

AN ANALYSIS OF TACTICAL THINKING IN TENNIS

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of the requirements for the degree of
PhD (Sport Science)

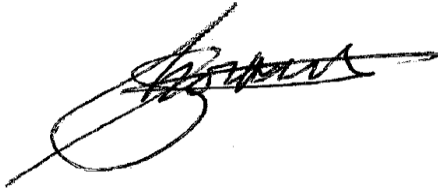
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Abstract

The purpose of this study was to explore the knowledge of tennis tactics of a group of South African tennis coaches. A secondary purpose was to gather their perceptions about where they believe they learned about tactics. A mixed methodology approach was used. The first was a quantitative knowledge test administered to 37 coaches. The second was a qualitative semi-structured interview with five coaches.

The results of the study showed that there was a significant difference in the choices of tactical options in 43 game scenarios between the less experienced and the more experienced coaches. No differences were found between coaches who were coaching at the top level compared to the lower levels. No differences were found between coaches who had been top tennis players and those who had not. The majority of the coaches in this study reported that they had learned tactics through trial and error.

Problems facing the development of top level tennis coaches in South Africa are discussed in relation to their knowledge of tactics and the priorities for the development of mass participation supported by national sport policy.

Key words: Tactics; knowledge of tennis; coaching knowledge.

Opsomming

Die hoofdoel van hierdie studie was om 'n groep Suid-Afrikaanse tennisafrigters se kennis van tennistaktiek te ondersoek. 'n Sekondêre doel was om uit te vind waar die afrigters glo hulle sodanige kennis opgedoen het. Die navorsingsbenadering het uit gemengde metodologieë bestaan. Die eerste was 'n kwantitatiewe kennistoets wat onder 37 afrigters afgeneem is. Die tweede was 'n kwalitatiewe semigestruktureerde onderhoud met vyf afrigters.

Die resultate van die studie dui daarop dat die minder ervare en meer ervare afrigters geen beduidende verskil getoon het in hul taktiese keuses in 43 wedstrydscenario's nie. Geen verskil is opgemerk tussen afrigters op die topvlak en dié op laer vlakke nie. Boonop was daar geen verskil tussen afrigters wat eens topspelers was en diegene wat nié was nie. Volgens die meeste van die afrigters in die studie het hulle hul kennis van tennistaktiek deur die metode van leer en probeer opgedoen.

Die studie bespreek die uitdagings in die ontwikkeling van topvlaktennisafrigters in Suid-Afrika wat betref hul kennis van taktiek en die prioriteite vir die bevordering van massadeelname ingevolge nasionale sportbeleid.

Trefwoorde: taktiek, kennis van tennistaktiek, afrigtingskennis

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Chapter One

Setting the Problem

In motor learning/control literature sport performance can be technically described as goal-directed co-operation between perceptual-motor and cognitive capabilities of the athletes involved in the sport (Magill, 2003) to achieve the highest level of performance possible. Due to the competitive nature of sport, participants continuously strive to gain some form of advantage over their opponent(s) in order to obtain their objective (winning the competition). The application of strategies and tactics are among the methods that are used to obtain this competitive advantage. To become an expert in a specific sport implies superior performance in both the technical and tactical aspects of that sport. From the perspective of Ericsson *et al.* (1993) interpretation of the development of expertise, the process of becoming an expert may take up to 10 years providing the aspiring expert engages in what is called deliberate practice.

Deliberate practice has been described as serious, intense and carefully planned (Ericsson, 1991) and to achieve the highest levels of sport proficiency requires a great deal of effort and sacrifice on the part of the participant. Designing, monitoring and adapting the structure and sequence of deliberate practice over a number of years requires expert knowledge. Although high performance sport programs list a variety of specialist consultants who have input into decisions about the development of expertise in sport, the contribution of coaches' technical and tactical knowledge is acknowledged as central to the process (Bloom, et al. 1999; Côté and Hay, 2002). To state it in a simplistic way, to become an expert performer requires input at some point in time from an expert coach.

But in what is the coach an expert? In order to address any part of this question, a holistic conception of the nature of coaching must be presented, even if it is a work in progress. Research over the past several decades have examined coaching from a variety of different perspectives ranging from novice coaches through to master coaches in order to derive a model to define the nature of

coaching. In their review of this literature Côté and Gilbert (2009) provided a comprehensive framework to define coaching that was very helpful in locating this study in a broader context of meaning. However, there are certain aspects of the model provided by Côté and Gilbert (2009) that may be missing. This study attempts to highlight these components.

An illustration of the Côté and Gilbert (2009) model is presented in Figure 1. In their presentation, they defined coaching as the interaction among three components: Coaching Knowledge, Athletes' Outcomes and Coaching Contexts. The following is a summary of the characteristics of coaching associated with each of the three components which they were able to draw from previous research:

1. Coaches' Knowledge.

Three different types of knowledge were identified:

- a) Professional Knowledge, described as the understanding of the science, pedagogy and sport-specific knowledge required to coach.
- b) Interpersonal Knowledge, described as the skills of communication with athletes, parents, communities, etc.
- c) Intrapersonal Knowledge, described as the ability to reflect on personal experiences in order to learn from them.

2. Athletes' Outcomes.

Four different types of outcomes were identified as emerging from the literature about coaching. Côté and Gilbert (2009) noted that the scope of these outcomes was influenced by the strong link in the research between teaching (education) and coaching:

- a) Competence in sport performance as a result of skill learning, fitness development, understanding rules and tactics.
- b) Confidence in oneself both as a sport performer and more generally in oneself as a result of the ways in which coaches provided instruction, feedback, support, etc.

- c) Connection with others as a result of the ways in which coaches tried to develop positive social interaction among athletes, groups, etc.



Figure 1. *The three components of coaching effectiveness (Côté & Gilbert, 2009).*

- d) Character/Caring as a result of coaches' trying to find ways to help encourage athletes to take responsibility and develop empathy

3. Coaching Contexts.

In this presentation, coaching contexts were defined in terms of sport contexts only. Two major areas were identified with a developmental consideration within each:

- a) Participation coaching in which coaches emphasised short-term goals, enjoyment and health for the participants, who could range from early childhood through to older adult.

- b) Competition coaching in which coaches emphasised long- term commitment from participants to specific training in preparation for intense competition. The range is usually from early adolescent to adulthood.

Of these three components of coaching, this study was designed to gain insight into the type of knowledge labeled “Professional Coaching Knowledge” as part of the component of coaching behaviour designated “Coaching Knowledge” in the Côté and Gilbert (2009) review (see Figure 2). When providing detail about professional coaching knowledge as specialized knowledge required to coach, the authors observed that there were different types of professional knowledge that had been identified in past research, and these types traditionally served as the focus areas in coaching education programmes:

- Knowledge in sport sciences (declarative knowledge) which included an understanding of the scientific principles that should guide coaching practices (e.g. knowledge about physiology, biomechanics, psychology, nutritional aspects, and injury considerations).
- Pedagogical knowledge (procedural knowledge) which included understanding teaching methods, forms of feedback, organisations for practice, etc.
- Sport-specific knowledge, which included the skills, rules, strategies and tactics that apply to a specific sport. This is often referred to as content knowledge that has both declarative and procedural aspects.

This allowed the focus of this study to be further refined to address only sport-specific professional knowledge in the form of tactics, specifically in tennis.

Because the model (Côté & Gilbert, 2009) presents coaching as an interaction among the three components of coaching effectiveness, it was possible to further refine the focus of this study. In terms of Athletes’ Outcomes, the focus was limited to coaching to promote the achievement of competence (in tennis). In terms of Coaching Contexts, the focus was on competitive sport. Competitive sport was chosen as the focus due to the researcher’s belief that this is where a

potential problem lies within the development of professional tennis players in South Africa. Contextualising this study within this model was considered to be an important step not only for guiding the study itself, but also for the interpretation of the results. The complexity of coaching leads to the observation that professional knowledge demands will differ in different contexts. In order to contribute to the literature on coaching, this study had to situate itself clearly in terms of its potential contribution to understanding the tactical knowledge of South African tennis coaches.

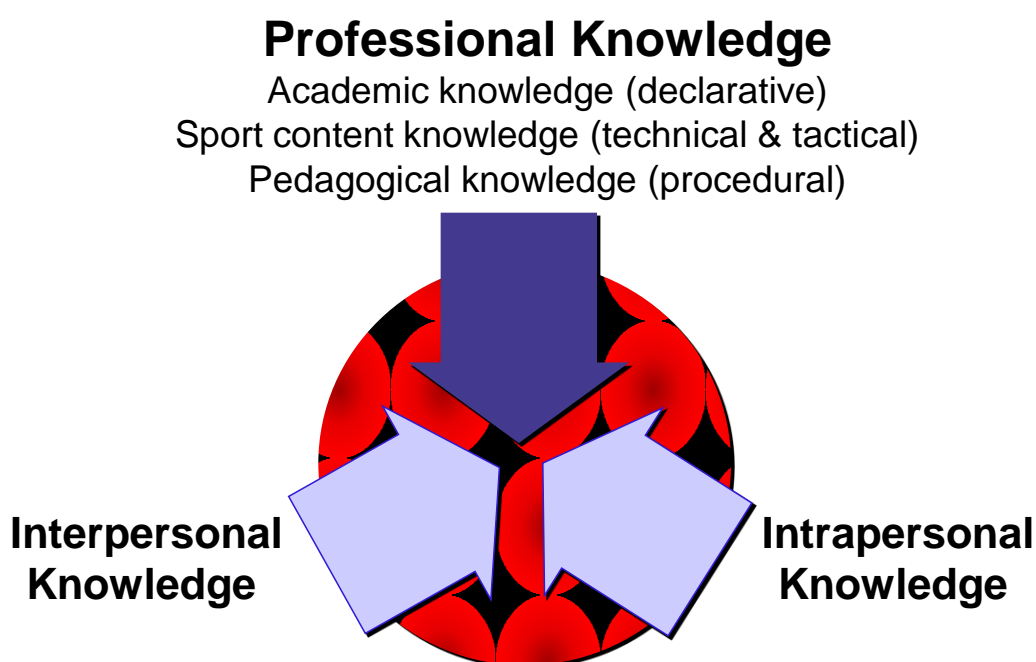


Figure 2. *The three types of professional knowledge that support coaching performance (Côté & Gilbert, 2009).*

Purpose of the Study

The purpose of this study is to explore the knowledge of tennis tactics of a group of South African tennis coaches. This aims to delve into the coaches' knowledge component of Côté & Gilbert's (2009) model of coaching effectiveness. Particularly it focuses on the professional knowledge of the coaches in South

Africa. A secondary purpose it to understand their perceptions about where they believe they learned about tactics.

Significance of the Study

There has been some research activity surrounding how the coaches gain their knowledge (Irwin, *et al.*, 2004; Côté, 2006; Carter & Bloom, 2009). However, no research was found that focused specifically on the tactical knowledge of tennis coaches. Gréhaigne *et al.* (1999) called for coaches to focus on important didactic decisions, such as methods for improving the tactical decision making of players. They identified the following four key areas for research to discover optimal approaches to the development of expertise in sport:

1. Technical vs. tactical pedagogical approaches to learning the sport.
2. Underlying learning strategies that are most compatible with gaining both technical skill and a cognitive understanding of a sport.
3. How teachers/coaches can transform their knowledge of content into learning situations so that players improve in their skill and understanding of a sport.
4. Developmental descriptions of tactical knowledge within a sport that can support the design of learning progressions to promote the acquisition of tactical knowledge.

There has been a great deal of interest shown in learning tactics in the professional literature (pedagogical knowledge) for under the broad descriptor of “Teaching Games for Understanding” (Turner and Martinek, 1999) which presumes coaches understand the tactics that are appropriate in different game contexts. However, whether coaches have the pre-requisite knowledge of tactics and how they acquired that knowledge is still unclear. An original written test of tactical choices has been designed for this study that offers one type of approach to assessing tactical knowledge that could make a contribution to the literature. It should at least contribute to some specific insights into the knowledge base of South African coaches, a topic that has not been studied.

Another significant contribution of this study is that is an attempt to mobilise research to gather information that may be of use in addressing serious problems facing tennis in South Africa. There have been some South African junior tennis players who have excelled at the junior level internationally, but have not gone on to make a successful transition to the elite professional level. This has led to questions about the quality and sophistication of both the tennis system and the tennis coaches in the country in terms of capacity to help talented players develop to the elite level. This study will open the discussion on the nature of the professional knowledge base of coaches specifically in relation to tactics which may lead to productive conversations about where the problems are in South African tennis and how to address them. However, it must be noted that numerous physiological and behavioural factors also contribute to the quality of play.

Research Questions

1. What was the effect of years of experience in tennis coaching on the choices of tactical options selected by the participants in this study? Erickson et al. (2007) showed that most coaches who coach at the elite level went through some other form of coaching experience prior to becoming a high-performance head coach.
 - 1a. Were there any differences in the how the more experienced vs. less experienced coaches reported they had learned about tactics in tennis?

2. What was the effect of coaching players at different levels of performance on the choices of tactical options selected by the participants in this study? Côté et al. (2007) suggested that a coach who coaches in the recreational sport participation setting will not be sufficiently equipped to coach players at a competitive level and vice versa.
 - 2a. Were there any differences in the how the coaches who work with players at different levels of performance reported they had learned about tactics in tennis?

3. What was the effect of the level of personal achievement as tennis players on the choices of tactical options selected by the participants in this study? Erickson et al. (2007) showed that experience in the sport that a coach currently coaches is important. Experience at the elite level was not deemed to be absolutely necessary. This study will aim to see if this holds true for South African coaches.

3a. Were there any differences in the how the coaches who had played at a higher compared to a lower level of tennis reported they had learned about tactics in tennis?

Nelson *et al.* (2006) confirmed that there were three methods by which coaches learned their trade and gained knowledge, namely formal, nonformal and informal learning settings. The research questions aim to ascertain which methods are most commonly used by South African tennis coaches.

4. What insights into coaching tennis in South Africa can be gained from individual interviews with selected coaches? The semi-structured protocol that was used as a guide focused on the following:

- What did the coaches believe it takes to become an expert tennis player?
- How did the coaches describe their beliefs about coaching and how they had learned to coach, with specific reference to the coaching of tactics?
- What did the coaches think influences decisions about tactics in tennis?
- What were the coaches' perceptions of the current situation in South African tennis?

The research in this study aims to diagnose one section of Côté and Gilbert's (2009) model of coaching effectiveness, namely that of coaches' knowledge.

Research question four also looks at the coaching contexts prevalent in tennis in South Africa.

