to insight—indicating that strategies to develop insight are needed (Roberts & Stark, 2008).

Validity. According to Roberts and Stark (2008), the factorial validity showed all items loading significantly on the expected factors with a good fit to the data. A weak significant correlation ($r = 0.22$) between age and insight was found (Roberts & Stark, 2008). A statistically significant relationship was found for male students ($p=.002$). The male students appeared to have more insight than females but no difference in engagement in, or need for, reflection was found. A statistically significant difference in insight was found ($p = .007$) for those who had undertaken a previous degree. A very weak relationships between SRIS sub-scales and preferred learning methods for professionalism was found between the need for positive role modeling with need for reflection ($r = 0.23$) and engagement in reflection ($r = 0.23$).

Content validity for the SRIS had been established by using three content experts to construct a pool of items designed to assess each of the domains. A typical item is: 'I am very interested in examining what I think about.' In order to discourage respondents from making automatic Yes responses, several of the items were reversed in the questionnaire. The scale was initially validated on two separate occasions amongst groups of psychology students at an Australian university. Their responses ($n = 268$, $n = 121$) had been analyzed using exploratory factor analysis (EFA) (principal components extraction with a varimax rotation) to reduce the number of variables from 30 into a simpler structure so that the final scale consisted of the 20 items used in this study (Roberts & Stark, 2008).

Factor loadings for items Q2, Q5, Q7, Q15 and Q18 loaded strongly on the latent variable 'engagement in reflection.' Factor covariance ($r = 0.77$) indicated a strong relationship between need for reflection and engagement in reflection. Insight is related to need for reflection ($r = 0.22$) but not to the process of engagement in reflection ($r = 0.06$). Grant found a weak relationship ($r = 0.3$) between insight and the self-reflection factors (Roberts & Stark, 2008).

The utility of structural equation modeling (SEM) goes beyond EFA to support hypotheses in the context of metacognition and learning (Hoban, Lawson, Mazmanian, Best & Seibel, 2005; Joreskog, 1993). The model was re-specified several times by allowing the effect of each student background variable (e.g. gender) and indicator variable (e.g. role modeling) on the latent variables to be explored, while controlling for the other background and indicator variables. Unobserved residual errors were associated with the latent variables. Paths that did not display significant influences were deleted in order to achieve the most parsimonious model that was also theoretically meaningful. The second-order factor self-reflection and the first-order factor insight best explaining responses to the SRIS. Statistically significant relationships that could be confirmed whilst remaining within the goodness-of-fit parameters included an association between age and insight ($r = 0.21$) and a relationship between self-reflection and the need of students for role modeling in developing professional behaviors ($r = 0.27$) (Roberts & Stark, 2008).

Twelve items (representing both engagement in self-reflection and the need of self-reflection) loaded on one factor, labeled 'Self-reflection,' and eight items loaded on a second factor, labeled 'Insight.' Cronbach's α for internal consistency ranged from 0.71 to 0.91 for Self-reflection and from 0.82 to 0.87 for Insight (Roberts & Stark, 2008). The final pathway shows a

second-order factor Self-reflection and the first-order factor Insight best explaining responses to the SRIS.

The SRIS does not capture those aspects of self-regulation concerned with problem-solving or solution-focused self-reflection in which the individual constructively reflects on how best to reach his or her goals. Such a subscale would need further scale development of intrinsic motivation (Roberts & Stark, 2008). Although there is some evidence of the construct validity of the SRIS, it was not assessed. Roberts and Stark (2008) encouraged further research to identify correlations with observed professional behaviors in order to find out the implications for those with low levels of insight. Table 3.2 presents a summary of the SRIS sub-scales, number of items, reliability values, predictors and criterion (Roberts & Stark, 2008).

Table 3.2

SRIS-Subscales, number of items, reliability values

Subscale	Items	Reliability values	Items
Engagement in self-reflection	6	0.83	<ul style="list-style-type: none"> • I don't often think about my thoughts • I rarely spend time in self-reflection • I frequently examine my feelings • I don't really think about why I behave I do • I frequently take time to reflect on my thoughts • I often think about the way I feel about things
Engagement in self-insight	8	0.87	<ul style="list-style-type: none"> • I am usually aware of my thoughts • I'm often confused about the way I really feel about things • I usually have a clear idea about why I've behaved in a certain way • I'm often aware that I have a feeling, but I often don't know what • My behavior often puzzles me • Thinking about my thoughts makes me more confused • Often I find it difficult to make sense of the way I feel about things • I usually know why I feel the way I do
Need of self-reflection	6	0.85	<ul style="list-style-type: none"> • I am not interested in analyzing my behavior • It is important to me to evaluate the things I do • I am very interested in examining the things I think about • It is important to me to try to understand what my feelings mean • I have definite need to understand the way my mind works • It is important to me to be able to understand how my thoughts arise

Source: Roberts & Starkes, 2008.

Demographic questions. Three demographic items are listed: age, gender and education level. The changes from the original instrument are organizational changes and have been move to more appropriate parts of the adapted version. Items about number of years coached and

current level of coaching have been moved to the sections on coaching experiences. The item regarding sports-related college credits was broken down into specifics about coaching education activities in the section on ways to develop your coaching practices.

Data Collection

The adapted questionnaire (see Appendix H) invited participants from the most current U.S. Rowing coaching roster of all high school, collegiate, club and national team coaches via email. A 10% response rate is a realistic level of participation from this group of around 2,000 coaches (Deringer, 2008). To encourage additional participation, web postings on (usrowing.org and www.row2k.com) invited additional participation from coaches who are not on the U.S. Rowing rosters. An email to all clubs contacts and word of mouth was used as well to inform potential participants about this study.

On Tuesday, March 6, 2012 the online questionnaire was posted for participants to complete. This was a period that maximized the number of responses. A deadline of Friday, March 23, 2012 was included in the cover letter. For many, the winter is an indoor training period while the fall and the spring spend most of the time coaching on the water. For college and high school coaches, the summer is when most coaches have fewer coaching responsibilities and focus on administration, writing reports, engaging in informal learning projects and other coach development activities, vacations and recruiting trips. These activities may also impact communicating with coaches to participate in this research.

The adapted Gilbert et al. (2006) Coach Developmental Profile Interview and (Grant et al., 2002) Self-Reflection and Insight Scale was posted to the online website, Survey Monkey. Participants were requested to answer questions in a methodical and standardized manner. Participants were asked to provide biographical and demographic information as well as their formal levels of education and coaching certification. Then participants were encouraged to respond to the 20 items the Self-Reflection and Insight Scale from Grant et al. (2002). Then to identify sport-related activities engaged in as an athlete including years of experience, level of competition and involvement in leadership roles. Participants were requested to reflect on their years of experience and the positions held in their coaching careers. This included their role as a coach, level of athletes coached, level of highest competition, and coaching record. Participants were also asked to record a description of strategies that have helped their coaching development.

Data Analysis

Descriptive statistics were used to summarize the demographics of the coaches, coaching and athletic profiles including years of experience, levels of self-reflection and coaching win-loss record. Regression analysis was conducted to determine predictors of coaching success. The independent variable, coaching success, measured by dividing number of races won by total number of races raced giving a score between 0 and 1. A successful coach is one that has better than a 0.500 coaching record.

The dependent variables in the regression analysis are past experiences measured by years of coaching experience, years of athletic experience, and levels of self-reflection measured by (a) engagement in self-reflection, (b) need of self-reflection, and (c) engagement in self-insight. The three measures of self-reflection were evaluated separately using the average score from the Self-Reflection and Insight Scale that range from 1 to 5. This is the range of actual responses for engagement in self-reflection, need of self-reflection and engagement in self-insight. Experience levels were measured in years for both coaching and athletic background. The demographics variables (year of birth, highest level of completed and gender) provide a more complete summary and understanding of the coaching population that participated in the questionnaire.

Using a 2 way ANOVA, coaches were classified into four groups (See Table 3.3) based on the dichotomization of two variables: a) their coaching record (win/loss record less than 0.500 versus 0.500 or higher), and b) their length of athletic experience (less than 10 years versus 10 or more years). These categories better understand the relationship with their development profile, that is, activities that are helpful in the development of their coaching practices.

Table 3.3

Classification of Respondents into Four Groups Based on Coaching Record and Athletic Experience

Category	Win/loss coaching record	Years of athletic experience
1	less than 0.500	less than 10 years
2	less than 0.500	10 or more years
3	0.500 or higher	less than 10 years
4	0.500 or higher	10 or more years

Research Question One—To what extent does the developmental profile of coaches relate to coaching success (win-loss record)?

Multiple regression was conducted to report the extent to which athletic and coaching experiences in rowing and other sports, other than rowing help predict coaching success.

Research Question Two—To what extent are self-reflective activities positively correlated to coaching success?

Conducting the multiple regression analysis using coaching success as the dependent variable and the three subscales for self-reflection as measured from a scale of 1-5 for dependent variables: a) engagement in self-reflection, b) need of self-reflection and c) engagement in self-insight.

Research Question Three—To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic success and three measures of self-reflection?

The more experience the individual has as an athlete and coach with greater levels of self-reflection the stronger the relationship with coaching success. Total years of experience as a coach and athlete as a measure in years and the three self-reflection variables as measured by engagement in self-reflection, need of self-reflection and engagement in self-insight were the dependent variables in the regression analysis to report on the extent of the relationship with of coaching success.

Limitations

The following outlines the limitations identified in this study. The self-reporting nature of the two instruments is one limitation of this study. Inaccuracies in one's self-perception are well documented in the literature (Dunning et al., 2004; Sedikides & Strube, 1997; Sedikides, C. &

Strube, 1997; Vazire & Mehl, 2008). Testing for validity is important for the retrospective data for experiences from the past and for the self-reporting of one's own skill level.

Determining an accurate measure of coaching success has also received significant contention in the literature. Coaching success has been measured by athlete achievement (win-loss record) (Côté, Salmela, Trudel, et al., 1995; Horn, 2002; LeUnes & Nation, 1989; Woodman, 1993), athlete experience (Becker, 2009; Johnson, 1998), athlete satisfaction (Horn, 2002), expertise in years of experience (Côté, Salmela, Trudel, et al., 1995; Erickson, Côté, et al., 2007; Ericsson et al., 1993; Ericsson, Prietula, et al., 2007), performance at the highest level of coaching (Côté, Salmela, Trudel, et al., 1995), recognition of expertise by their peers (Côté, Salmela, Trudel, et al., 1995), recognition of coach's past athletic performances and experience (Saury & Durand, 1998) and group achievement (Chelladurai & Quek, 1995). Attempts were made to simplify this in the context of the rowing coaching population. Ranking was considered as a possible measure of coaching success, but has its limitations and has received no coverage in the literature.

Conclusion

This chapter covered the participants, measures, data collection, data analysis and limitations to exploring the extent to which a coach's experiences and self-reflective practices are effective predictors of coaching success. The hypothesis is that a more experienced and highly reflective coach is a more successful coach as measured by winning record.

Chapter 4

RESULTS

The purpose of this study was to determine to what extent self-reflection and past experience are predictors of coaching effectiveness of rowing coaches in the United States. This research was an attempt to potentially improve pathways for coaching development by developing a better understanding of intrapersonal knowledge as a key facet of coaching effectiveness. The goals of this study were attained through the use of a survey design with two instruments: an adapted instrument to measure past performance in order to predict coaching effectiveness and a published instrument to measure the extent of a coach's level of self-reflection. The Coach Development Profile Interview developed by Gilbert et al. (2006) is a long-term retrospective recall tool to evaluate different aspects of coaching effectiveness and coaching development profile such as the level of success a coach had from their past athletic experiences and past coaching performances. The second instrument is the Self Reflection Insight Scale (SRIS) developed by Grant et al. (2002) to measure self-reflection (engagement in self-reflection, engagement in self-insight and need for self-reflection). The goal was to evaluate the SRIS (three reflection measures) as a predictor of coach effectiveness measured by win/loss record.

Participant Profile

A total of 153 rowing coaches responded to an email request to participate in this study. As shown in Figure 4.1, the age distribution of respondents is positively skewed. Table 4.1 shows respondents had a mean age of 39 years, were predominantly male (69%), were a highly educated group (over 80% had a bachelor's degree or higher qualification as seen in Figure 4.2).

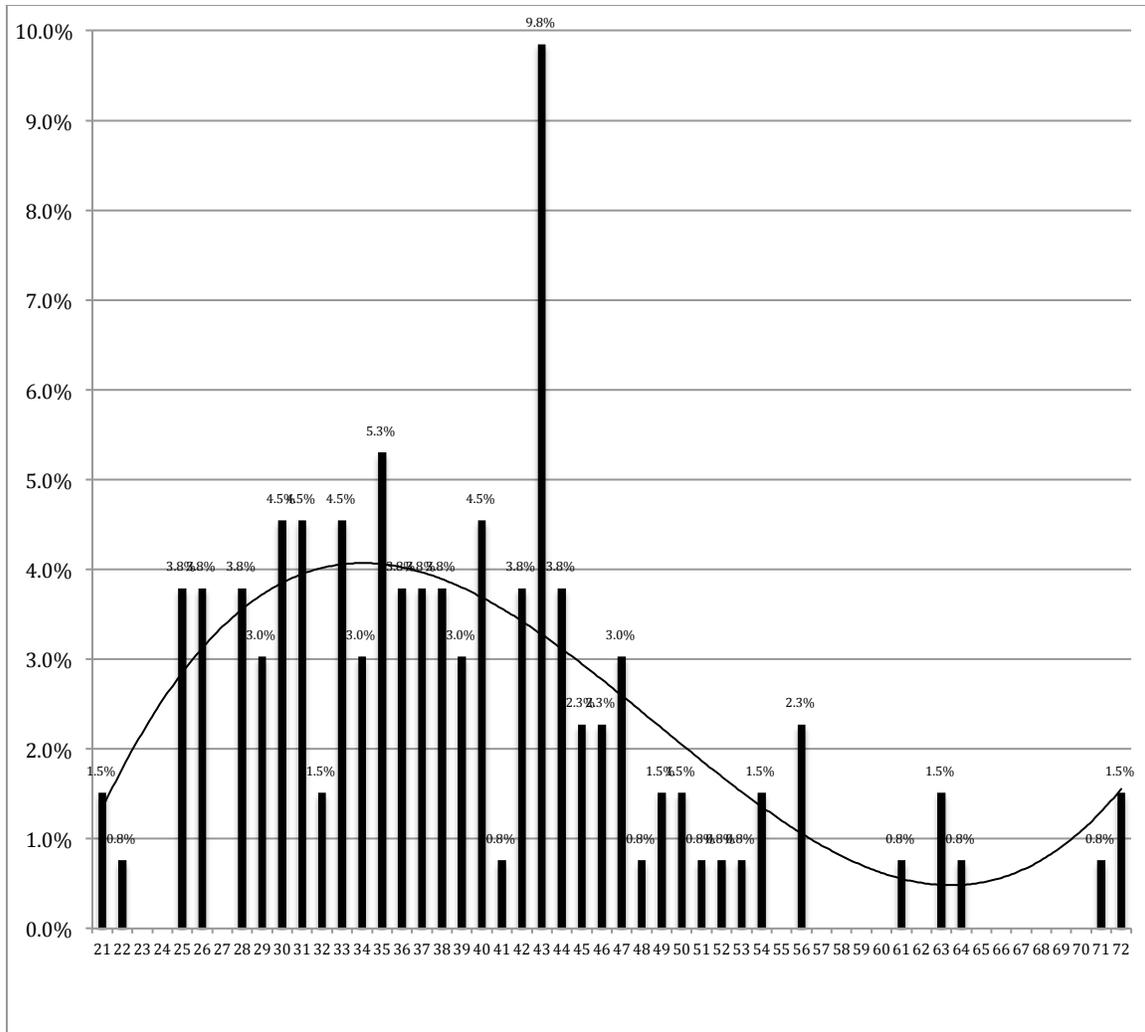


Figure 4.1. Age distribution

Table 4.1

Demographic Profile of Participants

	N	Mean	sd
Age	131	39.1	10.4
		N	%
Highest level of education	High school	2	1.30%
	Bachelor's	62	40.50%
	Master's	56	36.60%
	Doctorate	9	5.90%
	Professional	4	2.60%
	Other	20	13.10%
Gender	Male	106	69.10%
	Female	47	30.90%

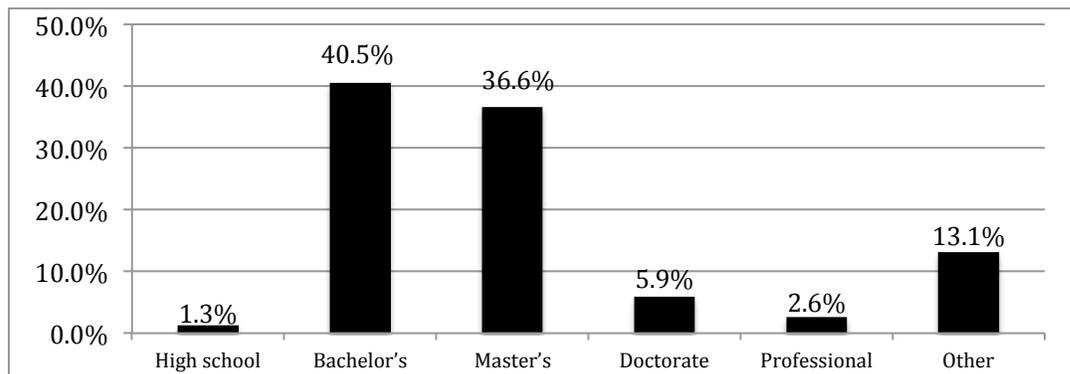


Figure 4.2. Highest level of education

Type of Athletic Experience

Table 4.2 shows respondents had a mean of 13 years of athletic experience in both rowing and in other sports.

Table 4.2

Athletic Experience in Rowing and Other Sports

	Mean	SD	Std Err Mean	Upper	Lower	N
Rowing experience	12.6	7.7	0.7	13.9	11.3	141
Other sport experience	12.5	8.4	0.7	14	11	126

As shown in Table 4.3, almost three-quarters of the coaches had their highest level of rowing training at either the elite level (42%) or the college level (30%). In contrast, the majority of them had their highest level of training in other sports at only the high school level (59%), followed by 19% at the club level. For a visual comparison of the two distributions, see Figures 4.3 and 4.4.

Table 4.3

Highest Level of Training and Competition as an Athlete

	Rowing Experience		Other Sport Experience	
	N	%	N	%
<i>Highest level of training</i>				
· High school	6	4.1%	90	58.6%
· College	46	29.9%	17	10.9%
· Elite	65	42.2%	4	2.3%
· Masters	7	4.8%	8	5.5%
· Club	17	10.9%	29	18.8%
· Professional	0	0.0%	1	0.8%
· Other	12	8.2%	5	3.1%
<i>Highest level of competition</i>				
· Recreational	5	3.4%	13	8.6%
· Regional	8	5.5%	57	37.5%
· State	5	3.4%	54	35.2%
· National	52	34.2%	17	10.9%
· International	34	21.9%	6	3.9%
· World championships	27	17.8%	2	1.6%
· Olympic Games	17	11.0%	0	0.0%
· Other	4	2.7%	4	2.3%

Within this group of coaches, they also differed dramatically to each other in terms of their highest level of competition (see Table 4.3). For rowing, over half of these coaches had international experiences as athletes (11% at the Olympics, 18% at the World Championships and 22% at other international events). In contrast, over 70% competed at either the state or regional level, as their highest competition in other sports, with only around 5% competed internationally, and none at the Olympic level. See Figures 4.5 and 4.6 for the visual comparison.

This indicates that these respondents, as athletes, have trained and competed at a much higher level in the sports of rowing. This may be explained in two ways. This may be explained due to the time intensive nature of a sport like rowing. The second is presented in the expertise

literature which indicates that it is very rare to reach the highest level in more than one domain (Ericsson et al., 1993).

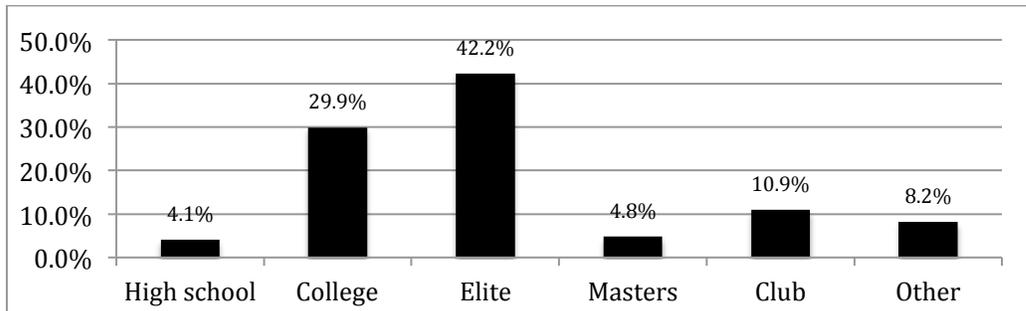


Figure 4.3. Highest level of training as a rower

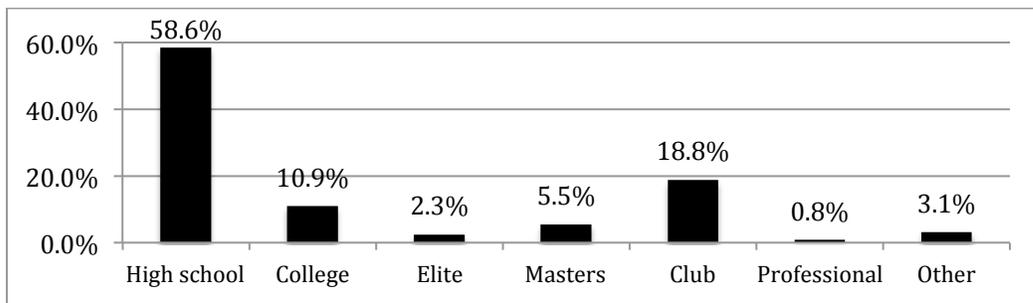


Figure 4.4. Highest level of training as an athlete in other sports

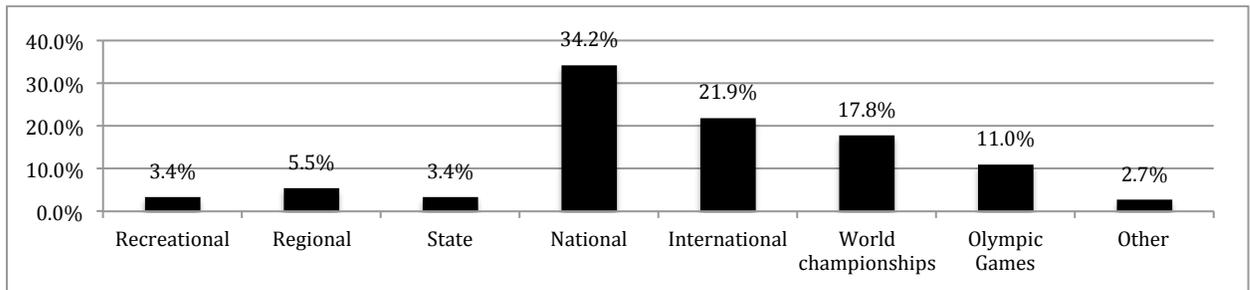


Figure 4.5. Highest level of competition as a rower

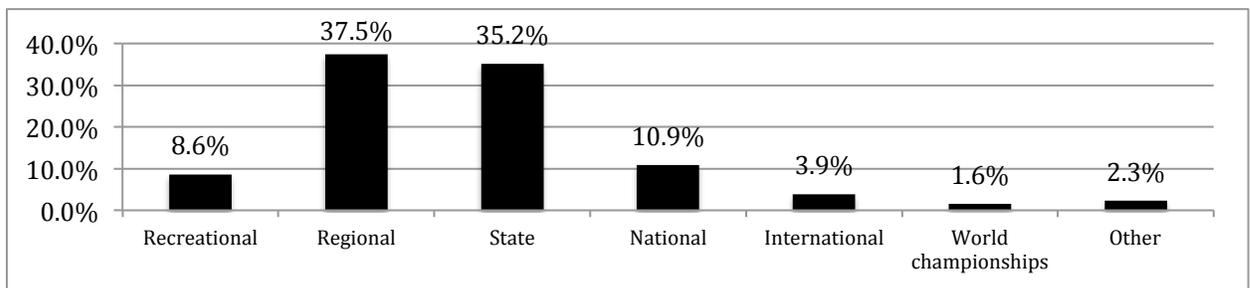


Figure 4.6. Highest level of competition as an athlete in other sports

With respect to other sports played, Table 4.4 shows that it is most likely that these respondents participated in team or individual sports rather than combat sports or water sports except for swimming. Of these coaches, 33% played soccer, almost 30% competed in track and field, and around one quarter of these respondents played basketball (26.8%), baseball (24.8%) or competed in swimming (20.9%).

Table 4.4

Sports Played Other than Rowing

Team Sports		Individual Sports		Water Sports		Combat Sports	
Soccer	33.3%	Track and Field	28.8%	Swimming	20.9%	Wrestling	5.9%
Basketball	26.8%	Cross Country	18.3%	Diving	2.0%	Aikido	0.7%
Baseball	24.8%	Running	14.4%	Surf Rowing	2.0%	Judo	0.7%
American Football	17.6%	Cycling	11.1%	Water polo	1.3%		
Volleyball	9.2%	Triathlon	9.8%	Surfing	0.7%		
Softball	7.2%	Golf	6.5%	Kayak	0.7%		
Field Hockey	5.2%	Tennis	6.5%				
Ice Hockey	3.3%	Skiing	5.9%				
Rugby	3.3%	Bowling	1.3%				
Lacrosse	2.6%	Cricket	1.3%				
Dance	2.0%	Sailing	1.3%				
Aussie Rules	0.7%	Badminton	0.7%				
Rugby League	0.7%	Climbing	0.7%				
		Frisbee	0.7%				
		Gymnastics	0.7%				
		Figure Skating	0.7%				
		Kickboxing	0.7%				
		Roller Derby	0.7%				
		Squash	0.7%				
		Weightlifting	0.7%				

Table 4.5 shows that 17% of coaches have participated only in the sport of rowing; the majority of respondents having participated in rowing plus one, two, three or four additional sports (64%), and 19% participated in five or more sports.

Table 4.5

<i>Number of Sports Participated Including Rowing</i>	
Participated only in rowing	17.0%
Participated in one additional sport	12.4%
Participated in two additional sport	19.0%
Participated in three additional sport	20.3%
Participated in four additional sport	12.4%
Participated in five or more sports	19.0%

Rowing Coaching Success

Defining coaching success had a number of different perspectives in the literature and is also heavily debated among coaches. The most common definition is by win/loss (Côté, Salmela, Trudel, et al., 1995; Horn, 2002; LeUnes & Nation, 1989; Woodman, 1993), other perspectives include athlete experience (Becker, 2009; Johnson, 1998), athlete satisfaction (Horn, 2002), expertise in years of experience (Côté, Salmela, Trudel, et al., 1995; Erickson, Côté, et al., 2007; Ericsson et al., 1993; Ericsson, Prietula, et al., 2007), performance at the highest level of coaching (Côté, Salmela, Trudel, et al., 1995), recognition of expertise by their peers (Côté, Salmela, Trudel, et al., 1995), recognition of coach's past athletic performances and experience (Saury & Durand, 1998) and group achievement (Chelladurai & Quek, 1995). For the purpose of this study, and somewhat counter-intuitively, coaching success is a measure of ranking against other crews. This is more of an accurate measure of coaching success in the sport of rowing than winning percentage (races won over races raced in during a season/career). The winning percentage does not accurately reflect the strength of competition raced. For example, a crew may have very light competition during the regular season due to their conference/division, and then at the national championship perform at the back of the field as they have not competed against the toughest competition from other regions during the regular season. This study records the best performance of a coach's crew at the highest level of competition coached rather than the over number of races "won" over the course of a coach's career.

For this study, coaching success was measured by dividing number of races won by total number of races raced at the highest level of competition, giving a score between 0 and 1. A successful coach is one that has better than a 0.50 coaching record. So if a coach's highest finish was 8th place out of 16 crews, this would be calculated as 0.50 win/loss coaching record. This group of rowing coaches who responded to this questionnaire had an average win loss record of 0.79 with a standard deviation of 0.22, indicating that the respondents were a fairly successful group of coaches.

Rowing Coaching Experiences

Based on the 139 respondents, the average rowing experience was 13 years (sd=8.7). This was a group of very experienced coaches who have also held leadership positions (66% as head coach and 75% as assistant coach). Of these respondents, 39% of coaches have coached sports other than rowing with a mean of 5.4 years of experience as shown in Table 4.6. The rest had spent time as volunteer coaches (42.5%). Over 80% of these rowing coaches have coached at the collegiate and elite level, with the remainder having coached at the high school, club, professional and master's levels as represented in Table 4.7. At the highest level of coaching competition, 46% of these coaches have coached rowing internationally, at either the Olympics (11%), world championships (20%) and other international races (15%), and at the national level (44%). The remainder have coached at the regional and at the state levels. Figures 4.7 and 4.8 show level of training and competition for rowing coaches.

Table 4.6

Coaching Experience in Rowing and Other Sports

	Mean	SD	Std Err	Mean	Upper	Lower	N
Rowing coaching	12.7	8.7	0.7		14.1	11.3	139
Other sport coaching	5.4	3.5	0.5		6.3	4.4	52
Coaching win/loss record	0.79	0.22	0.01		0.82	0.75	137

Table 4.7

Highest Level of Coaching and Competition in Rowing and Other Sports

	Coach Experience in Rowing		Coaching Experience in Other Sports	
	N	%	N	%
<i>Highest level of coaching</i>				
· High school	12	7.8%	60	38.9%
· College	64	41.6%	23	14.8%
· Elite	63	40.9%	3	1.9%
· Masters	2	1.4%	3	1.9%
· Club	9	5.6%	62	40.7%
· Professional	4	2.8%	3	1.9%
· Other	0	0.0%	0	0.0%
<i>Highest level of competition coached</i>				
· Recreational	3	2.1%	54	35.2%
· Regional	10	6.3%	51	33.3%
· State	3	2.1%	17	11.1%
· National	67	43.7%	28	18.5%
· International	26	16.9%	0	0.0%
· World championships	28	18.3%	0	0.0%
· Olympics	16	10.6%	0	0.0%
· Other	0	0.0%	3	1.9%

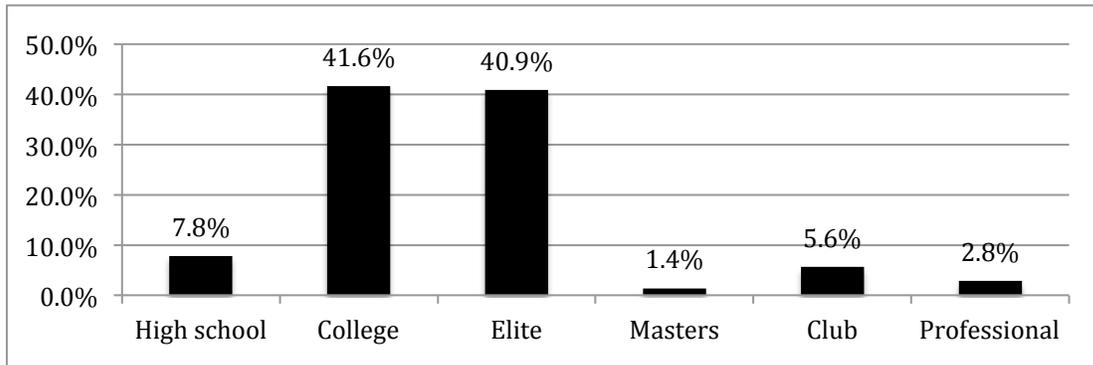


Figure 4.7. Highest level of training as a rowing coach

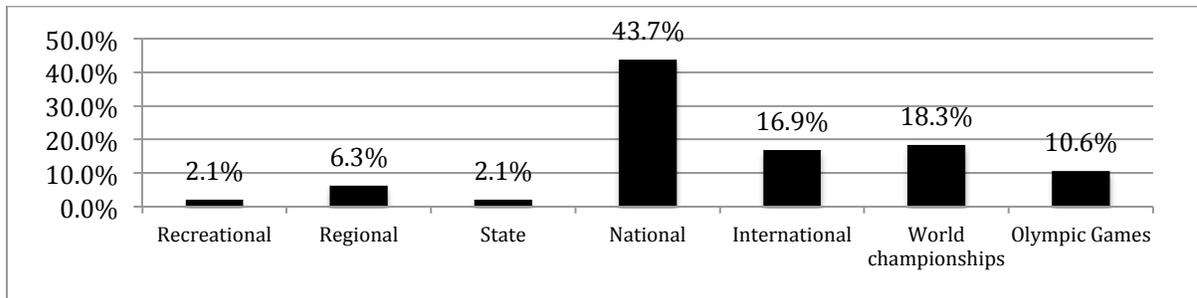


Figure 4.8. Highest level of competition as a rowing coach

Coaching Experience in Other Sports

Of those who have coached sports other than rowing, the majority have coached at the club level (41%) or at the high school level (39%), as indicated in Table 4.7. Just below 70% of coaches who have coached sports other than rowing have coached at the recreational and regional levels and the remainder at the state and national levels (see Table 4.7). Figures 4.9 and 4.10 show levels of training and competition for coaches of sports other than rowing.

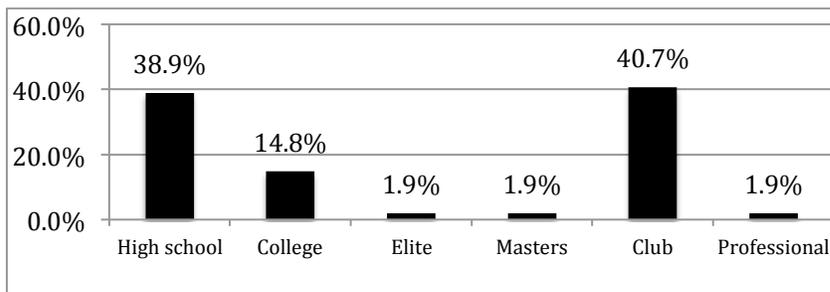


Figure 4.9. Highest level of training as a coach of sports other than rowing

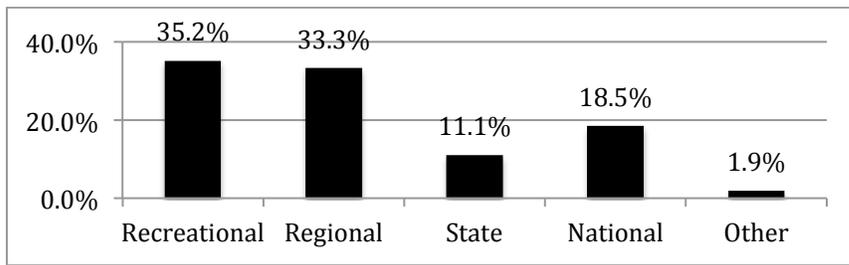


Figure 4.10. Highest level of competition as a coach of sports other than rowing

In their roles as coaches in sports other than rowing, the majority of the respondents held leadership positions (32% as head coach and 54% as assistant coach). The rest (46%) were volunteer coaches.

When categorized by sport type, over half of this group participated in team sports (52%), and around one quarter in individual sports (27%). Other categories include other water sports (such as Kayak and Sailing) and combat sports (Aikido and Wrestling). Table 4.8 shows the two most popular sports coached were soccer and basketball, which were coached by 15% and 14% of the respondents, respectively. Coaching swimming came in third (12%) and other sports were each coached by less than 5% of the respondents.

Table 4.8

Sports Coached Other Than Rowing—By Category

Team Sports	52.3%	Individual Sports	26.7%	Water Sports	17.4%	Combat Sports	3.5%
Soccer	15.1%	Weightlifting	7.0%	Swimming	11.6%	Wrestling	2.3%
Basketball	14.0%	Track and Field	5.8%	Kayaking	2.3%	Aikido	1.2%
Baseball	4.7%	Golf	2.3%	Sailing	2.3%		
Ice Hockey	4.7%	Skiing	2.3%	Surf Sports	1.2%		
Volleyball	4.7%	Triathlon	2.3%				
Football	3.5%	Cycling	2.3%				
Rugby	3.5%	Bowling	1.2%				
Lacrosse	1.2%	Shooting	1.2%				
Softball	1.2%	Squash	1.2%				
		Tennis	1.2%				

Self Reflection and Insight of Rowing Coaches

Grant et al. (2002) created a 20-item, self-reporting scale comprised of three subscales: (a) engagement in self-reflection (six items), (b) need of self-reflection (six items), and (c) engagement in self-insight (eight items). These items are rated on a five-point Likert scale ranging from one (strongly disagree) to five (strongly agree). Of the 153 respondents, the average value was highest for the sub-scale for the need for self-reflection (3.3), with similar averages for the sub-scale for engagement in self-insight (2.5) and self-reflection (2.6). Based on these averages, this group of coaches indicate that they had only a moderate need for self-reflection and even less engagement in either self-reflection or self-insight. Table 4.9 presents descriptive statistics on the subscales from the self-reflection and insight scale.

Table 4.9

Summary of Self-Reflection and Insight Subscale^a (N=153)

Subscale	Mean	SD	Std Err Mean	Upper	Lower	N
Engagement in self-reflection (6 items)	2.6	0.8	0.06	2.7	2.5	153
Need for self-reflection (6 items)	3.3	1.0	0.08	3.5	2.6	153
Engagement in self-insight (8 items)	2.5	0.7	0.06	3.2	2.4	153

^a Subscales from Grant, Franklin, and Langford (2002) instrument on self-reflection and insight of rowing coaches. Responses range from 1 = strongly disagree to 5 = strongly agree.

Relational Variables to Coaching Success

The correlation matrix in Table 4.10 shows some of the key variables in this study. Years of rowing athletic experience showed a weak positive relationship with coaching success ($r=0.17$) and a moderate one with rowing coaching experience ($r = 0.49$). Coaching success was not related to any of the self-reflective variables: need for self-reflection ($r=0.11$), engagement in self-reflection ($r=0.16$), and engagement in self-insight (0.01).

The correlation matrix also indicates that the need for self-reflection and engagement in self-reflection had a very strong relationship to each other ($r=0.88$, $p<0.0001$). However, neither one had any relationship with engagement in self-insight.

Contrary to expectation, none of the three self-reflection/insight scores were related to the win/loss record. Athletic and coaching experience in sports other than rowing were not related to rowing coaching win/loss record. Only rowing experience was related to rowing coaching win/loss record, with both rowing coaching and rowing athletic experience being weakly related to rowing win/loss record ($r = .30$ and $.17$, respectively).

Table 4.10

Correlation Matrix

	1	2	3	4	5	6	7	8
Win/Loss record	1.00							
Rowing Experience ^a	0.17*	1.00						
Other athletic Experience ^a	-0.13	-0.07	1.00					
Rowing Coaching Experience ^a	0.30*	0.49**	-0.01	1.00				
Other coaching Experience ^a	-0.14	0.17	0.31*	-0.10	1.00			
Engagement in Self Reflection	0.16	0.13	0.12	0.05	0.14	(0.83)		
Need for Self Reflection	0.11	0.17	0.10	0.04	0.30*	0.88*	(0.87)	
Engagement in Self Insight	0.01	-0.13	0.04	0.03	0.29	0.01	-0.01	(0.85)

^a Experience measured in terms of years. * $p < 0.05$, ** $p < 0.0001$

Reliability values for the sub scales are in the diagonal (Roberts & Starkes, 2008)

Relating Research Questions to Results

The above correlation results were used to answer the three research questions.

Research Question 1—To what extent does the developmental profile of coaches relate to coaching success (win-loss record)?

Only two of the four developmental profile variables were correlated with the win/loss ratio: rowing athletic experience and rowing coaching experience. And, therefore, only these were used as predictors of success in a multiple regression. Both variables dealt with experience in rowing, either as an athlete or as a coach. It is not surprising that neither athletic nor coaching experience in other sports was related to rowing coaching success.

As shown in Table 4.11, together rowing and rowing coaching experience variables explained 9% of the variability in coaching success. However, only rowing coaching experience attained a statistically significant beta-weight in the equation.

Table 4.11

Prediction of Coaching Success Using Rowing and Rowing Coaching Experiences

	R	R²	R²adj	F	p
Regression	0.3	0.09	0.08	6.50	0.002
Variables	B	SE	T	p	
Rowing Athletic Experience	0.01	0.00	0.14	0.880	
Rowing Coaching Experience	0.29	0.00	3.07	0.003	

Legend: R—Multiple correlation coefficient; R²—Determination coefficient; R²a—Corrected determination coefficient; F—F-ratio; p—Probability; B—Beta; SE—Standard error of estimate; t—t-test; P—Predictor.

Rowing coaching experience, as a single predictor, explained 9% of the variance in the win/loss record (based on squaring the r in the correlation matrix). Rowing athletic experience explains less than 3% of the variance in win/loss (.17x.17). Meanwhile, the two predictors shared 24% of their variance in common (i.e., they are more related to each other than either one is to the criterion—not a good thing for useful predictive models). When both variables are used together, they explain 9% of the variance in win/loss, all of which is due to coaching rowing experience and the addition of rowing experience having no additional predictive power.

The beta-weight represents the relationship between a predictor and the criterion, controlling for the other predictor (i.e., holding the other predictor constant). So, the correlation between rowing coaching experience and win/loss, controlling for rowing athletic experience = .29 (almost exactly what the zero-order r was, i.e., .30). However, the relationship between rowing athletic experience and win/loss record drops from .17 to a non-statistically significant .01 when controlling for rowing coaching experience.

To further explore the relationship between the coaches' background and their win/loss record, one-way analysis of variance (ANOVA) was used to compare the records across different rowing athletic levels and experience levels. Table 4.12 shows coaches who, as athletes rowed at the high school, club or master levels had higher win/loss records than those coaches who competed at a higher level, as reflected in ($F = 2.2, p = .01$).

Table 4.12

Comparison of Win/Loss Record for Different Rowing Athletic Levels

	Mean	Std Err		N	
		Mean	Lower		Upper
College	0.75	0.03	0.69	0.81	49
Elite	0.79	0.03	0.74	0.85	64
Other	0.86	0.05	0.78	0.96	24

Table 4.13 shows a comparison of win/loss records from the one-way analysis of variance with rowing coaching experience and win/loss record. College coaches had higher win/loss records than those at the elite level ($F=0.54$, $p=0.59$). Those coaches included in the

Table 4.13

Comparison of Win/Loss Record Rowing Coaching Levels

other category included high school, masters, club, and professional levels.

	Mean	Std Err		N	
		Mean	Lower		Upper
College	0.81	0.03	0.75	0.87	53
Elite	0.77	0.03	0.70	0.83	53
Other	0.79	0.04	0.71	0.87	31

Table 4.14 contains a cross tabulation of a dichotomized win/loss record (above 500 or 500 and below) by a dichotomized level of experience (more than 10 years or 10 years or less). There was a statistically significant relationship between the two variables ($\chi^2 = 17.9$, $p = 0.0001$). This was a very successful group of rowing coaches, with over 80% having a win/loss record above 500. However, almost all (94%) of the 71 coaches with more than 10 years of experience had a better than 500 record, but only slightly more than two-thirds (69%) of those with less than 10 years of experience did so.

Table 4.14

Cross Tabulation of Win/Loss Record by Experience

Experience	Win/loss record			N (%)
	Above 500	500 and below		
>10 years	n 67	4	71 (46.1%)	
	%>10 yrs 94.4%	5.6%		
≤10 years	n 57	26	83 (53.9%)	
	%≤10 yrs 68.7%	31.3%		
	N 124	30	154	
	80.5%	19.5%		

Research Question 2 – To what extent are self-reflective activities positively correlated to coaching success?

The three self-reflection/insight scores are not related to the win/loss record. This indicates that a null hypothesis for this research question could not be rejected. Self-reflective practices do not positively correlate to coaching success.

Research Question 3—To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic developmental profile and three measures of self-reflection?

This question was predicated on statistically significant and positive results for the first two research questions. Unfortunately, only two of the four developmental profile variables and none of the self-reflection measures were correlated with the proportion of wins. As was seen in the earlier discussion for research question one, 9% of the variance in win/loss ratio was essentially explained by only one variable, the number of years of coaching experience.

Qualitative Results: Comments about coaching development practices

Only 55 coaches in this study responded to an open-ended question about their coaching development (36% of respondents). Of those coaches, 75% mentioned mentoring as the most effective way to develop (see Table 4.15). Irwin et al. (2004) found that 91% of coaches identified mentoring as very important in the development of elite coaching knowledge. These findings are also supported by Erickson et al. (2008) and Currie and Oates-Wilding (2012).

Table 4.15

Distribution of Comments about Coach Development Practices (N = 55) and Comparison to Other Relevant Studies

	%	Erickson et al. (2008)	Irwin (2004)	Currie & Oates (2012)
Mentoring	74.5%	Learning from doing	58.4% Mentor	91% Passion, commitment and persistence
Learning from experience	47.3%	Interacting with others	42.7% Trial and error	64% Need to contribute
Knowledge from books, journals, articles and videos	32.7%	Formal education	32.7% Past Experience	45% Access to mentors
Self-Reflection	23.6%	Mentor	29.3% Coaching course	36% Past experience as an athlete
Gaining athlete feedback	23.6%	Observe others	17.3% Squad Sessions	27% Knowledge of sport focus on needs of athlete
Attending conferences and conventions	12.7%	Printed/ electronic materials	17.3% Coaching Manuals	9%
Improving communication	10.9%	Other clinics	17.3% Videos and Observations	9%
Planning	10.9%		Foreign Coaches and Travel	9%
Journaling	5.5%			

**Currie & Oates (2012) only provided comments on themes discussed without any data to follow*

In addition, twelve respondents commented on how it was difficult to respond to a number of the items on the Self-Reflection and Insight Scale due to the complex and multifaceted nature of sports coaching. All twelve respondents referred to how confusing some of the SRIS questions were, how they seemed repetitive, and how they were unsure of what was being asked of them. Learning by doing is a strategy that coaches use in their coaching development. This is extensively covered in the literature and is not a finding that profoundly advances what we already know.

Chapter 5

DISCUSSION, RECOMMENDATIONS & CONCLUSIONS

The purpose of this study was to examine the relationship between coaching experience, athletic experience and levels of self-reflection and self-insight as potential predictors of coaching success. Like many professions, sports coaches face challenges that are complex and multi-faceted. By definition sports coaching is a profession that focuses on facilitating learning to maximize athletic performance within the context of complex interpersonal relationships with athlete, other coaches and other key stakeholders. The coach's role is influenced by the coach's knowledge, the abilities of athletes they are working with and the sports coaching context (stakeholders, support systems, access to financial and non-financial resources). This conceptualization is a balance between participation-for-all on one end of extreme, to winning-at-all-costs on the other.

This pursuit of maximizing performance through better learning systems is a focus that is not exclusive to the sports coaching arena. The hypothesis explored is that a highly reflective coach with a successful athletic and coaching history helps predict coaching success.

The uniqueness of this study is the focus on the context of coaching success. The recent increase in attention in the literature on sport coaching effectiveness and expertise, particularly noted by Côté and Gilbert (2009) has been due to the expansion in the level of professionalization in sport. The literature lacks attention on effective strategies other than rowing experience and mentoring that facilitate coaching development and coaching success. This is critical in the light of an increasingly competitive sporting environment that has a primary focus on performance as the critical tool of evaluation of a coach's effectiveness.

Review of the Literature

The focus on this review of the literature attempts to achieve two goals. First, I attempt to present a broad and comprehensive foundation to create better understanding of sports coaching development. Second, I highlight the need for more research to be conducted to further advance the professionalization of sports coaching. Under the theme of understanding better coaching practices, I reviewed the literature with three key topics in mind: defining sports coaching, the conceptualization of sports coaching and the key historical events that have shaped sports coaching.

The second major theme was to look at the research relating to maximizing performance in the context of sports coaching. This included research on performance, expertise, sports coaching education. This also included self-awareness literature, and a range of topics from self-reflection and self-insight through to the importance of intuition and analysis in effective decision-making.

The literature on sports coaching identified the following categories: defining sports coaching, the conceptualization of sports coaching, and understanding the history and evolution of sports coaching as a profession. Sports coaching is defined as a complex interaction of multifaceted components that focuses on facilitating learning to improve performance. Sports coaching is conceptualized on a continuum that ranges from a complete focus on participation (which has little to no emphasis on competition) to a win-at-all-cost focus on competition.

The evolution of the sports coaching profession dates back to ancient times with much of the literature centering on the Ancient Greeks. The multi-faceted role of the coach has been defined to incorporate the qualities of a teacher and mentor, a doctor and psychologist, a manager and entrepreneur. Between the post-ancient and pre-modern period, the role of the coach was primarily focused on the preparation of those engaged in military pursuits. It was not until the 19th century when the term coach began to gain popularity. Sports coaching became more formalized as sporting groups started to give more structure and direction to organized sport. The professionalization of sports coaching was profoundly shaped by the revival of the Olympic movement in the late 19th and early 20th centuries (Da Costa, 2006; Davenport, 1996).

Understanding the limits of human performance is another key area of the literature that has been extensively examined here. Effective performance evaluation strategies date back to 1792 although little was written about William Farish and its origins (Anon, 1837; Hogan, 2010; Hoskins, 1968). This is relevant when we consider the process of evaluating the quantitative and qualitative aspects of coaching success. Mendel (1865) and Galton (1869) provide a context in this discussion of the role of the coach in developing, fostering and managing an athlete's capacity in relation to the balance between nature and nurture in pursuit of sporting success.

The work of Galton (1869) and Mendel (1865) formed the building blocks for the expertise literature of Ericsson et al. (1993). Across the sports domain, the expertise literature is heavily focused on the athlete's perspective. Sports coaching expertise is not nearly as closely examined. Côté et al. (2009) provided some important structure to the coaching effectiveness

literature by highlighting three key inputs: athlete outcomes, coaching context and coaching knowledge.

Research Questions

The following research questions were created to develop a better understanding of the development profiles of successful coaches, the level of self-reflective practices that they engage in, and the extent coaching and athlete experiences in addition to their self-reflective practices help in predicting coaching success. This study was an attempt to answer these three research questions:

1. To what extent does the developmental profile of rowing coaches relate to coaching success (win-loss record)?
2. To what extent are self-reflective activities positively correlated to coaching success?
3. To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic success and three measures of self-reflection?

Discussion of Research Findings

The respondents in this study are a relatively well-educated group of coaches, who average 39 years of age and have 13 years of experience as athletes in the sport of rowing and also as rowing coaches. The respondents indicated that they have a moderate need to self-reflect. This group of coaches were relatively successful in terms of their rowing coaching record, years of experience coaching rowing and level of coaching competitively as many have coached at the international level, and for some this includes at the Olympic Games. The result of exploring the answers to the research questions led to some interesting results. The result of exploring the answers to the research questions led to some interesting results.

Question 1-To what extent does the developmental profile of rowing coaches relate to coaching success (win-loss record)?

Experience as a coach and athlete in rowing was positively correlated with coaching win-loss record. Based on the findings on this research, rowing coaching experience and to a lesser extent rowing athletic experience both contribute to predicting coaching success. Rowing coaching experience only explains nine percent of the variance in the win/loss record of coaches. Athletic experience and coaching of sports other than rowing do not appear to have any positive correlation with rowing coaching success.

From the literature, these findings support Gilbert et al., (2006) in the context that experience is a predictor of coaching success. The studies that have used a version of the coaching development profile interview have not focused on a sport specific audience such as U.S. Rowing coaches like in this study. Côté, Baker & Abernethy (2007) highlight the literature on retrospective studies in sport development and focus their attention on the distinction between deliberate practice and play in expertise development for athletes. Côté, Ericsson & Law (2005) used an early version of retrospective interview profile to distinguish between elite athlete development and less talented athletes. Erickson, Côté, et al. (2007) recommended that formal coaching education programs is an important pathway to elite coaching development for Canadian university coaches. Erickson, Wilson, Horton, Young & Côté (2007) found that athletic experience was a statistically significant predictor of coaching development for immigrant coaches in Canada and made some recommendations for immigrant coaches to help them understand the coaching context. Koh, Mallett & Wang (2011) interviewed Singaporean high-performance coaches and highlighted the need for mentoring and more national sports organization structures to assist with formal coaching education programs. Wall & Côté, (2007) met with parents to recommend that youth sport dropout is prevented when coach's focus on play and participation rather than fitness development. Young et al. (2009) identified a development profile of Canadian track coaches based on coaches who:

- Number of years of experience as a track coach,
- Exhibited engagement in activities such as formal coaching education,
- Spent time developing a professional relationship with their athletes, and
- Engaged in mentoring other coaches.

As a comparison of the 81 coaches that responded to revised questionnaire adapted by Young et al. (2009), the mean for years of coaching experience was 13.5 years, compared to 12.7 for years of experience from the rowing coaches who participated in this study. This could be attributed to the likelihood that coaching track has less formal logistic and hiring obstacles to that of coaching rowing in the U.S. Rowing is a more team oriented sport compared to track where coaches normally work one-on-one with individual athletes. This would allow them to coach for longer.

Question 2-To what extent are self-reflective activities positively correlated to coaching success?

Reflective practices are not positively correlated with rowing coaching success. Levels of self-reflection as a coach are not positively correlated to coaching win-loss record, and did not have a statistically significant relationship.

The SRIS has been used in a number of studies (Butler, 2009; Chan, 2010; Chow et al., 2011; Haga, Kraft & Corby, 2009; Grant, 2003; Harrington & Lofferedo, 2010; Jankowski, Vanderwerker, Murphy, Montonye & Ross, 2008; Klug, 2011; Lowe, Rappolt, Jaglal & MacDonald, 2007; Leung et al., 2011; Lyke, 2009; Moen & Shaalvik, 2011; Pijnenborg, Van der Gaag, Bockting, Van der Meer & Aleman, 2011; Richards, 2010; Sauter, Heyne, Blote, Van Widenfelt & Westenber, 2010; Silvia, 2011a; Silvia, 2011b ; Spence & Grant, 2005; Xu, 2011; Yu, Collins, Cavanagh, White & Fairbrother, 2008). This study is unique because no other studies have looked at self-reflection and self-insight as a predictor of successful performance in the sporting domain, let alone the context of sports coaching.

The Self-Reflection and Insight Scale has provided some relevant findings outside of the sports context. Butler (2009) explored the relationship between fear and authoritarianism in the context of social psychology and personality and found that self-reflection and insight did not alter that relationship. Xu (2011) suggested a significant connection between self-reflection and insight with proficiency in language learning but recommended that further research is required into how processes such as self-reflection may impede long-term learning.

Chow et al. (2011) identified the negative relationship between self-reflective practices and personal distress levels in social workers. For the 37 first-year social workers at the University of Hong Kong participating in training course on reflective practice, Leung et al. (2011) found a statistically significant relationship between self-insight and the training program. No significant relationship between the need for and engagement in self-reflection, Leung et al. (2011) claimed that this may have been due to the course being held during the summer months.

Yu et al. (2008) found that coach to improve health care professionals on-the-job performance resulted in a significant relationship with self-insight, but not with self-reflection. Yu et al. (2008) agreed with Grant and Spence (2005) who found that self-reflection did not have a statistically significant relationship with coaching. Jankowski et al. (2011) examined the results of 144 health care professional participating in a pastoral care education program. They

found no significant relationship between self-reflection and pastor-care skills of health care professionals. Yu et al. (2008) and Jankowski et al. (2011) both recommended that further research is required to understand this relationship in more detail. Jankowski et al. (2011) found a positive relationship with emotional intelligence and self-reflective practices, albeit a moderate one ($r=0.57$). Lowe et al. (2007) described, in their qualitative study, an association between levels of self-reflection and translating learning into practice, for 41 health professionals participating in continuing education programs.

Haga et al. (2009) confirmed that higher levels of self-reflection practices were positively correlated to higher levels of life-satisfaction after conducting a cross-cultural study of 448 college students in Australia, Norway and the United States. Lyke (2011) disagreed with Haga et al. (2009) when they identified that self-reflection did not have a statistically significant relationship with life satisfaction. Lyke (2011) agreed with Harrington et al. (2010) who both found that SRIS sub-scale of self-insight was a significant predictor of life-satisfaction. Lyke (2011) concluded that in order to reach a level of happiness and life satisfaction a high level of self-insight needs to be attained.

Moen et al. (2011) revealed a strong relationship between self-reflection and successful achievement of 124 business executives from a leading Norwegian Fortune 500 company. Chan (2010) found no statistically significant link between self-efficacy and reflective practices of military leaders but uncovered a moderate statistical significant positive relationship with reflective triggers.

Silvia (2011a) and Pijnenborg et al. (2011) identified the relationship between self-reflection and well-being. Sauter et al. (2010) adapted the SRIS for a youth audience, but for the purpose of this study recommended a test for reliability and validity of the instrument for its predictive capacity. Silvia (2011a) found a significant predictive result for self-evaluation. Klug (2011) explored predictors of teacher's ability to assess student's learning needs and found that self-reflective practices were not predictors but teaching knowledge and self-concept were statistically significant predictors. Teachers may not engage in reflective practices (that leads to action) but engage in ruminations (that leads to no action) and recommends exploring other self-reflection measures may lead to different conclusions.

Question 3-To what extent is the proportion of variability in coaching success, as measured by proportion of wins, predictable by athletic success and three measures of self-reflection?

Statistical analysis of survey results identified no useful predictive capacity to improve understanding of what helps produce coaching success.

Implications for Practice

Suggestions for Coaching Development

Based on the variables studied, rowing coaching experience showed the strongest relationship to success as measured by win/loss record. Experience is necessary but is not a sufficient condition for expertise (Maetozo, 1971; Siedentop & Eldar, 1989). Experience is more than a passage of time or longevity. Experience is the refinement of the preconceived notions garnered from rich and meaningful practical learning situations (Gadamer, 1960; Wernimont & Campbell, 1968). Lynch and Mallett (2006) stated “some coaches experience ten years of accumulated experience through self-reflection and analysis, whilst others may experience the same first year ten times, without any development” (p. 20).

Mentoring and working through experimentation were the most important variables to developing coaching knowledge per the Irwin et al. (2004) study. Mentoring can facilitate coaching development (Irwin et al., 2004), but mentoring is not providing the mentee an opportunity to mimic the behaviors of the mentor (Erickson et al., 2008). Effective mentoring is a process that requires time and is often most powerful when it is unstructured and can be time- and location-specific. The desired outcome for the mentee is an experience that facilitates high order learning through interaction, reflection, and critical inquiry. Mentoring can provide the mentee the opportunity to develop their skills and learn to become a more effective problem solver.

There is no substitute for years of experience as an athlete and as a coach. However, there is no guarantee that development of the coach will occur in this context. When development exists, these athletic and coaching experiences help to develop a greater understanding of the athletes needs. Coaching development builds a greater understanding of the knowledge that is required by a coach to produce the learning that facilitates performance at the highest level.

As highlighted throughout this study, defining sports coaching success and accurately assessing and evaluating sport coaching performance are critically debated topics. This

discussion needs to continue in order to build a more complete case for the quantitative and qualitative elements that define successful sports coaching.

Recommendations for Future Research

This study pointed to several additional areas of potential future research that could bring more clarity to the highly complex and multi-faceted domain of coaching success.

- **CROSS CULTURAL**—This research could be replicated for rowing coaches around the world to determine the difference in developmental profiles of rowing coaches in other countries. This would provide a more comprehensive picture of a cross-cultural analysis where coach education systems are more streamlined and systematic.
- **CROSS-DISCIPLINE**—An examination of coaches in other sports (outside of rowing) could expand the current level of understanding of how coaches develop in the United States and around the world.
- **CROSS-CONSTRUCT**—Exploring other measures of self-awareness and introspection such as problems-solving measures, intuition and analytical skills and presence may shed more light on the question of introspection as a variable that influences coaching success. Additionally, an extension of the research by Grant et al. (2012) on a Solution-Focused Inventory may also provide some additional insights into coaching development.
- **ADDITIONAL MEASURES**—Developing a more comprehensive measurement tool for coach effectiveness would allow researchers to develop a better understanding of the relationship with the three main variables of the integrative definition of coaching effectiveness and expertise (Côté & Gilbert, 2009). This would highlight the magnitude and significance of the relationship each of these variables have with coaching expertise and effectiveness. Conducting further analysis such as path analysis or additional multiple regression would extend our current understanding and the extent of the relationship of the antecedents of sports coaching effectiveness and expertise. This could be conducted with the development of additional measure for coaching context and athlete outcomes.
- **RE-DEFINING SPORTS COACHING SUCCESS**—Arguably the most debated topic in this study is the definition of a successful coach. Further attention is needed to develop a more comprehensive measure of coaching success. A potential starting point may begin with objective career success (salary, promotions and experience) and subjective career success (on-the-job learning, job and career satisfaction and beliefs about future employability), and make the necessary adaptations to the sports coaching context based on work like (Park, 2010). This may exist in other domains, but extends beyond the scope of this study.
- **QUALITATIVE DATA**—Developing a greater understanding on a qualitative level of some of these variable would help garner a more comprehensive picture of how a coach develops, this would include strategies relating to problem solving skills such as understanding the mentoring relationship.

- **EXPERIENCE**—The experience variable in this study was a measure in years. Further examination of experience could be developed in terms of coaching at different levels, perceptions of other coaches and reputation.

Conclusion

This study explored the factors that help to predict coaching success in attempt to advance our understanding of coaching development in an increasingly competitive sporting environment. I looked at a coaches' sporting experience and their self-reflective practices as possible predictors of coaching success. This study showed that rowing coaching experience and rowing athletic experience are weak predictors of coaching success. While self-reflective activities are not predictors of coaching success, self-reflection is an activity that coaches engage in.

Other studies have indicated that these are strategies that do foster a coach's development. It is difficult to use self-reflective activities as predictors of coaching success due to the difficult in measuring coaching success. A coach's success is more than just the calculation of their win-loss record, as has been covered at some length in the literature. However, it is agreed that coaches engage in self-reflective practices.

Dating back to Webster (1938), it has been argued extensively that defining coaching success is a difficult concept on which to gain agreement. The coaching domain is a multifaceted and complex one that relies heavily on many different human interactions. Sports coaching success, in the context of rowing coaching, was defined as a ratio of ranking against other crews raced during the best season that coach has experienced at the highest level of coaching.

Unlike many domains, the conceptualization of sporting coaching can be simply measured by a final result of winning and losing. However, coaching is arguably much more than just a function of the final result (Huizinga, 1938, 1955). Côté and Gilbert (2009) stated that coaching effectiveness is a result of managing athlete outcomes, coaching context and coaching knowledge.

This study provides a greater understanding of how a coaching develops. Specifically, the focus here has been on introspection that is considered as an area of coaching knowledge by Côté and Gilbert (2009). Coaching knowledge is a function of knowing your craft (sport specific knowledge), mastering the art and science of managing others and the process of introspection and reflection (Côté & Gilbert, 2009). Acquiring coaching knowledge occurs through experience and process of learning the elements of sport-specific knowledge relating to sports coaching.

In addition, coaches commented on their interpersonal relationships with specific reference to the influence of mentoring, confirming other studies such as Irwin et al. (2004). Coaches also commented that they engage in strategies to improve their intrapersonal knowledge by facilitating learning by doing through activities like self-reflection. This study has also identified that successful coaches engage strategies to expand their professional knowledge by searching for solutions to their coaching challenges in the literature (books, journals, articles and other resources).

In summary, sports coaching development is facilitated by engaging in deliberate practice. Deliberate practice is a known pathway to developing expertise (Ericsson et al., 1993). These conclusions advance the literature by highlighting steps towards the further professionalization of sports coaching by assisting sports coaches with strategies to foster their development.

APPENDIX A—Glossary of Terms

This glossary is an attempt to guide the reader to ensure consistency in the understanding of these terms. Most of these terms are commonly understood by rowing coaches.

Coach—The capacity to transform or transport a person from one place to another.

Coaching context—A coach's understanding of the unique setting that impacts an athlete's performance

Coaching Effectiveness—The measure of a coaches capacity to balance athlete outcomes, coaching context and coaching knowledge.

Commercialization—In sport, commercialization has been a function of increased financial resources allocated to sport leading to creating a wider viewing audience.

Deliberate practice—This is described as a solitary practice to control the structure, detail and duration of learning to improve performance and is the key to developing expertise in any domain.

Elite athlete—An athlete who is considered to be competing at the highest level in their sport on an international level.

Expert coach—A coach who demonstrates superior performance and is often reflect in the perception of others such as by reputation.

Internationalization of sport—Greater participation and growing success of more nations at the highest level of competition.