Methodology

Two qualitative approaches were taken to exploring the tactical knowledge base of South African tennis coaches. The first was a quantitative knowledge test administered to 37 coaches. The second was a qualitative semi-structured interview with five coaches. This mixed methodology approach was decided upon in an attempt to get a clearer picture of the tactical thinking of tennis coaches in South Africa. The knowledge test provided quantitative data from a larger group of coaches, with the interviews producing a more in-depth look into a small group of coaches.

Knowledge Test

The researcher compiled an original test consisting of 43 scenarios of tennis situations. Six possible tactical responses were presented and the participants were required to rank their top three options. Comparisons were made to answer the first three research questions:

1. Between coaches with different levels of experience.
2. Between coaches who worked with players at different levels of expertise.
3. Between coaches who had achieved different levels of personal proficiency as players.

The coaches were also asked to complete a checklist indicating where they thought they had learned about tactics.

Semi-structured Interview

Five coaches participated in a semi-structured interview that addressed the fourth research questions. This interview focused on how the coaches gained their knowledge as well as the role that tactics play in the game of tennis. A content

analysis was completed on the verbatim transcripts of these interviews and the results were reported as categories of meaning.

Participants

The coaches who participated in this study held current qualifications in tennis from Tennis South Africa. They were all involved in tennis coaching at the time of the assessment and the interview and had all attending at least one formal tennis coaches' workshop during the year in which the assessment and interview took place.

Limitations

The following limitations must be kept in mind when considering the outcomes of this study:

1. The tactical themes used to generate the 43 games states on the written states were based on an identification of critical tactics published by an expert in tennis (Tiley, 2002). Although these tactics may be generally accepted themes, there may be discrepancies among experts about which tactics are critical, which may be missing, etc.
2. The scenarios presented on the written test do not encompass all the possible situations that may arise in tennis competition. This would have been impossible in any case, but the need to limit the test time to one hour led to a sampling of different kinds of situations. An effort was made to sample a similar number of situations from each tactical theme.
3. The coaches will differ in the ways they perceived the tactical choices in the different scenarios. This would have been the case whether the presentation was written (as in this study) or a video simulation or even an observation of real game play. For this reason, the data analysis looked only for differences between groups in terms of choices they would make in the presented scenario and did not try to determine whether one group made the "best choices" more often than another group.

4. The research tests the coaches' knowledge of tactics and not their pedagogical knowledge of how to apply this knowledge to help players make choices during game play.
5. The coaches were not accustomed to being interviewed. Although every effort was made to establish a comfortable environment, it is possible that they were not forthcoming in their responses to all of the questions.

Definitions

The following terms are used frequently in this study and have been operationally defined in the following way:

Declarative Knowledge

Includes rules and goals of the game (French & Thomas, 1987).

Procedural knowledge

Knowledge of what to do in a given situation (French & Thomas, 1987).

Knowledge Base

A coach's knowledge base includes propositional networks for conceptual knowledge (both tactical and skill related) and procedures for response selection and execution. It also includes other sport specific memory adaptations and structures such as action plan profiles, current events profiles, game situation prototypes, scripts for competition and sport specific strategies that are stored and accessible from long term memory (French & McPherson, 1999).

Strategy

A strategy is a pre-planned approach to getting an advantage in a game (Gréhaigne *et al.*, 2001).

Tactic

Short-term, situation-dependent problem solving processes under the constraint of the own playing ability, represented by the physical, motoric and psychological premises. (Höhner, *et al.*, 2004).

Summary

This study is an exploration of the tactical knowledge of South African tennis coaches. The results are compared to determine if there are differences based on years as a coach, level of players coached and personal level of tennis achieved as a player. The results of the study will help to determine if tactical knowledge is a problem area among South African coaches. Insights into the ways in which coaches have learned about tactics will also provide information about future directions for coaching education.

Chapter Two

Review of Literature

For players to excel in their chosen sport they need a wide variety of skills from technical to tactical to psychological. In order to achieve their potential these skills need to be developed in a systematic and integrated way. The guidance and facilitation of a coach can be invaluable. The following chapter presents a brief review of the nature of coaching effectiveness. The structure of the chapter will be based loosely on the three components that comprise the model of coaching effectiveness as proposed by Côté and Gilbert (2009). Firstly, the chapter will look at the knowledge that an effective coach needs to possess. Next, the focus will shift to the performers themselves and the outcomes that are desired from sports participation. Then the coaching contexts which are prevalent in the execution of effective coaching will be explored. Finally, a section will be dedicated to research specific to tennis. This process calls for coaches to learn how to coach tactics and is linked to the conclusion of the chapter: If players are to learn to apply tactics, they need coaches who understand tactics.

According to Côté and Gilbert (2009) it is important to distinguish between some of the terms commonly used when discussing expertise in coaching. The first term is coaching expertise which they define as specific knowledge in particular contexts. Next, they define effective coaches as coaches who show the ability to use and align their coaching expertise to specific athletes and circumstances so as to maximize the learning outcomes of the athletes. Côté and Gilbert (2009) go on to define coaching effectiveness as “the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes’ competence, confidence, connection, and character in specific coaching contexts” (p. 316). Finally, they note that one may become an expert coach once an effective coach has demonstrated coaching effectiveness over many years of practice.

Coaches' Knowledge

Côté and Gilbert (2009) mention three forms of coaches' knowledge that are important in the field of coaching, namely professional knowledge, interpersonal knowledge and intrapersonal knowledge. They note that extensive knowledge is a prerequisite for those who go on to become expert coaches.

The Expert Coach

Despite the relatively sparse literature with regards to expert coaches, there have been some studies that have looked at the characteristics and development of expert coaches. Some of this research has been rooted in research on expert teachers. Manross and Templeton (1997) described the characteristics of an expert physical education teacher in terms of an extensive knowledge base about the subject matter and advanced pedagogical skills. Some of those characteristics related to their professional knowledge, including:

- The development of a clear and thorough plan of what they intend to do in a lesson, using the environment in an effective and sometimes creative manner.
- The use of "if-then" thinking to generate contingency plans in case things do not go according to plan.
- Adaptation of lessons to individual differences in students' needs and abilities.
- Control of their perceptual abilities, reflected in their capacity to see small changes (even small changes) that are cues allowing them to anticipate what is going to happen in a particular situation.
- Adherence to a number of automatic routines to manage activities and organisational tasks.
- Command of the subject matter (experts possess extensive knowledge about the content that they teach and continually try to broaden their understanding of their subject).

- A sophisticated knowledge of teaching principles, including management of lessons and curriculum development.
- The use of reflection in order to learn from experience. This is an example of intrapersonal knowledge.

These characteristics of expert teachers fit well into the professional knowledge proposed by Côté and Gilbert (2009).

De Marco and McCullick (1997) generated a set of characteristics of an expert coach by looking into the coaching careers of some coaching legends. Their list was similar to that of Manross and Templeton (1997) and provides support for the position that the expert coach and the expert teacher share many qualities. Their elaboration on these qualities provides additional information about how expert coaches may express these qualities while coaching:

- They have extensive and specialised knowledge about their sport and the performers with whom they work. For many coaches their accumulation of knowledge began when they participated in their sport. Coaches also reported that they had fulfilled multiple roles on their road to expertise which contributed to their extensive knowledge regarding many different aspects of their sport.
- Their knowledge appears to be organised hierarchically. They seem to have quick and reliable access to past experiences. They also have the memory capacity to compare current performances to either past performances or to ideal standards, which was identified as an advantage for strategic thinking/planning.
- They were described as perceptive and as superior problem solvers. They displayed the capacity to recognise what was more and what was less relevant in a particular sport situation in order to come up with a tactical response or plan of action.
- They exhibited automaticity in some of their coaching duties, including their habits of analysis of performance.

- They had developed self-monitoring skills that allowed them to correct their own performance. This is an example of intrapersonal knowledge.
- They had a drive to improve their coaching effectiveness.

This study by De Marco and McCullick (1997) provides further support for the professional knowledge mentioned by Côté and Gilbert (2009) by applying it to coaches.

Schempp *et al.* (2006) extended on the characteristic of reflection in expert behavior and decided to determine what skills and knowledge were of concern to expert golf instructors. In other words, what skills and knowledge did they regularly monitor in their own behavior in their efforts to improve their coaching and teaching skills. Five themes were identified that represented the characteristics of professional practice that were monitored by the experts. These five factors were broadly labeled skills, knowledge base, personal characteristics, philosophy and tools. They are presented below in their priority order according to the experts.

1. Skills: Pedagogical skills, providing lesson structure, communication skills, golf skills (sport performance skills), analytical skills and administration skills.
2. Knowledge base, separated into seven categories: Knowledge of golf (sport-specific content), kinesiology (sport science), teaching (pedagogy), students (developmental context), business, technology and general.
3. Personal characteristics: Caring, even disposition, passion, trust, joy and patience.
4. Philosophy, manifested in two different concerns: Some experts indicated that they wanted to ensure they remained faithful to their own beliefs, and other experts wanted to make sure they were open learn about the beliefs of others. These “beliefs” referred to beliefs about learners’ needs, the content (what to teach), best instructional methods and beliefs about the programme should be structured.

5. Tools or teaching aids: A willingness to exploring new methods of enhancing instruction, including technology.

This study specifically provides confirmation of the intrapersonal knowledge required by Côté and Gilbert (2009) for coaching effectiveness.

There were many overlapping characteristics and concerns about expert teaching and coaching in the presentations of Manross and Templeton (1997), De Marco and McCullick (1997) and Schempp *et al.* (2006). From the standpoint of this study, the recurrence of the critical role of extensive and sophisticated content-specific knowledge is important. None of the definitions of “expert” were presented without putting a priority on content-specific knowledge. Manross and Templeton (1997) defined an expert teacher as one who must combine superior teaching skills with a vast understanding of the subject matter. De Marco and McCullick (1997) listed the possession of an extensive and specialised knowledge as a characteristic of expert coaches. This research concurs with the contention of Côté and Gilbert’s (2009) that professional knowledge is an integral component of coaching effectiveness.

Sources of Coaching Knowledge

Nelson, Cushion and Potrac (2006) categorised the sources of coaching knowledge as formal, non-formal and informal. In their description, formal learning referred to traditional educational formats such as structured learning environments such as formal coaching certification courses. Non-formal sources of learning included coaching workshops and professional conferences. Informal sources included experiences as a coach, interacting with athletes and other coaches, etc. Self-directed learning, such as reading coaching magazines, was also considered to be an informal source of learning. These sources of learning aim to address the coaches’ knowledge component of Côté and Gilbert’s (2009) model. In participating in these forms of learning, the coaches are attempting to improve their professional, interpersonal and intrapersonal knowledge capabilities.

Non-formal and informal sources have also been put together by some researchers under the broad descriptor “outside-of-the classroom learning

opportunities” (Culver & Trudel, 2008). In all cases they are recognized as valuable sources of knowledge. Rynne, Mallet and Tinning (cited in Côté, 2006) supported informal sources of as powerful contributors to coaching knowledge. They advocated learning while engaged in well-structured practical coaching experiences. They were convinced that coaches could acquire essential social, technical and organizational skills and knowledge in the workplace.

Erickson *et al.* (2008) conducted structured quantitative interviews with developmental-level coaches in order to determine the methods through which they thought they had gained their knowledge. They identified seven sources of coaching knowledge, all of which were compatible with one of the Nelson *et al.* (2006) categories. Only one of the seven sources was formal and one was non-formal. Five of the seven sources of learning for developmental coaches were informal:

1. Formal coaching education (formal).
2. Clinics and courses (non-formal).
3. Learning through experience (informal).
4. Mentoring (informal).
5. Observation of other coaches (informal).
6. Interaction with other coaches (informal).
7. Printed and electronic materials (informal).

Nelson, Cushion and Potrac (2006) postulated that informal, self-directed sources of learning had more impact than non-formal and formal modes of learning. They believed that the setup of formal coaching education programmes could more accurately be described as ‘training’ or even ‘indoctrination’ rather than as ‘education’.

Not all researchers were so negative about formal sources of learning. In Côté’s (2006) identification of three settings in which coaches learn, the first were formal coaching education programmes which are presented world-wide. Werthner

and Trudel (2006) referred to formal situations where learning was directed by another party as mediated learning situations. Mediated learning could include structured and supervised practical experience in coaching. They suggested that this type of learning situation would be most beneficial to youth sport coaches.

Research has shown that some effective coaches reported that they annually spend time participating in formal coaching education programmes (Gould, *et al.*, 1990; Gilbert, Côté & Mallett, 2006). However, in an international project conducted by Gilbert *et al.* (2006) followed the developmental activities of sports coaches. They found that their participation in formal education may have been an annual occurrence, but that the number of hours spent in formal education was much less than the hours spent in non-formal and informal learning activities.

Côté (2006) isolated two factors that he believed limited the effectiveness of formal coaching education programmes. Firstly, many courses are relatively short in terms of hours and days. Because coaching occurs in so many different contexts and for different athlete outcomes, its complexity cannot be easily accommodated over a short period of time. Secondly, there is no evidence that what is learned in a formal setting transfers to the actual coaching context. Among other problems, formal experiences cannot easily change a coach's philosophy or behaviour.

The lack of transfer between formal coaching education and coaching practice had been identified previously in Abrahams and Collins' (1998) examination of coaching development and in Gilbert and Trudel's (1999) evaluation of coaching education programmes. One reason for the lack of transfer may be the approach taken in many of these formal courses when the leader of the course takes the position of giving knowledge and the coaches (learners) in the course are the receivers of knowledge. Côté (2006) suggested that transfer would be more likely to occur if these programmes created a more co-operative learning environment.

Instead of looking at the labels of formal, non-formal and informal, Trudel and Gilbert (2006) took a different approach to categorizing sources for learning.

They considered the processes of learning and proposed two categories: acquisition and participation. These processes allowed them to look at the ways in which coaches acquire knowledge and in what activities they participate in order to learn more about coaching in their particular sport. The acquisition of knowledge through mentoring and apprenticeship as well as participation in communities of practice were mentioned frequently in the coaching education literature as viable processes for learning (Cassidy & Rossi cited in Côté, 2006). The value of peer interaction as a platform for learning was evident in mentoring, apprenticeships and communities of practice (Erickson *et al.*, 2008). All of these forms of learning were defined by Werthner and Trudel (2006) as unmediated learning situations (opportunities where no instructor is present and the learner takes the initiative with regards to what to learn). These unmediated situations help to improve a coach's effectiveness by addressing all three of the components of Côté and Gilbert's (2009) model of coaching effectiveness in ways that mediated situations do not. Specifically, these situations address the interpersonal and intrapersonal knowledge components.

Mentoring

According to Merriam (1983), mentoring originated from Greek mythology where a father trusted his son to a wise old man named Mentor who would guide the child in his development. Merriam (1983) suggested there is no agreed upon definition of mentoring, but that the research that was being conducted defined mentoring in terms of the context of the research. The generally accepted explanation of mentoring is when support, counsel and guidance is given by a more experienced mentor (Merriam, 1983). Mentoring has been adopted by coaching when coaches believed that mentoring programs were necessary for their professional development as expert coaches.