Intrapersonal knowledge—Knowledge that reflects one's self-understanding through one's ability to be introspection and reflective.

Introspection-This is one's ability to develop an understanding of self.

IOC-International Olympic Committee is the organization that aims to promote Olympism throughout the world and to lead the Olympic movement.

Levels of coaching

Elite—The highest level internationally

Collegiate—University and college competition at a recreational, club or varsity level

Club—Participation and competition within the membership of a sporting organization

Professional—Paid coaching that would not be included in these other levels

Recreational—Participation oriented competition

Masters—Age related competition that meet specific categories. Rowers in a crew must average a certain age, but must be 21 or older.

Pathways—Strategies to assist in one's development in an attempt to achieve a goal

Performers—A person carrying out a task, fulfill a role or demonstrate a skill with a particular goal in mind often taking place in front of an audience or spectators

Sport Coaching—A person facilitating an athlete's learning to improve their athletic performances in competition and training through the process of complex and multifaceted decision making process.

APPENDIX B—Chronology of Sports Coaching Development

Chronology of sports coaching development – 5800 B.C. to 1948 A.D..

Archaeologists findings from 5800 B.C. – 900 B.C.
5800 B.C. Boats found in Finland (Olivova, 1984; Volianitis, & Secher, 2007)
3400 B.C. Presenting evidence of lion hunting as the popular sport where warriors and aristocrats displayed their courage and athletic abilities (Mechikoff & Estes, 2006).
3300 B.C.—1700 B.C. The origins of yoga (Possehl, 2003).
3000 B.C. Boats with large oars in the early dynastic period of Sumerian civilization. (Olivova, 1984; Volianitis, & Secher, 2007).
2500 B.C. In China, the earliest records of organized sport were seen as a vehicle for promoting health (MacAuley, 1994; Mechikoff & Estes, 2006).
2000 B.C. In Egypt, evidence found tracing back to archery, boxing and wrestling (Carroll, 1988; Jacobs, 2006; Miller, McEwen, & Bergman, 1996),
1900 B.C. Evidence tracing back to the origins of the sport of fencing found (Czajkowski, 2005)
1800 B.C. In Mesoamerica, region south of northern Mexico, ball games like Ulama, meaning playing with a rubber ball (Mechikoff et al., 2006).
1500 B.C. evidence of the sport of hunting found (Griffin, 2007; Kyle, 2007).
1000 BC – 476 A.D.—Ancient Greece and sporting knowledge
1000 B.C. Coaching in chariot racing goes back to the poetry of Homer (Semotiuk, 1981)
900 B.C. Evidence in the literature in yoga in the Brahmanas, the seminal work in Hindu philosophy (Flood, 1996).
776 B.C. to 146 B.C. Ancient Olympic , the ancient Greeks were at war either between state, factions and foreign invaders (the First Messian War, Battle of Marathon, Peloponnesian Wars, Persian Wars, Macedonian Wars) (Young, 2004).
500 B.C. Herodicus was credited for the importance of physical activity and nutrition was given to Herodicus and laid the foundations for the work on diet and hygiene as he was Hippocrates mentor (Blundell, 1864).
500 B.C. Milo of Krotona was known as the father of resistance training, myth says that he would carrying a calf everyday above his head as apart of his resistance training he was also a six time ancient Olympic Champion (Willoughby, 1970).
100 A.D. Kung Fu began as a form of medical gymnastics and may have been adapted from yoga practiced on the Indian subcontinent (MacAuley, 1994).
170-240 A.D. Philostratus II first documented training methods that included training procedures, physical signs of poor conditioning, equipment, weight lifting programs and clothing (Lambert, Viljoen, Bosch, Pearce, & Sayers, 2009; Bourne, 2008; Gardiner, 1930; Robinson, 1955; Bompa, 1999; Yalorius & Andronicus, 1979)
131–201 A.D. Galen was considered a student of Hippocrates and was significant as he extended this work of nutrition and health that was recognized until the Renaissance period (Park, 1901)
900 A.D.—1400 A.D. There was a revival of physical condition for survival with the Feudal knights preparing themselves to defend their territories by riding, swimming, climbing, vaulting, fencing, wrestling, jousting, and archery (Delleck & Kravitz, 2005).

476–1800—Post ancient sport and pre modern sport coaching context

476 A.D. Fall of the Roman Empire and the decline of the ancient Olympics

1066 A.D. French organizing the first fencing competition in 1066 A.D. and fencing teachers taught from their own experiences as there were no formal schools (Bellotto, Kubesh, & McNeil, 2007).

1096-1270 The cultural and social impact of the crusades from

1100 Origins of lacrosse go back to the 12th century in various communities in North America by the Native Americans tribes of the Great Lakes, eastern Canada, the Southeastern United States, and the Mississippi Valley (Vennum, 1994)

1274 “Regatta Storica” known as a boat race introduced by the government of Venice as a military exercise to train oarsmen for war and also a parade of the evolution of the famous medieval and renaissance boats in the region (Dodd, 1992).

1400–1600 In the Renaissance—revival of the Galenic medicine where exercise was viewed as an essential part of the complete development of “self” (Berryman, 1989).

1500 Montaigne wrote of organized activity resembling gymnastics/exercise, running, fencing, hunting along with dance in the 16th century in France (Staley & Lowery, 2009; Todd, 1966).

1636 Lacrosse was named by French Jesuit Brébeuf after the crosier carried by a bishop (Fisher, 2002; Scott, & Scott, 1978).

1530–1606 Hieronymus Mercurialis Italian physician, epitomized the intellectual revival of the Renaissance by citing works of Hippocrates and Galen by extending the definition of exercise stating exercise protects health and develops fitness (Berryman, 1989; Blundell, 1864; Joseph, 1949; McIntosh, 1984).

1715 Doggett’s Coat and Badge the oldest continuous rowing race in the world is held on the river Thames in London continued since 1715 and had up to six watermen race over a 4 mile 5 furlong distance (7.4km) with the current along the Thames that includes passing under 11 bridges (Dodd, 2000; Halladay, 1990; Volianitis, & Secher, 2007).

1800–1840—The origins of modern sport coaching context

1800s Lacrosse began to appear as an organized structure activity in the formal sport setting

1800s Sports clubs began that today have a global presence (Zauhar, 2004).

1800s In Western Europe, by the emerged advocates for sport and exercise through the development of modern gymnastics (Werner, 2004).

1790 Guts Muth’s gymnastics spread from Germany to English, French and American schools and his movements were the forerunner to modern rhythmic gymnastic dance (Staley & Lowery, 2009).

1804 Friedrich Ludwig Jahn was a pioneer for the spread of gymnastics around the world (Kaimakamis, Kirialanis, & Albannidis, 2008)

1814 Henrik Per Ling who studied with Nachteggill, and like Jahn was also motivated by nationalism, developed the young military minds’ and bodies of the future Sweden through gymnastics at the Royal Gymnastics Center Institute (Eugene, 2009)

1804 Nachteggill studied with GutsMuth to introduce gymnastics to Denmark and was the director for Denmark Military Gymnastic Institute for military training that started in 1804 (Pfister, 2009).

1818 Leander Rowing club is one of the world's oldest rowing clubs, re-located from the Tideway to Henley-on-Thames in the 1870 (Wigglesworth & Foot, 1992).
1823 the Knickerbocker Club was the first rowing club established in the United States in New York (Dodd, 1992; Freyer, Rucker, & Thorn, 2005)
1829 Start of the Oxford- Cambridge Boat Race
1834 lead to the formation of the Castle Garden Rowing Association (Putman & Roberts, 1858)
1836 Rowing started at the Hamburg Rowing Club, Germany as the first club on the continent
1838 First Rowing clubs formed in France(Dodd, 1992).
1839 Henley Royal Regatta established in 1839 (Volianitis & Secher, 2007),
1840-1880 – PreModern sport – establishing coaching within an organizational setting
1840s sport integrated part of life through industrialization, technological innovation and a new social and cultural order (Eitzen, 2001; Gorn and Goldstein, 1993; Guttman, 1978; Hardy, 1981; Noverr & Ziewacz, 1983; Radar, 1994; Riess, 1995; Riess, 1989; Wiggins, 1995)
1844 YMCA was founded (Zald & Denton, 1963)
1846 First Rowing clubs formed in Belgium (Dodd, 1992).
1848 U.S. Turner Societies (Radar, 1984)
1851 First Rowing clubs formed in Sweden, (Dodd, 1992).
1855 First Rowing clubs formed in Denmark, Japan, Portugal,(Dodd, 1992).
1859 First Rowing clubs formed in Australia,(Dodd, 1992).
1860 First Rowing clubs formed in Russia, (Dodd, 1992).
1861 First Rowing clubs formed in South Africa,(Dodd, 1992).
1863 First Rowing clubs formed in Austria, Italy and Switzerland,(Dodd, 1992).
1852 U.S. intercollegiate sports including rowing between Harvard and Yale at Lake Winnepesaukee in New Hampshire,
1866 First Rowing clubs formed in New Zealand (Dodd, 1992).
1873 Oxford Cambridge agree to only amateurs racing in the Boat Race, First Rowing clubs formed in Argentina, Peru, and Poland, 1873 (Dodd, 1992).
1866 NYAC founded (Radar, 1984)
1869 U.S. baseball's first professional club started (Guschoy, 1998)
First evidence showed a combination of heroin and cocaine called speedballs were used to enhance endurance
1873 The first collegiate track and field event hosted at Princeton in 1873 (Letich, 1978), 1873 Morgan studied 255 athletes who raced from 1829 and 1869 in the Oxford/Cambridge boat race showing that athletes outlived the average member of the population disproving popular claims at the time by physicians like Da Costa and Skey that the effects of the boat race caused disease and premature death (Morgan, 1873;
1885 The American Association for the Advance of Physical Education (AAAPE) was founded (Dyreson, 1998)

1886 Arthur Linton, a British cyclist, died, the first known death of an athlete to the use of drugs (Dimeo, 2007; Goldman, Bush, & Klatz, 1984).

1879 Henley Royal Regatta wrote rules only permitting amateurs racing in the regatta

1880-1920 – Modern sport, reviving the Olympics and the birth of Olympism

1882 ARA Amateur Rowing Association founded

1889 Paris expo inspired Coubertin to revive the Olympic games

1891 Basketball was invented (Naismith, 1996)

1892 International Rowing Federation (FISA) founded (Meuret, 1992)

1893 The first European rowing champions were held in Italy, with three events, and only ten entries as no professionals were allowed to participate (Volianitis, & Secher, 2007).

1894 Phillipe Tissié, a French physician, the first to document extreme exertion experimenting on a cyclist found doping improves the psychological and physiological performance during his test of an athlete performing continuously for 24 hours (Hoberman, 2002).

1896 Modern Olympics were revived in Athens (Guttman, 1992) after 1500 years with fewer than 500 athletes representing 13 nations. On April 6, 1896, 245 athletes from 14 nations heard King George I of Greece open the 1896 Olympic games. The Greek Organizing Committee, which lacked any financial support raised money by selling stamps and medals, and a donor gave one million drachmas to reconstruct Athens' Panathenaic Stadium originally built in 330 BC (Davenport, 1996). The modern Olympics were a success with the crowning of U.S. triple jumper, James Connolly, as the first Olympic Champion in 1527 years (Mallon, & Buchanan, 2006). Winners were given a medal made from silver, a crown of an olive branch and a diploma in 43 events including swimming, weightlifting, shooting and gymnastics and rowing and sailing were both cancelled due to bad weather (IOC, 2012).

1898 First American football club Chicago Cardinals (now the Arizona Cardinals) founded (Ziemba, 1999)

1900 Paris Olympics was held with the World Fair for the first time making organization very complex as events were spread across five months which deemphasized Coubertin's Olympic vision, now IOC President, after Vikelas' retirement earlier in 1900 (Roche, 2000). The American track and field team dominated once again, women competed for the first time at these games in Paris and winners received cups and trophies and professional fencers were allowed to compete and arguable the youngest Olympic champion was the coxswain of the French Mens pair, whose name and date of birth were not recorded and strangely disappeared after the race (IOC, 2012).

1903 First baseball World Series (Benjamin, 1998) and inaugural Tour de France (Mignon, 2003)

1904 The city of St. Louis, in the U.S. was rewarded for their enthusiastic support of the previous two Olympics hosted both the 1904 Olympics and the World's fair but events were lost in the chaos of the world's fair as competition was spread out over a number of months (Wallenchinsky & Lucky, 2008). While fewer athletes attend than the 1900 games most of them were from North America. This event was where the first Olympics athletes received medals for first, second and third place. Boxing and freestyle wrestling made their debuts (IOC, 2012).

Olympic champion in the marathon from the U.S., Thomas Hicks collapsed at the finish line due to strychnine and brandy used during the race. Despite this matter he did not lose his medal (Todd, 1989).

Steve Fairbairn (1862–1938) was an Australian born rower who coached from 1904—1938 at Jesus College, Cambridge and revolutionized rowing and his coaching had an immense influence on the sport (Serle, 1949). Fairbairn's first principle of coaching the rowing stroke was that the legs were the strongest part of the body and thus the beginning of the stroke must be characterized by a good leg drive and have the rower concentrate not on the body movements but on correct blade movements and keep the blade well clear off the water during the recovery (Volianitis, & Secher, 2007). Fairbairn discussed his approach to coaching in detail in four books: *Rowing Notes* (1926), *Slowly Forward* (1929), *Some Secrets of Successful Rowing* (1931), and *Chats on Rowing* (1934). He was an innovator, masterful at times overpowering yet sympathetic coach and be remember for this famous Fairbairnisms which include “enjoy your rowing; win or lose”, “hear the boat sing” and “miles make champions” as he was a believer in distance training (Serle, 1949).

1905 The Intercollegiate Athletic Association (NCAA) started in 1905 (Fleisher, Goff, & Tollison, 1992).

1908 The Olympics of 1908 were originally awarded to Rome but with the eruption of Mt. Vesuvius, were relocated to London (Chatziefstathiou, 2005). At these games were the first official opening ceremony and marked Coubertin's legacy to the modern games revival as second to none. He wrote the Olympic Charter in 1908, installed the Opening and Closing Ceremonies, Olympic creed and motto and served as the 2nd president of the International Olympic Committee from 1896 to 1925 (IOC, 2012).

Italian, Dorando Pietri, crossed the line first in the 1908 marathon, but was disqualified for receiving assistance to finish after he collapsed due to strychnine abuse (Dimeo, 2007).

1912 “Sunshine” Games, the Swedish team topped the medal tally a reflection of superior team management. The Swedes were motivated to make the 1912 Olympics a success, they were at home, their King Gustav V was present for all the events in their new stadium that was funded by a very supportive government through a special lottery and their results reflected that the Swedes had created the first known state sponsored sporting system (Chatziefstathiou, 2005). This system came out of the great gymnastics and sporting system set up by Ling in the 1800s, which allowed for the pool athletes from the army to be selected into their Olympic team (Krüger, 1999).

After the 1912 Stockholm Olympics, the IOC decided to limit the hosting nation to influence on the Olympic program and the IOC and sport federations were involved with assuring a unified set of standards, rules and by-laws for all sports as the Stockholm organizing committee would not allow boxing to be contested at these games (IOC, 2012). With over 3000 athletes competing at the 1912 Olympics, Sweden dominated in 1912 topping the medal tally.

1913 Hiram Conibear, an American athletic trainer, took over the rowing program at the University of Washington and developed the American Conibear style (Volianitis, & Secher, 2007). The Conibear style characterized by an extremely fast and hard way of placing the blade into the water and a fast and exaggerated movement at the finish of the stroke with the arms (Gates, 1961).

1916 The 1916 Olympics were cancelled due to World War I.

1920-1948—From Nurmi to Owen

1920 The 1920 games were a success heralding the birth of 16 years of growth and expansion of the Olympics. Germany, Austria, Bulgaria and Turkey were not allowed to compete in the 1920 Antwerp Olympics due to their aggression during World War One (Bourne, 2008). These were the games where the Olympic flag and the Olympic Oath was introduced and the U.S. continued to dominate and Sweden were the nearest rivals in the medal count (Wallechinsky & Lucky, 2008).

Brutus Hamilton, was an Olympic silver medalist in the decathlon in 1920, Olympic track and field coach in 1932 and 1936 and head coach in 1952, and spent 33 years and head track coach at University California Berkeley, his athletes broke 2 world records, seven Olympic records and seven team national collegiate titles and he has been compared with some of the greatest philosophers of coaching like John Wooden, Vince Lombardi, Woody Hayes, James “Doc” Councilman and Percy Curetty (Walton, 1992). Hamilton was a humanist as he saw sport as an extension of self and as a result coaching was most about the person, he was a coaches coach while never putting pen to paper, his legacy may be best put by Archie Williams, 1936 Olympic Champion 400m, when Hamilton coached he made his athletes feel good about themselves, he was a coach’s coach and he knew how to get the best out of people (Bourne, 2008).

1923 China joined the IOC

1924 At the Olympics in Paris more ceremony was introduced including the Olympic motto, Citius, Altius, Fortius, and the ritual of raising of the three flags at the closing ceremony, the flags of the IOC, the host and next host nation (IOC, 2012). Participation jumped from 29 to 44 nations, and was signaled as becoming a widespread major event with over 1000 journalists in attendance. This was also when the first Winter Olympics were held in Chamonix, France (IOC, 2012).

In 1924 first sport psychology laboratory set up in the German by Robert Werner Schulte (1897-1933), a psychologist at the German Prussian College in Berlin and Coleman Roberts Griffith, American sports psychologist, is widely quoted as the first to research the optimal coaching performance (Bäumler, 1997; Benjamin, 1993; Bennie, 2009; Fletcher, 2006; Gould & Pick, 1995; Green & Benjamin, 2009; Kroll & Lewis, 1978; Singer, 1989; Swoap, 1998, 2000).

1927 Fred Koch and his assistant Lemeul Clyde McGee from the University of Chicago isolated a highly impure but highly potent form of testosterone from bull's testicles producing nearly miraculous qualities (Todd, 1989).

1928 In Amsterdam, this was the first time where during the Opening Ceremony the Greek team entered first and the host nation entered last. Athletes representing 28 different nations won gold medals, a record that would last 40 years (IOC, 2012). Among the starts of the 1928 Olympics included Johnny Weismuller, American swimmer, Percy Williams, Canadian track athlete, and Paavo Nurmi, who would win his 9 Olympic Gold medal at these Olympics (Barney, 2007). American would top the medal count with German and Finland in second and third (IOC, 2012).

1929 Avery Brundidge became U.S. Olympic Committee President

1930s In the literature, evidence about sport development in Australia and the involvement of the Federal Government dates back to the 1930s (Lynch & Veal, 1996). Government plans to develop a coaching accreditation system back to the late 1930s in preparation for the 1956 Olympics in Melbourne but this period was mainly driven by next to no federal financial involvement in sport development (Jobling, 1991; Phillips, 2000; Sotiriadou, 2005; Woodman, 1993).

1932 The 1932 Olympics in Los Angeles was the first major sporting event that symbolized the professionalization of sport. These games only lasted 16 days, previously no shorter than 79 days and since between 15-18 days. Despite the remoteness of the host city and the great Depression, this was the first to turn a sizable profit of \$1 million (Barney, 2007). Competition was extremely high with 18 new world records being set and medal winners stood on the medal stand as their countries flag was raised and official automatic timing and photo-finish cameras were introduced. This was the first Olympics housed in the Olympic village (IOC, 2012).

1935 The first molecular structure of cholesterol was altered to produce a synthetic testosterone, which would help the body create additional tissue (Ruzicka, Wettstein & Kaegi, 1935).

1936 Berlin hosted the Olympic Games and despite much pre-Games tension, the games ran smoothly and without any noteworthy problems (Gilmore, 1999). This Olympics may best be remembered for the failed attempt to prove Hitler's theory of Aryan racial superiority, best summed up by four time gold medalist Jessie Owens publicly befriending German rival Luz Long in front of the spectators in the stadium (Noverr, & Ziewacz, 1983). Despite the superficial success, the 'Nazi Games' will go down as being the games that were the most blatant misuse Games undertaken by the Nazi regime (Bourne, 2008). In 1936 the Games was broadcast on live closed circuit television that could be accessed with a 15km radius (Slater, 1998), China sent over 100 participants to the 1936 Berlin Olympic Games. In 1936 in Berlin, the torch relay was introduced and was the first to be broadcast on a form of television, allowing local people to see it for free (IOC, 2012). Olympia, was the official film of the Berlin games and was intended as a piece of Nazi propaganda, but ended up as a celebration of the human spirit as well (Chatziefstathiou, 2005).

1937 Swedish coach Gosta Homer (Nurmi's coach) developed 'Fartlek' is Swedish for speed-play and is defined as a systematic use of altered running pace (sprinting, striding and walking) or variable distances and time developed by Swedish coach, in 1937 (Doherty, 1980).

1938 IOC looked into drug use in finding the period reflected radical changes in more scientific approaches to training, sport was modernizing and drug use was one issue to contend with moving forward.

1939 A number of studies documented use of steroids and testosterone during World War II by the Germans including tests on storm troopers to increase their aggression (Arndt, 1939; Wade, 1972).

1948-1972 – Professionalization of sport and global politicization of the Olympic Movement

1948 Olympic Games relaxed a long period of aggression, and due to World War II, Germany and Japan were not permitted to attend. These were the first Olympics shown on home television although very few people owned their own televisions. Jim Thorpe American Decathlete from 1912 Olympics performance in the decathlon would have won him a silver medal in the 1948 Olympics. The London officials paid around \$4000 to regional homes 80 miles away targeting around 80,000 people (Slater, 1998).

1952 Helsinki Olympics were significant due to the achievements of Czech distance runner Emil Zatopek, who was the first to win the 5km, 10km and marathon at the same Olympics and also won silver in 5km and gold in the 10km in 1948. Zatopek's work ethic saw him train with greater quantities and intensity than his rivals with no weight training and without a coach or a stopwatch and was the subject of many studies in attempt to understand his athletic successes (Wilt, 1959).

IOC president Avery Brundage (US) 1952—1972

U.S.SR finished second behind the U.S. on the medal tally (Wallenchinsky & Loucky, 2012).

Soviet weightlifters dominated competition at the Helsinki Olympics. Claims were made that the Soviet coaches partnered with U.S. pharmaceutical company, Ciba, to produce an anabolic steroid that would help athletes train longer, it is known to increase muscle mass, increase aggression and decrease libido and the product was called Dianabol (methandrostenalone) (Zeigler, 1984).

In 1952, the Helsinki Games opened dramatically when 55-year-old Paavo Nurmi (nine time Olympic Champion carried the torch into the stadium and handed it to 62-year-old Hannes Holehmainen (four time Olympic track champion who lit the cauldron).

1953 Karl Adam co-founded the Ratzeburg Rowing Club (1912–1976) was a professor of rowing and a coach and had a major impact on one of the most successful eras in West German rowing history starting at the end of the 1950s and was a great innovator of rowing and training techniques and introduced methods that had a major impact on the further development of rowing known in the rowing world as the "Ratzeburger" style (Nolte, 2005). In the 1960s, Karl Adam pioneered advances such as speed play, interval training, oars design, longer stroke emphasis and other unorthodox rigging approaches (Rogers, 1984). Adam's systematic crew selection from rowers across Germany is argued to be the reason for his boats winning no less than seven titles at World and European Championships from 1959 to 1967 (Barrow, 2009). In addition, the West German eight won an Olympic gold medal in 1960 in Rome and 1968 in

Mexico introducing the title of “Deutschlandachter” translated to The German Eight. Nothing since has matched the impact of the sudden explosion of Ratzeburg and Karl Adam onto the rowing scene (Volianitis & Secher, 2007).

1954 Competition was fierce to break the 4 minute mile, American Santee had already gone 4:02.4 and Australian Landy had gone 4:02.0. On May 6, 1954 in Oxford, the wind was blowing at 25miles/hour and just before Bannister was scheduled race and just as he was about to pull out of the race knowing these were not record breaking conditions and to conserve his energy for the next opportunity, the wind suddenly calmed and he decided to race. Bannister ran 3:59.4. Then on June 21, 46 days later in Finland Landy ran 3:57.9. Then in August, Landy raced Bannister at the Commonwealth Games Landy went 3:59.6 and Bannister went 3:58.8. The quest to run under four minutes for the mile had been realized 4 times in 3 months. This achievement formed the foundation for research on training and planning moving forward toward a new pinnacle of human performance.

1956 The Olympics were held in Melbourne, but Australian quarantine laws meant equestrian was held in Sweden and were the first Olympics held in the southern hemisphere. Egypt, Iraq and Lebanon withdrew protesting the Israeli-led invasion of the Suez Canal and the Dutch, Spanish and Swiss boycotted the Soviet invasion of Hungary. West and East Germany on the other hand entered as a united team (IOC, 2012). This was the first Olympics the athletes entered together as symbol of global unity the suggestion of John Ian Wang a young Australian as Wang wanted no public acknowledgement, but 44 years later was flown from Bucharest Romania where he was running a Chinese restaurant to be honored at the Sydney Closing Ceremony (Barney, 2007).

Austro-Hungarian endocrinologist Hans Selye from his seminal work, developed his theory of General Adaptive Syndrome (GAS) or the totality of the adaptive changes of an organism was measured by the changes in the nervous system and internal organs (hormones secreted into the blood system) (Selye, 1956).

The first international telecast of Olympic competition took place at the 1956 Winter Olympics in Cortina, Italy with viewers from only eight countries (Billings, 2008).

In Melbourne in 1956, Australian Olympic Committee officials offered \$500,000 for the live television rights to broadcast the Games determining the Olympics as entertainment and broadcasting the games impacted attendance to live events the media boycotted the games (Billings, 2008). The U.S. media disagreed saying that the Olympics was news and news footage is free (Jobling, 1996).

In 1956 the USSR won more medals than any other nation (Wallenchinsky & Loucky, 2012).

1958 Dianabol (or dbol) was released by Ciba (an American pharmaceutical company) for the medical treatment of burn victims and geriatric cases exclusively (Hoberman, 2005). In 1958, Rule 49 of the Olympic Charter was promptly written after this outrageous argument and it stated that live television broadcast rights of the Olympics for entertainment will be sold by the IOC and this prepared the way for a future of high payments for the rights of exclusivity to broadcast the Olympics (Alaszkiwicz & McPhail, 1986).

1960 In Rome, four winning streaks broken, the U.S. Men's Eight first loss since 1920 to the Germans, the U.S. Men's 4x100m relay lost to the Germans, the U.S. Spring board and platform diving record 7 and 8 consecutive lost to Germany, and India first lost in field hockey since 1928 beaten by Pakistan (IOC, 2012). A new female track and field star reigned supreme in the sprints, the regal Wilma Rudolph, a student at a small black college in the American south, a member of the Ethiopian imperial guard, Abebe Bikila, running barefoot, won the prestigious marathon and, an American boxer called Cassius Clay won a gold medal in the light-heavyweight division (Barney, 2007).

Cyclists Knud Enemark died from excessive amphetamine use during competition at the Rome 1960 Olympic Games.

The IOC budget in 1960 was \$10,000, and the rights to the 1960 Olympics were sold to CBS for \$394,000 coverage was viewed live in 18 nations, The sale of the rights to the 1960 Rome Olympics transformed the Olympic movement forever and commercialism took over the world of sport (Davies, 1996). The IOC began receiving much need financial support from the mass media revenue but this opened the door to media influence on the Games that was a high price to pay after the media boycott of the 1956 Melbourne Olympics (Slater, 1998).

1962 Matveyev's research published the concepts of periodization, training organization, biomechanics and exercise physiology in *The Fundamentals of Sports Training* (Matveyev, 1981). Coaches in the Soviet Union had spent hundreds of hours studying and learning about the general theory of sport and the fundamentals of training and this was all in tandem with their scientists and their athletes in an effort to produce world dominance in Olympic sport (Bourne, 2008). Periodization was the paradigm shift that changed the basis of how every serious athlete trains (Bompa, 1983; Freeman, 1975; Harre, 1981; Ozolin, 1971). Thousands of top athletes performances and profiles were studied from sports like track and field, weight lifting and swimming that resulted in the general theory of sport (Bourne, 2008). Periodization was Matveyev's defining contribution as describes it as essentially the life cycle of an athlete by specifying cycles that an athletes need in preparation to be at their best level of condition to produce their best physical performance (Matveyev, 1972). Sabin and Chudinov (1966) extended training theory by determining sub optimal performance was a result of insufficient technical preparation and competition in combination with a lack of physical, tactical and individual preparation. Peak performance required philosophical, methodological, social and psychological biological, metrological and medical dimensions (Matveyev, 1981). Matveyev incorporated Selye's General Adaptation Syndrome arguing that an accurately executed training program could prepare an athlete for peak performance on a specified day of competition (Fry, Morton, Keast, 1992).

1963 Boxer Billy Bell dies of a heroin overdose (Wallenchinsky & Loucky, 2012). The IOC established a doping inquiry (Dimeo, 2007).

1964 Tokyo Olympics were the first to be held in Asia, South Africa was banned due to racist government policy, North Korea and Indonesia withdrew their teams (IOC, 2012). Live television broadcast via satellite sent images around the world of Bill Mills dramatic victory in the 10k, Ivanov (rowing), Fraser (swimming) and Oerter (discuss) winning their third consecutive gold medals (Barney, 2007). At the Tokyo Olympics, the IOC received \$2 million for Olympic television rights as a communications satellite made possible the first live coverage of the Olympic Games to world occurred (Alaszkiwicz & McPhail, 1986; Slater, 1998; Whannel, 1984).

1965 Matveyev's work spread of periodization began as the translations of Matveyev's work circulated. This first translation was complete in the Soviet Union in 1965, in 1968, West German throwing coach, Peter Tschiene translated Matveyev's work into German, in 1971 Arnd Krüger revised Tshiene's translation and Frank Dick from Britain's translated the work into English in 1975 marking the watershed moment in the history of sport training (Bourne, 2008). Many believed and attempted to make replications and adaptations of the system in a variety of sports including discuss (Riveri, 1986), figure skating (Poe, Pitsos, & Provost-Craig, 2000) football (Burgener, 1987), golf (Knight, 2000), heptathlon (Myer, 1986), high jump (Myer, 1988), judo (Blumenstein, Lidor, & Tenebaum, 2005), mountain biking (Willis, & Jones, 1999), pole vault (Jagodin & Tshunganov, 1981), rowing (Van Ort, 1997), synchronized swimming (Flynn, 1993), weightlifting (Fritz, 2001), and wrestling (Burns, 1983). British scientist that began testing with data collected at the 1965 Tour de France (Dimeo, 2007).

1966 FIFA World Cup this established the tests for the 1968 Olympics (Dimeo, 2007).

1967 British tour de France cyclist Bobby Simpson overdoes on amphetamine,

1968 Mexico City Olympic host city and is located at 2300 meters of altitude and this made controversy as slowest times were recorded in long distance track but events shorter than 400m saw new records set, including Bob Beamon's long jump record of 8.90m (IOC, 2012). Al Oerter won his fourth Olympic gold (IOC, 2012). These are the games that will always be noted for the emergence of African athletes as track and field giants in distance racing, between Keino, Temu and Biwott of Kenya, Wolde of Ethiopia, and Gammoudi of Tunisia, Africans won every men's running event at distances over 800 meters (Barney, 2007). These were the first games of drug disqualification for Swedish modern pentathlete Hans-Gunnar Liljenwall for excessive alcohol (Toohey & Veal, 2000).

The German Democratic Republic entry onto the world stage after the war and at the Olympic in 1968 was neither smooth nor graceful, but left a lasting imprint on all aspects of sport (Riordan, 1983). In the 1960s, the GDR was in relatively obscurity behind the mystery of the "iron curtain" then the Socialist Unity Party took control GDR national spirit and pride through sport to produce the 1972 Olympics performance in Munich (Carr, 1974). If there was ever a way to quantify the scale of operations in the GDR when it came to Olympic sport, Houlihan and Green (2008) stated that in the GDR about 1% of the annual GDP was allocated to sports for their twenty year, totaling 409 Olympic medals haul over 5 Olympics between 1968 and 1988 (153 gold, 129 silver,

127 bronze) (International Olympic Committee, 2010). Without any rough estimation, it is clear that hundreds of millions of dollars were spent on guaranteeing Olympic success for the GDR. If in 1990, GDP was 250 billion East German Deutchmark, and the conversion to \$US was 20:1, the GDR was allocating over \$100 million/year into the Olympic effort.

The only meaningful test used was the chromosome check to determine if a woman athlete was biologically female because there was still not enough research to prove that steroids improved performance and no test could detect if a banned substance was in the system (Todd, 1989).

French cyclist Yves Mottin died of an amphetamine overdose (Wallenchinsky & Loucky, 2012).

1972 – 1992 – A new era of world sport

1972 All other events of the 1972 Munich Olympics paled in comparison when on the 11th day of the games, eight Palestinian terrorist invaded the Olympic village kidnapping and killing the nine member Israeli team (Wallechinky & Loucky, 2012). They also killed a policemen along with the five terrorist also being killed (Reeve, 2006). A memorial service was held in the main stadium and competition resumed as events were briefly suspended then it was decided the games were to continue (Guttmann, 1992).

The Munich Olympics were the largest yet of 195 events, 7173 athletes and 121 nations and ended the winning streak of the U.S. basketball team who had won 62 consecutive games since 1936, to be defeated by the USSR. Mark Spitz, American Swimmer won 7 gold medals (Wallechinky & Loucky, 2012). In 1972, the beginning of the sporting industrial revolution for international Olympic movement with the steady liberalization of the amateur status of athletes competing at the Games (Macaloon, 1991).

The first formal test did not occur until the 1972 Munich Olympics, but no official samples were taken (Donike & Stratmann, 1974).

Television revenue replaced ticket sales as top revenue earner at the Olympics the IOC became profit maximizing organization and took advantage of the high competition for bidding on the games by allowing bidding go as high as possible (Preuss, 2004). but resulted in escalating the cost of the Olympics

For the first time in Australian history sport was recognized as an integral part of Australian life and in 1972 this became a turning point in the Federal Government's involvement in Australian sport (Cashman, 1995; Jobling, 1991; Sotiriadou, 2005).

1974 98% of the IOC revenue was from the mass media (Slater, 1998).

1976 U.S. finished third place in the gold medal tally for the first time ever and this primarily due to the superiority of USSR and GDR. At the Montreal Olympics in 1976, gymnast Nadia Comăneci of Romania at age 14, scored seven perfect 10.0 and won three gold medals. The Women from Romania dominated the rest of the women's gymnastics, and the women from GDR dominated in rowing and swimming, the

Canadian team was the first host nation not to win a Gold medal and financially the games was a massive financial disaster (Wallechinsky & Loucky, 2012). The 1976 Montreal Olympics organizing committee called on Coca-Cola and Adidas to rescue when a massively financial disaster was about to occur due to being over budget, but regardless, competition went smoothly (Espy, 1979). Twenty-two African nations boycotted because of the racial policies of South Africa and that the New Zealand rugby team had toured South Africa.

Despite additional advances in testing for anabolic steroids by 1976, only 275 of the 1800 samples were analyzed due to the complexity of the procedures (Bertrand, Masse & Dugal, 1978).

This was the first time complaints were received about the number of commercials held during live Olympic broadcasts (Diamond, 1992).

1978 In Australia the creation of the National Sports Organizations (NSO) to research strategies for elite sport's development

The U.S. established the 'Ted Stevens' Olympic and Amateur Athlete Sports Act was chartered and granted monopoly power status to the U.S. Olympic Committee as the single most important decision to be enacted on U.S. amateur sport (Delmont, 1983). Nafzinger wrote the following as the main reasons for why Congress created this legislation:

1. Results from the 1972 and 1976 Games were significantly below expectations – characterized by two incidents in Munich with a coach giving athlete the wrong time for races resulting in them being disqualified,
2. Conflicts were growing between NGB's hindering Olympic efforts and American athlete performances; and,
3. Congress desired greater participation of women, racial and ethnic minorities and adaptive athletes in Amateur Athletics.

1980 The Moscow Olympics was marked by boycotts resulting in low participation. The 1979 Russian invasion of Afghanistan led to the U.S. boycott joined by 65 nations so in total 80 nations competed the lowest since 1956 (IOC, 2012). East German women won 11 out of the thirteen events in swimming and 54 rowers went home with medals. Russian Salnikov swam under 15mins for the time for the 1500m. In 1980, The East Germans and Russians dominated and British runners, Sebastian Coe who was favored to win the 800m won the 1500m, and Steve Ovett who was favored to win the 1500m won the 800m (Wallechinsky & Loucky, 2012).

In 1980 in Moscow, the IOC was so confident that drugs was not an issue at the Olympics. This was supported in that there were no positive drug cases reported (Wayne, 2001).

Olympic television rights were sold for \$100 million.

1981 The development of a centralized systems beginning with the Australian Institute

of Sport

1982 Professor Manfred Donike, the German member of the IOC medical commission, took unofficial urine samples for athletes competing in Moscow including 16 Olympic Champions and he found all had more than 6 times the normal ratio for testosterone in their bodies (Wilson, 2001). In 1982, the IOC was then convinced to ban these unsafe levels of testosterone (Todd, 1989).

1983 Thorpe's gold medals were re-awarded posthumously after the athletes amateurism rules changed (Cahill, 1998).

1984 Los Angeles Games was also impacted significant by the boycotts resulting in low participation. The 1984 Los Angeles Olympic bid was the only one for the 1984 games after the terrorist attacks of 1972 and the financial disaster in 1976 (Guttman, 1992; Toohey & Veal, 2000). This was the first Olympics not to be financed with government money, criticized at the time, the \$223 million profit made for a model for the future of the Olympic Games. The USSR revenged the boycott with 14 nations staying away, many sports were hard hit by this boycott. Nonetheless a record 140 nation took part, with the women's marathon being added to the Games. Carl Lewis matched Jessie Owens four gold medals. All eight men's rowing events were won by eight different nations, and the flying Fin Karpinen won his 3rd Olympic Gold in the single scull. Professional soccer player were permitted to compete if they had not played in the World Cup and over 100000 spectators saw France beat Brazil 2-0. Beginning in 1984 a B final was held for finishers 9-16, and for the only time in Olympic history did the winner of the B final, West German Thomas Farhner, swim a faster time than the winner in Final A (Wallechinsky & Lucky, 2008). 1984 at the Los Angeles Olympics that was criticized at the time for being the first Olympics not to be financed with government money but made \$150 million profit became a model for the future of the Olympic Games (Barney, 2007). The USSR revenged the boycott 1980 along with 14 nations staying away from the 1984 Olympics. Carl Lewis matched Jessie Owens four gold medals (IOC, 2012). For the only time in Olympic history the winner of the B final, West German Thomas Farhner, swam a faster time than the winner in Final A (Wallechinsky & Loucky, 2012).

1985 The Australian Sports Commission was created as response to the failure to capture any gold medals in 1976 Montreal Olympic (Adair, & Vamplew, 1997; Farmer, & Arnaudon, 1996; Green et al. 2005; Houlihan, 1997; Woodman, 1989).

1988 Seoul, Korea hosted the games, 8391 athletes represented 160 nations in 237 events, 52 nations won medals, 31 took home gold and were the last Olympic dominating by the Soviet Union and East Germany, U.S. finishing third in the medal count for the second time in history and host nation Korea finishing fourth (Barney, 2007). After breaking the world record in selection, U.S. sprinter Florence Griffith Joyner won both the 100m Olympic record (10.62) and the 200m world record (21.34) to capture gold medals in both events and also a gold in the 4x100 relay and a silver in the 4x400, in swimming Kristin Otto from East Germany won six gold medals, Americans Matt Biondi and Janet Evans won five and won three gold medals respectively (Wallechinsky & Loucky, 2012).

The greatest scandal perhaps was Ben Johnson's disqualification, becoming the 43rd Olympic athlete and this scandal rocked the sports world (IOC, 2012). Public interest in

Games exploded in 1988 following the Ben Johnson doping incident (detection of the anabolic steroid stanozolol). The subsequent Dubin Inquiry resulted and investigated the use of drugs and banned practices intended to increase athletic performance (Dubin, 1990). The 1988 Olympics also marked the end of history's largest pharmacological experiments with the administration of drugs to athletes to enhance performance as it was the last games for the GDR and U.S.S.R (Franke & Berendonk, 1997).

After the 1988 Seoul Olympics, the IOC declared all professionals eligible to compete at the Olympics and removing amateur and amateurism from all official Olympic publications (Staudohar & Mangan, 1991).

This domination by the USSR of Olympic sport through a win at all cost approach ended at the 1988 Seoul Summer Olympics. Over the nine Olympics, between the 1952 Olympics in Helsinki and the 1988 Olympics in Seoul, the Soviets had amassed 1010 Olympic medals, 395 gold, 319 silver and 296 bronze medals (International Olympic Committee, 2010).

1990 Dubin Inquiry marked a new era for drugs in sport with increase in cooperation between international sport governing bodies and various government agencies when it came to drugs in sport (Fraser, 2004, Hunt, 2007).

1992 – present – Professionalization, globalization and commercialization

1992 Olympics in Barcelona, 9356 athletes from 196 nations competed in 32 sports including Germany competed as a unified team for the first time since 1964, South Africa competed in the first Games since 1960, the remaining Soviet states competed as the Unified team and the Estonia, Latvia and Lithuania sent their own teams, along with Croatia, Slovenia and Bosnia and Herzegovina. The admission of professionals saw NBA stars featuring in the “dream team” won their first Olympic gold medal. The Unified team top the medal tally with the U.S. in second, Germany in the third and China in fourth (Wallechinsky & Loucky, 2012).

1992 marked a new era as the IOC of embracing the idea of making sure the games reached the widest audience possible and this policy would lead to a period of greatest prosperity (Levin, 1995). Sponsorships and licensing revenue in 1992 and 1996 outstripped anything seen prior and more host cities began and continue to bid for the games (Spa, Rivenburgh, & Larson, 1995).

1996 Olympics a record 79 nations won medals, Canadian Donovan Bailey set a new world record in the 100m 9.84s. U.S. swimmer, Amy Van Dyken won four medals in the pool, professional cyclists from the tour de France were permitted to compete and five athletes were disqualified for using illegal substances (Wallechinsky & Loucky, 2012). 1996 television rights went for over half a billion dollars

1998 NBC signed a \$2.3 billion deal with the IOC to secure the rights for the 2004, 2006 & 2008 Games and lead to subsequent deals with broadcasters in Australia, Canada and in Europe (Kelly, 1998) and NBC extended this deal for an additional a \$2.2 billion deal for 2010 & 2012 Olympics and bidding for the 2014 & 2106 games is expected sometime after 2010 (Billings, 2008). \$1.27 billion for Sydney and Salt Lake City, \$793 million for 2004, \$613 million for 2006, and \$894 million for 2008 (Slater, 1998).

1999 The IOC creating of The World Anti-Doping Agency (WADA) on the basis of equal representation from the Olympic movement and public authorities (Hunt, 2007). WADA was to harmonize the Olympic antidoping code creating of several international standards (IS) for laboratories, testing, the prohibited list, and for therapeutic use exemptions TUE—permission to use, for therapeutic purposes, a drug or drugs which are otherwise prohibited in sporting competition (Fraser, 2004).

2000 Investigations began into use of performance enhancing substance in the former GDR where reports had indicated that physicians, scientists and professors performed doping research using prescribed and unapproved experimental drug preparations involving hundreds of athletes (Franke, & Berendonk, 1997). U.S. track athlete Marion Jones was stripped of her Sydney 2000 three gold and two bronze medals in October 2007 after confessing that she had taken tetrahydrogestrinone (THG) from September 2000 through July 2001. In 2008, the International Olympic Committee stripped the gold medal from the U.S. men's 4x400-meter relay team, after Antonio Pettigrew, twins Alvin and Calvin Harrison, and preliminary round runner Jerome Young, all have admitted or tested positive for performance enhancing drugs (Berning, Adams, & Stamford, 2004). Today human growth hormone, erythropoietin (EPO), beta-blockers, stimulants or diuretics are being used to enhance performance (Wilson, 2001). Historians have pointed out that drug use has been in existence since antiquity (Berning, Adams, & Stamford, 2004; Hoberman, 2002; Wilson, 2001). As long as drugs are illegal for use in competition, there will always be a fight between the users and abusers and those attempting to catch the cheaters (Hoberman, 2002).

At the 2000 Olympics, triathlon made its debut at the Olympics, Steve Redgrave won his fifth consecutive Olympic gold medal, Australian Cathy Freeman won the 400m in front of her home crowd, with the U.S. topping the medal tally, Russia in second, China in third and Australia host's in fourth (Wallechinsky & Loucky, 2012).

2001 The mandate of IOC President Rogge was to bring competition back to bidding for the Olympics and promotion of the Olympic values and symbols to television (Fernández Peña, 2009).

2004 At the Olympics, a record 201 nations represented in 28 sports, the return of the games to Athens for the first time in 108 years was significant for the people of Greece especially with Fana Halkia coming out of retirement to win the 400m hurdles, the U.S. mens basketball lost for the first time since professionals were admitted to the Games in the final to Puerto Rico, Michael Phelps was the first athlete to win 8 medals at a non-boycotted Olympics and the U.S. finished at the top of the medal tally followed by Russia, China and Australia (Wallechinsky & Loucky, 2012).

2008 At the Beijing Olympics, China became the third city in Asian to host the Summer Olympics after Tokyo in 1964 and Seoul in 1988, Michael Phelps won 8 gold medals in the pool, Usain Bolt broke world records in the 100m, 200m and with his Jamaican team mates in the 4x100m relay, 40 world and 130 Olympic records were broken and was the first time that either the U.S. or the Russians did not top the gold medal tally. U.S. won more total medals, China won more gold medals and Russia finished third with Great Britain in fourth (Wallechinsky & Loucky, 2012).

2012 London became the first city to host three Summer Olympics with 1908, 1948 and 2012 with participating athletes from 204 countries. Michael Phelps became the top medal-winning athlete of all time with a total of 20 medals, Usain Bolt became the first athlete to win the 100m and 200m in consecutive Olympics. The U.S. won the medal tally, China in second, Great Britain finished in third and seven nations won gold medals for the first time at the Summer Olympics.

Lance Armstrong gets stripped of his seven Tour de France titles and his 2000 Olympic bronze medal after admitting to taking performance-enhancing substances that included blood doping, human growth hormones, testosterone and EPO.

APPENDIX C—Rowing Bibliography

This is a more comprehensive bibliography of rowing references. These references include but are not limited to all the references on rowing in this dissertation. This rowing bibliography attempts to extend the work of Brittain (1930) who published the first rowing bibliography but there appears to be no attempt to keep this up to date.

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APPENDIX D—Summary of Coaching Effectiveness Instruments

Coach Developmental Profile Interview, Côté, Ericsson, & Law, (2005).

Coaching Behavior Assessment System (CBAS), Smith, Smoll, & Hunt, (1977).

Leadership Sport Scale (LSS), Chelander & Saleh, (1978, 1980)

Arizona State University Observation Instrument (ASUOI) Lacy & Darst, (1984).

Sports Orientation Questionnaire (SOQ) Gill, Dzewaltowski, & Deeter, (1988)

Coach Feedback Questionnaire (CFQ) (Black & Weiss, 1992; Allen & Howe, 1998; Amorose & Horn, 2000)

Coaching Behavior Questionnaire (CBQ), Kenow & Williams, (1993)

The Coach Efficacy Scale (CES), Feltz, Chase, Moritz & Sullivan, (1999)

Coaching Behavior Scale for Sport (CBS-S) Côté, Yardley, Hay, Sedgwick, & Baker, (1999).

The Coach-athlete Relationship Questionnaire (CART-Q) Jowett & Ntoumanis, (2004).

Coaching Competence Scale (CCS) Myers, Wolfe, Maier, Feltz, & Reckase, (2006).

Coach Developmental Profile Interview, Côté, Ericsson, & Law, (2005)

Relevance to study	The primary construct of this instrument is past experience. This instrument was selected at for it's quantitative approach and was most suitable to determine experience as a predictor of coaching success as a measure of win/loss record.
Summary of instrument	A retrospective interview procedure was used to obtain a quantitative account of the developmental pathway of each coach (Erickson, Côté, Fraser-Thomas, 2007). Côté, Ericsson, and Law (2005) first proposed this procedure to examine the development of elite athletes that is based on athletes "recall of factual knowledge about concrete activities they engaged in throughout their development" (Côté et al., 2005, p. 4). The interview was designed to collect quantitative information that could potentially be verified using external sources, if needed, with specifics to each developmental activity.
Underpinning theories	The interview procedure proposed in this article was developed to trace the development of expert performance in sports (Côté et al., 2005) and to allow assessment of deliberate practice within the expert-performance framework (Ericsson & Smith, 1991). At this time, various procedures ranging from open-ended interviews (Bloom, 1985) to fixed-response questionnaires (e.g., Starkes et al., 1996) have been used to examine the activities that promote sport expertise throughout the lifespan.
Development process summary	This structured quantitative interview was designed for data collection by Gilbert, Côté, and Mallett (2006) to systematically assess significant activities coaches are involved with at various stages of their coach development. The interview provides a longitudinal and detailed account of a participant's performance as an athlete and as a coach. The interview was designed assuming individuals would recall past episodic experiences, which is more accurate and reliable than answers general questions (Côté, Ericsson & Law 2005). The goal of the interview is to gather longitudinal data on performance and types and amounts of activities that are engaged in through one's development.
Usefulness of the instrument	Gilbert, Côté, & Mallet (2006) modified this procedure for use with coaches. The modified interview contains preset questions designed to collect demographic information and assess coaches' previous experiences as athletes, as coaches, and in formal education, with questions based on the principles of reliable and valid retrospective data collection outlined by Côté, Ericsson, and Law (2005). Thus, only objective, quantifiable, potentially verifiable data (e.g., number of seasons played) were collected, as opposed to subjective information that might be more prone to distortion over time (e.g., enjoyment ratings). In addition, data were gathered in the simplest units possible in an attempt to make recall as objective and straightforward as possible. For example, to determine total number of games played or coached for each team or level, participants were only asked to recall the number of seasons played or coached and the number of games per season, thus requiring some calculation on the part of the interviewer. Erikson, Wilson, Horton, Young & Côté (2007) using the Coaching Development Interview Profile found immigrant coaches to

	Canada who were career-oriented rather than leisure-orient coaches were overqualified for the initial positions they found but the longer they stay the more the gap reduced.
Reliability determination	Young, Jemczyk, Brophy, & Côte (2009) found after conducting a comprehensive re-test reliability analysis found a significant in-class correlation on years of coaching ($r=0.99$) and hours interacting with athletes in training and competition ($r=0.74$).
Validity determination	Côté, Ericsson, & Law (2005) provided a detailed review of previous research that supports the accuracy, validity, and reliability of this methodology.
Item number	73 items
Items described	The 73-items profile begins with the demographic section of 20 items, a athlete profile of 4 items, athlete background of 8 items, coaching profile of 28 items and a coaching background sub-scale of 13 items.
Response number	Mixed
Response type	Open ended, and some Likert scale items
Response description	Not required
Sub-scales or one-dimensional	4 sub-scales
Subscale described	The four sub scales are demographic, athlete profile, athlete background, coaching profile and coaching background.
Domains in the literature	Sport coaching effectiveness
Target population	Sport coaches, athletes and parents
Items	<ol style="list-style-type: none"> 1. Name 2. Gender 3. Main sport currently coaching 4. Place of birth 5. Date of birth 6. Telephone # 7. Email address: 8. Country of Residence: 9. Occupation: 10. High School 11. Community College/TAFE: (area of specialization) 12. College/University - Undergraduate: (area of specialization) 13. College/University – Honors/Master’s: (area of specialization) 14. College/University - Doctoral: (area of specialization) 15. Other 16. Coach accreditation in [Sport] through National Coaching Accreditation Scheme 17. Years of coaching experience

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18. Years of coaching at present level:
 19. Coaching awards/recognitions won in your career at all levels of coaching:
 20. Coaching-related organizations membership in your coaching career.
 21. Sport
 22. Start Year
 23. End Year
 24. Total Years
 25. Sport level
 26. Assigned Leadership
 27. Role of participation
 28. Months per year in regular competition
 29. # of events/years
 30. Months per year of training
 31. Hours per week of training
 32. Overall ability at this level
 33. Sport Coached
 34. Year Started
 35. Year Finished
 36. Total Years of coaching
 37. #athletes coached at the club or school level
 38. #finalists coached at the club or school level
 39. #championships won at the club or school level
 40. #athletes coached at the regional level
 41. #finalists coached at the regional level
 42. #championships won at the regional level
 43. #athletes Coached at the state or provincial level
 44. #finalists coached at the state or provincial level
 45. #championships coached at the state or provincial level
 46. #athletes coached at the national level
 47. #finalists coached at the national level
 48. #championships won coached at the national level
 49. #athletes coached at the professional level (professional sport leagues)
 50. #finalists coached at the professional level (professional sport leagues)
 51. #championships won at the professional level (professional sport leagues)
 52. #athletes coached at the international level (other than Olympic or World Championship)
 53. #finalists coached at the international level (other than Olympic or World Championship)
 54. #championships won at the international level (other than Olympic or World Championship)
 55. #athletes coached at Olympic /World Championships
 56. #finalists coached at Olympic /World Championships
 57. #championships won at Olympic /World Championships
 58. Total Athletes coach
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59. Total Finals made
 60. Total Championships won
 61. Role on the Coaching Staff
 62. Age of athletes coaching
 63. Gender of athletes coached
 64. Level of competition
 65. # of coaches on coaching staff
 66. Hours per week coaching
 67. Months per year coaching
 68. Months per year of competition
 69. Number of competitions per year
 70. Hours of administration per week during competition
 71. Hours of administration per week during off season
 72. Hours per year in formal coach education
 73. Mentors contacted regularly through year
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Wall, M., & Côté, J. (2007). Developmental activities that lead to drop out and investment in sport. *Physical Education and Sport Pedagogy*, 12, 77–87.

The Coaching Behavior Assessment System (CBAS), Smith, Smoll, & Hunt, (1977)

Relevance to study	While this instrument has been one of the most used instruments in terms of coaching behavior and feedback. As compared to the Coaching Development Interview Profile it didn't appear to be able to provide the same quantitative analysis in terms of prediction to coaching success. This instrument focuses more on the coaching context than on coaching knowledge and experience
Summary of instrument	The Coaching Behavior Assessment System (CBAS) provides a very specific measure of coaching behavior with regard to feedback patterns. In a number of field studies, Smith and Smoll (1996) tested the relationship between coaches' behaviors and athletes' reactions; additionally the CBAS has been utilized to evaluate their Coach Effectiveness Training (CET) program, which provided evidence for a causal relationship between coach behaviors and athlete development. In a comprehensive program of research and intervention, coaches with the most positive impact on athletes' development typically follow four behavioral guidelines providing a high degree of positive reinforcement, mistake-contingent encouragement, corrective instruction, and technical instruction (Smith & Smoll, 1996).
Underpinning theories	The underlying investigation is that the coaching context is influenced by the coach, the athlete and their environment (Chelladurai, 1984, 1993; Cote, Salmela, Trudel, Baria & Russel, 1995; Smoll & Smith, 1993).
Development process summary	Smith, Smoll & Hunt (1977) developed a measure of coaching effectiveness by investigating coaching influence on the athlete's psychological development through sport using behavior observation to identified 12 behavioral categories. The CBAS was designed to examine the influence of the coach on the psychological development of children through sport (Abraham & Collins, 1998a, 1998b, 1998c), with a view to providing intervention recommendations, and to test the behavioral component of the MM. The CBAS was developed over a number of years through the observation and recording of youth soccer coaches' behaviors during practice and game sessions. Smith et al. developed the set of categories through the content analysis of the behavioral categories from previous studies. The resulting behavioral categories were then used as the basis for the observational instrument and applied to basketball, baseball, and American football coaches. Smith et al. concluded that the results of the scoring system were sufficient to incorporate a large variety of different coaching behaviors. Smith et al. (1977) developed the set of categories through the content analysis and were then used as the basis for the observational instrument and applied to basketball (Soloman, & Kosmitzki, 1996), baseball, and American football coaches.
	<p>The application of the CBAS required observers to be trained and competent in assessing the different behaviors of the coach. Each independent observer must agree on how a particular behavior is to be categorized to ensure reliability. Smith et al. (1977) developed a training program that was aimed at achieving high inter-rater reliability. The main purpose was to overcome the individual biases evident when different observers directly observe the same individual</p>

	and, consequently to increase the reliability of the research and the observational instrument.
Usefulness of the instrument	Reactive behavior of a coach occurs in response to an athlete's behavior and level of performance. Spontaneous behavior is not provoked or directly linked to the observed performance of the athlete, and the behavior may be either relevant or irrelevant to a game or performance. In one major study, approximately two-thirds of all observed behaviors fell into the categories of positive reinforcement, general technical instructions, or general encouragement. The observed behavior of the coach can be compared with athletes' perception of the coach's behavior and the coach's self-perception. Coaching behavior can be modified with training.
Reliability determination	The reliability of the CBAS has been questioned despite the effort by Smith et al. to examine and improve the reliability of the coding system. Smith et al. (1977) developed several procedures to improve the reliability of the CBAS. These procedures included a training manual for extended study by observers, group instruction in the use of the scoring system through video tape, written tests that require the defining of the 12 categories and scoring of behavioral examples, scoring of videotaped sequences, and extensive practice and reliability checks in field settings (Chelladurai & Riemer, 1998).
Validity determination	The CBAS, however, does provide information on the consistency of coaching behavior and identifies a range of results for interventions or coach development (e.g., Smith & Smoll, 1996). Chelladurai and Riemer (1998) concluded that the CBAS has shown content validity, however, after running a principal components analysis, they were unable to make a definitive statement regarding the construct validity. Despite the measures to ensure that the CBAS was a reliable instrument, Smith and Smoll (1990) stated that the CBAS is a broad coding system that does not make the distinction between important aspects of coaching behaviors, including verbal and non-verbal responses, the magnitude of the reinforcement, and quality and duration of instructions.
Item number	12 items
Items described	The 12 items are behavioral classes that divided into eight kinds of reactive behavior and four kinds of spontaneous behavior.
Response number	5-point
Response type	Likert
Response description	5 item likert scale, you never (1), rarely (2), sometimes (3), often (4), or always (5)
Sub-scales or one-dimensional	12 sub-scales
Subscale described	The CBAS focus on youth coaches, the LSS focuses on adults but both focus on leadership theories, the CBS-S is grounded in the essential components of coaching success (Cote et al., 1999). The CBS-S is distinct from the CBAS and LSS as it measures mental preparation, goal setting, personal rapport and negative rapport (Cote, et al, 1999). The LSS distinguishes itself from the

	CBAS and CBS-S as it measures the democratic and autocratic dimensions of coaching behavior although the internal consistency of the autocratic dimension is low (Gordon 1998, Spink 1996).
Domains in the literature	Sport coaches
Target population	Coaching behaviors in the CBAS are classified categorized into 12 categories, including eight reactive behaviors and four spontaneous coaching behaviors. Definitions of the 12 categories Smith et al. (1977) distinguished between the two types of behaviors with reactive behaviors having an identifiable stimulus and spontaneous behaviors having no identifiable or clear-cut antecedents.
Items	As a coach, I... <ol style="list-style-type: none"> 1. make statements such as “way to go” when athletes perform well. 2. do not yell statements of encouragement during practice or competitions. 3. make comments such as “shake it off” or “that’s all right” after a mistake is made. 4. instruct athletes on how to correct mistakes or flaws in their technique or performance. 5. voice disappointment regarding athletes’ performance following mistakes. 6. yell instructions to athletes following mistakes to motivate them to perform up to their potential. 7. ignore technical errors that athletes make during a competition. 8. have practices organized and running smoothly. 9. instruct athletes on needed strategies for an upcoming competition. 10. yell things such as “keep hustling” when the team is doing well. 11. assign athletes individual responsibilities during practices and competitions. 12. talk with athletes about academic problems.
References	<p>Abraham, A., & Collins, D. (1998a). Assessment and development of coaching expertise: A need to change the direction of research. <i>Journal of Sports Sciences, 16</i>(1), 69-70.</p> <p>Abraham, A., & Collins, D. (1998b). Declarative and procedural knowledge assessment in novice and intermediate coaches. <i>Journal of Sports Sciences, 16</i>(1), 70.</p> <p>Abraham, A., & Collins, D. (1998c). Examining and extending research in coach development. <i>Quest, 50</i>, 59-79.</p> <p>Côté, J., Yardley J., Hay, J., Sedgwick, W., & Baker, J. R. (1999). An Exploratory Examination of the Coaching Behavior Scale for Sport. <i>Avante, 5</i>(2), 82-92.</p> <p>Smith, R. E., Smoll, F. L., & Hunt, E. (1977). A system for the behavioral assessment of athletic coaches. <i>Research Quarterly, 48</i>(2) 401-407.</p> <p>Smith, R. E., & Smoll, F. L. (1990). Self-esteem and children's reactions to youth sport coaching behaviors: a field study of self-enhancement processes. <i>Developmental Psychology, 26</i>(6), 987-993.</p> <p>Smith, R. E., Smoll, F. L., & Christensen, D. S. (1996). Behavioral assessment</p>

and interventions in youth sports. *Behavior Modification*, 20(1), 3-44.

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Leadership Scale for Sports (LSS; Chelladurai & Saleh, (1978, 1980))	
Relevance to study	The LSS is an instrument that focuses on assessing leadership style. It was a consideration as it looks at coaching behavior, but was not going to provide the same details in terms of a coach's experience both as an athlete and as coach when compared to the Coaching Development Interview Profile.
Summary of instrument	The Leadership Scale of Sports measures coaching effectiveness by assessing the relationship between coaches perceived and preferred behavior and athlete performance and/or satisfaction (Chelladurai, & Saleh, 1978). The LSS evaluates (a) athletes' perceptions of the coach's behavior, (b) athletes' preferred coach behavior, and (c) the coach's perception of their own behaviors (Smith & Bar-Eli, 2007).
Underpinning theories	A coach's leadership styles underlies the emotional atmosphere of a training session (Salminen, & Liukkonen, 1996). Underlying the development of the Leadership Scale of Sport is that coaching behavior in competition, training and organization are affected by coaching personal characteristics, athlete personal characteristics and the contextual factors facing their development (Côté, Yardley, Hay, Sedgwick, & Baker, 1999). Studies in sport leadership have covered areas including coach's personality (Sage, 1975), decision style (Lenk, 1977), situational leadership (Bird, 1977), coaching behavior (Chelladurai & Carron, 1978; Chelladurai & Saleh, 1978, 1980; Chelladurai, 1978).
Development process summary	The Leadership Scale for Sport (LSS) was developed in conjunction with the model the MML (Chelladurai & Saleh, 1980) to measure sport leadership behaviors, the perception of their leader's behavior and the perceptions of their own behaviors (Smith & Bar-Eli, 2007).
	Jambor & Zhang (1997) and Zhang, Jensen, & Mann (1997) developed the Revised Leadership Scale for Sport (RLSS). Using a three-stage process, Zhang et al. (1997) interviewed coaches from different sports and accumulated 240 new items that were added to the original 40. In the second stage, three linguistic experts and 17 expert coaches reviewed and revised the list, focusing on the consistency of the added items to the original. Through this process, the 240 items were subsequently reduced to 120. The 120 items were then administered in a questionnaire to 696 athletes and 206 coaches. Zhang et al. (1997) conducted a factor analysis of the 120 items, applying different items. The RLSS, was found to include the following factors: democratic behavior, positive feedback behavior, situational consideration factor, social support, teaching and instruction, and autocratic behavior. The RLSS has been found to have a high internal consistency, reporting alpha coefficients of .70, and above, however, the scale has only been applied in a limited number of situations (Zhang et al., 1997). Jambor and Zhang (1997) completed one of the few studies published using the RLSS. Jambor et al. (1997) investigated the leadership behaviors of 162 high school and college coaches and compared the responses from the coaches and found that there were no significant gender differences. There were, however, significant differences between the different

levels of coaching. Jambor et al. (1997) reported inadequate low internal consistency for the RLSS reporting alpha coefficients that ranged from .52 to .84 for the six subscales. Due to several of the alpha coefficients being below .70 the reliability of the results must be questioned.

Beam, Serwatka, & Wilson (2004) used the RLSS to examine the leadership preferences of student-athletes and compared the results, based on gender, competition level, task dependence, and task variability. Beam et al. found that significant differences occurred between gender, with female athletes preferring situational consideration and training and instruction behaviors, while male student-athletes showed significantly greater preferences for autocratic and social support behavior. Furthermore, Beam et al. found that independent sport athletes preferred more democratic behaviors, positive feedback, situational consideration, and social support behaviors when compared to team sport athletes. Beam et al., however, failed to assess the reliability and validity of the RLSS. Further evaluation and more detailed research in sport settings are required before the merits of the RLSS can be determined. The RLSS, however, is a viable alternative to the often criticized LSS.