Bloom *et al.* (1998) found that mentoring plays an important role in the development of expert coaches. After interviewing 21 expert team coaches they discovered that all of them had been mentored during their athletic careers as well as the early part of their coaching careers. Once these coaches had reached a certain level, they assumed the role of the mentor to help other prospective coaches.

In their study of elite coaching knowledge in artistic gymnastics coaches, Irwin *et al.* (2004) reported findings consistent other studies in that the coaches had learned most of their knowledge through interactive coaching clinics as well as mentorships. According to the authors, these forms of learning facilitate inquiry and experimentation allowing the coach to learn through reflective practice in the training setting.

Communities of Practice

Culver and Trudel (2008) described communities of practice in terms of opportunities for mutual engagement, a kind of joint enterprise. Mutual engagement is based on knowing how to give help to others and knowing where to find help among members of the community. As a joint enterprise, the community does not expect all members to agree on everything, but rather fosters collaborative conversations among members to encourage reflection and critical thinking. As time goes by, the community generates a “shared repertoire” of ways of doing things, a history of preferred methods, a common terminology, standards for behavior, etc. A community of practice has been simply defined as a group of people who teach and learn from each other.

Experience as a Coach

A review of previous research has revealed that all coaches report that their skills and knowledge of coaching has in large part come through the experience of coaching (Côté *et al.*, 1995). Gilbert and Trudel (2001) developed an experiential learning model based on six focus areas for reflection: Coaching issues, role frames, issue setting, strategy generation, experimentation and evaluation. Erickson *et al.* (2007) corroborated the findings of subsequent research by Trudel and Gilbert (2006) and documented that the majority of the elite-level coaches they interviewed had had some experience in coaching prior to developing into a high performance coach.

Experience as a Player

Many coaches have claimed that their experiences as athletes contributed to their knowledge and skill as coaches (Côté, 2006). Gilbert *et al.* (2006) found

that successful coaches (winning record over minimum of five years) in high school softball, college volleyball and college football participated had a minimum of 13 years of experience as players. They had participated in thousands of hours of practice in their sports prior to becoming coaches. In fact, many of them took part in more than three competitive sports during their playing days.

In their study of team and individual sport coaches at interuniversity level in Canada, Erickson *et al.* (2007) found that all the team sport coaches had not only played sport, but they had also fulfilled leadership roles when they were players. Their experiences as players came from participation in several team sports, not just the one they were currently coaching. These authors also noted that these high performance team coaches had developed leadership skills and a more general understanding of the sport experience than they found when they interviewed high performance individual sports coaches. This observation led them to conclude that the development of team sport coaches might be different from that of individual coaches and that care must be taken when trying to make generalisations about learning pathways.

No studies were found that contradicted the earlier findings of Salmela (1994) who stated that while playing experience was a legitimate reference for coaching knowledge, it was not an absolute necessity. In his support for this conclusion, Ericsson (2008) noted that top-class sport performance does not automatically produce domain-related knowledge and insight into professional skills.

Preferred Sources of Knowledge

When Erickson *et al.* (2008) conducted the interviews with coaches that produced seven sources of coaching knowledge, they followed-up with a second interview to determine which sources of learning were preferred by coaches. They also asked the coaches to indicate what they thought were the best ways to develop coaching knowledge. The discrepancies between the sources of their learning and the ways in which they preferred to learn were particularly interesting in the methods learning by doing, coaching certification courses and mentorships.

- In terms of learning by doing, coaches noted that although it was a primary source of learning, many of them would prefer to develop their coaching knowledge from other sources.
- In terms of participation in both certification programmes and mentorships, the coaches indicated that they would prefer to gain more of their coaching knowledge from these sources than they are currently doing.

Erickson *et al.* (2008) concluded that it appeared that these coaches preferred to be guided in their learning rather than lead themselves through the trial and error method as they were currently doing. This shows that the coaches in this study were displaying their intrapersonal knowledge by realising what methods would help to improve their abilities as coaches. This method of learning would lead to an improvement in interpersonal knowledge.

The Evaluation of Coaching Expertise

Several different approaches have been taken to the evaluation of coaches, ranging from observation to formal testing. From the perspective of this study, the critical questions revolved around coaches' implementation of their knowledge.

Do coaches implement their knowledge?

Rodgers *et al.* (2007) presented some interesting findings regarding the implementation of recommended coaching practices. These practices were taken from a list of coaching behaviours. A survey method was used to gather data from 821 coaches who had participated in the National Coaching Certification Program (NCCP) in Canada. Of the 22 variables that were thought might influence the application of coaching principles, seven were found to have a significant impact on certain coaching behaviours:

1. Sex of the coach: Female coaches using significantly more positive self-talk than male coaches. Male coaches changed the intensity and duration of practice sessions significantly more than female coaches.

2. Individual vs. team sport context: Coaches of individual sports assessed their athletes' self-improvement goals more than team coaches did. Coaches of individual sports recommended the use of imagery and controlled breathing to their athletes than team coaches did.
3. Level the coach had reached as a player: Coaches who had reached higher levels of personal achievement as a player were more likely to implement the assessment of their athlete's nutrition habits, the use of collaborative goal setting, sport-specific training, changing the duration and intensity of the training sessions and the athletes' use of imagery.
4. Sex of the athletes being coached: Coaches who worked with both sexes reported that they encouraged controlled breathing more often than coaches of only female athletes. Coaches of only male athletes reported recommending this strategy the least.
5. Number of training hours per week: Coaches who worked with their athletes for more hours each week implemented the following significantly more than coaches who have limited weekly practices: the re-evaluation of practice goals, the assessment of nutrition, the use of collaborative goal setting, sport-specific training, the inclusion of flexibility in training, the alteration of duration and intensity of training and the use of imagery.
6. Length of season: Coaches who work with their athletes for longer seasons were more likely than coaches who have shorter seasons, to evaluate practice goals, use of sport-specific training, include flexibility in the sessions and recommend the use of controlled breathing to their athletes.
7. The highest level of athlete that the coach had ever coached: Coaches who had coached at higher levels were more likely to re-evaluate practice goals, assess athletes' nutritional habits, use collaborative goal setting, use of sport-specific training, include flexibility in training, assess according to self-improvement goals, change the duration and intensity of sessions and recommend the use of imagery to athletes.

In an additional analysis of the data Rodgers *et al.* (2007) found that males were more likely to coach team sports, while females were more likely to coach individual sports. Coaches who coached both males and females were also more involved in coaching individual sports. When analysing the highest level that the coach's had reached as athletes, Rodgers *et al.* (2007) concluded that the coaches who had competed at higher levels were more likely to have participated in practice sessions in which desirable coaching behaviours were implemented. They would also have been coached by elite coaches, which could have a modelling effect. With regards to the unique contexts of team and individual sports, the authors contended that team sport coaches had to create opportunities for individual level coaching in order to fully apply their coaching knowledge and skills. The other context variable they isolated for comment was the number of hours of training per week. The authors were of the belief that coaches needed enough time with their athletes if they were to implement recommended coaching behaviours.

Methods of Assessment

In their review of the research on coach development, Abraham and Collins (1998) found that both behavioural assessment and knowledge assessment were pursued to discriminate levels of expertise.

1. Behavioural assessment involved identifying the frequency and/or quality with which a coach performs certain "target behaviours" (Abraham & Collins, 1998). They identified the Coach Behavioural Assessment System (CBAS) as the most commonly used method to evaluate expert coaches at the time of their study and noted that the observation of coaching sessions was increasingly popular.

Using the observation method, Bloom *et al.* (1999) used the 12 behaviour observation categories on the Revised Coaching Behaviours Recording Form to assess the behaviours of an expert basketball coach:

Technical instruction.	Non-verbal punishment.
Tactical instruction.	Criticism.
General instruction.	Modelling.
Hustles.	Non-verbal rewards.
Praise.	Humour.
Scolds.	Uncodable behaviours.

The top three categories observed over the course of one season were tactical instruction (29%), hustles (16%) and technical instruction (13.9%). In their study, Bloom et al. (1999) defined technical instruction as the skill-based dimension that includes the pedagogical aspects of coaching and frequently involves adjusting individual skills. Tactical instruction was defined as providing instruction in cognitive strategies used by coaches in order to outmanoeuvre their opponents. The authors believed the possible reason for tactical instruction being used the most was because the athletes that he coached were on an elite level. Part of the coach's job is to plan how to defeat opponents. This is supported by information gathered by scouting the opposition. At this level the players were expected to have a high degree of technical proficiency. Hustles are general statements (neither positive nor negative) that are designed to energise the athletes. Attention to technical instruction may have been proportionately less than to tactical instruction because players at this level in basketball may be expected to work on their technique outside of the team's practice sessions.

Becker and Wrisberg (2008) also focused on the coaching behaviours of an expert basketball coach. Six practice sessions were videotaped and analysed for verbal and non-verbal behaviours. The results showed that 55% of these behaviours were focused on the team, while 45% were

aimed at individuals in the team. The three most frequent behaviours were instruction (48%), praise (14.5%) and hustles (10.7%). This concurs with the research of Bloom *et al.* (1999).

A Côté and Sedgwick (2003) project asked expert Canadian rowing coaches and athletes what coaching behaviours they thought were likely to have a direct influence on the development of athletes. The results yielded seven behaviours considered to be effective by both the athletes and the coaches: Planning proactively, creating a positive training environment, facilitating goal setting, building athletes' confidence, teach skills effectively, recognising individual differences and establishing a positive rapport with each athlete. These behaviours define the role of a coach in terms of a broad range of responsibilities beyond the ability to transfer knowledge and teach skills to their athletes.

Looking at tennis specifically, Claxton (1988) compared coaches who had a 70% or more winning record over three years to coaches who had a 50% or less winning record over three years. Their observations were that coaches whose players won less provided more instruction than the coaches whose athletes won more often. They also praised their athletes more than the more successful coaches. The more successful coaches questioned their athletes more than the less successful coaches. This may allow the athletes to be able to think more about the game and therefore understand the intricacies of competition better than those coached by the less successful coaches. The more successful coaches were coded as being in 'silence', 'management' and 'other' more frequently than the less successful coaches. The authors contended that this may be due to the need for tennis players not to be interrupted with frequent instruction periods.

2. Knowledge assessment followed different methods, one of which was called "concept mapping" which is a kind of think aloud/interview method (Abraham & Collins, 1998).

Abraham and Collins (1998) stated that the expert coach must have knowledge in at least two domains, despite the fact that expertise is domain specific. The first domain is a knowledge that is specific to coaching, thus the ability to set an environment that is conducive to learning. This could be considered to be general pedagogical knowledge (Côté & Gilbert, 2009). The second domain knowledge of the actual sport that is being coached, including knowledge of techniques, tactics, physical attributes and mental skills. This could be considered to be sport-specific content knowledge (Côté & Gilbert, 2009).

With regards to the assessment of coaches' knowledge Abraham and Collins (1998) noted that the majority of research in this area has dealt with the assessment methods used by teachers in educational environments rather than coaches in sport environments. The areas that have received consideration are teachers' ability to plan and their knowledge base.

The Assessment of Coaching Knowledge

Very little research was found that looked at coaches' sport-specific content knowledge. The majority of the research into coaches' knowledge was focussed on determining where and how coaches gained their knowledge. For example, Coté (2006) discussed coaching knowledge in terms of the coaches' learning environment and the three settings in which coaches learn their skills. Erickson *et al.* (2007) examined the experiences and milestones that coaches had reached in their development to the level of high performance sport using a retrospective interview method. Erickson *et al.* (2008) also used an interview method to determine the actual and preferred sources of coaching knowledge, but did not assess the level of knowledge sophistication.

Crespo (2007) recommended that assessment of coaches' content knowledge could be accomplished using two types of instrumentation: oral and written. During oral assessments coaches express their knowledge in response to oral questions (*e.g.* interviews) or have the opportunity to structure oral presentations in which they determine how to structure their expression of what

they know about their sport. Written assessments may make use of multiple choice, true/false, short answer, project or essay tests that call for coaches to draw on their content knowledge base.

Development Paths of Experts

Models describing the development pathways followed by coaches have focused on the development of the coaches of competitive rather than recreational sport. Bell (1997) outlined a progression proposing a four-stage developmental sequence in the development of coaching skills and knowledge that leads to the level of expert coach.

Stage One: Beginner Coach

Coaches can be classified as a beginner, although they are seldom novices in their sport. They have usually been involved in the sport they want to coach in some way at some level. Beginner coaches focus on learning the conventional rules and procedures that characterise coaching practices in their sport. They may feel they have little personal control over their coaching situation which can result a tendency to avoid taking responsibility for what happens.

Stage Two: Competent Coach

As coaches gain experience, their knowledge of sport-relevant situations and events should expand. Competence emerges if coaches learn from their experiences, especially if they evaluate their current practices with the goal of finding more effective coaching actions. They begin to develop a more strategic view of coaching that allows them apply the principles of coaching in more flexible ways as well as respond in unconventional ways. Competent coaches will still struggle to discriminate between more and less relevant cues in the environment. They still may feel they are not completely in control in their coaching situation which means they still may be hesitant to take full responsibility for what happens.

Stage Three: Proficient Coach

The proficient coach can differentiate between unimportant and important cues in the learning environment. They can anticipate events and link them to likely outcomes which gives them the capacity to make proactive changes when something begins to go wrong. They have sufficient observational skills to support the analysis of situations and select appropriate coaching responses from a knowledge base that includes a well-organised memory of viable options. At this stage coaches feel a strong responsibility for what happens in their coaching situation and hold themselves responsible for solving problems that may arise.

Stage Four: Expert Coach

This stage represents the achievement of expertise in their specific sport domain. Coaches at this stage are able to go beyond making analytical, logical and deliberate decisions to incorporate intuition and innovation into their decision making process.

Erickson *et al.* (2007) provided a description of coach development that reflected a North American perspective. It was proposed that many high performance coaches had progressed in five stages that ranged from their initial participation in sport through to their achievements as elite level coaches. This model includes the premise that minimum sporting experiences may be necessary for coaches to become experts. The authors did not suggest, however, that sport participation at any level was a sufficient condition to become a high performance coach.

Stage One: Diversified early sport participation (Ages 6 – 12) which emphasised recreational participation in several team and/or individual sports.

Stage Two: Competitive sport participation (Ages 13 - 18) which provided competition in at least one sport. That sport was usually the sport they ultimately would coach, but participate in other sports continued as well.

Prospective team sport coaches often assume sport leadership roles during this stage of development.

Stage Three: Highly competitive sport participation and an Introduction to coaching (Ages 19 - 23) which offered the opportunity to continue competition as a performer and at the same time begin to coach.