To evaluate the coaches' leadership behavior we administered the 21-item British version of the Leadership Scale for Sport (LSS; Lee, Williams, Cox, & Terry, 1993), translated and adapted to the Croatian language (Barić, 2004). We wanted to obtain the athletes' and coaches' evaluations of the coaches' leadership styles, so both the athletes and the coaches responded to the same questionnaire. The items were rated on the 5-point Likert-type scale, ranging from 1 (never), to 5 (always). The Cronbach's alpha coefficients obtained for the four dimensions of coaches' leadership styles were: explanation and instructions (.70 and .74), democratic style (.68 and .82), positive feedback (.62 and .69) and social support (.62 and .78) for the coaches and the athletes, respectively. In this version of LSS the autocratic scale was omitted due to its low reliability and questionable validity (Lee, et al., 1993).

Usefulness of the instrument	The leadership aspect of coaching effectiveness is a cornerstone instrument in sports coaching science. Specifically for the purpose of this study of analyzing coaches' self-reflection and past experiences the LSS is not as well matched in terms of the constructs of past performance and coach developmental profiles as the Coaching Developmental Profile Interview.
Reliability determination	The validity and reliability of the LSS have been demonstrated, but, the results are inconsistent, and as such, conclusions drawn from studies using the LSS should be viewed with caution, particularly with regard to the autocratic behavior dimension (Chelladurai, 1993). Reliability and validity of the LSS are reported in Chelladurai and Reimer (1998).
Validity determination	The autocratic behavior subscale has continually shown poor internal consistency with reported Cronbach's (1951) alpha coefficients ranging between .11 and .79 (Chelladurai & Reimer, 1998).
Item number	40 items

Items described	The 40 items include 13 items for training and instruction, 9 items for democratic behavior, 5 items for autocratic behavior, 8 items for social support, and 5 items for positive feedback.
Response number	5-point
Response type	Likert
Response description	5-point scale ranging from 1 (never) to 5 (always) (e.g., “My coach ... lets the athletes share in decision making”).
Sub-scales or one-dimensional	5 sub-scales – training and instruction, democratic behavior, autocratic behavior, social support, positive feedback.
Subscale described	<p>The LSS is distinct from the CBAS and CBS-S as it measures the democratic and autocratic dimensions of coaching behavior although the internal consistency of the autocratic dimension is low (Gordon 1998, Spink 1996). The CBAS focus on youth coaches, the LSS focuses on adults but both focus on leadership theories, the CBS-S is grounded in the essential components of coaching success (Cote et al., 1999).</p> <p>Chelladurai et al. (1978, 1980) measured a wide array of general leadership behaviors including: (a) training-instruction (i.e., the degree to which the coach conducts hard and strenuous practices and is engaged in instructing athletes in skills, techniques, and tactics of the sport), (b) positive feedback (i.e., the degree to which the coach provides the athletes with positive and encouraging feedback), (c) democratic behavior (i.e., the degree to which the coach encourages the athletes to participate in decisions regarding the team), (d) autocratic behavior (i.e., the degree to which the coach stresses his/her own personal authority for decisions regarding the team), and (e) social support (i.e., the degree to which the coach exhibits concern for the personal well-being of the athletes).</p>
Domains in the literature	Sport
Target population	Athletes and coaches
Items	<p>My coach;</p> <ol style="list-style-type: none"> 1. Sees to it that every athlete is working to his/her capacity 2. Explains to each athlete the techniques and tactics of the sport. 3. Pays special attention to correcting athlete's mistakes. 4. Makes sure that his/her part in the team is understood by all the athletes. 5. Instructs every athlete individually in the skills of the sport. 6. Figures ahead on what should be done. 7. Explains to every athlete what he/she should and what he/she should not do. 8. Expects every athlete to carry out his assignments to the last detail. 9. Points out each athlete strengths and weaknesses. 10. Gives specific instructions to each athlete as to what he/she should do in every situation.

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11. Sees to it that the efforts are coordinated.
 12. Explains how each athlete's contribution fits into the total picture.
 13. Specifies in detail what is expected of each athlete.
 14. Asks for the opinion of the athletes on strategies for specific competitions.
 15. Gets group approval on important matters before going ahead.
 16. Let his/her athlete share in decision-making.
 17. Encourages athletes to make suggestions for ways for conducting practices.
 18. Lets the group set its own goals.
 19. Lets the athletes try their own way even if they make mistakes.
 20. Asks for the opinion of the athletes on important coaching matters.
 21. Let's athletes work at their own speed.
 22. Lets the athletes decide on the plays to be used in a game.
 23. Works relatively independent of the athletes.
 24. Does not explain his/her actions.
 25. Refuses to compromise a point.
 26. Keeps to himself/herself.
 27. Speaks in a manner not to be questioned.
 28. Helps the athletes with their personal problems.
 29. Helps members of the group settle their conflicts.
 30. Looks out for the personal welfare of the athletes.
 31. Does personal favors for the athletes.
 32. Expresses affection he/she feels for his/her athletes.
 33. Encourages the athletes to confide in him/her.
 34. Encourages close and informal relations with athletes.
 35. Invites athletes to his/her home.
 36. Compliments an athlete for his performance in front of others.
 37. Tells an athlete when he/she does a particular good job.
 38. Sees that an athlete is rewarded for a good performance.
 39. Expresses appreciation when an athlete performs well.
 40. Gives credit when credit is due.

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Arizona State University Observation Instrument (ASUOI) Lacy & Darst, (1984)

Relevance to study THE ASUOI is another well-known and frequently used instrument looking at coaching behavior and instruction. It was not used in this study primarily because it is time consuming process of data collection when observing coaching behavior. It would no have been possible to observe 153 coaches as was the case with this study.

Summary of instrument The ASUOI provides a more detailed record of the teaching behaviors of coaches and divides instructional categories for separate classes: pre-instruction, concurrent and post-instruction and questioning. The ASUOI was based on an event recording system, which provides researchers with a number of behaviors observed in each category over a specified time period and is one of the most widely used observation instruments used in coaching research (Kahan, 1999).

The ASUOI includes several instructional categories breaking down generic instruction unlike other studies. The ASUOI focuses on coaches' behaviors in training and competition settings and is a commonly used instrument for evaluating the practice time of athletic teams. The literature on coaching behavior draws on a variety of athletic settings such as;

- archery (Dugas, 1983; Van der Mars, & Darst, 1991)
- athletics (Rate, 1981)
- baseball (Rupert & Buschner, 1989)
- basketball (Becker & Wrisberg, 2008; Bloom, Crumpton, & Anderson, 1999; Hastie, 1999; Lacy & Goldston, 1990; Tharp & Gallimore, 1976; Williams, 1978),
- football (Lacy & Darst, 1985; Langsdorf, 1979; Model, 1983; Segrave, & Ciancio, 1990; Tovell & Gravele, 2009),
- gymnastics (Buschner, Colligon, Thornburg, & Moulton, 1985)
- field hockey (Dodds & Rife, 1981)
- ice hockey (Gilbert & Trudel, 2000; Hastie, 1999),
- rugby union (Brewer & Jones, 2002)
- soccer (Cushion & Jones, 2001; Potrac, Jones, & Armour, 2002),
- tennis (Claxton, 1988), and
- volleyball (Hastie, 1999; Lacy & Martin 1994; McKenzie, 1986; Stewart & Bengier, 2001).

Underpinning theories Flanders (1963, 1970) originally developed a research tool to analyze instructional interactions by categorizing style and quantity of verbal dialogue to provide a picture of the quality of the interactions that facilitated learning in the classroom. Tharp and Gallimore (1976) pioneered the first best practices in sport coaching by documenting observation of instruction of successful UCLA basketball Coach John Wooden, using a 10 category system. Langsdorf (1979) added two items to Tharp & Gallimore (1976) observation instrument and developed the Coaching Behaviors Recording Forms as a means of summarizing and interpreting the data by viewing different segments of practice.

Development process summary The original ASUOI advanced the work of Tharp & Gallimore (1976) and Langsdorf (1979) to record the behaviors of coaches using videotape with interval recording (Lacy & Darst, 1984). Claxton (1988) observed the behavior of coaches using both event recording (frequency of behavior) and interval recording (times spent conducting a certain behavior) procedures. Event recording showed that instruction was the most frequently observed behavior, consistent with earlier research. However, the interval recording data found that instruction accounted for less than 10% of the recorded intervals of coaching behaviors during training (Claxton, 1988). These results indicated that the two methods provided divergent information on the amount of instruction transmitted from coach to player during practices.

Many observation tools are used within sports coaching environments and typically use an event recording format. When event recording systems are used, such as the ASUOI, studies have shown that instruction was the most frequently exhibited behavior (Lacy & Darst, 1985; Lacy & Goldston, 1990; Langsdorf, 1989; Tharp & Galimore, 1976).

Other coaching observation tools have been introduced since the early research by Tharp and Gallimore (1976) and Smith, Smoll & Hunt, (1977) including the Lombardo Coaching Behavior Analysis System (LOCOBAS) (Lombardo, 1989), the Coach Observation Schedule (COS) (Rushall, 1989), Coaching Observation System of Games (COSG) (Trudel, Côté, & Bernard, 1996), the Computerized Coaching Analysis System (CCAS) (Jenkins & Hughes, 1995) and the Coaching Behaviors Observational Recording System (Tannehill & Burton, 1989). In many studies using the ASUOI, researchers modified the original instrument to create more detailed behavior categories and to tailor the instrument to the particular focus of their individual studies.

Lacy & Martin (1994) expanded the ASUOI with a two-way ANOVA to show no significant difference between motor skill engagement and coaching behaviors in different segments of pre-season practice in collegiate women's volleyball.

Silverman & Zotos (1987) compared different methods of coding motor skill engagement (MSE) and found that duration recording was more accurate than two other interval recording methods. Therefore, duration recording was utilized for measuring MSE. Head coaches submitted a list of starters and nonstarters, and players to be observed were then selected for each session. Four players (2 nonstarters and 2 starters) were asked to wear scrimmage vests to allow for coding MSE from the videotapes for each practice session. Different starters and nonstarters were selected for each practice session. Most teams had at least 12 players, and whenever possible, no player was coded more than once. This allowed for all 6 starters and nonstarters to be identified and coded for MSE in one practice each.

Usefulness of Coach-athlete interactions also occur outside of practice time. These

the instrument

interactions, discussions and counseling meetings are often critical to athlete development along with the times spent by coaches in planning and review of training sessions. The time is spent around each practice and are also important factors that don't seem to be accounted for in this observation instrument. While instruction is a key component for skill acquisition, the management aspect (non sport specific interactions) have many dimensions outside of practice time when it comes to athlete management and ultimately facilitating athlete development.

Another practical aspect of this instrument is that observation is necessary to view the practice session in order to get a true picture of what is taking place, which often necessitates the evaluation being derived from observation of the practice (Jubenville, 1999). For a sport like rowing, mid-competition and in some cases mid-training coaching is not possible. This is a result of the constraint of being on the water. For example, for practical reasons, such as over crowding or protecting water quality (some bodies of water, i.e lakes, etc, are also used for community drinking water) as a result some coaching environments don't allow for access to the water for coaches, which means coaching is conducted from a bike. This makes for the pre-racing and pre-training interactions even more valuable and potentially an area for further investigation with use of an instrument like the ASUOI.

According to Lacy & Martin, (1994), the relevance of pre, post and during coaching activities for training and competition is essential for development profiles of elite coaches. Some of these insights include;

1. The majority of preseason practice sessions were spent in the skill-work segment (77.8%), followed by warm-up (12.4%), scrimmage (7.7%), and conditioning (2.2%).
2. There were no differences in time spent with players motor skill engagement (MSE) between starters and nonstarters in the total practice time or in the warm-up and drill segments of preseason practices. Overall, players spent an average of 31.1% of practice time engaged in MSE.
3. Outside of silence (35.3%), the total intervals were in some form of instruction (39.8%), by combining the categories, pre-instruction (9.4%), concurrent instruction (10.2%), correction (10.7%), praise-skill (6.7%), questioning (1.8%), and scold-skill (1.0%).
4. The overall praise-to-scold ratio was almost 7:1. A major factor in this ratio was the infrequent use of scold by coaches in reaction to both skill attempts and players' conduct.
5. Of 30,766 total interval scored, 43.2% were specific in nature as compared to 5.4% that were general. Because silence (35.3%) and absence (3.9%) are nonverbal, an overwhelming majority of verbal behaviors were specific (Lacy & Martin, 1994).

Rushall (1980) found that shown that coaches of different sports use different coaching behaviors. For example team sport versus individual sports would be

	<p>an obvious difference in the quantity and type of interactions between coach and athlete during face to face coaching time. Hastie (1999) compared between different types of team sports, such as football to basketball, this analysis could focus on gender differences, such as a male coach interacting with female athletes and vice versa.</p>
Reliability determination	<p>To minimize measurement error, the intra-observer reliability of both instrument and the researcher was established (Thomas, & Nelson 1996). Intra-observer reliability refers to the extent to which there is agreement between different records of the same event, made by the same observer, but at different times (Brewer & Jones, 2002). This indicates the test-retest reliability of both the observer and the instrument. An intra-observer reliability test was carried out by analyzing a videotaped coaching session using time-sampled event recording (Claxton, 1988). Following a two-week time period, in order to allow memory lapse, the researcher analyzed the same coaching session again. The level of intra-observer reliability was then determined by calculating the percentage of agreements between observations 1 and 2 for both the frequency (the number of times behaviors were recorded) and duration (the percentage of total time devoted to each behavior) of each behavior classification. Here, the agreement percentages exceeded the accepted level of 85 per cent (Van der Mars, 1989).</p>
Validity determination	<p>Face validity, according to the criteria set by (Cheffers, 1977), was met because the fourteen behavior categories are specifically designed and distinctly related to coaching behavior (Lacy & Darst, 1989). The ASUOI was validated within the context of pilot study and was carried out to determine its suitability to investigate the instructional behaviors of top-level soccer coaches within the practice environment. The pilot study was conducted on a sample of six semi-professional soccer coaches who had the same qualifications as the participants in the main study. Forty-five minutes of 18 concurrent training sessions spread over a period of six weeks were observed. The pilot study revealed that no new behavioral categories needed to be added to the existing ASUOI, while the 'uncodable' category was recorded at the levels of previous research in other sports. In keeping with the recommendations of Brewer and Jones (2002), a further panel of five top-level soccer coaches was also invited to provide written feedback about the behavioral categories of the ASUOI (Brewer & Jones, 2002). The resulting feedback from the panel of coaches indicated agreement that the behavioral categories were adequately comprehensive and reflective of coaching behaviors in soccer. Consequently, it was concluded that the ASUOI allowed for the gathering of valid descriptive-analytic data concerning the coaching behaviors of top-level soccer coaches during practice sessions.</p>
Item number	Interval recorded (5-s observe, 1-s code)
Items described	Using the videotapes, the behaviors of coaches are interval recorded (5-s observe, 1-s code).
Response number	Observed behavior

Response type	Not required
Response description	Coded to sub-scales
Sub-scales or one-dimensional	14 sub-scales
Subscale described	The ASUOI focuses on fourteen different codes including: use of name; pre-instruction; concurrent instruction; post instruction; questioning; physical assistance; positive modeling; negative modeling; hustle; praise; scold; management; uncodeable; and silence (Lacy & Darst, 1984).
Domains in the literature	Sport
Target population	Team sport settings
Items	<ol style="list-style-type: none"> 1. Pre-instruction – instruction preceding desired action (e.g. “<i>Reach out further on the next one!</i>”) 2. Concurrent instruction cues during execution of desired action (e.g. “<i>Stick your chest up more and sit taller!</i>”) 3. Post-instruction – feedback after desired action has been executed (e.g. “<i>You can be more dynamic than that!</i>”) 4. Questioning – asking question (e.g. “<i>Why don’t you give a little more on the next one? How can we improve on this?</i>”) 5. Manual Manipulation – Physically moving body parts (e.g. “<i>Feel the connection here in the last, just under your arm pit!</i>”, “<i>Keep you chest up!</i>”) 6. Positive modelling – demonstration of correct action (e.g. “<i>Strong grip, elbows high!</i>”) 7. Negative modelling – demonstration of incorrect action (e.g. “<i>Don’t let go of the handle, keep you grip around the handle, wrists higher!</i>”) 8. Use of first name 9. Hustle – encouragement to intensify efforts (e.g. “<i>Let’s go!</i>”, “<i>Stay tough!</i>”) 10. Praise – compliment or expression of pleasure about an executed action (e.g. “<i>That looks pretty good!</i>”) 11. Scold – expression of displeasure about an executed action (e.g. “<i>What are you doing?</i>”) 12. Management – questions or comments not referring to fundamental sport (e.g. “<i>How is your shoulder feeling?</i>”). 13. Silence 14. Other – uncodeable behavior not fitting into other categories
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Sports Orientation Questionnaire (SOQ) Gill, Dzewaltowski, & Deeter, (1988)	
Relevance to study	A measure of achievement in the context of level of competitiveness would be a very interesting comparison to coaching success. It was a decision in this study to look more specifically at coaching experience than a coach's competitiveness when considering predictors of coaching success.
Summary of instrument	The Sport Orientation Questionnaire (SOQ) is a multidimensional measuring of sport achievement orientation, win orientation (outcome), goal orientation (performance), and competitiveness. The SOQ consistently yields strong gender differences, with males scoring higher than females on competitiveness and win orientation but not on goal orientation (Gill, 1986; Gill & Deeter, 1988). Martin & Gill (1991) found that athletes with high levels of sport confidences were all high in winning and goal orientation and goal orientation was a significant predictor of self efficacy for performance.
Underpinning theories	The SOQ is a sport-specific measure of achievement orientation to measure personality and individual differences in approaches to competitive sport situations but it not only is sport-specific but also approaches achievement orientation as a multidimensional construct (Gill 1986; Gill, Dzewaltowski, & Deeter, 1988)..
Development process summary	The Sport Orientation Questionnaire (SOQ) developed by Gill and Deeter (1988) has three subscales measure win orientation (outcome), goal orientation (performance), and competitiveness. In addition, concurrent validity was established with the Work and Family Orientation Questionnaire (Helmreick & Spence, 1978).
Usefulness of the instrument	This instrument is a useful tool to indicate the outcome and process orientation of a coach and their level of competitiveness all important qualities in an athlete but also in a developing coach. Acevedo, Dzewaltowski, Gill, & Noble, (1992) that the gender differences found in other studies were not as extreme for ultra marathoners and this may be an interesting future study in the case of other sports such as rowing and to also explore their goal orientations as compared to other studies. For the purpose this study this is as useful a tool that selected instruments, but could be useful for future studies to look at the type of outcome and process orientation at different stages of a coaches' development
Reliability determination	Gill and Deeter (1988) reported test-retest reliability from .73 to .89 and internal consistency coefficients from .79 to .95 for the three subscales. A series of exploratory and confirmatory factor analyses revealed a consistent, logical three-factor structure across three separate samples. Alpha reliability coefficients and test-retest correlations indicated that the three subscales of competitiveness (the desire to enter and strive for success in sport competition), win orientation (a focus on interpersonal standards and winning), and goal orientation (a focus on personal standards) were internally consistent and stable over time.
Validity determination	Evidence for the validity of the SOQ, as competitiveness measure consistently differentiated students in competitive classes from those in noncompetitive classes and competitive sport participants from non-

participants (Gill, 1993). Construct validity has also been demonstrated as the SOQ differentiates students in competitive activities from those in noncompetitive activities (Gill & Deeter, 1988). Several researchers question the validity of traditional unidimensional achievement motivation measures for predicting achievement behaviors across varied general achievement situations (Gill, Williams, Dowd, Beaudoin, & Martin, 1996). The findings obtained with both high school and university students provided convergent and divergent evidence for the validity of the SOQ. SOQ scores were highly correlated with other competitiveness measures, moderately correlated with general achievement measures, and uncorrelated with competitive anxiety and social desirability. Competitiveness scores were the strongest discriminators between competitive sport participants and non-participants, but SOQ scores were weaker discriminators for noncompetitive achievement choices. The findings confirm the value of a multidimensional, sport-specific achievement measure and provide good evidence for the validity of the Sport Orientation Questionnaire (Gill, 1993).

Item number	25 items		
Items described	The SOQ is a 25-item scale with three subscales that assess competitiveness, goal orientation, and win orientation (Gill & Deeter, 1988). Scores range from 13 to 65 for the 13-item competitiveness subscale and from 6 to 30 for the 6-item goal and win orientation subscales		
Response number	5-point		
Response type	Likert		
Response description	Subjects respond on a 5-point Likert-type scale anchored by strongly agree (5 points) and strongly disagree (1 point).		
Sub-scales or one-dimensional	3 sub-scales		
Subscale described	The SOQ yields three scores: competitiveness, win orientation, and goal orientation.		
Domains in the literature	Sport coaching effectiveness		
Target population	University and high students		
Items	<p>Competitiveness</p> <p>1. I am a determined competitor. 3. I am a competitive person. 5. I try my hardest to win. 7. I look forward to competing. 9. I enjoy competing against others. 11. I thrive on competition. 13. My goal is to be the best</p>	<p>Win orientation</p> <p>2. Winning is important. 6. Scoring more points than my opponent is very important to me. 10. I hate to lose. 14. The only</p>	<p>Goal orientation</p> <p>4. I set goals for myself when I compete. 8. I am most competitive when I try to achieve personal goals. 12. I try hardest when I have a</p>

<p>athlete possible. 15. I want to be successful in sports. 17. I work hard to be successful in sports. 19. The best test of my ability is competing against others. 21. I look forward to the opportunity to test my skills in competition. 23. I perform my best when I am competing against an opponent. 25. I want to be the best every time I compete.</p>	<p>time I am satisfied is when I win. 18. Losing upsets me. 22. I have the most fun when I win.</p>	<p>specific goal. 16. Performing to the best of my ability is very important to me. 20. Reaching personal performance goals is very important to me. 24. The best way to determine my ability is to set a goal and try to reach it.</p>
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Coach Feedback Questionnaire (CFQ) (Black & Weiss, 1992; Allen & Howe, 1998; Amorose & Horn, 2000)	
Relevance to study	CFQ is another feedback instrument and was a consideration for this study as coaching behaviors are a critical element of coaching success. Not unlike the ASUOI, the CFQ would be an interesting measure of coaching interactions, but does not fit the specific nature of this study when it comes to looking at experience as a predictor of coaching success.
Summary of instrument	The athletes' perceptions regarding the type of feedback their coaches give them in response to their performance successes and failures was measured by the CFQ (Amorose & Horn, 2000). The CFQ is a pen and paper version of the CBAS observational tool for assessing coaches' behaviors (Smith, Smoll, & Hunt, 1977).
Underpinning theories	Underlying foundations of the CFQ is the CBAS.
Development process summary	In developing the CFQ, Amorose and Horn (2000) generated 16 items that represented eight types of coaching feedback that were taken directly from the CBAS instrument. The eight types of feedback include the following: 1) Reinforcement ("Good play!"); 2) Nonreinforcement (Coach ignores your good performance or play; 3) Reinforcement plus technical instruction ("Way to go! You really extended your elbow that time"); 4) Mistake-contingent encouragement ("That's O.K. Keep working at it!"); 5) Ignoring mistakes (Coach ignores your error or poor performance); 6) Punishment ("That was a really stupid play"); 7) Mistake-contingent technical instruction ("No that's not right, you need to work on a faster release"); and 8) Punishment plus technical instruction ("Your technique looks lousy! Keep your head up").
Usefulness of the instrument	The value for a coach in receiving feedback can strength both the coach athlete relationship in addition to providing the coach an opportunity to reflect on one's own practices and further develop a deeper understanding of the development of that particular athlete. This instrument has value on a number of levels with regard to this study on self-reflection and past experience as predictors of coaching effectiveness.
Reliability determination	Amrose and Horn's (2000) study included NCAA Division 1 and 3 collegiate athletes. Their factor analysis of the athletes' responses to the 16 CFQ items revealed three factors: 1)Positive and informational feedback (alpha = .72); 2) Punishment-oriented feedback (alpha = .33); and 3) Non reinforcement I Ignoring mistakes (alpha = .78). The psychometric properties of the CFQ they presented were acceptable, although presently the CFQ has only been used in their single published study.
Validity determination	A principal components analysis with varimax rotation (oblique rotation was similar) resulted in the identification of three conceptually distinct factors. Again, due to small communality value two items were eliminated from the study. These three factors accounted for 61.2% of the variance. A minimal loading of 0.40 was used as a criterion value in the interpretation of individual factors. Each item loaded on only one factor.

	<p>CFA (maximum likelihood method) indicated exactly the same factor structure that emerged in the exploratory analysis. Examination of the factor loadings indicated that items on Factor 1 described the teacher's feedback, which can be characterized as positive and information-based feedback given as responses to students following performance. Given these characteristics of the feedback and loadings, Factor 1 was labeled perceived positive specific feedback. Items loading on Factor 2 described the teacher's feedback, which can be characterized as encouraging, praising and confirming based feedback given in responses to the performance success of students. Hence, Factor 2 was labeled perceived positive general feedback. Finally, examination of the items loading on Factor 3 described the teacher's feedback, which can be classified as information about students' performance and was thus labeled perceived knowledge of performance. The internal consistency of the PTF subscales were perceived positive specific feedback (0.74), perceived positive general feedback (0.71), and perceived knowledge of performance (0.70).</p>
Item number	16 items
Items described	For each of the 16 items, athletes were asked to indicate on a 5-point scale (not at all typical to very typical) how typical it is for their coach to give them that particular type of feedback during practices and games.
Response number	5-point
Response type	Likert
Response description	Indicated on a 5-point scale (not at all typical to very typical) how typical it is for their coach to give them that particular type of feedback during practices and games.
Sub-scales or one-dimensional	8 sub-scales
Subscale described	The eight categories of feedback are praise/reinforcement, non-reinforcement and reinforcement combined with technical instruction (players performance success), responses to (error) are mistake contingent encouragement, ignoring mistakes, corrective instruction, punishment and corrective instruction (punishment)
Domains in the literature	Sport coaching effectiveness
Target population	Sport coaches and athletes
Items	<p>Coaching Responses to Player's Successes</p> <p>Listed below are six examples of feedback your coach might give you after you have had a successful performance in a game or practice. Rate each statement in terms of how typical your coach gives you this kind of feedback after you have had a successful performance.</p> <ol style="list-style-type: none"> 1. "Good play!" 2. The coach ignores your good performance.

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3. "Way to go! You really extended your elbow that time."
 4. "Great play. Now you're keeping you eyes on the ball."
 5. "Excellent work in practice today."
 6. Coach doesn't say anything to you about your good performance. game or practice.

Please rate each statement in terms of how typical your coach gives you this kind of feedback you have had a performance error or poor play.

1. "That's O.K. Keep working at it!"
 2. Coach ignores your error or poor performance.
 3. "That was a really stupid play!"
 4. "You dropped your elbow. Next time keep it up."
 5. "How many times have I told you to extend your elbow?"
 6. "Hang in there! You will do better next time."
 7. Coach doesn't say anything to you about your error or poor performance.
 8. "Your technique looks lousy! Keep you head up."
 9. "That play sucked!"
 10. "No, that's not right. You need to work on a faster release."
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Coaching Behavior Questionnaire (CBQ), Kenow & Williams, (1993)	
Relevance to study	The CBQ is a way of understanding athletes responses to coaching behavior and while it looks at personal characteristics of coach was not close enough to the needs consider important for this study on predictors of coaching success.
Summary of instrument	The CBQ measures athletes' evaluative reactions to aspects of their coach's behavior, but it measures a fairly specific subset of coaching behaviors and in a rather targeted scenario (i.e., competition against a top opponent). The CBQ is a coaching effectiveness measure as it includes three distinct versions, which are a required, actual, and preferred version and comprises of two sections: (a) a 12-item demographics section, and (b) a 48-item coaching behavior section. The CBQ is a valuable tool for measuring athletes' evaluative reactions to aspects of their coach's behavior, but it measures a fairly specific subset of coaching behaviors and in a rather targeted scenario (i.e., competition against a top opponent).
Underpinning theories	Smith and Smoll's mediation model is the theoretical framework for the CBQ (Tenenbaum & Eklund, 2007). The CBQ is based on Smith, Smoll, and Hunt's (1977) Coaching Behavior Assessment System and Chelladurai and Saleh's (1978; 1980) Multidimensional Model of Leadership (Kenow et al., 2003). The theoretical base for this instrument is Smoll and Smith (1989) who examined the athletes-coach relationship to occasional factors and the personal characteristics of the coaches.
Development process summary	The tool of measure has as base the theoretical model of Smoll and Smith, (1989) and examines the concept of the male and female athletes for the coaches in relation to occasional factors and the personal characteristics of the coaches.
Usefulness of the instrument	Three competency domains stipulated in the National Standards for Athletic Coaches (National Association for Sport and Physical Education [NASPE], 1995) not fully covered by the CBQ are: (a) athletes' growth, development, and learning, (b) psychological aspects of coaching, and (c) skills, tactics, and strategies. For athletes' growth, development, and learning, coaches are expected to provide competent instruction to develop specific motor skills. In the psychological domain, a coach is expected to demonstrate effective motivational skills and conduct practices and competitions to enhance social/emotional growth and promote good sportsmanship in athletes. Within the skills, tactics, and strategies domain, coaches are expected to apply appropriate competitive strategies. An instrument that more fully measures athletes' evaluations of their head coach in these three competency domains is warranted.
Reliability determination	The results of internal consistency show satisfactory Cronbach's alpha levels of (Supportiveness /Emotional 0.73 and Negative activation 0.63). The two factors were negatively, moderately correlated ($r = -$

	.38, $p < .01$).
Validity determination	The CBQ allows athletes to evaluate their coach's typical behavior, specifically his or her negative activation and supportiveness/emotional composure during competition against a top opponent. Evidence has been provided for the proposed two-factor structure, the internal reliability, and the external aspect of validity of the instrument's measures (Williams et al, 2003).
Item number	28 items
Items described	There are 21 substantive items and 7 fillers. The CBQ has a stem that begins with "A coach at this level...", the CBQ actual version begins with the stem "My coach...", and the CBQ preference version starts with the stem "I prefer a coach who...". Therefore, the CBQ is a self-report measure of coaching behavior that combines the multidimensional model provided by the LSS, as well as the twelve coaching behavior categories developed for the CBAS.
Response number	4-point
Response type	Likert
Response description	Participants rate 1 strongly disagree and 5 strongly agree
Sub-scales or one-dimensional	3 sub-scales
Subscale described	The three categories include (a) coactive (e.g., archery and golf) in which little interaction among teammates is required to be successful, (b) interactive (e.g., basketball and baseball) which requires teammates working together to be successful, and (c) mixed (e.g., track and field and gymnastics) which requires varying degrees of both coactive and interactive participation (Cox, 1990; Cratty, 1989).
Domains in the literature	Sport coaching effectiveness
Target population	High school and collegiate athletes: The preferred version of the CBQ was administered to high school and collegiate female athletes (Kravig, Ludtke, & Martin, 2002). Kravig and colleagues divided athletes into three separate categories based upon the sport classification system developed by Cox (1990). The three categories include (a) coactive (e.g., archery and golf) in which little interaction among teammates is required to be successful, (b) interactive (e.g., basketball and baseball) which requires teammates working together to be successful, and (c) mixed (e.g., track and field and gymnastics) which requires varying degrees of both coactive and interactive participation (Cox, 1990; Cratty, 1989).
Items	I prefer a coach who; 1. makes statements such as "way to go" when athletes perform

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- well.
 2. does not yell statements of encouragement during the game/meet.
 3. makes comments such as “shake it off” or “that’s all right” after a mistake is made.
 4. instructs athletes on how to correct mistakes or flaws in their technique or performance.
 5. voices disappointment regarding athletes’ performance following a mistake.
 6. screams instructions at athletes following a mistake to motivate them to perform up to their potential.
 7. ignores technical errors that athletes make during a competition.
 8. has practices organized and running smoothly.
 9. instructs athletes on needed strategies for an upcoming competition.
 10. yells things such as “keep hustling” when the team is doing well.
 11. assigns athletes individual responsibilities during practices and competitions.
 12. talks with athletes about academic problems.
 13. greets athletes when they finish a performance with encouragement and support.
 14. does not vocally praise athletes after they execute a good play/strategy.
 15. provides athletes with positive feedback even if a mistake was made.
 16. takes the time to help athletes with competitive plans.
 17. makes athletes “run laps” or “do push-ups” following a mistake.
 18. belittles athletes who perform skills incorrect
 19. pays no attention to athletes’ mistakes.
 20. breaks up any arguments that may occur at practice or during competition.
 21. stops practice to emphasize techniques or strategies needed for upcoming competitions.
 22. singles athletes out as role models because they have been trying hard at practice.
 23. discusses strategies for specific athletes prior to a game.
 24. has a sense of humor during practices and competitions.
 25. expresses pride in the efforts of athletes as well as in their successes.
 26. only helps athletes when a mistake is made.
 27. praises athletes for trying hard after a mistake is made.
 28. demonstrates techniques that athletes need to learn for improved performance.
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29. punishes athletes in front of their teammates following a mistake.
 30. uses physical intimidation following a technical mistake to get athletes to perform up to their potential.
 31. shows no emotion when athletes make a mistake.
 32. keeps athletes on task to accomplish the overall objectives and goals.
 33. provides athletes information on their technique after a successful performance.
 34. pulls athletes aside to let them know they are doing a good job.
 35. prepares athletes by informing them of their schedules and tasks.
 36. is willing to discuss relationship problems that affect athletes' performance.
 37. verbally praises the team and individual athletes after they have successfully executed a play/skills.
 38. does not make comments about good performances.
 39. says things like "keep trying" when athletes make a mistake on a new performance task that was introduced.
 40. spends time helping athletes who are having trouble improving their performance.
 41. immediately removes athletes from competition following a mistake.
 42. uses sarcasm when communicating to athletes about correcting flaws in technique or skills.
 43. does not comment and allows athletes to learn from their own mistakes.
 44. is fair in upholding the team rules no matter who is involved.
 45. provides individual instruction to athletes about technical skills and competition strategies.
 46. spends time during practice praising athletes for things they have done well during competition.
 47. clearly defines roles and responsibilities of the athletes.
 48. is willing to discuss personal problems that affect athletes' performance.
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The Coach Efficacy Scale (CES), Feltz, Chase, Moritz & Sullivan, (1999)

Relevance to study	Coaching efficacy would be another interesting construct to look at as a predictor of coaching success. One of the know antecedents of coaching efficacy is coaching experience and as a result, coaching experience seemed to be a more appropriate measure to use in the context of predictors of coaching success.
Summary of instrument	The Coaching Efficacy Scale (CES) measures a coach's belief in his or her ability to influence athletes' learning and performance (Feltz, Chase, Moritz, & Sullivan, 1999). The specific factors include instructional technique, motivation, character building, and game strategy purposely overlap with the expected competency domains noted in the previous paragraph and are congruent with self-efficacy theory (Bandura, 1997). The CES has psychometric qualities that provide an acceptable level of confidence in the efficacy measures (Feltz et al., 1999; Lee, Malete, & Feltz, 2002; Myers, Wolfe, & Feltz, 2005). Studies using the CES have correlated coaching efficacy with coaching behavior (Feltz et al., 1999), exposure to a coaching education program (Malete & Feltz, 2000), leadership styles (Sullivan & Kent, 2003), commitment to coaching (Kent & Sullivan, 2003), and athletes' self-efficacy, satisfaction with the coach, and team performance (Myers, Vargas-Tonsing, & Feltz, 2005; Vargas-Tonsing, Warners, & Feltz, 2003).
Underpinning theories	Bandura (1997) claimed self-efficacy is one's perception of his/her ability plays a central role in human agency. Self-efficacy has relevance to sports coaching as it was the foundation that led to the significant work on coaching efficacy (Feltz, 1988; Chase et al., 1997; Malete, 1998; Feltz, Chase, Moritz & Sullivan, 1999; Malete & Feltz, 2000; Fung, 2003; Feltz, Short & Sullivan, 2008). The human capability to self reflect is a very powerful one and involves the ability to analyze one's experience and to think about one's own thoughts (Freeman, Mahoney, & Devito, 2004).
	In the field of education, research has shown that self-efficacy has an impact on teachers' effectiveness (Denham & Michael, 1981), commitment to their profession (Coladarci, 1992), persistence in a failure situation (Gibson & Dembo, 1984), and time spent teaching (Gibson & Demo, 1984). Teachers with high efficacy beliefs will have students who show greater achievement (Ashton & Webb, 1986). Based on the teaching efficacy research, it follows that coaching efficacy also would be a powerful variable in coaching effectiveness.
Development process summary	Development of the CES (Feltz et al., 1999) was the basis for validating the instrument for this new purpose. The CES was developed during a 5-week seminar involving 11 coaches who had varying levels of experience in coaching and were graduate students in sport psychology. The National Standards for Athletic Coaches (NASPE, 1995), preliminary work on a coaching efficacy scale (Park, 1992), and a review of the coaching education literature provided a framework for group discussions on the key components of coaching efficacy. Themes that emerged from the group's discussions were

reduced to: teaching technique, implementing game strategies, motivating athletes, and developing athletes' character. These themes represented many of the primary roles previous research suggested coaches perform (Gould, Hodge, & Peterson, & Petlichkoff, 1987).

The dimensions from the seminar generated 41 items that included the stem: "How confident are you in your ability to...." A 10-point Likert-type scale was used, with categories ranging from 0 (not at all confident) to 9 (extremely confident). Nine collegiate and scholastic coaches acted as content experts to evaluate the relevance of the items on a scale from 1 (essential) to 3 (not essential). Feedback from this group led the research team to conclude that all items were potentially important indicators of coaching efficacy. However, 17 of the original items were later dropped after considering the results of factor analyses. All 24 items and the rating scale structure were determined relevant for the CCS; however, the stem was changed to: "How competent is your head coach in his or her ability to....," and the anchors of the rating scale were changed to 0 (not at all competent) and 9 (extremely competent).

Feltz et al. (1999) put forth both an oblique multidimensional and a hierarchical internal model of the CES. The hierarchical model fit the data more poorly than the multidimensional model. Because the multidimensional factors tend to correlate with one another moderately to highly (Feltz et al., 1999; Lee, Maleté & Feltz, 2002), subsequent psychometric work compared the fit of the multidimensional model to a unidimensional model (Myers & Vargas-Tonsing, 2005). These authors concluded the multidimensional model fit better than a unidimensional model but either could be justified depending on the study purpose.

The CES was developed to assess coach efficacy. According to Feltz, Hepler, Roman and Paiement (2009), the CES is purportedly the only instrument developed for measuring coaching efficacy. Feltz, et al. (1999) presented coach's past success, coaching experience, perceived player talent and social support each influences coaching efficacy. According to Chase, Lirgg and Feltz (1997) claim that the past performance as sources of efficacy information is based on mastery experiences. Past performance is believed to have one of the most influential affects on efficacy Feltz, 1988; McAuley, 1985). There is a positive relationship with past performances and expectations of the next. Namely if past performance are successful, expectations of the upcoming performance will increase.

According to Feltz, et al. (1999), the Coaching Efficacy Scale was developed in two phases. Phase 1 involved designing the instrument and establishing it's factorial validity through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Phase 2 involved the investigation of the sources and outcomes of coaching efficacy using high school boys'

	basketball coaches.
Usefulness of the instrument	<p>There are two sources of particular interest past win/loss record and past performance in CES that if a value could be placed on them could provide a great addition to this study on coaching effectiveness predictors. This is where the selected instrument has a quantitative advantage over the CES.</p> <p>Past experience has been shown to be the strongest source of efficacy for individuals. Likewise, a group's previous experiences should have a powerful effect on a team's collective efficacy. Using structural equation modeling, Riggs and Knight (1994) tested the effects of a group's success or failure in a work environment on personal and collective efficacy as well as personal and collective outcome expectancy. They found that success/failure played a direct and dominant role in all four variables. They believe that these results suggests that "success breeds success and that failure must surely be difficult to overcome" (p. 762).</p> <p>The limitation with many of these instruments is their self-reporting nature. The qualitative nature of the data collected from the CES while valuable is not as relevant for this study as the past experience data generated from the data collection of the Coaching Developmental Profile Interview.</p>
Reliability determination	Feltz et al. (1999) reported the reliability for the four factors was assessed through the coefficient alpha and test-retest. Coefficient alphas and test retest coefficients were .88 and .77 for character building, .89 and .78 for technique, motivation was .91 and .83 and strategy .88 and .84 with total CES being .95 and .82.
Validity determination	<p>According to Feltz et al. (1999) showed all factor loadings in both the first-order CFA and the second-order CFA were significant at $p < .05$, suggesting that each item was significantly related to the relevant latent variables. Although the convergent validity supported that the items included in each factor were significantly related, the factors themselves could still have been redundant. Discriminant validity was assessed by examining the correlations between the latent factors. Correlations between the four first-order factors ranged from .46 to .73, and the correlations with the second-order factor of general coaching efficacy ranged from .62 for character building to .88 for strategy. These relationships suggest that the first-order factors converge in a conceptually meaningful way on a second-order factor of general coaching efficacy.</p>
Item number	24 items
Items described	The 24 items could be grouped into four dimensions. Sample items for each dimension are as follows, Motivating Athletes: "Maintain confidence in athletes", and "Mentally prepare athletes for competition"; Strategy Use: "Make critical decisions during competitions", and "Maximize own athletes' strength during competition"; Coaching Technique: "Detect skill errors", and "Teach the skill of the sport"; Character Building: "Instill an attitude of fair play among athletes", and "Promote good sportsmanship".

Response number	10-point
Response type	Likert
Response description	Athletes rate their coach(es) on each of the items on a 10-point Likert scale ranging from 1 (not at all) to 10 (extremely confident).
Sub-scales or one-dimensional	4 sub-scales
Subscale described	The four sub-scales for the CES are: teaching technique, implementing game strategies, motivating athletes, and developing athletes' character. These themes represented many of the primary roles previous research suggested coaches perform (Gould, Hodge, Peterson, & Petlichkoff, 1987).
Domains in the literature	Sport coaching effectiveness
Target population	Sport coaches and athletes
Items	<p>How confident are you in your ability to...</p> <ol style="list-style-type: none"> 1. maintain confidence in your athletes? (ME1) 2. recognize opposing team's strengths during competition? (GS2) 3. mentally prepare athletes for game/meet strategies? (ME3) 4. understand competitive strategies? (GS4) 5. instill an attitude of good moral character? (CB5) 6. build the self-esteem of your athletes? (ME6) 7. demonstrate the skills of your sport? (TE7) 8. adapt to different game/meet situations? (GS8) 9. recognize opposing team's weakness during competition? (GS9) 10. motivate your athletes? (ME10) 11. make critical decisions during competition? (GS11) 12. build team cohesion? (ME12) 13. instill an attitude of fair play among your athletes? (CB13) 14. coach individual athletes on technique? (TE14) 15. build the self-confidence of your athletes? (ME15) 16. develop athletes' abilities? (TE16) 17. maximize your team's strengths during competition? (GS17) 18. recognize talent in athletes? (TE18) 19. promote good sportsmanship? (CB19) 20. detect skill error (TE20) 21. adjust your game/meet strategy to fit your team's talent? (GS21) 22. teach the skills of your sport? (TE22) 23. build team confidence? (ME23) 24. instill an attitude of respect for others? (CB24)
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Coaching Behavior Scale for Sport (CBS-S) Côté, Yardley, Hay, Sedgwick, & Baker, (1999)

Relevance to study	This instrument was a foundational step in the development of the Coaching Development Interview Profile. And the idea of looking at the behaviors of high-performance coaches was considered as a possible approach to this study. It was decided to take a more general approach and thus include more coaches in this study than to just specifically look at high performance coaches.
Summary of instrument	Drawing on these in-depth qualitative studies and other studies of coach behavior, Côté and colleagues developed the Coaching Behavior Scale for Sport (CBS-S; Côté et al., 1999). CBS-S provides a comprehensive assessment of high-performance coaches' behaviors that are exhibited in training, competition, and organizational settings (e.g., goal setting, personal rapport) (Mallett & Côté, 2006). The CBS-S is distinct from the CBAS and LSS as it measures mental preparation, goal setting, personal rapport and negative rapport (Cote, et al, 1999). The LSS distinguishes itself from the CBAS and CBS-S as it measures the democratic and autocratic dimensions of coaching behavior although the internal consistency of the autocratic dimension is low (Gordon, 1998; Spink, 1996). The CBAS focus on youth coaches, the LSS focuses on adults but both focus on leadership theories, the CBS-S is grounded in the essential components of coaching success (Cote et al., 1999).
Underpinning theories	Côté (1998) developed a theoretical model of coaching to factor in all of the influences affecting the coaching process this is the underlying framework of the development of this scale. Côté, Salmela, Trudel, Baria, & Russel, (1995) examined the work of expert gymnastics coaches using an expert systems approach and subsequently developed the Coaching Model (CM). The CM proposes that expert coaches develop “mental models” that help them organize their knowledge and subsequently direct their behavior in competition, organization, and training. A coach's mental model is based on an assessment of a coach’s own characteristics, athletes' characteristics, and the context in which coaching occurs. Since its publication, the CM has been used as a framework for several qualitative studies conducted with coaches and athletes (Bloom, Durand-Bush, & Salmela, 1997; D’Arripe-Longueville et al., 1998; Gilbert & Trudel, 2000).
Development process summary	The CBS-S was designed to evaluate the coach interactions that athletes received the coach (Côté, Yardley, Hay, Sedgwick, & Baker, 1999). Cote (1998) developed a theoretical model of coaching to factor in all of the influences affecting the coaching process this is the underlying framework of the development of this scale. Constructs and items were extracted from behaviors and strategies used by coaches in training, competition and organizational settings (Bloom, 1996; Bloom, Durand-Bush & Salmela, 1997; Côté & Salmela, 1996, Côté, Salmela, Trudel, Baria, & Russell, 1995; Desjardins, 1996; Durand-Bush, 1996; Gilbert & Trudel, 1997; Sedgwick, Côté & Dowd, 1997).

Usefulness of the instrument	The CBS-S is a result-based evaluation of coaches' work and was designed for use in a manner akin to methods used for evaluating teaching in college and university settings (Marsh, 1987). The CBS-S is also evaluates the coaching that athletes received. For each factor of the CBS-S, athletes are asked to identify the coach that is most responsible for this specific aspect of the program. Although other existing instruments such as the LSS, the CBQ, and the Coach Evaluation Questionnaire (CEQ; Rushall & Wiznuk, 1985) could be used in the evaluation procedure, the use of the CBS-S has been proven to be psychometrically sound, grounded in athletes' and coaches' experiences, and has been widely used by different high-performance sport programs as an instrument that provides comprehensive and useful feedback to coaches. The data provided by the CBS-S presents a comprehensive profile of coach behaviors, which can be useful for consultants or administrators in reviewing coaches' performances and competencies. Progressive coaches may also use these data as a means of getting feedback on their own coaching practice and identifying areas where improvement is required.
Reliability determination	Two forms of reliability were reported, internal consistency measured by Cronbach's alpha coefficient for all constructs demonstrated very high internal consistency with alpha coefficients of .85 or greater. The rest-retest reliability results each of the positive constructs were adequate but for the negative personal rapport construct was the lowest $r=.49$.
Validity determination	To validate the questionnaire, Côté et al. (1999) then re-submitted the CBS-S to a larger more diverse population of 205 athletes. The results of an exploratory factor analysis extracted the same six factors, but expanded the number of items to 44. Côté et al. (1999) concluded that the CBS-S was an insightful research tool that can be applied to examine perceptions of coaches' behavior. The CBS-S was derived from an initial 75 items and were drafted for validity testing into a draft questionnaire using a seven point likert scale and subjects were asked to respond the stem how frequently do you experience the following coaching behaviors? 37 items were retained from the six factors, technical (8), goal setting (6), mental preparation (5), personal rapport (7), physical training (8) and negative personal rapport (3). The factor analysis for each sub-scale showed each item loaded clearly on one factor and all items on the other at less than .40 the large majority .2 or less. Each factor had an eigenvalue over 1.0, which accounted for significant variance beyond that of the other factors and had high item loadings indicating strong factor validity. The six factors solution accounted for 79.8% of the total variance.
Item number	37 items
Items described	The 37 items were the result of the exploratory factor analysis of the questionnaire response that formed six factors.
Response number	7-point
Response type	Likert

Response description	Athletes rate their coach(es) on each of the items on a 7-point Likert scale ranging from 1 (<i>never</i>) to 7 (<i>always</i>).			
Sub-scales or one-dimensional	6 sub-scales			
Subscale described	<p>The CBS-S offers seven dimensions of coaching behaviors that have been identified both by coaches and athletes as being important aspects of high-performance coaching. Côté et al. (1999) named the 6 factors in the following manner:</p> <ul style="list-style-type: none"> (a) Technical skills, (b) Goal setting, (c) Mental preparation, (d) Personal rapport, (e) Physical training and planning, and (f) Negative personal rapport. 			
Domains in the literature	Sport coaches and athletes			
Target population	Sport coaches and athletes			
Items	<p>My coach provides me with;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 1. A detailed program 2. A program I am confident in 3. A plan for Physical preparation 4. A physically challenging program 5. An annual program 6. A plan that coordinates with training 7. A plan that coordinates with competition 8. A structured training environment 9. Specific feedback 10. Feedback on technique 11. Reinforcement 12. Provides cues 13. Demonstrations 14. Uses examples 15. Immediate feedback 16. Opportunity to asks questions 17. Being easily approachable 18. Being available to meet 19. Demonstrating concern </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> 20. Being a Good listener 21. Showing understanding 22. Maintaining confidentiality 23. Being trustworthy 24. Helping me set specific goals 25. Helping identify strategies 26. Helping identify target dates 27. Monitoring my progress 28. Helping set goals 29. Demonstrating commitment 30. A tough and competitive environment 31. Opportunities to perform under pressure 32. Opportunities to build confidence 33. Opportunities to stay positive 34. Opportunities to stay focused 35. Using fear 36. Disregarding my opinion 37. Yells when angry </td> </tr> </table>		<ol style="list-style-type: none"> 1. A detailed program 2. A program I am confident in 3. A plan for Physical preparation 4. A physically challenging program 5. An annual program 6. A plan that coordinates with training 7. A plan that coordinates with competition 8. A structured training environment 9. Specific feedback 10. Feedback on technique 11. Reinforcement 12. Provides cues 13. Demonstrations 14. Uses examples 15. Immediate feedback 16. Opportunity to asks questions 17. Being easily approachable 18. Being available to meet 19. Demonstrating concern 	<ol style="list-style-type: none"> 20. Being a Good listener 21. Showing understanding 22. Maintaining confidentiality 23. Being trustworthy 24. Helping me set specific goals 25. Helping identify strategies 26. Helping identify target dates 27. Monitoring my progress 28. Helping set goals 29. Demonstrating commitment 30. A tough and competitive environment 31. Opportunities to perform under pressure 32. Opportunities to build confidence 33. Opportunities to stay positive 34. Opportunities to stay focused 35. Using fear 36. Disregarding my opinion 37. Yells when angry
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The Coach-Athlete Relationship Questionnaire (CART-Q) Jowett & Ntoumanis, (2004)	
Relevance to study	The CART-Q looks at the coach-athlete relationship and was a consideration for this study as it looked at the interpersonal relationship related to sports coaching. The intrapersonal aspect of coaching has received far less attention in the literature and for this reason was decided not to use this instrument.
Summary of instrument	The CART-Q measures the coach-athlete relationship. The CART-Q. The refined 11-item CART-Q was employed. The CART-Q is a self-reporting instrument that assesses the nature (i.e., quality and quantity) of the coach-athlete relationship, it is brief and simple-to-use instrument that investigates the associations between the variable of interpersonal satisfaction and coaches' and athletes' emotions, thoughts, and behaviors.
Underpinning theories	Sport and physical activity are carried out in the presence of others. Based on this premise, a conceptual framework was advanced by Iso-Ahola (1995) to show that athletic performance is a multiplicative function of intrapersonal (e.g., coping skills) and interpersonal (e.g., coach-athlete relationship) factors. Iso-Ahola's proposed framework emphasizes that for successful performance, an athlete's intrapersonal and interpersonal psychosocial factors are required to be developed. Despite the apparent significance of both intrapersonal and interpersonal factors in athletic performance, the interest of sport psychology researchers has been predominantly concentrated on the intrapersonal factors such as motivation and anxiety (Biddle, 1997). Guisinger & Blatt (1994) stated that "western psychologies have traditionally given greater importance to self-development than to interpersonal relatedness, stressing the development of autonomy, independence, and identity as central factors in the mature personality" (p. 104). Guisinger and Blatt (1994) challenged theories that emphasize either dimension at the expense of the other because they restrict people's understanding of psychological development.
Development process summary	Guided by interdependence theory (Kelley & Thibaut, 1978), Jowett & Lavallee (2007) has hypothesized that coaches' and athletes' would experience more positive outcomes, such as personal and interpersonal satisfaction the more interdependent they are (i.e., the higher the levels of the 3 Cs). A number of studies have established links between the 3 Cs and satisfaction variables. Lack of closeness, co-orientation, and complementarity in the coach-athlete relationship was linked with interpersonal conflict (Jowett, 2003; Jowett & Meek, 2000). The interpersonal constructs of closeness (Berscheid & Reis, 1989), co-orientation (Newcomb, 1953), and complementarity (Kiesler, 1997) were utilized to define broadly coaches' and athletes' emotions, thoughts, and behaviors, respectively.
Usefulness of the instrument	While the coach-athlete relationship is a significant aspect of interpersonal aspect of coach effectiveness, the intrapersonal knowledge development and acquisition is the focus of this research proposal.
Reliability determination	Jowett and Ntoumanis (2004) have revealed that athletes' and coaches' direct closeness ($b = 0.37, p < 0.01$) and direct complementarity ($b = 0.36, p < 0.01$) were predictive of satisfaction with the coach-athlete relationship. Moreover,

Jowett (in press) has shown that athletes' meta-closeness ($b = 0.32, p < 0.04$) and coaches' meta-commitment ($b = 0.36, p < 0.01$) were predictive of satisfaction with performance, while athletes' and coaches' meta-complementarity ($b = 0.25, p < 0.01$ for athletes and $b = 0.34, p < 0.01$ for coaches) were predictive of satisfaction with personal treatment. Jowett and Don Carolis (2003) have also found that direct commitment was a common relationship aspect that contributed to both male and female athletes' satisfaction with training ($b = 0.58, p < 0.01$ for males and $b = 0.30, p < 0.05$ for females). However, direct complementarity was predictive of only female athletes' satisfaction with performance accomplishments ($b = 0.59, p < 0.01$). These research studies highlight the role of coach-athlete relationships in terms of positive affective outcomes such as satisfaction and provide initial evidence for the unique contribution the 3 Cs make to specific dependent variable measures.

**Validity
determination**

According to Li, Harmer & Acock (1996), convergent validity is reflected by the degree to which certain items "converge" as indicators of a hypothesized construct. This was evaluated by examining whether each of the items in the best-fitting model M3 had substantial loadings to their hypothesized factors. All factor loadings were high, ranging from 0.68 to 0.90 (M factor loading 5 0.80) and statistically significant ($P < 0.001$). Additional evidence for the convergent validity of the refined CART-Q was obtained in the variance extracted estimate (Fornell & Larcker, 1981). This estimate represents the average proportion of variance in the items accounted for by their underlying factors in relation to the amount of variance due to measurement error. According to Fornell & Larcker (1981), values above 0.50 are satisfactory. In this study, the values were 0.61 for the commitment factor, 0.66 for the closeness factor, and 0.67 for the complementarity factor. Taken together, the results supported the convergent validity of the refined CART-Q subscales.

Discriminant validity refers to the extent to which the three factors exhibit uniqueness (Li, Harmer & Acock, 1996). The factor correlations, which were corrected for attenuation due to measurement error, were high (M 5 0.81) casting doubt on the discriminant validity of the refined CART-Q. Anderson & Gerbing (1988) suggested that discriminant validity could be tested by establishing whether the upper limit of the 95% confidence intervals of the factor correlations approach unity. In all three possible combinations between factors, the upper limit of the 95% confidence intervals approached or exceeded unity. This suggested that the three refined CART-Q factors can sometimes be perfectly correlated and that their items may be tapping a single underlying construct.

To examine this possibility, and following the suggestion by Markland et al. (1997), M3 was compared against three two-factor models in which two of the CART-Q factors were combined in turn. As shown above, when the Commitment and Closeness items were hypothesized to load on the same factor (i.e., M2), the model fit was poorer than that of M3. Furthermore, fit

	indexes not reported here, showed that M3 was far superior to a model in which Closeness and complementarity loaded on the same factor (e.g., $\chi^2_{diff}(3) = 58.53$; $P < 0.001$), and to a model in which commitment and complementarity loaded on the same factor (e.g., $\chi^2_{diff}(3) = 35.84$; $P < 0.001$). These findings indicate that despite the high factor correlations, the three refined CART-Q factors should be conceptualized as separate dimensions.		
Item number	11 items		
Items described	The 11 items were all formulated as statements (e.g., “I trust my coach”; “When I am coached by my coach, I am ready to do my best”).		
Response number	7-point		
Response type	Likert		
Response description	All items were measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).		
Sub-scales or one-dimensional	3 subscales		
Subscale described	Of the 11 items, three items measured the construct of commitment, four items measured the construct of closeness, and four items measured the construct of complementarity.		
Domains in the literature	Sport coaching effectiveness		
Target population	Sport coaches and athletes		
Items	Commitment 1. I feel close to my athlete/coach 2. I feel committed to my athlete/coach 3. I feel that my sport career is promising with my athlete/coach	Closeness 4. I like my athlete/coach 5. I trust my athlete/coach 6. I respect my athlete/coach 7. I feel appreciation for the sacrifices my athlete/coach has experienced in order to improve his/her performance	Complementarity 8. When I coach my athlete/When I am coached by my coach, I feel at ease 9. When I coach my athlete/When I am coached by my coach, I feel responsive to his/her efforts 10. When I coach my athlete/When I am coached by my coach, I am ready to do my best 11. When I coach my athlete/When I am coached by my coach, I adopt a friendly stance

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Coaching Competence Scale (CCS) Myers, Wolfe, Maier, Feltz, & Reckase, (2006)	
Relevance to study	Linked to Coaching Efficacy, Coaching Competence is another interesting aspect of coaching, and specifically in this study on predictors of coaching success. This would be an interesting instrument to develop a better understanding of a coach's ability to influence learning and improve performance. But was not as closely linked to the notion of predicting coaching success as coach's athletic and past coaching experience.
Summary of instrument	The Coaching Competence Scale (CCS) measures coaching competencies from the athlete's perspective (Myers, Wolfe, Maier, Feltz, & Reckase, 2006). CCS asks athletes to evaluate of their head coach's ability to affect their learning and performance by looking at a coach's competence in motivation, technique, game strategy and character, which is an adaptation from the Coaching Efficacy Scale from Feltz, Chase, Moritz & Sullivan, (1999).
Underpinning theories	With it's links to the CES, Bandura's work is an underlying theoretical base to this instrument. Competence has been defined as the interaction with one's environment to provide learning from experience (White, 1959). Maslow wrote about competence theory in the 1940s in reference to the stages of learning, first we are unconsciously incompetent when an individual learns a new skill, then the individual becomes consciously incompetent, aware of their lack of skill, then conscious competence reflecting a skill that you are competent at that you still need to thinking about, unconscious competence is when you are good at something and it comes naturally. The Johari Window is a similar concept but is a reflection of one's awareness not competence (Luft & Ingham, 1955).
Development process summary	The purpose of the CCS is to measure athletes' evaluation of their head coach's ability to affect their learning and performance. Measures are intended to test relationships in coaching effectiveness models (e.g., How do athletes' evaluations of their head coach's competencies affect athletes' self-perceptions, beliefs, and attitudes?) and help evaluate coaching education programs (e.g., assessing the ability of education programs to alter athletes' perceptions of their head coach's competencies). Initially, 41 items that included the stem: "How confident are you in your ability to...." A 10-point Likert-type scale was used, with categories ranging from 0 (not at all confident) to 9 (extremely confident). 17 of the original items were later dropped after considering the results of factor analyses and the stem was changed to: "How competent is your head coach in his or her ability to....," and the anchors of the rating scale were changed to 0 (not at all competent) and 9 (extremely competent).
Usefulness of the instrument	The CCS can be used in field, laboratory, and other educational settings. CCS scores are conceptualized as being norm-referenced, because interpretations are intended to compare a head coach's competency scores to other coaches' scores within a specified population or to track changes in a coach's competency scores across time. The main reason for inclusion of this

	instrument in this analysis is the concept of competency as an key evaluation tool in coaching performance. This instrument is targeted for high school and lower level collegiate coaches.
Reliability determination	Cronbach's alpha estimates were .90 (MC), .87 (GSC), .85 (C) and .82 (CB). These coefficients suggest very good to excellent consistency for multidimensional coaching competency estimates.
Validity determination	Factors were moderately to highly correlated with one another, with the strongest association occurring between GSC and TC, $r = .92$ and the weakest between CBC and GSC, $r = .79$ (see Table 4). Because of the high correlation between GSC and TC, another model was specified in which all these items loaded on only one factor. Thus, the four-dimensional model was retained as the final model. A multidimensional internal model was retained in which motivation, game strategy, technique, and character building comprised the dimensions of coaching competency. Some redundancy among the dimensions was observed, particularly between GSC and TC subscales.
Item number	24 items
Items described	All of the 24 items were retained from the original CES and the 10-point Likert scale. The stem was changed to: "How competent is your coach in his or her ability to:".
Response number	10-point
Response type	Likert
Response description	Athletes rate their coach(es) on each of the items on a 10-point Likert scale ranging from 1 (low) to 10 (extremely competent).
Sub-scales or one-dimensional	4 sub-scales
Subscale described	Motivation competence (MC) was defined as athletes' evaluations of their head coach's ability to affect their psychological mood and skills, game strategy competence (GSC) as athletes' evaluations of their head coach's ability to lead during competition, technique competence (TC) as athletes' evaluations of their head coach's instructional and diagnostic abilities, and character building competence (CBC) as athletes' evaluations of their head coach's ability to influence the personal development and positive attitude toward sport in their athletes. In the unidimensional model, total coaching competence (TCC) was defined as athletes' evaluations of their head coach's ability to affect their learning and performance.
Domains in the literature	Sport coaching effectiveness
Target population	High school and lower level collegiate team sport programs.
Items	How competent is your head coach in his or her ability to; <ol style="list-style-type: none"> 1. help athletes maintain confidence in themselves? (MC1) 2. recognize opposing team's strengths during competition? (GSC2) 3. mentally prepare his/her athletes for game strategies? (MC3)

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4. understand competitive strategies? (GSC4)
 5. instill an attitude of good moral character? (CBC5)
 6. build the self-esteem of his/her athletes? (MC6)
 7. demonstrate the skills of his/her sport? (TC7)
 8. adapt to different game situations? (GSC8)
 9. recognize opposing team's weakness during competition? (GSC9) |
 10. motivate his/her athletes? (MC10)
 11. make critical decisions during competition? (GSC11)
 12. build team cohesion? (MC12)
 13. instill an attitude of fair play among his/her athletes? (CBC13)
 14. coach individual athletes on technique? (TC14)
 15. build the self-confidence of his/her athletes? (MC15)
 16. develop athletes' abilities? (TC16)
 17. maximize his/her team's strengths during competition? (GSC17)
 18. recognize talent in athletes? (TC18)
 19. promote good sportsmanship? (CBC19)
 20. detect skill errors? (TC20)
 21. adjust his/her game strategy to fit his/her team's talent? (GSC21)
 22. teach the skills of his/her sport? (TC22)
 23. build team confidence? (MC23)
 24. instill an attitude of respect for others? (CBC24)
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APPENDIX E—Summary of Self Reflection Instruments
The Self Reflection and Insight Scale, Grant, Franklin, & Langford, (2002)

Relevance to study	Self Reflection and Insight was selected as the instrument for this study. One of the reasons for using this instrument was because it has not been used in the sports coaching context before. Second, the intrapersonal knowledge of sports coach, and specifically self-reflection and insight have received little attention in the sports coaching literature. Third, of the instruments considered it was the most used in other domains and had a greater coverage in the literature in other relevant fields.
Summary of instrument	<p>Grant, Franklin, & Langford (2002) created a 20-item, self-reporting scale comprising of two subscales: (a) a self-reflection scale (SRIS-SR) and (b) an insight-scale (SRIS-IN). The SRIS assesses individuals' propensity to reflect on, and their level of insight into, their thoughts, feelings and behavior. The SRIS is a self-administered, 20-item closed questionnaire in which respondents use a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).</p> <p>Self-reflection is defined as the inspection and evaluation of one's thoughts, feelings and behaviors. This consists of two domains, of which one assesses the motive or 'need for reflection' and the other captures the process of 'engagement in reflection'. The third domain assesses an individual's clarity of 'insight' into his or her own thoughts, feelings and behaviors.</p> <p>The underlying premise of the SRIS is that insight and self-reflection are central to the self-regulatory process. Thus, students who regularly monitor their thoughts, feelings and behaviors should have higher levels of insight and self-reflection.</p>
Underpinning theories	The Self-reflection and Insight Scale (SRIS), developed by Grant from theories of metacognition and self-regulation derived from the PrSC, aims to measure the readiness of individuals for purposeful behaviour change (Roberts & Stark, 2008).
Development process summary	This is a 20-item instrument that measures two domains of private self-consciousness, self-reflection and insight. It was designed to be an improvement over the Private Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975), and correlates with diary keeping as well as related self-report measures (Grant, Franklin, & Langford, 2002).
Reliability determination	<p>The total score measures self-reflection and self-insight has a reported Cronbach alpha of 0.81 and a test-retest reliability of 0.78 (Grant et al., 2002). Each subscale had internal reliability (>0.8). There was a strong relationship between the need for reflection ($r=0.77$) and those who kept diary entries.</p> <p>Insight was related to the need for reflection (0.22) but not to the process of engaging reflection (0.06). Insight is related to the motive or need for reflection but the process of reflection doesn't lead to insight indicating that strategies to develop insight are needed.</p>

There appeared to be a significant correlation ($r = 0.22$) between age and insight. Male students (mean = 30.02) appeared to have more insight than females (28.55, t -test $P = 0.002$) but no difference in engagement in, or need for, reflection. There was a significant difference on insight (means = 30.48/28.84, $P = 0.007$) for those who had undertaken a previous degree. The most significant relationship (Pearson's, $P < 0.01$) between SRIS sub-scales and preferred learning methods for professionalism was the need for positive role modelling with need for reflection ($r = 0.23$) and engagement in reflection ($r = 0.23$). These tentative relationships were then explored using CFA (Roberts & Stark, 2008).