Stage Four: Part-time early coaching (Age 24 – 28) in which high level participation in competitive sports and other non-coaching activities (e.g. work and academic education) receive more attention. In terms of coaching, part-time or assistant coach responsibilities are pursued and interaction with mentor coaches is very valuable as a source for coaching development.

Stage Five: High performance head coach (Age 29+) in which the coach gets his/her first high performance head coach position.

Gilbert *et al.* (2006) completed a comprehensive review of coaches' development pathways and found that there was substantial in the number of hours that coaches had spent playing sport. Not all the team sport coaches had fulfilled leadership roles during their playing years although they were probably above average athletes when compared to their peers (e.g. most were starters on their teams and most ranked themselves approximately seven out of 10 with regards to perceived athletic ability).

Implications for Coaching Education

With regards to implications for coaching education and the systems that are in place to help with their development, past research leads to some obvious guidelines (Bell, 1997). For example:

- Because beginner coaches need to learn the rules and procedures of the work environment it is important that the coaching education programmes supply the coaches with these guiding principles.
- During formal coaching education courses, coaches should be provided with practical experiences, not just theoretical.

- Some form of mentorship would be invaluable for aspiring coaches so that they can learn through observing expert coaches as well as have informal opportunities to interact with them.
- In an effort to increase their knowledge base, reading materials should be provided.

Werthner and Trudel (2006) promoted the use of mediated learning situations for youth sport coaches. They recommended providing them with the minimum knowledge and skills they need to get started coaching, then encourage them to get together and work collaboratively to improve their coaching effectiveness. For elite coaches they suggested providing them with assistance in the development their coaching networks as well as their ability to benefit from reading research.

The Development of Knowledge about Tactics

Research about coaches' knowledge about tactics was not found although there is a line of research and professional literature extending back for several decades (Werner, 1989) about how to coach tactics, especially to children (*e.g.* the Teaching Games for Understanding approach). Werner (1989) described this approach as student centered because it involved guiding athletes with discovery and problem solving methods of teaching. It represented a break from traditional coaching that taught games from a technical standpoint. In tennis the serve, forehand, backhand, etc. would be taught with the mechanics of the movement as the main focus. Once the skill techniques involved in the game were taught, players would then have the opportunity to participate in the official game itself. It was believed that the teaching of these techniques would fall into place and skilled performance would take place.

The role of the coach as the teacher/facilitator of the learning of tactics seemed an appropriate direction to pursue in order to understand what a coach's knowledge of tactics should be. The next part of this chapter is organised to examine the role of the knowledge of tactics in the development of expertise as a sport performer. Implications are then drawn for the professional knowledge base

of their coaches. This part of the coach's role addresses the athlete outcomes mentioned by Côté and Gilbert (2009) in their coaching effectiveness model.

Athlete Outcomes

To be an expert in any domain implies a large and well-organised knowledge base. In their analysis of the knowledge base of the consummate expert detective - the fictional character Sherlock Holmes - André and Fernand (2008) contrasted his orderly memory of general knowledge of the history of crime, human nature, etc., from which he could draw facts and concepts useful in a variety of situations to a more schematic memory in which ideas and parts of ideas could freely associate. This memory allowed him to correlate his observations about a current investigation with previous patterns of crimes that were stored in his episodic memory. They also concluded that he was able to manipulate his schematic memory to try out probabilities in his imagination and in that way anticipate a criminal's next move.

The correlation between solving crimes and figuring out what to do against one's opponents may seem a bit weak, especially when one considers that sport performers are usually under extraordinary time pressure. Their decisions are in the moment choices that immediately affect the environment and change the problem situation. However, their choices are affected by their knowledge and as with Sherlock Holmes, it is reasonable to conclude that the expert performer has a large and well-organised knowledge base as well.

This interpretation is supported by the description of Singer and Janelle (1999) of the knowledge characteristics of an expert performer compared to a novice:

1. They have a greater task-specific knowledge.
2. They can interpret situations more easily based on partial information.
3. They can store and access of information about game experiences more effectively.

4. They detect and recognise structured patterns of play more quickly and accurately.
5. They think more in terms of situational probabilities than in terms of certainty.
6. Their decisions are more appropriate to the situation at hand and quicker.

According to McPherson and French (1991), in order to make a decision, the performer needs to have sport-specific knowledge, knowledge about performance in past similar experiences and knowledge about the opponent(s) in order to make an optimal decision. These types of knowledge were also identified in the Côté and Gilbert (2009) model of professional knowledge. When referring to sport performance, however, the definitions are modified slightly:

- Declarative knowledge.

Anderson (1982) defined declarative knowledge as the knowledge of factual information. In sport, Thomas and Thomas (1994) stated that declarative knowledge included the knowledge of facts and rules regarding the sport. Declarative knowledge was defined as “knowing what to do” in a sport situation (McPherson, 1994).

- Procedural knowledge.

Thomas and Thomas (1994) defined procedural knowledge as the actual performance of the task. Procedural knowledge was defined as “knowing how to do it...and doing it” by McPherson (1994).

- Sport-specific knowledge for the performer is called episodic knowledge (Magill, 2003).

Episodic knowledge is the memory of past sport performances in terms of actions performed and choices made. It is the movement performance experience of the performer. According to Ericsson and Lehman (1996) the expert advantage is in part due to superior domain-specific memory skills and knowledge that they have built up through years of deliberate practice.

Declarative knowledge is thought to be expressible in verbal terms because the performer can put it into words. It is sometimes referred to as cognitive knowledge. Procedural knowledge might not be easily put into words since it is associated with action. The same is true with episodic knowledge of movement performance. It is more easily shown or demonstrated, rather than discussed.

The Link between Knowing and Doing

The development of procedural knowledge is associated with the declarative knowledge base of the performer. McPherson and French (1991) explained that a procedure is a kind of if-then statements which applies to a series of events. During hours of practicing a sport performers develop a large memory of actions that have been successful under certain circumstances as episodic knowledge. When confronted with the possibility that a certain event might happen in a game, they already have movement options ready from which to choose, whereas novices often must wait for the event to happen and then try to figure out a response (Thomas, 1994).

In looking at the changes that occur in cognition and skill in tennis, McPherson and French (1991) performed two experiments in an attempt to ascertain which of the two is more easily developed. Novice adult tennis players were provided with different practice schedules for instruction in motor skills (procedural knowledge) as well as declarative knowledge of tennis. They concluded that cognitive understanding of “what to do” was more easily developed than motor skills (“knowing how to do it and doing it”).

Williams *et al.* (1993) found that experienced soccer players possessed more task-specific cognitive knowledge than their less experienced counterparts. However, declarative knowledge does not appear to be a determinant (limiting factor) of expertise. Numerous researchers (French & Thomas, 1987; McPherson & Thomas, 1989; McPherson, 1993a) showed that despite experts having a high level of declarative knowledge there are also novices and spectators (couch potatoes) who possess a good grasp of the facts and rules that govern their sports.

Allard *et al.* (1993) looked into the relationship between knowing and doing by examining the task-specific knowledge of athletes, coaches and spectators. The results of the research with ice hockey showed that those actively involved in the sport (*i.e.* athletes and coaches) used the knowledge they had developed through playing in order to interpret situations presented to them, while spectators were only able to sort situations into categories based solely on the information presented to them.

Despite these observations, McPherson (1999) cited various researchers who found that novice accessed a less sophisticated network of declarative and procedural knowledge in the solving of problems. This may be reason why experts are experts – their ability to solve the problems that they are presented with in sporting situations and not how much they know about the game. This process draws on an interaction of declarative, procedural and episodic knowledge.

Turner and Martinek (1999) noted that both skill and knowledge are required to make decisions in game situations. Players need to have knowledge about the game as well as its goals and they also need to have knowledge about the actions that may take place during the game. Players who have more knowledge about the sport are able to process the information from the current situation and use the knowledge they have along with the goal structure for the sport in order to make appropriate responses in a particular situation. Rink *et al.* (1996) explained that tactics and skill are intimately linked. In order for players to choose a tactic in a particular situation, they must be able to perform the skills linked to the application of that tactic. If players lack the ability to apply a tactic, then that tactical choice is not an option.

The Nature of Strategies and Tactics

Greenwood (2004) defined a strategy as a basic framework for play that guides decision making. It can be seen as pre-game plan that aims to co-ordinate a team's actions during a match. In the case of an individual sport it is a plan that is devised prior to the start of a match to guide the actions of a player.

A tactic can be seen as the adaptations to the situations as they occur during the game. These can be seen as strategic actions. Greenwood (2004) defined tactics as the practical application of a strategy. This means that the players need to understand the situation at hand and use the knowledge that they have built up through years of training and competition to make a decision about what to do based on the strategy being employed. It is this interaction between the pre-planned strategy and the player's knowledge that leads to correct and timely decisions being taken. Tactical decision making therefore requires sufficient knowledge in the given domain (Gréhaigne *et al.*, 2005).

Strategy is the preliminary programming and tactics are the adaptation of the programme in action. This suggests that tactics are in the moment decisions that a player makes during competition. These decisions are based on the amount of knowledge that the athlete has and how effectively that knowledge is used within the framework of the overall strategy in order to solve a problem presented during competition.

Tactical knowledge has been described as knowledge in action (Gréhaigne & Godbout, 1995). These authors suggest that tactical knowledge can be divided into three categories of knowledge:

1. Action rules: Conditions that need to be enforced and factors that need to be considered in order to achieve efficient action.
2. Play organisation rules: Rules that cover themes related to the 'logic of the activity, including the size of the playing area and player distribution in the area.
3. Motor capacities: The perceptual and decision making ability of a player as well as the necessary motor skills to achieve desired goals.

Thomas (1994) placed sports on a decision-making continuum based on the cognitive stress placed on participants during competition. Low strategy sports are those that take place under low time pressure on the decision to be made during competition (Farrow *et al.*, 2008). Decisions in these sports are made prior to commencement of the competition and success in these sports depends mainly on

the skill execution and the fitness level of the competitor. Gymnastics and swimming are examples of low strategy sports.

High strategy sports are characterised by a high time pressure on the decisions that need to be made during competition (Farrow *et al.*, 2008). Decisions are made during performance based on the strategy laid out before commencement of the competition. This means that high strategy sports consist of the motor skill execution component as well as the ability to make decisions. Along with the skill and fitness, success in high strategy sports is dependent on the quality of tactical decisions made during performance.

Strategy and Tactics in Tennis

Tennis can be classified as a high-strategy sport as there is interaction, albeit not directly, between opponents. Players must try to influence the situation in such a way that the opponent has a lower probability of winning that situation. With the amount of players involved in the sport and the high level of motor skill achieved by numerous players due to deliberate practice there are often other factors that separates the very best from those who are highly skilled but not the best. Studies have shown that this can be attributed to the tactical prowess of the players. Other factors that may also contribute to this gap could include psychological factors.

McPherson (1994) proposed that novice players have little knowledge in the form of condition-action rules relating to the achievement of goals. This is demonstrated by the use of isolated goal and condition concepts to represent their tactical knowledge. These goal concepts include winning the point, getting the ball over the net. The condition concepts include their own weaknesses or the current status in the game. On the other hand, McPherson (1994) suggested that experts develop a well-detailed profile of an opponent's weaknesses which is achieved through specialized meta-cognitive strategies that are used to collect the necessary information. This profile is also monitored for accuracy during the competition. If there are any inaccuracies in this profile then it will be updated and modified.

In their study of expertise in boys' tennis, McPherson and Thomas (1989) quantified the verbal reports of individual players using a three-category classification system: goal concepts, condition concepts and action concepts.

1. Goal concepts referred to the goal structure of the game, such as returning the ball into play or winning the point.
2. Condition concepts specified under what condition and when to apply the action or pattern in order to achieve the goal. Examples of this would be the state of the game or the position of the opponent on the court.
3. Action concepts referred to patterns or rules for generating them in order to produce goal-related changes.

Using this system, McPherson (1999) looked at the difference in the tactical knowledge development of expert and novice tennis players. In comparing youth and college experts it was found that both generated in excess of 80% of their concepts as conditions and actions. However, results also showed that college players produced more total concepts. Other differences were that college player generated more variety of goal, condition and action concepts, their condition and action concepts were more sophisticated, and they were able to make more concept links. This means that the experts with more years of experience in competition produced more extensive, tactical networks of condition-action rule decisions than their less experienced youthful counterparts. This suggests that the development of tactical knowledge in tennis may benefit from years of coaching, practice and tournament competition.

In their study of the effect of the score on tactics used during professional tennis matches, Scully and O'Donoghue (1999) demonstrated the interaction between knowledge and decision making. In their study they analysed matches based on a change in tactics that the eventual winner of the match adopted based on the score. The results showed that the winners of the matches made similar changes in their tactics based on whether they were leading, even or behind in the match. This demonstrates that elite tennis players are able to combine their knowledge of the game and situations that arise during competition to make decision on how to play the match from these situations.

McPherson and Kernodle (2007) looked at the differences between adult beginner and entry-level professional tennis players. Using the coding method originally designed by McPherson, the authors investigated the structure of problem representations and concept content that was verbalised by players during immediate recall and planning interviews. The results of their research showed that high skill levels were accompanied by an increase in the tactical problem representations. The varsity players and the professionals showed more action plans and current event profiles in response to situations that occurred on the court compared to the beginners and advanced beginners. In differentiating between the tactical prowess of varsity players and professionals, it was found that varsity players planned specific shots and techniques while professionals planned shot types, predicted their opponent's responses and had more specific goals. This demonstrated that the elite players use their knowledge built up over years of competition to make tactical adjustments in their play in order to take advantage of opponents' tendencies in previous game situations.

The Knowledge Base for Tactical Decisions

McPherson (1994) suggested that as expertise increases with practice and competition, players' knowledge base and domain-related strategies become more sophisticated. Turner (1996), Mitchell *et al.* (1995) and Griffin, Oslin and Mitchell (1995) found that declarative knowledge in field hockey, soccer and volleyball was significantly higher in the groups that received tactical instruction as compared to the control groups or those that received technical instruction.

In their research into the "Teaching Games for Understanding" approach, Turner and Martinek (1999) found that the group receiving tactical instruction scored higher in declarative knowledge of field hockey than players in the control group. When children start a sport, they invariably have little specific knowledge about that sport and this is developed through instruction (Turner & Martinek, 1999). Based on the results of their research, they believed that teaching games in a tactical manner has cognitive benefits for the participants.

Rink *et al.* (1996) provided some implications for the practical application of the "Teaching Games for Understanding" approach to improve an understanding

and application of tactics in game play. For example, the sequence in which strategies and skills are taught are important. They also concluded that some level of skill is necessary before tactics can be taught.