**Validity
determination**

Content validity for the SRIS had been established by using three content experts to construct a pool of items designed to assess each of the domains. A typical item is: 'I am very interested in examining what I think about.' In order to discourage respondents from making automatic Yes responses, several of the items were reversed in the questionnaire. The scale was initially validated on two separate occasions amongst groups of psychology students at an Australian university. Their responses ($n = 268$, $n = 121$) had been analyzed using exploratory factor analysis (EFA) (principal components analysis [PCA] with a Varimax rotation) to reduce the number of variables from 30 into a simpler structure so that the final scale consisted of the 20 items used in this study. In both studies, 10 items (representing both engagement in self-reflection and the need for self-reflection) loaded on one factor, labeled 'Self-reflection', and eight items loaded on a second factor, labeled 'Insight'. Cronbach's α for internal consistency ranged from 0.71 to 0.91 for Self-reflection and from 0.82 to 0.87 for Insight (Roberts & Stark, 2008).

According to Stark and Roberts (2008), the factorial validity showed all items loading significantly on the expected factors with a good fit to the data. The factorial validity of a modified SRIS showed all items loading significantly on their expected factors, with a good fit to the data. Each subscale had good internal reliability (> 0.8). There was a strong relationship between the need for reflection and engagement in reflection ($r = 0.77$). Insight was related to need for reflection (0.22) and age (0.21), but not to the process of engaging in reflection (0.06).

Validation of the SRIS provides researchers with a new instrument with which to measure and investigate the processes of self-reflection and insight in the context of students' self-regulation of their professionalism. Insight is related to the motive or need for reflection, but the process of reflection does not lead to insight. Attending to feelings is an important and integral aspect of self-reflection and insight. Effective strategies are needed to develop students' insight as they reflect on their professionalism.

The first iteration of our CFA model assumed the presence of Grant's two-

factor structure.¹⁰ The fit of our first model (Model 1 in Table 3) to the data was unsatisfactory even with the deletion of item Q3 because it loaded on all three factors (Model 1: $\chi^2 = 847.70$, d.f. 151, $P < 0.001$, CFI 0.826, RMSEA 0.100). We then tested the three-factor model we had found in our EFA, again without item Q3 (Model 2), but with little improvement in goodness-of-fit (Model 2: $\chi^2 = 583.10$, d.f. 149, $P < 0.001$, CFI 0.892, RMSEA 0.079). The model modification indices suggested that the fit could be further improved if the residuals of some pairs of items were allowed to correlate. The relevant pairs of items were questions 15 and 18, 16 and 19, and 6 and 20. These residual error covariances represent systematic rather than random error measurement in item responses deriving either from respondent reasons (e.g. giving Yes responses) or from the fact that two items are conceptually similar.¹⁶ The factorial validity of our 19-item modified SRIS, with all items loading significantly on their expected factors, was confirmed with a good fit (Model 3: $\chi^2 = 378.10$, d.f. 146, $P < 0.001$, CFI 0.942, RMSEA 0.059). The schematic representation of the model, termed a ‘path diagram’, is given in Fig. 2. By convention, squares represent observed variables (e.g. Q7 is item 7 in the SRIS), ellipses represent unobserved latent variables (e.g. need for reflection), single-headed arrows represent the impact of one variable on another and double-headed arrows represent covariances or correlations between pairs of variables. Associated with each variable is an unobserved error term (e.g. e7 represents the measurement error associated with item 7).¹⁶ There were strong factor loadings: for example, items Q2, Q5, Q7, Q15 and Q18 loaded strongly on the latent variable ‘engagement in reflection’. There is a strong relationship, as evidenced by the factor covariance ($r = 0.77$), between need for reflection and engagement in reflection. Insight is related to need for reflection ($r = 0.22$) but not to the process of engagement in reflection ($r = 0.06$). This compares with Grant’s¹⁰ finding of a relationship ($r = 0.3$) between Insight and the Self-reflection factor. Finally, we undertook structural modelling to confirm or reject the relationships suggested by the EFA. The model was re-specified several times by allowing the effect of each student background variable (e.g. gender) and indicator variable (e.g. role modelling) on the latent variables to be explored, while controlling for the other background and indicator variables. Unobserved residual errors were associated with the latent variables (e.g. res_E with latent variable ‘engagement in reflection’). Paths that did not display significant influences were deleted in order to achieve the most parsimonious model that was also theoretically meaningful.¹⁶ The final path-way diagram (Fig. 3) shows a second-order factor Self-reflection and the first-order factor Insight best explaining responses to the SRIS. Significant relationships that could be confirmed whilst remaining within the goodness-of-fit parameters (Roberts & Stark, 2008).

Item number	20 total items, 12 items assess self-reflection, six items measure “engagement in self-reflection” and the other six measure “need for self-reflection.” The remaining eight items measure insight.
Response	These items are rated on a six-point Likert scale ranging from one (strongly

options	disagree) to six (strongly agree).
Usefulness of the instrument	<p>The SRIS does not capture those aspects of self- regulation concerned with problem-solving or solution-focused self-reflection in which the individual constructively reflects on how best to reach his or her goals. Such a subscale would need further scale development. of intrinsic motivation(Roberts & Stark, 2008).</p> <p>The SRIS could monitor changes in this context. Although we have demonstrated some evidence of the constructive validity of the SRIS, we did not assess its predictive validity to identify students at risk in this study. Further research is to be encouraged to identify correlations with observed professional behaviours in order to find out whether students with low levels of insight are at risk of unprofessional behaviour (Roberts & Stark, 2008).</p>
Sub-scales or one-dimensional	The SRIS has two subscales. One assesses an individual's propensity to reflect on their thoughts, feelings and behaviors from 12 items. The second is their level of insight into their thoughts, feelings and behaviors from eight items.
Domains	Mainly found in the medical and coaching
Target population	All
Access to sample	<p>Self-reflection items include; "It is important to me to try to understand what my feelings mean", and "I frequently take time to reflect on my thoughts". Insight items include; "I usually know why I feel the way I do", and "My behavior often puzzles me" (reverse scored). (E) engage in self-reflection, (N) need for self reflection, (I) Insight.</p> <ol style="list-style-type: none"> 1. I don't often think about my thoughts E 2. I rarely spend time in self-reflection E 3. I frequently examine my feelings E 4. I don't really think about why I behave in the way I do E 5. I frequently take time to reflect on my thoughts E 6. I often think about the way I feel about things E 7. I am usually aware of my thoughts I 8. I'm often confused about the way I really feel about things I 9. I usually have a very clear idea about why I've behaved in a certain way I 10. I'm often aware that I having a feeling, but I often don't quite know what I 11. My behavior often puzzles me I 12. Thinking about my thoughts makes me more confused I 13. Often I find it difficult to make sense of the way I feel about things I 14. I usually know why I feel the way I do I 15. I am not really interested in analyzing my behavior N 16. It is important for me to evaluate the tings that I do N 17. I am very interested in examining what I think about N 18. It is important to me to try to understand what my feelings mean N 19. I have definite need to understand the way that my mind works N 20. It is important to me to be able to understand how my thoughts arise N

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The Texas Social Behavior Inventory (TSBI), Helmreich, Spence & Stapp, (1974)

Relevance to study	While the TSBI looks at self-esteem, exploring self-reflection and self-insight seemed to be more relevant constructs to explore for this study due to its lack of coverage in the literature.
Summary of instrument	The TSBI is an objective measure of an individual's feelings of self-esteem or social competence, constructs that are not distinguished conceptually or empirically. This scale is used to operationalize self-esteem (Lammers & Becker, 1992; Helmreich and Stapp 1974; Helmreich, Stapp, & Ervin, 1974). TSBI was the first measure to consider the athletic realm of self-esteem but no evidence of being adapted for coaching (Robinson, Shaver, & Wrightsman, 1991). The TSBI has been used generally and broadly across the field of psychology. The TSBI items address the respondent's degree of self-confidence in groups of people, ability to deal with strangers, and sense of comfort in social situations (Helmreich & Stapp, 1974). The TSBI treats self-esteem and social competence as conceptually and empirically equivalent, and positive response bias is a potential problem. This scale would correlate positively with measures tapping social skill and self-confidence, as high self-esteem is socially desirable, the modest correlations with social desirability are not unreasonable and are typical of the self-esteem scales. The scale is short, simple and an easy-to-use measure of self-esteem (Robinson, Shaver, & Wrightsman, 1991).
Underpinning theories	Maslow was one of the first to write about self-esteem being a basic human need back in the 1940s and 1950s. Maslow (1954) defined self-esteem as the need for respect from others and the need for self-respect. Rosenberg (1965) defines self-esteem as a stable sense of personal worth or worthiness. Rosenberg's (1965) Self-Esteem Scale (RSES) was probably the first of its kind and has been frequently used 10-item measure of global self-esteem. Responses are made on scales from 1 (strongly disagree) to 5 (strongly agree). Critics of self-esteem, Ellis (2001) claim self-esteem theory and self-esteem is unrealistic, illogical and socially destructive and his response is to embrace the principles of rational emotive behavior therapy to completely embrace total unconditional acceptance of self and others.
Development process summary	Sadowski, Woodward, Davis and Elsbury (1983) found the TSBI to be significantly related to locus of control. For both males and females high self-esteem was positively associated with internality. Helmreich, Stapp & Ervin (1974) reported that TSBI scores were correlated .81 with masculinity for males and .83 for females, and .42 with femininity for males and .44 for females. McIntire and Levine (1984) reported that the TSBI correlated 0.25 with Ghiselli Self-Assurance Scale, .76 with performance self-esteem, .40 with academic self-esteem, .25 with athletic self-esteem, .39 with academic social self-esteem, and .23 with athletic social self-esteem. The TSBI correlated .26 (McIntire & Levine, 1984) and .32 (Helmreich, Strapp, & Strapp, 1974) with the Marlowe-Crowe Social Desirability Scale.

Reliability determination	<p>There seems to be very limited application specifically within the scope of this study on the developmental profile of coaching success predicted by the introspective aspect of self-reflection of past experiences. This instrument is important to include in this analysis as it has provided many other instruments and studies relating to sport a valuable contribution and it has developed many other ideas as it is the foundational instrument for many.</p> <p>Further investigation into the interpersonal aspects of the development profile of coaching success seems like a more appropriate focus for future research, particularly as it relates to transition in and out of stages of the development process from beginner coach to expert coach.</p>
Validity determination	Test-retest reliability was .94 for males and .93 for females (Robinson, Shaver, & Wrightsman, (1991).
Item number	<p>The TSBI was normed on 1,000 students and factor analysis determined its validity. Overall, the TSBI is a highly reliable and valid measure of perceived social competency (Helmreich and Stapp, 1974). There were two forms of the measure a 16 item in the short form and a 32 item in the long form (Robinson, Shaver, & Wrightsman, (1991). The original TSBI consisted of 32 items and was revised to two parallel 16-item forms. The split was based on the desire for rapid administration and fur use in studies attempting to change self-esteem. The criteria for assignment to one of the forms were equivalence of part-whole correlations, equivalence of means between forms and between sexes, equivalence of score distributions and parallel factor structures. Owing to their equivalence, the two scales correlate .97 with the full 32-item version and .87 with each other. Most researchers employ the short form (Robinson, Shaver, & Wrightsman, (1991).</p>
Response options	<p>5-point Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree). Test items consist of declaratory statements with response options of “not at all characteristic of me,” to “very much characteristic of me.” All response items are given scores ranging from 1 to 5, with 1 associated with low self-esteem and social competence and 5 associated with high self-esteem and social competence. The response scored 5, “not at all characteristic of me” or “very much characteristic of me,” varies because statements may describe behaviors associated with either high or low self-esteem and social competence (Robinson, Shaver, & Wrightsman, (1991).</p>
Usefulness of the instrument	One dimensional
Sub-scales or one-dimensional	Self Esteem
Domains	General Psychology
Target population	College students

**Access to
sample****FORM A**

1. I am not likely to speak to people until they speak to me.
2. I would describe myself as self-confident
3. I feel confident of my appearance.
4. I am a good mixer.
5. When in a group of people, I have trouble thinking of the right things to say.
6. When in a group of people, I usually do what the others want rather than make suggestions.
7. When I am in disagreement with other people my opinion usually prevails.
8. I would describe myself as one who attempts to master situations.
9. Other people look up to me.
10. I enjoy social gatherings just to be with people.
11. I make a point of looking other people in the eye.
12. I cannot seem to get others to notice me.
13. I would rather not have very much responsibility for other people.
14. I feel comfortable being approached by someone in a position of authority.
15. I would describe myself as indecisive.
16. I have no doubts about my social competence.

FORM B

1. I would describe myself as socially unskilled.
2. I frequently find it difficult to defend my point of view when confronted with the opinions of others.
3. I would be willing to describe myself as a pretty “strong” personality.
4. When I work on a committee I like to take charge of things.
5. I usually expect to succeed in the things I do.
6. I feel comfortable approaching someone in a position of authority over me.
7. I enjoy being around other people, and seek out social encounters frequently.
8. I feel confident of my social behavior.
9. I feel I can confidently approach and deal with anyone I meet.
10. I would describe myself as happy.
11. I enjoy being in front of large audiences.
12. When I meet a stranger, I often think that he is better than I am.
13. It is hard for me to start a conversation with strangers.
14. People seem naturally to turn to me when decisions have to be made.
15. I feel secure in social situations.
16. I like to exert my influence over other people.

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Private Self-Consciousness Scale (PSC) Fenigstein, Scheier, & Buss (1975)

Relevance to study	Using self-consciousness as the primary focus of this study was considered as this is a well-known instrument, but the SRIS came from some of the items from the PSC and as a result the SRIS seemed like a more useful instrument for the purpose of this study.
Summary of instrument	The Private Self-Consciousness Scale (PSC) is a 10-item questionnaire (Fenigstein, Scheier, & Buss, 1975). Liao & Masters (2002) measured self-focus using the PSC as a pretest and post test instrument. The post test items were modified slightly to reflect the participant's current feelings.
Underpinning theories	The foundations of the development of Private Self-Consciousness Scale are formed around the concept of self-focused. attention being the Argyle (1966) speculated about the impact of self-awareness on social interactions and Duval and Wicklund (1972) elaborated on an entire theory of self-awareness. Self-focused attention occurs when a person focusing on thoughts, feelings, behaviors or appearance when reflection or making decisions. Self awareness is the existence of a self-directed state of either transient situational variables, chronic dispositions or both. Self-insight is a concept that is described as one that those with high levels of self-consciousness are able to engage in the act of meditation more easily than others. Assessing and understanding the impact of different levels of self-consciousness is the major reason for devising this instrument (Fenigstein, Scheier, & Buss, 1975).
Development process summary	The development of Private Self-consciousness Scale began by identifying behaviors that constitute the domain of self-consciousness. The following classification were constructed: (a) preoccupation with past, present, and future behavior; (b) sensitivity to inner feelings; (c) recognition of one's positive and negative attributes; (d) introspective behavior; (e) a tendency to picture or imagine oneself; (f) awareness of one's physical appearance and presentation; and (g) concern over the appraisal of others.
	38 original items were devised a principal-components factor analysis using varimax rotation was performed on the data (Nie, Bent, & Hull, 1970). A large proportion of the variance (43%) was accounted for by the first three factors that emerged. The remaining factors contained only a few items each and were interpretable. The first two factors suggested that self-consciousness has two major components—one private and one public. The third factor, social anxiety, was defined by a discomfort in the presence of others, e.g., "I feel anxious when I speak in front of a group." The private self-consciousness factor was concerned with attending to one's inner thoughts and feelings, e.g., "I reflect about myself a lot." The public self-consciousness factor was defined by a general awareness of the self as a social object that has an effect on others, e.g., "I'm very concerned about the way I present

myself."

Public and private self-consciousness referred to a process of self-focused attention; social anxiety refers to a reaction to this process. When attention is turned inward, a person may find something to be anxious about. It seems reasonable, then, for an anxiety factor to emerge as a by-product of self-consciousness. Clearly, the three factors have theoretical implications for the nature of self-consciousness and were pursued in subsequent constructions of the scale.

Further revisions of the scale were needed for several reasons. A few of the original items loaded highly on more than one factor; other items were endorsed either too frequently or too infrequently; a few items were reported by some subjects as being ambiguous; and, above all, there was a clear need for replication to make sure that the three factors were stable. Accordingly, some items were discarded, new items were added, and the inventory went through several revisions. Prior to two final administrations, the revised scales were given to nine different samples, with a total N of 1,821. The same three factors consistently emerged (Fenigstein, Scheier, & Buss, 1975).

Reliability determination	Fenigstein et al. (1975) was used. The SCS scale includes ten items on private self-consciousness, with an internal reliability for the Cronbach's alpha of 0.77. The response scale and scoring were consistent with the procedure specified by Fenigstein et al. (1975). Each item was rated on a five-point scale, ranging from extremely uncharacteristic (0) to extremely characteristic (4).
Validity determination	The test of construct and discriminant validity of the Private Self-Consciousness Scale of Fenigstein et al. (1975) found that from the exploratory factor analysis of data and confirmatory factor analysis showed that a two-dimensional model of private self-consciousness represented the data significantly better than an unidimensional model. The chi-square (0.2) measure for the single-factor model of PRSC was 135.67 (df 1/4 20, $p < 0.001$). The GFI index and the RMSEA were 0.83 and 0.17 respectively. This indicates that a single-factor model of PRSC does not fit the data. A two-dimensional model adding public self-consciousness fitted data significantly better than an unidimensional model.
Item number	Ten items
Response options	Item 1, "I'm always trying to figure myself out," was modified to, "I'm currently trying to figure myself out" on a scale of 0 (extremely uncharacteristic) to 4 (extremely characteristic).
Usefulness of the instrument	As the foundational instrument to the Self Reflection and Insight Scale the PSC is an important instrument to consider. The criticisms of self-reflection are another consideration from the literature on self-consciousness that promotes self-insight as a far more effective strategy for self-focused attention.

Sub-scales or one-dimensional	Unidimensional - PSC (one factor, based on Fenigstein et al., 1975)
Domains	General
Target population	Adults
Access to sample	Private self-consciousness 1. I'm always trying to figure myself out. 2. Generally, I'm not very aware of myself. 3. I reflect about myself a lot. 4. I'm often the subject of my own fantasies. 5. I never scrutinize myself 6. I'm generally attentive to my inner feelings 7. I'm constantly examining my motives. 8. I sometimes have the feeling that I'm off somewhere watching myself. 9. I'm alert to changes in my mood. 10. I'm aware of the way my mind works when I work through a problem.
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Self-directed Learning Readiness Scale (SLDRS) Guglielmino (1977)

Relevance to study	Self-direction would have also been a very interesting construct to explore as a predictor of sports coaching success. The SDLRS has been used in many different domains since the 1970's.
Summary of instrument	A self-administered and self-scored instrument entitled the Self-Directed Learning Readiness Scale (SDLRS) is available for comparison of yourself with normed information. An opportunity also is provided for you to detail what the results means in terms of future learning approaches and efforts.
	<p>One of the instruments used for measuring self-directed learning, Self-Directed Learning Readiness Scale (SDLRS), is developed by Dr. Guglielmino in her doctoral dissertation. The SDLRS uses a 58-item 5-point Likert scale. Through factor analysis, the scale includes eight factors: openness to learning opportunities, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility for one's own learning, love of learning, creativity, positive orientation to the future, and ability to use basic study skills and problem-solving skills. Higher scores occurring from using the scale represent higher readiness for self-directed learning (Guglielmino, 1977).</p> <p>Since development of the scale by Guglielmino, a number of studies have supported its reliability and validity (Guglielmino, 1989). According to Guglielmino and Guglielmino (2003b), "This instrument has consistently demonstrated strong reliability and validity in identifying those who are ready for self-directed learning in its 26-year history"(p.5). However, a recent study conducted by Hoban et al. (2005) conflicts with this statement. They found that SDLRS can not truly assess medical students' self-directed learning. They further explained that other methods for exploring self-directed learning should be considered.</p>
Underpinning theories	<p>In order to determine the content of the SDLRS, a three-round Delphi survey of authorities on self-direction was done. Of the 20 persons asked to participate in the survey, 14 agreed. The participants were: Drs. Herbert A. Alf, B. Frank Brown, Edward G. Buffie, Arthur W. Chickering, Patricia M. Coolican, Gerald T. Gleason, Winslow R. Hatch, Cyril O. Houle (first two rounds only), Malcolm S. Knowles, Wilbert J. McKeachie, Barry R. Morstain, Mary M. Thompson, Allen Tough, and Morris Weitman</p> <p>The Delphi survey involved the listing and rating of characteristics which the authorities considered important for self-direction in learning, including attitudes, abilities, and personality characteristics (Linstone & Turoff, 1975). Characteristics emerging from the Delphi</p>

	survey with a median rating of desirable, necessary, or essential for self-direction in learning were used as a basis for the construction of items for the SDLRS.
Development process summary	Guglielmino's (1977) Self-Directed Learning Readiness Scale (SDLRS) is an instrument that was designed to assess the degree to which individuals perceive themselves to possess attitudes and skills often associated with the notion of readiness, an internal state of psychological readiness for self-directed learning. Based on the Delphi technique, a factor analysis revealed eight factors: (a) openness to learning opportunities, (b) self-concept as an effective learner, (c) initiative and independence in learning, (d) informed acceptance of responsibility for one's own learning, (e) love of learning, (f) creativity, (g) future orientation, and (h) ability to use basic study and problem-solving skills. This instrument has been one of the most widely used and has generated controversy and criticism regarding issues of reliability and validity (see, e.g., Brockett & Hiemstra, 1991).
Reliability determination	Evidence of SDLRS' reliability and validity Finestone (1984), Long & Agykum (1983), Reynolds (1986) and Long (1987) and The internal consistency for each component was estimated using Cronbach's coefficient alpha. The computed values of Cronbach's coefficient alpha for the total item pool (n = 40), self-management subscale (n = 13), the desire for learning subscale (n = 12) and the self control subscale (n = 15) were 0.924, 0.857, 0.847 and 0.830 respectively. According to deVaus (1991), a scale with a computed alpha greater than 0.70 is considered to have an acceptable level of internal consistency (although the consistency for other types of scales, such as achievement tests, is generally expected to be at or above 0.80).
Validity determination	Validation of the SDLRS (Torrance & Mouran, 1978; Mourad, 1979; Long & Agyerum, 1983). The Guglielmino SDLRS has inherent problems relating to construct validity and reliability. Research has failed to confirm the factor structure of the Guglielmino SDLRS (Field 1989, 1991; Straka, 1996). The purpose of this study was to develop a reliable and valid scale that measures SDL readiness in nursing students. The resulting scale, comprised of 40 items, appeared to be both homogeneous and valid. Exploratory factor analysis revealed three subscales. The sample measures of central tendency and dispersion for the total scale and subscales. Given that the total scores for this sample were normally distributed, it can be concluded that a total score greater than 150 indicates readiness for SDL.
Item number	54 item scale
Response options	Five point likert scale
Usefulness of the instrument	Issues have been raised concerning the cost, validity and use of this instrument. Based on problems with validity testing of this instrument, Field (1989) and Candy (1991) suggest discontinuing this tool.

Furthermore, there has been significant questioning of the construct validity of the SDLRS (Field, 1989, 1991; Straka, 1995, Straka & Hinz, 1996). Field (1989) identified that the strongest item-to-score correlations for the SDLRS were produced by those items dealing with love and/or enthusiasm for learning (17.6% of total variance) and those items that appear to be intimately connected with readiness for SDL have low correlations with total SDLRS scores (less than 5% for each factor).

Replication of the eight-factor structure model of the SDLRS has proved difficult (Field, 1989, 1991; Straka, 1996). Some studies have raised questions about the reliability of Guglielmino's SDLRS when used in different racial and class populations (Long & Agyckum 1983, 1984; Straka, 1995). Long and Agyckum (1984) failed to validate the SDLRS when comparing SDL readiness scores and teacher ratings and concluded that it was possible that the SDLRS does not measure self-direction in learning. Bonham (1991) also reports concerns about the construct validity of the SDLRS by questioning the meaning of low scores. It was concluded that low scores do not measure low readiness for SDL, but rather dislike for any kind of learning, therefore, construct validity was questionable for low SDLRS scores.

Even though scales such as Guglielmino's SDLRS have been developed, they are not readily available and incur a cost for their use. The development of a new scale allows for the problems associated with the use of the other scales to be addressed. This study aimed to develop and pilot an instrument measuring SDL readiness.

Field (1989, 1990), the most ardent critic of the instrument, claimed that the Delphi technique used to create the scale was not appropriate for determining potential items for an instrument. He emphasized that the Delphi technique should not be used to generate items. Field noted, "Given the conceptual confusion surrounding 'self-directed learning' Guglielmino's use of the Delphi technique to generate items may do no more than merely transfer this confusion into a set of items" (p. 129). In addition, he asserted that the construct measured by the SDLRS seems to be "only peripherally related to self-directedness" (Field, 1989, p. 135) and has problems with the eight factors because he claimed that the instrument instead measures one "homogenous construct" which is a love and/or enthusiasm for learning (Field, 1989). Bonham (1991) noted a similar critique of the content validity of the instrument when she questioned whether the SDLRS did in fact measure readiness for self-directed learning.

Based on the moderate to high correlations found between the 4 factors produced by a CFA and an analysis of West and Bentley's 6-factor

	<p>correlation matrix. Although the SDLRS has been widely used as a single scale of readiness for self-directed learning, our analysis did not support this scheme. Instead, a model that includes 4 substantive factors plus a reverse coding method factor accurately describes the SDLRS factor structure. Despite confirmation of this structure, the reader should note the substantial amount of measurement error associated with each item.</p>
Sub-scales or one-dimensional	<p>A unidimensional scale is one in which each item measures the same underlying concept, in this case SDL. To test for unidimensionality, i.e. whether the response on a particular item reflects the response on other items, item-total correlation coefficients were conducted. The higher the coefficient for each item the more clearly the item belongs to the scale. Generally, a coefficient of less than 0.30 suggests that the item should be dropped from the scale. Ten of the 52 items produced a coefficient less than 0.30 and hence were dropped from the scale. Self management was defined by 13 of the pooled items. Desire for learning was defined by 13 items and 15 items, which related to characteristics of self-control.</p>
Domains	General
Target population	All adult learners
Access to sample	<ol style="list-style-type: none"> 1. I solve problems using a plan 2. I prioritize my work 3. I like to solve (answer) puzzles/questions 4. I manage my time well 5. I have good management skills 6. I set strict time frames 7. I prefer to plan my own learning 8. I prefer to direct my own learning 9. I believe the role of the teacher is to act as a resource person 10. I am systematic in my learning 11. I am able to focus on a problem 12. I often review the way nursing practices are conducted 13. I need to know why 14. I critically evaluate new ideas 15. I prefer to set my own learning goals 16. I am willing to change my ideas 17. I will ask for help in my learning when necessary 18. I am willing to accept advice from others 19. I learn from my mistakes 20. I will alter my practices when presented with the facts 21. I am open to new learning opportunities 22. I am open to new ideas 23. When presented with a problem I cannot resolve 24. I will ask for assistance 25. I am responsible

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26. I like to evaluate what I do
 27. I have high personal expectations
 28. I have high personal standards
 29. I have high beliefs in my abilities
 30. I am aware of my own limitations
 31. I am assertive
 32. I am confident in my ability to search out information
 33. I enjoy studying
 34. I have a need to learn
 35. I enjoy a challenge
 36. I want to learn new information
 37. I enjoy learning new information
 38. I set specific times for my study
 39. I am self disciplined
 40. I like to gather the facts before
 41. I make a decision
 42. I am organized
 43. I am logical
 44. I am methodical
 45. I evaluate my own performance
 46. I prefer to set my own criteria on which to evaluate my performance
 47. I am responsible for my own decisions/actions
 48. I can be trusted to pursue my own learning
 49. I can find out information for myself
 50. I need minimal help to find information
 51. I like to make decisions for myself
 52. I prefer to set my own goals
 53. I am in control of my life
 54. I need to be in control of what I learn
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Oddi Continuing Learning Inventory (OCLI) Oddi, (1984)

Relevance to study	As was the case for the SDLRS, the OCLI would be a suitable instrument to collect data about a sports coach's learning styles. Self-reflection and self-insight was selected for this study as it is a topic that needs more attention in the literature.
Summary of instrument	Oddi's Continuing Learning Inventory (OCLI) is an instrument that has been used frequently to measure the personal characteristics of self-directed learning. The OCLI is a 24-item 7-point Likert scale and contains three domains established by factor analysis: proactive/reactive learning drive, cognitive openness/defensiveness, and commitment/aversion to learning. Higher scores in the scale indicate having greater characteristics of a self-directed continuing learner. In this scale, the reliability coefficient also achieves a higher level (more than 0.8) (Oddi, 1984, 1986). However, factor analysis conducted by a recent study suggested that Oddi's three domains should be extended to four domains. The new four factors they created are: learning with others, learner motivation/self-efficacy/autonomy, ability to be self-regulating, and reading avidity (Harvey, Rothman, & Frecker, 2006).
Underpinning theories	Oddi (1984, 1986) believed that self-directed learning should be conceptualized as a personality characteristic, rather than a process or the combination of the two. Oddi (1986) provided the basic information on her instrument in a journal article format.

The Oddi Continuing Learning Inventory (OCLI) was born out of Lorys Oddi's (1984) criticism of Guglielmino's theory base for the Self-Directed Learning Readiness Scale (SDLRS). Instead of the then premier conceptualization of self-directed learning as a pedagogical process, Oddi (1984) instead conceptualized it as a personality characteristic. She used three related dimensions to group personality traits that she believed related to self-directed learning: proactive drive versus reactive drive, cognitive openness versus defensiveness, and commitment to learning versus apathy or aversion to learning (Oddi, 1984, 1986).