After finding that youth baseball players were not able to take current game situations into account when making decisions about game play, French *et al.* (1996) suggested the following guidelines for coaches to help facilitate the building of advanced knowledge structures in baseball:

- Explain the interaction between the game conditions (outs, score and runners), actions (throw, tags, player movement) and goals to the players.
- Repeat the explanation of this interaction as well as practicing the interactions under varying game condition-action sequences.
- Design practices that include a differing number of runners on bases and varying game situations in order to get the players to monitor game conditions, plan actions in advance and choose an action from numerous possibilities;
- As the players develop more responsibility, give them problems to solve. This can be done by asking the athletes questions during practice that prompt the appropriate cognitive processing.

Coaching Context

The Roles of the Coach

Defining the roles and responsibilities of the coach have been articulated in many coaching books and manuals, but has not been the focus of as much research. Perhaps that is because a coach can assume many roles and responsibilities according to sport context. Abraham and Collins (1998) took the position that the role of the teacher and that of the coach were similar, citing Griffey's (1991) analysis of the role of the teacher as one of coordinating the learning activities and controlling the social environment while at the same time diagnosing and correcting the performance of the learners.

As today's sport becomes more and more professional, the coach's role in many international-level teams seems to be undergoing a shift. In soccer the coach is already being called a manager with the use of specialist coaches in certain areas. In professional rugby and cricket, coaches also seem to be heading in the direction of the management of expert personnel. Knowles *et al.* (2005) noted that the coaching profession recognises that coaches in more professionalized contexts needed the ability to manage the athletes, the assistant coaches, the training environment and the support staff as well as sponsors (among others). This, however, does not seem to be true for the coaches who coach at the lower level, who may still be considered teachers. At these levels, Poglinco and Bach (2004) added sport skill proficiency so that the coach could provide instructional models for learners. Thus, the professional knowledge base needed by a coach will be affected by the roles that must be fulfilled, and that in turn will be profoundly by the coaching context.

Sport UK (2009) illustrated the coaching context in terms of the same participation sport – competitive sport dichotomy that was presented by Côté and Gilbert (2009) (see Figure 3). This notion of context is limited exclusively to sport orientation and developmental progressions when the diverse cultural and economic environments in which coaches operate in both developed and developing countries is considered. In South Africa these cultural and economic contexts have been defined by the role which Apartheid played in producing rural, impoverished communities. Different roles and responsibilities which coaches fulfill in different contexts may emphasise different types of professional knowledge.

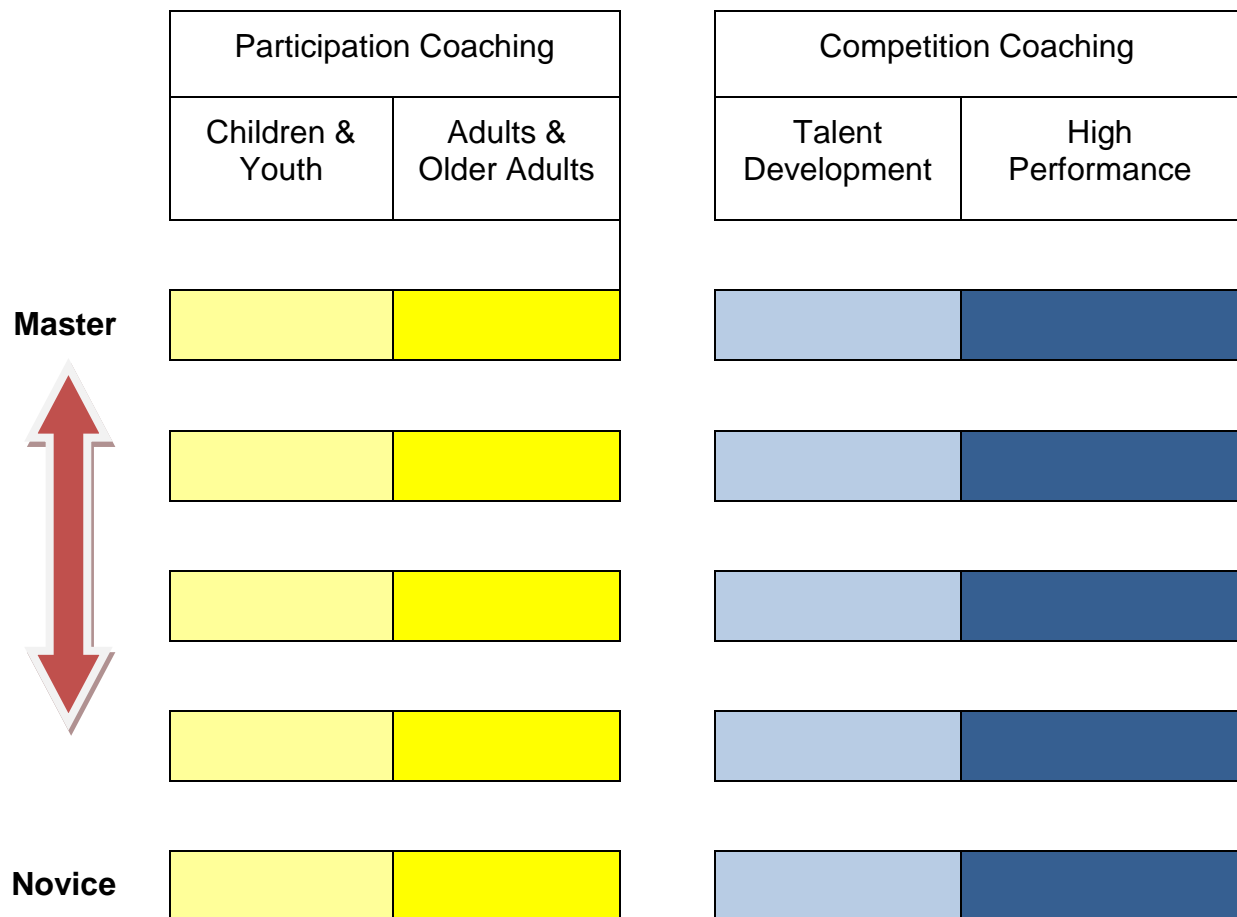


Figure 3. A five-step model of developmental expertise in the coaching contexts of participation sport and competition sport (UK Sport. 2009).

Côté (2006) acknowledged that coaches at different levels may be expected to perform in myriad roles, including being a leader, a psychologist, a teacher, a friend, an administrator, a fundraiser, a personnel manager and a role model. Support for a closer look at the Athlete Outcomes component of the model when identifying the roles and responsibilities of coaches were found in Gould *et al.* (2006). They found that high school coaches believed that they had varying responsibilities in the five roles related to life skills education through sport identified by the researchers. The roles of being a counselor and an athletic trainer were the two roles they reported they most often performed and felt they were most prepared to fulfill. The other three roles that also were also assumed though

to a lesser extent were that of surrogate father, surrogate mother and best friend/brother/sister.

Despite this comprehensive model of coaching effectiveness, Côté and Gilbert (2009) may not have mentioned some other factors that may also be important factors in the coaching context.

1. Country: Each country has its own special set of characteristics which usually govern the other factors mentioned below.
2. Culture: Due to the diversity of the people in South Africa (and 13 official languages), this is a critical factor that coaches may need to deal with in their coaching environments.
3. Gender: The gender of both the coach as well as the athletes play a role in the coaching environment and may impact each of the role players in different ways.
4. Politics: Another important factor in the South African situation due to the role that apartheid, and its after effects, has played in sport in the country. The attempt at transformation in the country so that teams are more representative of the country's population influences coaches in the country at least to some degree.
5. Economics: This has been partly influenced by the political situation that was prevalent in South Africa, which led to some sections of the population and various areas in the country having less access to important equipment and facilities.

Expert Novice Differences in Tennis

McPherson and French (1991) studied the changes in cognitive strategies and motor skills in tennis in an attempt to study the process by which expertise is gained. In their research, adult novices received two types of instruction. In the first experiment, subjects were given instructions (declarative knowledge) and motor skills practice which was followed by the introduction and implementation of tennis strategies. In the second experiment, the subjects were given minimal

instruction about skills but were given declarative and strategic knowledge about game play. The researchers found that knowledge and game decisions improved concurrently with skill acquisition when skill-oriented instruction is provided. They also found that skill did not improve until direct instruction regarding skills was given.

In her research on youth and adult tennis players, McPherson (1999a) examined three different age groups at the expert and novice levels in terms of performance skills as well as problem representations during competition. It was found that during competition, experts made better decisions regardless of age. In this study, the youth experts did slightly better than their adult counterparts. Among the novices, the youth performed better than their adult counterparts in their decision and execution skills. This was believed to be due to the more active participation in camps, practice and formal lessons by the youth novices. During competition it was found that adult experts generated more sophisticated response selections than the youth experts. It was concluded that the adult experts encoded, modified and updated their action plan and current event profiles as play continued. The youth experts showed fewer support processes and their response selections were based primarily on the situation that presented itself at the time.

McPherson (1999b) attempted to complement her earlier research (McPherson and Thomas, 1989) on youth experts' tactical problem representations in tennis by studying adult (collegiate varsity and beginner) female tennis players. Expert and novice subjects were interviewed regarding certain situations that present themselves during tennis competition. The exact same six questions as used in the 1989 research were used in the 1999 study. The research showed that adult experts generated more total concepts than youth experts. Experts who had more years of training and competed at higher levels had more tactical, extensive and associated structures of condition-action concepts. Novices primarily produced goal concepts with little regard for other components of the situation. Experts also produced more tactical concepts than novices regardless of age. The results of this research showed that more years of practice, coaching and high level competition are necessary to improve the tactical knowledge a player has with regards to tennis. It also demonstrated that experts

did not only use the information provided to them by the current situation, but they also accessed information from past experiences.

McPherson (2000) studied the differences between expert and novice tennis players in terms of the planning strategies used during singles competition. All subjects were interviewed between points of singles competition. The question in which the researcher was interested revolved around the thought process that the subjects were in between points. The responses were again coded into the five categories used in the researcher's previous studies, namely goal, condition, action, regulatory and do concepts. The results showed that experts produced considerably more total concepts than novices. It was also found that experts generated similar amounts of action, goal and condition concepts, while novices produced more goals and conditions than actions. This was contrary to what was predicted as the experts' plans were based more on goals than those of novices. This meant that elite tennis players based their plans on achieving the task at hand, using a combination of action, condition and/or goal-oriented conceptual knowledge and procedures. Novice players were highly goal oriented in relation to other concepts that were generated.

Nielsen and McPherson (2001) examined the response and execution skills of novices and professional tennis players during singles competition. This was achieved through the rating of players during competition in three categories: control skills, response selection skills and response executions skills. The experts were better able to generate tactical shot selections and executions than novices. They also had better control over their shots. When compared to previous research (McPherson and Thomas, 1989; McPherson 1999) male professional tennis players showed higher scores on tennis performance than young male experts (10- to 13 years old) and collegiate female players.

Tactical skills between advanced beginners and entry-level professionals during competition was completed (McPherson & Kernodle, 2007) to supplement the earlier work by McPherson (1999a, 1999b, 2000) and McPherson and Thomas (1989). The researchers studied the problem representations and performance of tennis players into five categories of game concepts:

1. Goal concepts: Related to the way in which the game is won or the purpose of the action that was chosen.
2. Condition concepts: Conditions under which certain actions or patterns of action will be applied.
3. Action concepts: The action or pattern of actions selected that could produce a goal-related change in the current situation.
4. Regulatory concepts: Statements that indicated whether or not an action was executed.
5. Do concepts: Specifics of how to perform an action.

The participants underwent recall and planning interviews between points of competition. This study was used to add more points to the continuum of tennis expertise and is thus supplementary to the previous research done (McPherson & Thomas, 1989; McPherson, 1999; McPherson, 2000; Nielsen & McPherson, 2001). This research revealed that entry-level professionals performed more advanced problem representations than advanced beginners regardless of the interview type.

Shim *et al.* (2005) compared the ability of novice and skilled tennis players to use visual cues to anticipate actions in tennis. In the first experiment, the authors looked at the ability of novices and experts to anticipate ball direction when confronted with live, 2D and point light situations. Players were asked to initiate a movement in the direction they believed the ball would go. It was found that both novices and skilled players were able to predict which way the ball was going to be hit. These results were significantly higher than chance or luck. It was also found that the more information provided in the situation the worse the novices performed in anticipating the direction of the ball. The opposite was true for the skilled players who were able to improve their anticipation with the presentation of more information. In their second experiment the authors studied the ability of skilled players to use information from an opponent's movement patterns in order to respond quicker to the shot being hit by the opponent. The subjects were asked to hit volleys in response to a ball being hit by a live opponent

and also to balls being fed by a ball machine. The results showed that the skilled players used information provided by the live opponent to decrease the time with which they reacted to the shot thereby giving them more time to be able to move to get to the ball.

Research in tennis has focused mainly on players and has looked at cognitive and motor skills. The use of more tactically advanced concepts has been shown to increase with skill level. Shot selection and skill execution is better among more advanced players. More skilled players are also better able to use visual cues to predict ball direction and decrease response time.

Summary

Baker *et al.* (2003b) noted that access to an expert coach is critical for the development of expert players. In some instances the coach is responsible for facilitating up to 100% of a player's practice time. It stands to reason that the expert coach must be able to plan a practice sessions very well, including those sessions in which tactics are learned.

Reaching an expert level in various domains exhibits two qualities (Ericsson, 1996b):

1. The desire to consciously build the knowledge and strategies involved in the domain.
2. The ability to resist the automaticity of skill.

As players strive to achieve the level of expert, so too must their coaches. This will require sustained efforts on the part of coaches to develop the declarative, procedural and content-specific knowledge base that supports their performance as a coach. In resisting automaticity, coaches will be able to make conscious efforts in the highly complex and time-pressured contexts in which they must make decisions about how to facilitate the performance of their players.

Chapter Three

Methodology

This chapter begins with an orientation to the research approach used in this study followed by an explanation of the processes involved in the development of the instruments and procedures followed in the two phases of data gathering: The assessment of tennis coaches' declarative knowledge of tactics and the interview of selected coaches regarding coaching with special reference to tactics. The chapter concludes with a description of the ways in which the data were analysed in order to generate insight into the ways in which a sample of coaches in South Africa think about tactics in tennis and how they learned about coaching tactics in tennis.

The Research Approach

The research approach taken in this study was described by Thomas, Nelson and Silverman (2005) as qualitative. They noted some of the distinguishing characteristics of qualitative research were:

- A focus on description, understanding and the discovery of meaning.
- A relatively small and purposive sample.
- Data gathering in real world settings.
- The researcher as an integral part of the "instrument" for gathering data.
- A descriptive and interpretive approach to data analysis.

Goetz and LeCompte (1984) stated that the most commonly used protocol for gathering data in qualitative research were researcher-designed instruments, interviews and field-based observations. These descriptions of qualitative research are compatible with Crespo's (2007) proposal that coaches' proficiency should be evaluated by integrating evidence about both their skill and their knowledge (see Figure 4).

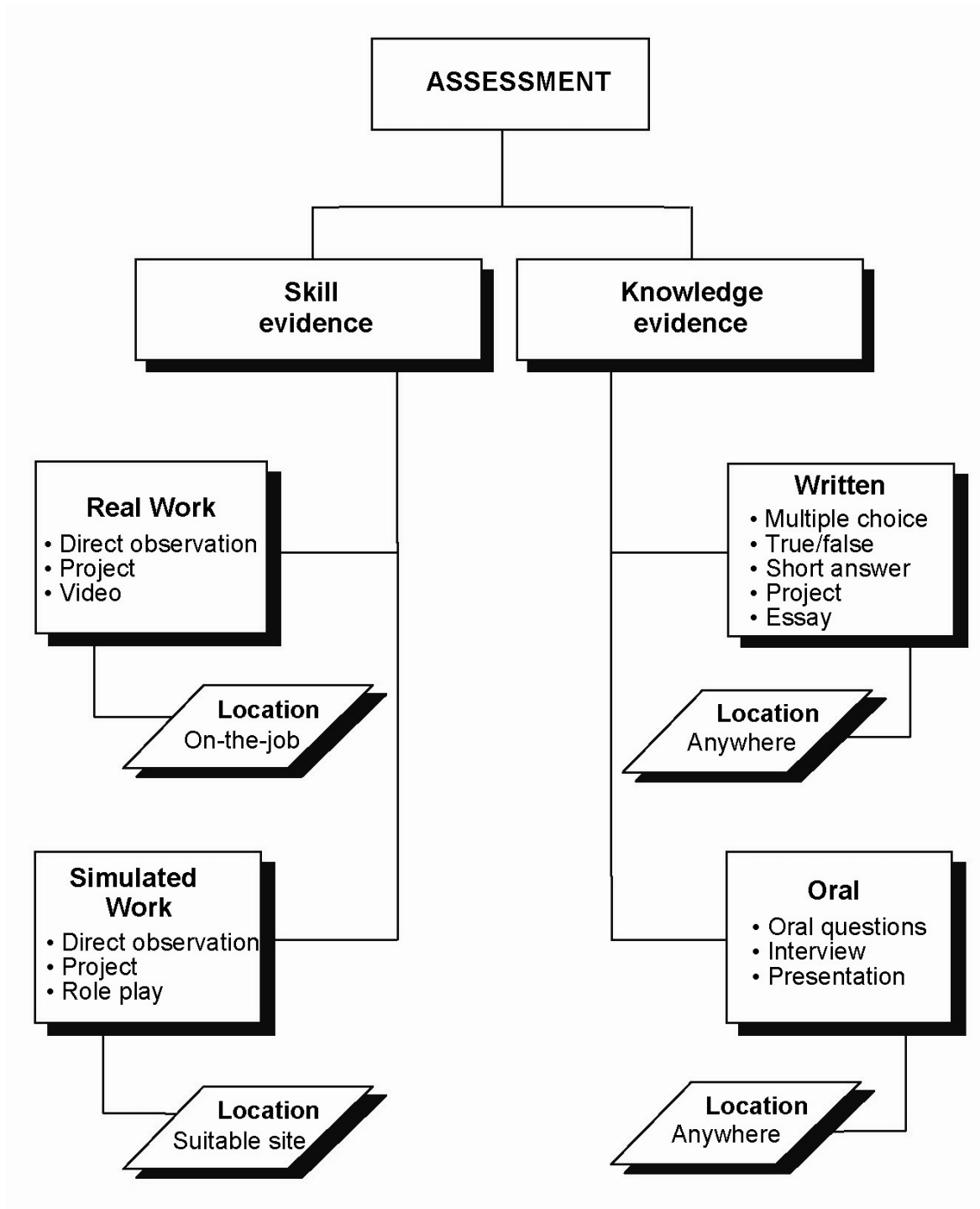


Figure 4. Crespo's (2007: slide 19) framework defining sources of evidence for the integrated assessment of coaches' skill and knowledge.

Within Crespo's (2007) framework, the assessment of a coach's skill (procedural knowledge) can be accomplished by instruments such as direct observation, video analysis and role playing in either real work or simulated settings. He proposed that the assessment of a coach's knowledge (declarative knowledge) be accomplished using written and/or oral sources of evidence. Because this study was focused only coaches' declarative knowledge of tactics, their perceptions about the importance of that knowledge and how they learned about tactics, only a written source (a written test in Phase 1) and an oral source (an oral interview in Phase 2) were used as methods for collecting data.

General Considerations in Qualitative Research

McCracken (1990) highlighted a number of considerations that must be accommodated when doing qualitative research. The following were particularly applicable to this study and required careful attention by the researcher:

- Recognise the differences between qualitative and quantitative research.

Due to the depth involved in qualitative research it is generally recommended that fewer subjects be tested than in quantitative research. During Phase 1 of this study, quantitative data was collected from only two coaching education workshops in order to focus on coaches (N=37) who were similar in terms of the regional environment in which they worked. Data was also collected from a local tennis academy. This focus on a regional context was further refined in Phase 2 when a sample of only six coaches who had participated in Phase 1 were invited to participate in the qualitative interview process in Phase 2. There was no intention to generalise the results to a population of tennis coaches, but rather the intention was to gain insight into the knowledge of tactics and acquisition of the knowledge of tactics.

- Manage the impact of the investigator on the data gathering process.

The investigator cannot help but have an impact on the data gathering process since he/she has usually been instrumental in the design of the strategies for gathering that data..

In Phase 1 of this study, the original written test of knowledge of tactics that was designed by the researcher was drawn from a reference by a tennis expert, and that expert was asked to evaluate the test to determine its content validity. This expert was the head coach at a NCAA champion team and was a two time NCAA coach of the year. In this way, the bias of the researcher for certain tactical situations or presentations was mediated by the expert's modifications to assure correspondence to the original reference.

During Phase 2 of the study, the setting was private and an audio tape recording was made. However, time was taken at the beginning of the session for informal conversation to set a non-judgemental tone.

- Balance structure (the obtrusive) with openness (the unobtrusive).

All qualitative research has a structure that reflects the ways in which the researcher plans to gather information from the participants. However, the structure should not discourage participants from expressing themselves freely.

During the administration of the written test in Phase 1, the set structure of the test did not allow participants to generate their own tactical responses to the game situations. Because the structure was set by the researcher, it can be regarded as a limitation on gaining insight into their knowledge of tactics and also as a strength as it built off existing knowledge in the area.

However, during the interview process with the coaches in Phase 2, the researcher asked open-ended questions and practiced active listening.

- Implement a multi-method approach.

Because of the complex interaction between participants and their environments, it is advised that gathering information and interpreting results be approached from several different perspectives. In this study, two phases were implemented, each of which involved a different method, in order to develop insight into how coaches relate to tactics in tennis.

In Phase 1, a written test was used on a group of 37 coaches and in Phase 2, individual interviews were conducted with five of the coaches who had participated in Phase 1.

- Manufacture some distance from the information.

Neibert (2009) warned that the experiences, judgement and biases of the investigator will invariably become entangled in the interpretation of the information gathered during qualitative research. Not only is the investigator in effect part of the research instrumentation, but the interpretation of the information drawn from the application of those instruments requires interpretation on the part of the investigator. Miles (1979) noted that the investigator must use his/her broad range of personal experiences, imagination and intellectual ability to enrich the gathering and interpretation of information. However, Merriam (1998) cautioned that the investigator must try to control the impact of these unavoidable biases. She suggested that the best method to do this was to acknowledge that they exist and try to manage them.

In this study, the researcher has disclosed to the best of his ability his biases (page 66) regarding the relationship between tennis coaches and tactics in the game. This disclosure was done in part to help the researcher create in his own mind sufficient distance from the information to allow a more scholarly perspective. It was also done to assist the reader in taking an informed perspective when considering the results of this study.

Thomas *et al.* (2005) explained that the determination of the sample from which to collect data in qualitative research could be best described as 'purposive.' In other words, the participants in a study are individuals/groups from which the

investigator believes that insights can be generated. They are often selected because they have certain characteristics (e.g. level of experience as tennis coaches). Pragmatic concerns were also identified as relevant to conducting qualitative research, such as the accessibility of the location and the availability of participants. Within this study, the participants in Phase 1 were already attending coaching courses so they were easily accessible. The researcher was known to these coaches as both a colleague and a presenter of parts of previous coaching education workshops, so the rapport was pre-existing. The participants in Phase 2 had also participated in Phase 1, so the rapport was already established. The researcher travelled to a setting of their choice for the interview, which made accessibility a matter of convenience for them.

Ethical Considerations in Qualitative Research

All of the ethical concerns that apply to research in general also apply to qualitative research. Thomas *et al.* (2005) stressed that because qualitative research involves personal interaction with the participants, special care should be taken surrounding the concept of informed consent, confidentiality and interpretation of the results. The following precautions were taken in this study:

- Despite the previous relationships between the researcher and participants, a formal presentation of the purpose of the study was made to all participants prior to asking for informed consent. Care was taken to stress the voluntary nature of participation.
- The master list on which the names of participants were assigned the numbers that appeared on written tests or interviews was kept in a separate confidential file in a separate location away from the data. Once the quotations/units of meaning were lifted from the verbatim transcriptions of each interview, the original transcriptions were also placed in the confidential file. This meant it was not possible to link any quotation to a particular coach during the content analysis of the interviews.
- The researcher made every effort to remain non-evaluative when gathering data. In addition to disclosing personal biases prior to this study, a brief

period of mental rehearsal preceded all of the data gathering sessions (written tests or interviews) in which the researcher reminded himself of the importance of setting a relaxed and non-judgemental tone when interacting with the participants.

- Prior to the analysis of the transcripts of the interviews, the researcher and the co-researcher who assisted with the content analysis of the interviews discussed openly their biases about coaches and their understanding of tactics and how tactics are learned. They assumed a mutual responsibility to try to interpret the information generated from the interviews with minimal prejudice.

Phase 1: The Written Test

The first phase in this study was designed for the purpose of gathering data about tennis coaches' current knowledge about tactics. This involved the development of an original assessment instrument (a knowledge test) and the administration of the test to a purposive sample of South African tennis coaches who represented a range in terms of years of experience as coaches, background as tennis players themselves, and the level of players whom they coach (*i.e.* beginners, intermediate or advanced/expert players).

The Assessment Instrument

Different studies have used different instruments to determine what kinds of strategies and tactics are applied in different situations in tennis. An increasingly popular approach is video-based notational analysis because it can statistically break down game play into shots and sequence of shots. This allows researchers to identify what tactics players apply in different kinds of situations. For example, Scully and O'Donoghue (1999) analysed the game performance of professional male tennis players in Grand Slam singles to determine whether or not the score had any effect on the strategies they attempted to apply. O'Donoghue and Liddle (1998) were concerned with the possible impact of different court surfaces on the strategies employed by female professional tennis players. Taylor and Hughes

(1998) also used video technology. They compared the tactical choices of British junior tennis players to choices made by a similar sample of players from other countries.

After careful consideration of the practical constraints that the researcher encountered in gaining access to coaches in the field, and the recognition that it was only the declarative knowledge of coaches that was of interest in this study, the decision was made to use a written test without any video technology. Written tests have been recommended as one viable approach to testing knowledge (Morrow, Jackson, Disch & Mood, 2000). Included in the guidelines for the design of written tests of knowledge, Barrow, McGee and Tritschler (1989) emphasised the need to have a specific scope for the content of the test and a clear idea about the level of cognitive sophistication to be assessed in relation to that content. For example, they suggested that tests of higher levels of cognitive function (*e.g.* application level) include diagrams, figures, etc.

The rationale behind developing this test stemmed from professional and personal reasons. During the coaching education courses which I had attended prior to reaching the qualification of instructor, I noted that some of the coaches attending the courses did not seem to look at tennis in a scientific manner. Education of coaches revolved around the technique involved in the game and little attention was given to the tactical component. Having done a master's thesis on the use of video feedback to potentially improve performance, I felt a natural progression would be to study the tactical side of the game. As the team captain for my University's tennis team I found myself in numerous situations where I was surprised by the lack of initiative of the players on my team to adjust their games tactically when losing and their general understanding of how the game is played disappointed me. Due to my extensive academic career I have not been in the position to coach on a regular basis, but I have been requested to assist in the analysis of many tennis players by their coaches.

Focus of the Assessment

The identification of a specific scope or focus for the content of a test to assess coaches' current knowledge about tactics in tennis was inspired by an

article in a quarterly newsletter of the International Tennis Federation, written by a frequently-published expert teacher of coaches, as well as an expert coach (Tiley, 2002). This article provided guidelines for the optimal implementation of various strategic themes according to specific game situations. These themes were presented as relevant to players who adopt an “all court” style. The reason the researcher chose strategies recommended for a specific style of play was because, in the opinion of the researcher, the modern game requires players to be able to play from all areas of the court. Also, the article presented definitive guidelines for the employment of tactical options by providing a specific framework from which to work. Other articles merely discuss tactics in a general sense.

The strategic themes identified in this article (Tiley, 2002) were:

1. Play consistent percentages.
2. Know the zones.
3. Understand target areas.
4. Limit direction changes.
5. Center the ball.
6. Attack the short ball.
7. 1, 2 Sequence.
8. Defensive; Neutral; Offensive.
9. Hold the line.
10. Change gears.

An explanation of the purpose of each of these strategic themes is presented in Appendix A. Once the scope of strategic themes had been identified, the process of construction of a written knowledge test was initiated.

Test Construction

Once the 10 strategic themes identified by the expert teacher were accepted as a point of departure, the researcher proceeded to create a collection of scenarios of game situations that presented plausible opportunities to apply these themes. The premise was that the choice of a tactical response in a particular scenario would reflect a coach's knowledge about what strategic/tactical application was optimal based on the game situation set up in the scenario.

The quality of the scenarios was central to the integrity of the written test. Chiesi, Spilich and Voss (1979) described a game as a dynamic sequence of game states and game actions (see Figure 5). A game state is a moment in time in which we "freeze" the action in order to examine existing conditions. Game actions are the continuous changes in action that link one game state to the next/new game state. Within this approach, a scenario is a game state accompanied by a description of the preceding game actions that not only produced the game state but that also gives information supporting predictions about the following game actions that will lead to a new game state.