Oddi created 100 seven point Likert-type items through her review of literature on self-directed learning. These items were related to the three dimensions mentioned above. The items were reviewed by a panel of nine students who were similar to those who were to be used in her study. They placed the items into the dimensions they believed that the item represented. Sixty-five items were selected from this process because at least seven of the nine student panelists correctly identified the item as being related to Oddi's intended dimension. These 65 items were then reviewed by a panel of three experts as determined by their experience with psychology and/or self-directed learning. Experts were

given an explanation of each dimension and were asked to determine whether each item accurately reflected the proposed dimension and whether all aspects of the dimension had been covered based on the items provided (Oddi, 1984).

Data from the OCLI were factor analyzed. The five principal components accounted for 55.3% of the variance. Using oblique rotation, the five factors were not interpretable because of insufficient loadings of items on two of the factors. Using an extraction criterion of three factors, three principal components were found to have accounted for 45.7% of the variance (Oddi, 1984).

The experts recommended several revisions related to grammar and word choice and one expert suggested a missing aspect of one dimension that was corrected by changing one word. All of these recommendations were incorporated into the items. The refined group of items was put together into a pre-pilot instrument that was then administered to a group of 30 volunteers. These subjects reviewed the items and directions for clarity and these scores were subjected to an item analysis. Initial coefficient alpha for the total scale was .83. Thirty-four items were deleted because they lowered the reliability. A second reliability analysis resulted in a .85 coefficient alpha for the scale. The final 31 items were assembled into another instrument that would then be used in the pilot study (Oddi, 1984).

The first factor, which accounted for 30.9% of the total variance and was made up of 15 items, was described by Oddi as a “general factor relating to several other elements of self-directed continuing learning, such as ability to work independently and learning through involvement with others” (Oddi, 1984, p. 134). The second factor, which accounted for 8.0% of the variance and was comprised of three items, was thought to represent the ability of an individual to be self-regulating. Factor three, which accounted for 6.8% of the total variance and was made up of four items, was described as reading avidity. These three factors differed from her initial three domains.

Finally, four valid and reliable instruments that measured variables that were thought to be related to self-directed continuing learning were selected to provide external validity estimates (Oddi, 1984, 1986). Overall scores on the OCLI correlated positively with several of the subscales from three of the instruments, which suggests convergent validity of the OCLI (Oddi, 1986). “A measure of discriminant validity was provided when scores on the OCLI failed to correlate with scores on the Shipley, a measure of adult intelligence” (Oddi, 1984, p. 170). Oddi (1984) believed that this is consistent with research by Chickering and others that self-directed learning is not dependent on intelligence.

Oddi (1984) ended her dissertation by stating that the scale could have implications for practice after further validation studies had been conducted but that “the OCLI is an instrument of satisfactory reliability and stability” (Oddi, 1986, p. 104).

Responses were then collected from 292 subjects who were all graduate law, education or nursing students. Five respondents were eliminated because of unmarked or double marked answers; responses from 287 completed instruments were then analyzed. Because the construct that Oddi was measuring “self-directed continuing learning” was “based on the assumption that the dimensions of the construct were interrelated, an oblique approach (oblim method of rotation) was selected for rotation of the principal components extracted for the plot sample data” (Oddi, 1984, p. 99).

The result of this factor analysis was that nine principal components (selected because they had eigenvalues of 1 or more) accounted for 54.7% of the total variance. The coefficient alpha for the 31 item scale was .72. Rotation of these factors was unsuccessful. Five items were then deleted in order to improve the reliability of the scale and this resulted in a coefficient alpha of .75 for the total scale. This was followed by a second factor analysis that yielded eight principal components that accounted for 57% of the variance. The final development of the scale, after the revisions to refine the instrument, facilitate ease in responding, and random rearrangement of the items, was followed by its dissemination to another sample. The following demographic information was also collected from the participants because of Oddi’s (1984) assertion that previous studies said they were influential on self-directed learning: age, sex, level of education, level of family income, level of mother’s education, level of father’s education. None of the 271 students in the final sample were participants in the pilot study.

**Development
process
summary**

The Oddi Continuing Learning Inventory (OCLI) assesses self-initiated learning and continuing professional education. Oddi (1986) identified characteristics related to initiative and perseverance in learning over time. The range of scores on the OCLI in Oddi’s final study was 44-161. There is a maximum possible score of 168 and a minimum possible of 24. The initial alpha coefficient for reliability was .83 but two items correlated negatively with the total score so they were eliminated. The standardized coefficient alpha for the 24-item OCLI was .88. Several follow-up studies using the OCLI have been done (Harvey et al., 2003, 2006; Landers, 1989; Oddi et al., 1990; Six, 1989a, 1989b; Straka, 1996). Six (1989b) studied the generality of the underlying dimensions of the OCLI using Oddi’s original data set of 271 responses, data from 98 students from Landers’ (1989) study, as well as 328 responses that he collected himself. His factor analysis

	found that the three factors derived from his data set matched the same three factors reported by Oddi and his explained 44% of the variance. Six (1989b) added that: In most cases, a royalty-free copyright license for the use of the OCLI is granted by Lorys F. Oddi for the use of this instrument for research purposes..
Reliability determination	The high correlation between the two sets of factor scores suggested that the factors derived by Oddi do not break up to form new factors under different study conditions. To this degree the factors remained stable across studies, demonstrating their generality. Furthermore, the results strongly suggested that the factors identified by Oddi are not unique to her sample. Six (1989a, 1989b) did, however, find that there were smaller interfactor correlations than what Oddi (1984, 1986) reported and he suggested further factor solutions should be pursued.
Validity determination	Straka (1996) also tested the stability of the factor structure by using the same procedure as Oddi (1984) and Six (1989a) but with a sample from a German college. Straka's study yielded a Cronbach's alpha of .74 for the total set of items. In addition to the eigenvalues being smaller and only two thirds of the items being assigned to the same factors, his factor analysis indicated a similar solution to Six's and Oddi's. The percent of variance explained, however, was 32%, which was lower than in Six's or Oddi's studies. He believed that this may have been the case because Oddi and Six accepted loadings that were $>.5$. Furthermore, Straka (1996) noted that there may be cultural differences in the understanding of self-directed learning in addition to unidentified translation effects when the OCLI was translated into German. In another study with 250 responses (Harvey et al., 2006), coefficient alpha for the OCLI was .66. The researchers also found a similar factor structure to Oddi, Six, and Straka when they used a three-factor obliquely rotated factor analysis; their eigenvalues, however, were similar to Straka's so lower than the ones described by Oddi and Six. In addition, the portion of variance explained was 34% (Harvey et al., 2006). They also explored solutions with more than three factors and they found that a four-factor solution from obliquely rotated analysis was "the simplest, most interpretable solution for this set of student responses" (Harvey et al., 2006, p. 195). The four factors proposed were Learning with Others, Learner Motivation/Self Efficacy/Autonomy, Ability to be Self-Regulating, and Reading Avidity (Harvey et al., 2006).
Item number	24 items
Response options	7-point Likert scale
Usefulness of the instrument	Although used less frequently than the SDLRS, several studies have demonstrated its reliability and validity (Harvey et al., 2003, 2006; Landers, 1989; Oddi, 1984, 1986; Oddi, Ellis, & Altman Roberson, 1990; Six, 1989a, 1989b; Straka, 1996).

Sub-scales or one-dimensional	The new four factors they created are: learning with others, learner motivation/self-efficacy/autonomy, ability to be self-regulating, and reading avidity (Harvey et al., 2006).
Domains	The OCLI used three related dimensions to group personality traits that is believed to relate to self-directed learning: (a) proactive drive versus reactive drive, (b) cognitive openness versus defensiveness, and (c) commitment to learning versus apathy or aversion to learning (Oddi, 1984, 1986). Items were developed with these dimensions in mind.
Target population	All adult learners
Access to sample	This is a partial sample of this instrument; 3. I seek involvement with others in school or work projects 12. I'm not comfortable with my performance on an assignment until my supervisor, teacher, or colleague says it's acceptable 17. I find it difficult to judge if I've performed well or poorly on a task such as giving a speech, writing a paper, or answering a test question 20. When in school, I tend to have difficulty in estimating whether or not the teacher is going to like my work 21. I find it useful to think about people (or refer to them) according to categories (such as education, occupation, race, or ethnic background) 23. I make an effort to meet new people.
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Reflection in Learning Scale, (RLS) Sobral, (2000)

Relevance to study	The RLS looks at self-reflection and critical reflection. It is similar to the GRAS, the RTQ and the SRIS as relevant instruments when considering the introspective construct for this study. Most of the literature using this instrument was in the medical field. While the SRIS had also not been used in sports coaching, more cross over was evident in the SRIS to sports coaching than the RLS.
Summary of instrument	Sobral (2000) used a 10-item self-report questionnaire to appraise self-reflection in learning, with 103 medical students.
Underpinning theories	Mezirow (1991) on critical reflection as the four sub-scales are habitual action; understanding; reflection; and, critical reflection.
Development process summary	Students (n = 196) completed the 14-item Reflection-in-Learning Scale (RLS) along with the Course Valuing Inventory (CVI) and the Approaches to Study Inventory (ASI) (Richardson 1990).
Reliability determination	Positive, significant relationships were found between RLS scores and the CVI ($r = 0.55$; $p < 0.01$) and the ASI's Meaning Orientation ($r = 0.52$; $p < 0.01$). With reliability analysis showing good internal consistency for both start of term ($\alpha = 0.84$) and end-of-term ($\alpha = 0.86$) measures.
Validity determination	A validation study showed high internal consistency ($\alpha = 0.81$) and moderate stability across time (test-retest correlation, $r = 0.65$ after 3 months). Factor analysis identified two dimensions of integration and monitoring of learning. Sobral found positive relationships between some items in the Course Valuing Inventory (CVI) (Nehari and Bender 1978) and reflection scores. These were: relating and making sense of course content ($r = 0.46$); achievement of personal goals ($r = 0.44$); acquiring a clear and integrated notion of learning ($r = 0.36$); and a sense of self-esteem related to the course experience ($r = 0.34$). Building on this research, Sobral (2005) further explored the construct validity and reliability of the 14-item RLS scale, which appraises the reflective learning process, with 275 students. The author found support for the construct validity of the RLS scale. These relationships supported the theoretical stance that reflection and deep learning are positively related and provided some evidence of construct validity.
Item number	Sobral (2000) used a 14-item self-report questionnaire to appraise self-reflection in learning, with 103 medical students.
Response options	The questionnaire asked students to think about their learning experiences in the medical program and featured a seven-point scale anchored at the extremes by the responses 'never' = 1 and 'always' = 7.
Usefulness of the instrument	The RLS seems to be as comprehensive with the items and subscales as the GRAS and the SRIS
Sub-scales or one-dimensional	The instrument also includes a four-point global scale designed to assess personal efficacy for reflection in learning. This is a self-report instrument.

Domains	Mainly found in the medical literature
Target population	Students
Access to sample	<p>To what extent have I;</p> <ol style="list-style-type: none"> 1. Carefully planned my learning tasks in the courses and training activities of the medical program 2. Talked with my colleagues about learning and methods of study 3. Reviewed previously studied subjects during each term 4. Integrated all topics in a course with each other and with those of other courses and training activities 5. Mentally processed what I already knew and what I needed to know about the topics or procedures 6. Been aware of what I was learning and for what purposes 7. Sought out interrelations between topics in order to construct more comprehensive notions about some theme 8. Pondered over the meaning of the things I was studying and learning in relation to my personal experience 9. Conscientiously sought to adapt myself to the varied demands of the different courses and training activities 10. Systematically reflected on how I was studying and learning in different contexts and circumstances 11. Mindfully summarized what I was learning day in, day out, in my studies 12. Exerted my capacity to reflect during a learning experience 13. Diligently removed negative feelings in relation to aims, objects, behaviors, topics or problems pertaining to my studies 14. Constructively self-assessed my work as a learner
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Reflection Thinking Questionnaire (RTQ) Kember, Leung, Jones, Loke, McKay, Sinclair, Tse, Webb, Wong, Wong, & Yeung, (2000)

Relevance to study	The RTF looks at self-reflection, habitual action, understanding, reflection, critical reflection which are relevant when considering the intrapersonal knowledge needed for sports coaching. This instrument did not seem as well referenced in the literature, and lacks research on the validity and reliability of this instrument.
Summary of instrument	Kember et al. (2000) developed a four scale 16-item questionnaire to measure reflective thinking, based principally on Mezirow, and administered it to 303 students from eight classes of a health sciences faculty.
Underpinning theories	Mezirow (1991) on critical reflection as the four sub-scales are habitual action; understanding; reflection; and, critical reflection.
Development process summary	Kember and colleagues (Kember et al., 2000) developed an inventory, the Reflective Thinking Questionnaire (RTQ), to assess experiential thinking towards the four phases of reflective thinking. The 16 items of the RTQ are answered on a seven-point scale from 1 (“definitely agree”) to 7 (“definitely disagree”); for example, “In this course we do things so many times that I started doing them without thinking about it” (habitual action), “To pass this course you need to understand the content” (understanding), “I often re-appraise my experience so I can learn from it and improve for my next performance” (reflection), and “This course has challenged some of my firmly held ideas” (critical reflection). Leung and Kember (2003) have reported reliability estimates ranging from .58 to .74 for the four subscales of the RTQ.
Reliability determination	Reflection Thinking Questionnaire Kember et al. (2000) developed a four scale 16-item questionnaire to measure reflective thinking, based principally on Mezirow, and administered it to 303 students from eight classes of a health sciences faculty. The four scales, each measuring a construct, along with their reliability estimates, were: habitual action (Cronbach’s $\alpha = 0.62$); understanding ($\alpha = 0.76$); reflection ($\alpha = 0.63$); and, critical reflection ($\alpha = 0.68$).
Validity determination	Confirmatory factor analysis showed a good fit to the four factor structure. Comparison of mean scores between the eight classes showed predicted differences on each of the four scales between undergraduate and postgraduate students.
Item number	Kember et al. (2000) developed a four scale 16-item questionnaire to measure reflective thinking, based principally on Mezirow, and administered it to 303 students from eight classes of a health sciences faculty.
Response options	Items using the 5-point Likert scale (1 = totally disagree, 5 = totally agree).
Usefulness of the instrument	The RTQ seem to be a comprehensive with the items and subscales as the GRAS or the SRIS

Sub-scales or one-dimensional	The four scales, each measuring a construct, along with their reliability estimates, were: habitual action (Cronbach's $\alpha = 0.62$); understanding ($\alpha = 0.76$); reflection ($\alpha = 0.63$); and, critical reflection ($\alpha = 0.68$). Confirmatory factor analysis showed a good fit to the four factor structure. Comparison of mean scores between the eight classes showed predicted differences on each of the four scales between undergraduate and postgraduate students.
Domains	Mostly found in the Health domain
Target population	Students
Access to sample	<p>Reflection Questionnaire: Please fill in the appropriate circle to indicate your level of agreement with statements about your actions and thinking in this course.</p> <p>Habitual Action</p> <p>1. When I am working on some activities, I can do them without thinking about what I am doing.</p> <p>5. In this course we do things so many times that I started doing them without thinking about it.</p> <p>9. As long as I can remember handout material for examinations, I do not have to think too much.</p> <p>13. If I follow what the lecturer says, I do not have to think too much on this course.</p> <p>Understanding</p> <p>2. This course requires us to understand concepts taught by the lecturer.</p> <p>6. To pass this course you need to understand the content.</p> <p>10. I need to understand the material taught by the teacher in order to perform practical tasks.</p> <p>14. In this course you have to continually think about the material you are being taught.</p> <p>Reflection</p> <p>3. I sometimes question the way others do something and try to think of a better way.</p> <p>7. I like to think over what I have been doing and consider alternative ways of doing it.</p> <p>11. I often reflect on my actions to see whether I could have improved on what I did.</p> <p>15. I often re-appraise my experience so I can learn from it and improve for my next performance.</p> <p>Critical Reflection</p> <p>4. As a result of this course I have changed the way I look at myself.</p> <p>8. This course has challenged some of my firmly held ideas.</p> <p>12. As a result of this course I have changed my normal way of doing things.</p> <p>16. During this course I discovered faults in what I had previously believed to be right.</p>

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Groningen Reflection Ability Scale (GRAS) Aukes, Geertsma, Coehn-Schotanus, Zwierstra, Slaets, (2007)

Relevance to study	The GRAS looks at self-reflection, empathetic reflection, and reflective communication. The GRAS and the SRIS had many similar merits when looking at the goals of this study. The GRAS has been used in similar fields to the SRIS and also it's has some similar coverage in the literature. However, this instrument was originally developed in Dutch. I was not able to find any evidence in the literature on the reliability and validity of this instrument in English.
Summary of instrument	Groningen Reflection Ability Scale (GRAS) measures personal reflection ability with three factors self-reflection, empathetic reflection and reflective communication. This instrument contains cognitive-emotional and meta-cognitive processes which have had extensive coverage in the literature.
Underpinning theories	Sackets, Haynes, Guatt, & Tugwell (1991) linked clinical reasoning to scientific reflection, in the context of the medical world, evidence based medicine (EBM) is the bridge between theory and practice. To fully understand the process of self-reflection is not a task regarding intellectualization, but rather a greater awareness of sensations, images, feelings and thoughts (Coleman, 2005; Epstein, 1999). Hilton & Slotnick (2005) described the notion of reflection in the context of professionalism as more a state than a trait and is a critical quality of a professional that enables better performance in the work environment.
Development process summary	The Groningen Reflection Ability Scale (GRAS) was developed to measure the personal reflection ability of medical students (Aukes, 2008).
Reliability determination	According to the standards for educational and psychological testing (American Educational Research Association et al. 1999), the GRAS (with Cronbach's alpha's of 0.83 and 0.74) can be regarded as 'good' for less important decisions at individual level (0.70 - 0.80) and group level (0.60 - 0.70), and 'not quite sufficient reliable' for important decisions at individual level (0.80 - 0.90). Whereas other scales only focus at one specific aspect (Niemi 1997; Wong, Kember, Chung, & Yan, 1995) or at critical reflection on well-defined clinical problems (King & Kitchener 1994), the GRAS focuses at personal reflection on experience and less structured problems.
Validity determination	In two studies, medical students completed the GRAS and related validated scales: 4 Korthagen reflection scales, the Need For Cognition (NFC) scale, the Open-Mindedness scale, and the Personal Need For Structure (PNFS) scale. The correlations between the scales were analyzed. Study 1 showed significant decreasing correlations with the Korthagen scales, ranging from .67 with the most reflective scale to .32 with the least reflective scale; the GRAS Self-Reflection items explained most of the variance. Study 2 showed significant positive correlations with the NFC scale (.56) and the Open-Mindedness scale(.56), and a low negative correlation with the PNFS scale (-.14) (both studies $p < .01$, 2- tailed, all correlations with attenuation correction).

Item number	The 23-item scale range of total scores between 14 (very low reflection) and 70 (very high reflection). The items are grounded in the reflection literature. Self-reflection (10 items): Introspection, exploration, understanding and appraisal of experiences; empathetic reflection (6 items): Replacement in and taking into consideration the situation of others, openness to different ways of thinking, contextual understanding and appraisal; and reflective communication (7 items): Reflective behavior, openness for feedback and discussion, taking responsibility for own statements and actions, ethical accountability.
Response options	Items use the 5-point Likert scale (1 = totally disagree, 5 = totally agree)
Usefulness of the instrument	The available instruments for measuring reflection are mainly focused on critical thinking regarding well-defined problems (King & Kitchener 1994). However, critical thinking is not identical to reflection (Polanyi 1974; Mezirow 1998; Mamede & Schmidt 2004). The theoretical framework underpinning the GRAS was eclectic and included reference to clinical reasoning, evidence-based medicine and the five-factor personality theory, as well as reflection. Quite a lot of problems arising in sports coaching along are multifaceted and complex. By the authors' admission, the GRAS has a number of problems with its factorial validity and requires further development before it can become useful.
Sub-scales or one-dimensional	The GRAS is a one-dimensional scale with these relevant aspects of that dimension: self-reflection ('I take a close look at my own habits of thinking'), empathetic reflection ('I am aware of the possible emotional impact of information on others'), and reflective communication ('I am open to discussion about my opinions').
Domains	Mainly found in the medical literature
Target population	Experts and students
Access to sample	<ol style="list-style-type: none"> 1. I want to know why I do what I do. 2. I am aware of the emotions that influence my behavior. 3. I do not like to have my standpoints discussed. 4. I do not welcome remarks about my personal functioning. 5. I take a closer look at my own habits of thinking. 6. I am able to view my own behavior from a distance. 7. I test my own judgments against those of others. 8. Sometimes others say that I do overestimate myself. 9. I find it important to know what certain rules and guidelines are based on. 10. I am able to understand people with a different cultural /religious background. 11. I am accountable for what I say. 12. I reject different ways of thinking. 13. I can see an experience from different standpoints. 14. I take responsibility for what I say. 15. I am open to discussion about my opinions. 16. I am aware of my own limitations.

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17. I sometimes find myself having difficulty in illustrating an ethical standpoint.
 18. I am aware of the cultural influences on my opinions.
 19. I want to understand myself.
 20. I am aware of the possible emotional impact of information on others.
 21. I sometimes find myself having difficulty in thinking of alternative solutions.
 22. I can empathize with someone else's situation.
 23. I am aware of the emotions that influence my thinking.
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APPENDIX F—Original Coach Development Profile Interview

Section	Number of items	Items and reliability values	Measures
Demographics	7	Gender	Sex (0=F; 1=M)
		Age	Years (Numeric)
		Occupation	Position/Industry (Category)
		Education level	High School, Community College, Bachelor, Masters, Doctoral, Post Doctoral (category)
		Number of college coaching courses (r=.73)	N (numeric)
		Years of coaching (r=.99)	Years (Numeric)
		Current level of coaching	1=Level 1 (new coach), 2=Level 2 (novice), 3=Level 3 (competent intermediate), 4=Level 4 (proficient intermediate), 5= Level 5 (expert) (category)
Athletic profile	4	# Sports played	Number sports played (numeric)
		Sports played year started	Year started (numeric)
		Sports played year finished	Year finished (numeric)
		Sports played in years	Year finished minus year started (numeric)
Rowing Athletic background	8	Level sport played	Beginner=1, Intermediate=2, Elite=3 (Numeric)
		Leadership Position	Leadership position (0=no; 1=yes) (dichotomous)
		Assigned position	Starter=1, Reserve=2, Practice squad only=3 (Dichotomous)
		# of competitions/year	# competitions/yr (numeric)
		Months/year in competition	Months/yr in competition (numeric)
		Hours/week in training	Hrs/week in training (numeric)
		Months/year in training	Months/yr in training (Numeric)
Overall ability at this level	1-10 (1=poor, 5 =average, 10=outstanding) (numeric)		
Rowing Coaching profile	28	Sport coached	List all sports (category)
		Year started	Years
		Year finished	Years
		Total years of coaching	Year started minus year finished - N yrs coaching (numeric)
		- at each of the following levels	
		# athletes coached,	N athletes coached (numeric)
		# games played	N games played (numeric)
		# games won	N games won (numeric)
		# final appearances,	N final appearances (numeric)
		# championships won/level;	N championships won at:
		- school	- school (numeric)
		- regional	- regional (numeric)
		- state (r=.73)	- state (numeric)
		- national	- national (numeric)
		- professional	- professional (numeric)
		- international	- international (numeric)
		- Worlds/Olympics	- Worlds/Olympics (numeric)
Total athletes coached	Total of seven levels above		
WIN/LOSS	Wins/Games played (numeric)		
Total final appearances	Sum of seven levels above (numeric)		
Total championships won	Sum of seven levels above (numeric)		
Coaching Background	13	Role on coaching staff (r=.98)	Head (primary) Coach, Assistant coach (category)
		Age of athletes	Average age (numeric)
		Athletes gender	Percent of males/females (numeric)
		Level of competition	1=Beginner, 2=Intermediate, 3=Elite (category)
		Number of coaches on coaching staff (r=.79)	N coaches (numeric)
		Hours/week coached	Ave hrs/week coach (numeric)
		Weeks/year coached	Weeks/year coach (numeric)
		Total hours of coaching/year (r=.74)	Weeks/year times hours/week coached
		Months/year of competition	N Months/year of competition (numeric)
		Competitions/year	N competitions/yr (numeric)
		Hours/week admin in competition	Hrs/week admin in competition (numeric)
		Hours/week admin in training	Hrs/week admin in training (numeric)
		Hours/year in formal coach education in rowing	Hrs/yr in formal coach education (numeric)
		Hours/year in formal coach education in general sport (r=.77)	Hrs/yr in formal coach education (numeric)
Number of mentors contact per year (r=.62)	N mentor contacts/yr (numeric)		

APPENDIX G—Original Self-Reflection and Insight Scale

SRIS

Please read the following questions and circle the response that indicates the degree to which you agree or disagree with each of the statements. Try to be accurate, but work quite quickly. Do not spend too much time on any question

THERE ARE NO “WRONG” OR “RIGHT” ANSWERS – ONLY YOUR OWN PERSONAL PERSPECTIVE

BE SURE TO ANSWER EVERY QUESTION

ONLY CIRCLE ONE ANSWER FOR EACH QUESTION

	Disagree Strongly	Disagree	Disagree Slightly	Agree Slightly	Agree	Agree Strongly
1. I don't often think about my thoughts	1	2	3	4	5	6
2. I am not really interested in analyzing my behaviour	1	2	3	4	5	6
3. I am usually aware of my thoughts	1	2	3	4	5	6
4. I'm often confused about the way that I really feel about things	1	2	3	4	5	6
5. It is important for me to evaluate the things that I do	1	2	3	4	5	6
6. I usually have a very clear idea about why I've behaved in a certain way	1	2	3	4	5	6
7. I am very interested in examining what I think about	1	2	3	4	5	6
8. I rarely spend time in self-reflection	1	2	3	4	5	6
9. I'm often aware that I'm having a feeling, but I often don't quite know what it is	1	2	3	4	5	6
10. I frequently examine my feelings	1	2	3	4	5	6
11. My behaviour often puzzles me	1	2	3	4	5	6
12. It is important to me to try to understand what my feelings mean	1	2	3	4	5	6
13. I don't really think about why I behave in the way that I do	1	2	3	4	5	6
14. Thinking about my thoughts makes me more confused	1	2	3	4	5	6
15. I have a definite need to understand the way that my mind works	1	2	3	4	5	6
16. I frequently take time to reflect on my thoughts	1	2	3	4	5	6
17. Often I find it difficult to make sense of the way I feel about things	1	2	3	4	5	6
18. It is important to me to be able to understand how my thoughts arise	1	2	3	4	5	6
19. I often think about the way I feel about things	1	2	3	4	5	6
20. I usually know why I feel the way I do	1	2	3	4	5	6

Grant, A. M., Franklin, J., & Langford, P. (2002). The Self-reflection and Insight Scale: A new measure of private self-consciousness. *Social Behavior and Personality*, 30, 821-836. – Permission is freely granted to use this scale for research and therapeutic/coaching purpose. Commercial use of this scale requires written permission from A. M. Grant. Email: anthonyg@psych.usyd.edu.au
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APPENDIX H—Coaching Experience Questionnaire and Emailed Letter of Invitation

Dear fellow coach:

This is an invitation to participate in a study about your athletic and coaching experiences. The purpose of this research is to develop a better understanding of coaching development that may in turn help more athletes' transition into a career in coaching.

This questionnaire focuses on your experiences at different levels of competition, your results, the time you have spent training and competing. You will be asked to reflect on your experiences as an athlete and as a coach in the sport of rowing. You are also asked for your agreement to a series of statements that deal with self-reflection in your coaching experiences.

This will take about 10 to 15 minutes. Please take time to focus on your experiences, as these questions will take some attention. Your answers, along with those of your fellow coaches, will help summarize athletic and coaching experiences and relate them to aspects of self-reflection.

Click on this link <https://www.surveymonkey.com/s/coachingexperiences> or copy and paste this link into your web browser. Friday, March 23, 2012 is the closing date for submitting this questionnaire.

Thank you for taking the time to participate in this study. If you have any questions or would like to discuss this in more detail, please contact me at the email address or phone number below.

Results will be published as part of my dissertation at Virginia Tech. Additionally, an executive summary of results will be posted online and you will be sent an email with the URL if you wish to access the results.

Cameron Kiosoglous
Phone - 202 415 1984
Email - cameronk@vt.edu

Rowing Athletic experience

1. How many years have you competed as an athlete in the sport of rowing? (metric)
2. What was your highest level of training as an athlete in the sport of rowing? (category) – high school, college, elite, masters, club, professional, other
3. What was your highest level of competition as an athlete in the sport of rowing? (category) – recreational, regional, state, national, international, world championships, Olympic Games, other

Athletic experience in sports OTHER than rowing

4. How many years did you compete as an athlete in sports OTHER than rowing? (metric)
5. What was your highest level of training as an athlete in the sports OTHER than rowing? (category) – high school, college, elite, masters, club, professional, other
6. What was your highest level of competition as an athlete in sports OTHER than rowing? (category) – recreational, regional, state, national, international, world championships, Olympic Games, other
7. Please list any OTHER sport(s) you have played.

Rowing Coaching experience

8. How many years have you been coaching rowing? (metric)
9. What was your highest level of coaching in the sport of rowing? (category) – high school, college, elite, masters, club, professional, other

10. What was the highest level of competition you have coached rowing? (category) – recreational, regional, state, national, international, world championships, Olympic Games, other

Coaching experience in sports OTHER than rowing

11. How many years have you been coaching in sports OTHER than rowing? (metric)
 12. What was your highest level of coaching in sports OTHER than rowing? (category) – high school, college, elite, masters, club, professional, other
 13. What was the highest level of competition you have coached in sports OTHER than rowing? (category) – recreational, regional, state, national, international, world championships, Olympic Games, other
 14. Please list any OTHER sport(s) you may have coached.
 15. What roles have you filled? (category) Head Coach, Assistant coach, Other
 16. How many years of rowing coaching experience do you have in the United States of America? (numeric)

Rowing Coaching Success

17. At your highest level of competition coached, how many crews did they compete against. (For example, 16)
 18. At your highest level of competition coached, what place did your top performing crew finish (For example – 8th place/16).

Self-Reflection and Insight Scale

The following questions relate to your reflective practices as a coach. Please consider these items in the context of your rowing coaching experiences. Please respond on a scale from 1 = strongly disagree to 5 = strongly agree.

-
1. I don't often think about my thoughts in the coaching context
 2. I rarely spend time in self-reflection as a coach
 3. I frequently examine my feelings as a coach
 4. I don't really think about why my coaching behavior
 5. I frequently take time to reflect on my thoughts as a coach
 6. I often think about the way I feel about my coaching behavior

 7. I am usually aware of my thoughts as a coach
 8. I'm often confused about the way I really feel about things in the coaching context
 9. I usually have a clear idea about why I've behaved in a certain way a coach
 10. In the coaching context, I'm often aware of a feeling, but I often don't know what it is
 11. My coaching behavior often puzzles me
 12. Thinking about my thoughts as a coach makes me more confused
 13. Often I find it difficult to make sense of the way I feel about things in the coaching context
 14. I usually know why I feel the way I do as a coach

 15. I am not interested in analyzing my coaching behavior
-

16. It is important to me to evaluate the things I do as a coach
 17. I am very interested in examining the things I think about as a coach
 18. It is important to me to try to understand what my feelings mean as a coach
 19. I have a definite need to understand the way my mind works as a coach
 20. It is important to me to be able to understand how my thoughts arise as a coach
-

Demographics

1. What is your year of birth? (metric)
2. What is your gender? (category) Male/Female
3. What is your highest level of education? (category) High school, Bachelor's degree, Master's degree, Professional degree, Doctorate, Other

Optional

If you would like to keep in touch, have any questions or want to know of the results of this study, in order to follow up, please complete the following questions.

- What is your name?
- What is your email address?
- What is your telephone number?
- Additional comments/questions

APPENDIX I—Permission to use Self-Reflection and Insight Scale, and Coaching Development Interview Profile

Anthony Grant

6:01 AM (3 hours ago)

to me

Dear Cam

I am very pleased to confirm that you have (and had) my permission to use the SRIS in your research.

Please do not hesitate to contact me if I can be of any further help

Regards

Tony Grant

ANTHONY M GRANT PhD | Associate Professor

Director: Coaching Psychology Unit | School of Psychology

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Re: Permission to use Coaching Development Interview Profile

Wade Gilbert

8:31 AM (35 minutes ago)

to me

Dear Cam,

I wholeheartedly endorse your project and grant you permission to use the coach development interview profile tool my colleagues and I created several years ago.

Sincerely,

Wade.

[Wade Gilbert, PhD](#)

Professor

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