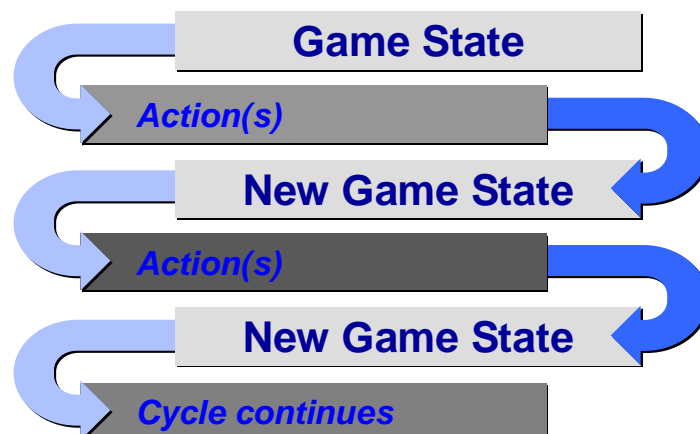


Figure 5. An illustration of the dynamic cycle of game states and game action as described by Chesi et al. (1979).

The researcher decided to present each scenario as a combination of a diagram of a tennis court with an illustration of a game state with a written description of the game actions leading to that game state. Each scenario was also accompanied by six legal options for subsequent game actions. Each of the options reflected a tactical response to the game state. All options were feasible in the mind of the researcher although some of these options were not optimal and in some cases, would not lead to gaining ascendancy in the situation described. The options reflected the application of one or more of the 10 strategic themes (see Figure 6). Some options were included that did not fall into the recommended themes. This was done in order to ascertain whether or not the participants in the testing selected tactical options that were not within the framework provided by Tiley (2002). The researcher decided to ask the coaches to rank their first three choices of tactical responses in order of preference in order to encourage thinking about the scenario as well as to emphasize that different responses would be possible and legal.

Each situation was explained in writing on the left hand side of the page and there was a diagram of a tennis court on the right hand side of the page. The written part of the situation that was not illustrated in the diagram was shaded in grey. The diagram did illustrate the last three shots of each situation. This was done so to avoid overloading the diagram with too much visual information which could make it difficult to follow what was happening in the situation. The diagram divided the court into 36 blocks for each side of the court, including area just outside the lines of the court itself. These blocks were used as reference points to identify one or more of the following:

1. Position of the player on the court.
2. Position of the opponent on the court.
3. Where a ball bounced on the court.
4. Where contact was made on the court by either the player or the opponent.

5. Movements of player, the opponent and/or the ball on the court.

Description of the match situation:
 Your opponent is serving in the 2nd set (1-0 in your favour).
 Score in this set 4-3.
 Score 15-30 in this game.
 Opponent: All-courter.

Description of the specific situation:
 Your opponent hits a body serve (intersection of 23 and 26). You return with a backhand slice to 16. Your opponent hits a forehand to 10. You hit to 15.

Your opponent hits an approach shot to 27 that you contact at 32. You hit to 26 and your opponent volleys to 9. You contact the ball at 8.

Optional responses from which to choose:
 Rate your 1st, 2nd and 3rd choices for hitting your shot.

	Attempt forehand pass down the line (27/28)
	Topspin lob to 28
	Attempt pass to 12
	Dipping shot to feet in 12
	Dipping shot to feet in 25
	Defensive lob to 21

6	7	18	19	30	31
5	8	17	20	29	32
4	9	16	21	28	33
3	10	15	22	27	34
2	11	14	23	26	35
1	12	13	24	25	36
36	25	24	13	12	1
35	26	23	14	11	2
34	27	22	15	10	3
33	28	21	16	9	4
32	29	20	17	8	5
31	30	19	18	7	6

Your side of the net.

Figure 6. An example of the format for the game state and action scenarios that comprised the 43 items on the written test.

The use of diagrams of tennis courts with grids to indicate areas is not new to assessment in tennis. Barrow *et al.* (1989) provided this format in their example of a knowledge test for high school level intermediate tennis players. Although

Taylor and Hughes (1998) presented game situations with video presentations, they asked participants to respond using a court diagram in which each player's side of the court was divided into four quadrants. Because there was no video presentation of the scenarios presented in this study, each side of the court was divided into 36 blocks in order to describe more precisely the areas where the ball bounced, where a player moved and where ball contact was made. Despite the seemingly complex nature of the test, once the procedure had been explained in detail, and after questions were answered, the coaches were clear on the task presented to them.

Once this format for the test was determined, the researcher proceeded to develop scenarios presenting games states and actions that challenged the coaches to rank their choices for the first three tactical responses they considered viable in each scenario. The on-court situations presented were designed to place the participant in defensive, neutral and offensive positions during a rally. All of the scenarios presented were for right handed players. The game score for each scenario was also given to introduce the possibility that there might be different tactical responses preferred in certain situations based on the score.

The scenarios were written from the perspective of the participants seeing themselves as "the player." Consideration was given to using the perspective of "your player" since the participants were coaches, but because some of the coaches worked only with beginners and other with international players, it was thought that their choices would be different based on the different level of player they coached. All of the coaches had played so the decision was made to set the scenario in the context of "what would you do as a right handed all-courter" in this situation. Due to the fact that all participants were coaches, it was believed that they would think in the manner of a coach and how they would expect a player in the presented situation to react to it.

A total number of 43 scenarios emerged from this process and were organised into a test format (Appendix B). The total number of scenarios was an artefact of the researcher's effort to explore the application all of the strategic themes as well as respond to the Barrow *et al.* (1989) guideline that the length of a

test should be long enough to sample the content responsibly but not be so long that the participants would lose their interest or willingness to complete it properly. A table recording the correspondence between the six tactical response options for each scenario and one or more of the strategic themes is presented in Appendix C).

Content Validity

Once a complete draft of the test was produced, the researcher approached the author of the article that defined the 10 strategic themes and asked him to verify the validity of the scenarios in relation to the tactical responses offered as choices and their link to the strategic themes. He was asked to engage in an examination of the test in collaboration with a colleague of similar stature in tennis coaches' education. Both he and his colleague accepted this invitation. These two experts were asked to evaluate each scenario and to provide suggestions with specific regards to:

1. Whether or not the scenarios were realistic
2. Whether or not the six options for tactical responses for each scenario were possible and legal
3. The identification of tactical responses that they thought should be included options that had been omitted
4. The removal of certain options due to inapplicability
5. Re-wording of situations in the interest of clarity
6. The association of each tactical response with one or more of the 10 strategic themes

Once the experts had reviewed the test they sent their comments and recommendations for adjustments in the test (see example in Appendix D). Once these adjustments were made, the revised test was considered to have content validity and to be ready for use.

A pilot test was conducted on the players in the University's tennis team. Feedback was given regarding the test length, format as well as its ease of use.

Selection of Participants

The participants in this study were volunteers who were attending two different regional coaching courses. A total of 37 participants volunteered. The coaches had a mean of 15.76 years of coaching experience, ranging from two years to 36 years of experience. This range in coaching experience was intentional. There is a line of research on expert sport performers that have found that the organisation and structure of an expert's knowledge base is qualitatively different from that of a less experienced or a novice performer. For example, Thomas *et al.* (1986) explained that a player with a sophisticated knowledge base possessed an extensive network of both declarative and procedural knowledge. They contended that this more sophisticated knowledge base in a specific sport left a player better able to:

- Select the appropriate response in a game state compared to a player who has a less sophisticated knowledge base.
- Select the appropriate response when presented with less information than an athlete with a sophisticated knowledge base.

If an expert player has a more extensive knowledge network than a less experienced or novice player, then it is reasonable to assume an expert coach would have a more extensive knowledge network than a less experienced or novice coach. It is also reasonable to examine differences in their choices of tactical responses in order to determine if there are differences between groups. For this reason, a range in coaching experience was desirable among the participants.

In terms of inclusion criteria, any coach with two or more years' experience who attended one of the regional workshops was eligible to volunteer providing that he/she:

- Attended the formal presentation at which the researcher described the purpose and expectations of participation in this study and distributed Informed Consent forms to all coaches who expressed an interest.
- Volunteered to participate and signed the Informed Consent form (Appendix E).
- Agreed to appear at the scheduled time to complete the written test.

The following exclusion criteria were applied to the coaches who volunteered to participate:

- Failure to arrive at the venue for taking the written test at the pre-agreed scheduled time.
- Failure to complete the test before leaving the venue (unfinished test).

Procedures

The researcher obtained a schedule of coaching workshops from the regional tennis coordinator. The convenors of each of two courses were contacted by telephone and after an explanation of the study, the researcher requested permission to make a presentation to coaches at each workshop regarding their possible participation. Both convenors agreed to arrange a time for a presentation by the researcher.

A formal presentation was made by the researcher to potential participants at one of the general group sessions at each of the coaching courses after obtaining permission to do so by each of the course leaders. The purpose of the study and the process of testing was explained in English (all participants had a good understanding of English). The coaches in attendance were then given an opportunity to ask any questions pertaining to the study. Subsequent to this session the coaches who were interested in participation were asked to identify themselves. These coaches were then given an Informed Consent form. Coaches not interested in this study were thanked and then they left the area. Potential volunteers were asked to read the consent form carefully and, if still willing to

participate, asked to sign the form and sign up for an agreed time at which to take the test.

The volunteers arrived at the venue for testing. After the distribution of written tests and pencils, the researcher explained in English how to complete the information sheet and then took the group through the sample question, explaining the format and the rating of preferred tactical choices as #1 the preferred choice, #2 the next preferred choice and #3 as the third preferred choice. An opportunity for the participants to ask questions was then provided. When all the participants indicated they were ready, they proceeded to complete the test at their own rate. No pressure was placed on them with regards to speed at which the test was to be completed.

The researcher collected the completed tests as the participants finished. When the last participant left the venue, the researcher removed the information page from each test, making sure that the number assigned to each participant appeared on both the information sheet and on the remainder of the test papers. The information sheets (which had both the participants' names and their assigned coded number) were then put in an envelope and sealed to be stored later in a location to ensure confidentiality. The completed tests were then put in a different envelope and stored in a box to be accessed later for data processing.

These same procedures were followed for the administration of all written tests of knowledge about tactics at the different coaching workshops.

Analysis of the Results of the Written Test

The written test asked coaches (N=37) to rank their tactical choices in response to each of the 43 tennis scenarios. The coaches also completed a checklist that specified the resources from which they had learned about tactics in tennis. Completion of this checklist produced frequency distribution results that were reported as percentages.

A Chi-square analysis was completed to determine if there were significant differences ($p < 0.05$) in the first choice of options chosen by the coaches when the data was grouped according to the three different research questions.

- A comparison between the rankings of tactical options between more experienced and less experienced coaches.
- A comparison between the rankings of tactical options among coaches who were coaching regional players compared to those who were coaching either national or international level players.
- A comparison between the rankings of tactical options between coaches who personal achievements as a tennis player had reached the regional level and those who had achieved the level of a national player.

The coaches were asked to indicate where they had gained their knowledge about tactics in tennis from a list of nine typically available resources. This list included explicit sources, implicit sources and reflection. The coaches did not have to rate the value of any of the resources to them. They only indicated if the resource has contributed to their understanding of tennis tactics, and they could indicate as many resources as they thought applicable. These results were organised into frequency distributions that could be calculated into percentages of coaches using each resource. These percentages were reported for the whole group and then recalculated according to each of the three research questions (above) to look for patterns of difference according to coach's level of experience, level of players with whom they work, and level of personal achievement as a tennis player.

In order to interpret the results, links were explored between the results found in this study in relation to each of the three research questions and previous research on coaching.

Phase 2: The Oral Interview

The second method of assessment used in this study was that of a semi-structured one-on-one interview. Seidman (1998) recommended the interview process when an investigator seeks to understand other peoples' experience and what importance they attach to those experiences. Individual interviews were seen by the researcher as a viable method for gathering information from coaches about how they perceived the importance of the knowledge of tactics and how they believed they had learned about tactics. Individual interviews were chosen so that each participant's viewpoint could be obtained without possible influence by other participants due to discussion.

The Assessment Instrument

Brenner (1985) stated that a questionnaire is absolutely necessary for guiding the interview process in qualitative research. A questionnaire provides structure for the investigator so that the interview will be a similar experience for each participant and he/she will have a similar opportunity to express thoughts, feelings, perceptions, etc.

Interviews have been used previously in sport research to gain insight into knowledge of tactics. McPherson and Thomas (1989) developed an interview process that involved asking athletes six questions. The answers that the athletes provided were recorded and later analysed. Based on the answers to these six questions, they were able to generate an overview of the participants' knowledge of tactics. The same basic interview structure was used in follow-up studies (McPherson, 1999a; McPherson, 1999b; McPherson, 2000; Nielsen & McPherson, 2001; McPherson & Kernodle, 2007). Carter and Bloom (2009) also used semi-structured, open-ended questionnaire to interview six Canadian Male university team sport coaches in order to gain insight into how they participants perceived their knowledge of coaching and how they had acquired that knowledge.

Construction of the Questionnaire

The interview questionnaire designed for this study was constructed according to the guidelines suggested by McCracken (1990). Open-ended questions were formulated so that the participants could take their own direction in answering the questions (Seidman, 1998).

The interview questionnaire was designed so as to address certain research questions. The questionnaire as well as the research questions which it was designed to address is presented in Appendix F.

Content Validity

Once an initial questionnaire was designed, the researcher met with another investigator who had previously conducted (and published) the results of qualitative interviews. The purpose of this study was discussed. A discussion between the researcher and the experienced investigator produced some modifications in the wording of some of the questions to encourage participant responses. Several probing questions were also created in case participants were not forthcoming in their responses. This modified questionnaire was then ready for use in the interview process (Appendix F).

Selection of Participants

Coaches who represented a range of years in coaching experience and who resided in the nearby geographical area were approached to participate in the interview process. The geographical limitation was due to practical considerations, including financial restraints. The decision to work with a purposive sample reflecting a range of years coaching was that the processing of data from the Phase 1 written test had found that there was a significant difference in the tactical choices between less and more experienced coaches. Because a holistic picture was sought from the interviews, it was chosen to invite coaches who represented a range of experience.

Coaches were contacted by phone. The purpose of the interview and its structure were explained to them. They were made aware that the interview could

extend to 60 minutes, that all interviews would be conducted in English and that a semi-structured one-on-one protocol would be followed. They were also informed that an audio recording would be made. The use of a tape recorder preserves the original data and allows the researcher to check the source for accuracy (Seidman, 1998).

Participants

Five of the coaches who were contacted volunteered to participate in the interviews. Individual sessions were then scheduled at places that were both suitable for a confidential session and convenient for each participant.

When the researcher arrived at the time and place of the interview, he sat with the participant and again explained the purpose of the study. The voluntary nature of participation was emphasised and participants were reminded that the interview would be conducted in English. The participant was asked to sign the Informed Consent form (Appendix G). The consent form was collected and the participant was asked if the interview could begin. In order to develop rapport between the researcher and participant, an informal conversation about tennis and recent occurrences in the game was begun. Upon receiving a positive sign from the participant that he/she was ready, the audio recorder was started and the interview began.

The interviews for the five coaches followed the same protocol although the experience was individualised. Because of the informal and conversational tone of the interview, some of the participants did not require any probes to get them to respond more completely to the questions, while other coaches may have needed encouragement to respond or to focus their remarks. This sample of coaches had an average of 12.8 years of coaching experience, ranging from three to 35 years. Two females and three males participated and all participants were Caucasian. When each interview was concluded (approximately 40 minutes per interview), the researcher thanked the participant and explained that the interpretation of the interview information would be shared with them so that they could corroborate its interpretation and/or add to it.

Analysis of the Results of the Interview

The interview produced verbatim transcripts that called for a qualitative analysis to identify categories and themes of meaning that reflected the coaches (N=5) perceptions about coaching, tactic in tennis and the current situation in South African tennis. Because the researcher conducted the interviews and participated in the analysis of the transcripts, it is necessary to disclose his bias in relation to tactics, coaching and South African tennis prior to the presentation of the results.

Acknowledgement of the Bias of the Researcher

This section is included to inform the reader of the background of the researcher and inform him/her about any potential biases on the part of the researcher that may impact on the study in terms of either the generation and/or interpretation of the results.

The researcher has no previous experience in the conducting of interviews for research purposes. However, he was assisted by a colleague who has done extensive work in the field of research with the use of interviews.

My background in tennis comes mainly from the perspective of a player. I played competitive tennis at high school and during my university career. I represented my province at senior level and had limited playing experience in some professional tournaments. I completed my M. degree in Sport Science on the use of video-based performance analysis as a source of immediate vs. delay visual feedback to improve the serve of tennis players.

I completed some of the coaching courses presented by the governing body of South African tennis through the “old system” that was oriented toward sport-specific content. I was generally disappointed in my interactions with most of the other people attending these courses. I felt that many of them did not have an understanding of the scientific dimensions of tennis. I did not think many of them were very interested in talking about tennis coaching in terms of how they could improve. I became very discouraged about the standard of their knowledge and

commitment to improve the tennis in South Africa and stopped attending these courses. This is a bias that I will have to try to manage in this study.

While playing university-level tennis, I had numerous interactions with coaches from the university as well as with those of other universities across South Africa. I also had encounters with some overseas coaches who were present at the professional tournaments as well as on some of the tours in which I participated. In my conversations with them about what it takes to get players to the top in tennis, I began to ask questions regarding the knowledge of tactical prowess of coaches in South Africa and of coaches in general. Having not been able to pursue a career as a professional player myself, I found myself keenly interested in how coaching could contribute to a player's chances for success at the top levels of the game.

With regards to the current state of South African tennis, I find I am becoming increasingly disillusioned. There have been South African players who have proven to be good enough for international competition at the junior level: One player reached the top three in the world in the under 14 category, another player made the finals of the under 18 Sugar Bowl defeating a current top 10 player in the semi-finals and another player won the Junior Wimbledon Title in 1997. However, none of these players were able to use their achievements as juniors as springboards to achievements in the professional ranks. This pattern has been repeated with other junior players and has led me to speculate about why this occurs. Obviously these players who have excelled as juniors were talented enough to make the transition, but there has been some sort of gap in the development of these players.

As I observed South African players as they tried to break into the professional game, I thought that one of their common limitations was that they struggled to focus their tactics on their own strengths in relation to their opponents' weaknesses and that they had difficulty adapting their tactics during matches. I came to the conclusion that their tactical knowledge and their ability to apply that knowledge could be a debilitating factor. This led me to wonder if there are fundamental problems with the way they had been coached. I decided that it was

important to look first at whether the coaches in South Africa had an understanding of tennis tactics and how/when tactics should be adapted in different game situations. I believe that good coaching should include a progressive development of players' tactical sophistication. I do not think there are enough South African coaches with a sufficient level of understanding about tactics in tennis to take the game forward to success at the international level. This is another bias that I will have to try to manage in this study.

Analysis of the Interview Transcripts

Following the interview process during which the audio records of the interviews were made, the processing of data followed Boeije's (2009) four recommendations for preparation for analysis.

1. Organise and sort the data in a manner that is easily retrievable.

In this study the audio tape of each interview was immediately stored in a locked cabinet accessible only to the researcher.

2. Transcribe the interviews properly.

The audio recording of all interviews were transcribed verbatim by the researcher in an MS Word document. Seidman (1998) supported this role for researcher because it is an effective way for the researcher to become familiar with the content of the interviews. An electronic copy of each transcript was stored on a private computer so that backups of the interviews were available. A hard copy was stored in a locked cabinet accessible only to the researcher.

3. Remove any information that may identify the participant and infringe on the guarantee of confidentiality.

A code was used to label each transcript rather than the participant's name. The researcher looked through each transcript and removed or re-worded any phrase that might reveal the identity of the participant interviewed.

4. Prepare the transcriptions for analysis.

Each transcript was double-spaced to make it easier to read. Three copies were made of each transcript. One copy was stored as a reference document if needed and the other two copies were for the two analysts who would need their own copies during the data analysis process.

The analysis of the transcripts required the identification of one expert who had formal education using qualitative methods and who had published research using the thematic analysis of interviews in scientific journals. This expert was recruited to work with the researcher in drawing themes and categories of meaning from the comments made by the coaches. When the expert and the researcher met to perform the analysis, a protocol was followed similar to the protocol described by Tesch (1990) and Neibert (2009):

Session One

1. All transcriptions were read and re-read independently.
2. Each analyst broke each transcript into “units of meaning” which were phrases considered to express a single thought or feeling.
3. The analysts compared their perceptions of the units of meaning and discussed any discrepancies until reaching agreement. This produced a document that identified all the units of meaning (quotations) identified consensually from all five transcripts.

Session Two

1. The analysts examined the units of meaning and independently tried to group the units into meaningful chunks (Smith & St. Pierre, 2009).
2. When they felt they had exhausted their independent ideas, they began to discuss their thoughts. Through discussion they arrived at an initial framework that organised most of the units into identifiable themes.

Session Three

1. The initial framework was examined and “second thoughts” were discussed. Those units that had not been incorporated into the framework were also discussed. A revised framework of themes was produced from these discussions.
2. The revised framework was then examined independently by each analyst in order to come up with initial ideas about how the themes might relate to each other to form higher order themes of meaning.
3. The analysts shared their ideas with each other about the higher order themes but did not make any decisions regarding further development of the framework.

Session Four

1. The analysts shared their thoughts on the higher order themes and finally reached consensus.
2. A check was then made back to the lower order themes and then back to the units of meaning to ensure that the analysts agreed with the way in which meanings had been organised. Some revisions were made in this checking process.
3. The analysts then worked together to identify the major categories of meaning that could serve as the major organising element in the framework.

Session Five

1. The analyst met and discussed the entire framework, arriving at confirmation of the categories, the higher order themes and the themes that they believed accurately reflected the units of meaning drawn from the transcripts.

2. Units of meaning were selected at random and the analysts considered whether each unit might be better accommodated under a different theme or if it deserved a separate theme in the framework. Nine units of meaning were re-categorized during this process.
3. The themes and higher order themes were next tested for accuracy of meaning. Seven themes were modified in this process and re-labelled to better reflect the units of meaning. Five higher order themes were modified. Two of the higher order themes were found to be too broad and each was split into two themes to better reflect the themes within them. Three of the higher order themes were re-labelled to become more accurate in describing the themes within them.
4. The four major categories of meaning in the framework were considered for modification but the analysts agreed that modification was not needed.
5. The analysts agreed that the framework was complete and reflected the meanings of the coaches who had been interviewed. They also agreed it was not necessary to meet again.

Summary

According to Crespo (2007) there are two ways in which to assess a coach's knowledge, namely written and oral assessments. The current study used both approaches to do this amongst South African tennis coaches. An original written test was developed by the researcher in order to assess the tactical awareness of the coaches. This test presented 43 game states in the form of points that had built up to the current game state. The participants were then required to rank their three preferred options in response to the presented situation. An in-depth interview with each five coaches, ranging in experience, was conducted to delve deeper into the mind of coaches in order to gain insight into their thoughts about coaching in general, coaching tactics specifically and the current situation in South African tennis.

Chapter Four

Written Test Results and Discussion

The participants in this study who completed the written test (N=37) had an average of 18.8 years of experience as a player and 15.8 years of experience as a coach (almost all of them had been both playing and coaching at the same time during some period in their lives). During their playing careers, 14 of the coaches reached the regional level, 11 made it to the national level and 12 competed at the international level. Six of the 37 participants were still playing tennis competitively. Not all coaches were coaching full time. A summary of where they reported they had learned about tennis tactics is presented in Table 1.

Table 1

How the coaches (N=37) learned about tactics in tennis

How Coaches Learned about Tactics	% of Coaches
Learned by myself (trial and error)	94.6%
General tennis workshops/clinics	89.2%
Formal tennis coaching education courses	75.1%
Coaches explained tactics to me when I was a player	73.0%
Talking about tactics with other players	62.2%
Books, magazines and other written material about tennis	62.2%
DVD, videos and other visual material about tennis	56.8%
Internet	13.5%
Sports science courses or other academic classes	13.5%

The remainder of this chapter is structured in sections that correspond to the research questions. The results of data analysis of the participants' tactical choices to 43 problem situations are reported in two clusters of choices, depending on whether participants were asked to think of themselves as the player who was serving or as the player who was receiving the serve. Within each of these clusters there are three possible games states created by the conditions described in each situation: defensive, neutral and offensive situations. By using these categories to report the data, it will be possible to determine if there is any pattern of differences among the different types of game states.

1. You are serving and the point develops into a defensive situation for you (your serve defensive - YSD)
2. You are serving and the point develops into a neutral situation (your serve neutral - YSN)
3. You are serving and the point develops into an offensive situation for you (your serve offensive - YSO).
4. Your opponent is serving and the point develops into a defensive situation for you (opponent's serve defensive - OSD)
5. Your opponent is serving and the point develops into a neutral position (opponent's serve neutral - OSN)
6. Your opponent is serving and the point develops into an offensive situation for you (opponent's serve offensive - OSO)

A final descriptive section presents the coaches' reports about where they had learned about tactics in tennis according to the grouping of participants according to the research question.

Research Question One

1. What was the effect of years of experience in tennis coaching on the choices of tactical options selected by the participants in this study?
 - 1a. Were there any differences in the how the more experienced vs. less experienced coaches reported they had learned about tactics in tennis?

The following tables present the results of the analysis of choices in the six different games states describe at the beginning of this chapter analysed according to a more experienced group who had coached 15 years or more (n = 20) vs. a less experienced group of coaches who had less than 15 years of coaching experience (n= 17). Table 2 presents the results for those game states in which the participant took the point of view of the player who was serving and the point developed into a defensive situation for that player (YSD).

Table 2

Chi-square analysis of each of the choices made by experienced (n = 20) and inexperienced (n = 17) coaches in YSD games states

Your Serve Defensive (YSD)		
Scenario number	Chi-square value	p value
3	19.64	0.001*
7	12.77	0.026*
12	11.97	0.035*
17	8.69	0.069
21	20.22	0.001*
31	14.64	0.012*
42	13.79	0.017*

*p≤ .05

These results indicated that there was a significant difference between the tactical choices made by coaches in six out of seven “your serve defensive” game states. Table 3 presents the results for those game states in which the participant took the point of view of the player who was serving and the situation developed in a neutral direction for the player (YSN).

Table 3

Chi-square analysis of each of the choices made by more experienced (n = 20) and less experienced (n = 17) coaches in YSN games states

Your Serve Neutral (YSN)		
Scenario number	Chi-square value	p value
4	10.65	0.059
6	19.93	0.001*
16	13.99	0.016*
29	11.70	0.039*
30	11.28	0.046*
34	3.16	0.676
35	26.86	0.000*
39	14.04	0.015*

*p≤ .05

These results indicated that there was a significant difference between the tactical choices made by coaches on six out of eight “your serve neutral” game states.

Table 4 presents the results for those game states in which the participant took the point of view of the player who was serving and the situation developed in an offensive direction for the player (YSO).

Table 4

Chi-square analysis of each of the choices made by more experienced (n = 20) and less experienced (n = 17) coaches in YSO games states

Your Serve Offensive (YSO)		
Scenario number	Chi-square value	p value
5	4.48	0.482
10	9.37	0.095
18	3.35	0.501
22	3.59	0.610
26	27.45	0.000*
27	0.09	0.993
38	13.07	0.023*

*p≤ .05

These results indicated a significant difference was found between the tactical choices made by coaches in two out of seven “your serve offensive” game states.

Table 5 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent's serve and the situation developed in a defensive direction for the player (OSD).

Table 5

Chi-square analysis of each of the choices made by more experienced (n = 20) and less experienced (n = 17) coaches in OSD games states

Opponent's Serve Defensive (OSD)		
Scenario number	Chi-square value	p value
1	17.04	0.004*
9	8.49	0.130
15	18.07	0.003*
19	19.64	0.001*
24	10.86	0.054
25	2.45	0.653
37	21.70	0.001*
40	14.87	0.011*
41	11.08	0.050*

*p≤ .05

These results indicated a significant difference was found between the tactical choices made by coaches in six out of seven "your serve offensive" game states. Table 6 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent's serve and the situation developed in a neutral direction for the player (OSN).

Table 6

Chi-square analysis of each of the choices made by more experienced (n = 20) and less experienced (n = 17) coaches in OSN games states

Opponent's Serve Neutral (OSN)		
Scenario number	Chi-square value	p value
8	4.30	0.508
11	10.36	0.066
14	9.61	0.087
20	13.62	0.018*
33	21.62	0.001*
36	24.66	0.000*

*p≤ .05

These results indicated a significant difference was found between the tactical choices made by coaches in three out of six “opponent’s serve neutral” game states. Table 7 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed into an offensive situation for the player (OSO).

Table 7

Chi-square analysis of each of the choices made by more experienced (n = 20) and less experienced (n = 17) coaches in OSO games states

Opponent’s Serve Offensive (OSO)		
Scenario number	Chi-square value	p value
2	7.48	0.187
13	18.42	0.002*
23	13.20	0.010*
28	18.56	0.002*
32	13.45	0.019*
43	23.14	0.000*

*p≤ .05

These results indicated a significant difference was found between the tactical choices made by coaches in five out of six “opponent’s serve offensive” game states.

Summary of the Effects of Coaching Experience on Tactical Choices

There were differences found in each of the six categories of game states when the tactical choices of more experienced coaches were compared to the choices made by less experienced coaches. Figure 7 presents a comparison among the percentage of choices in which there were differences between the less experienced and more experienced coaches.

In addition to looking at tactical choices according to category of game state, it was also possible to compare percentages of differences in tactical choices in situations setting up an offensive, neutral or a defensive situation. Figure 8 presents that comparison.

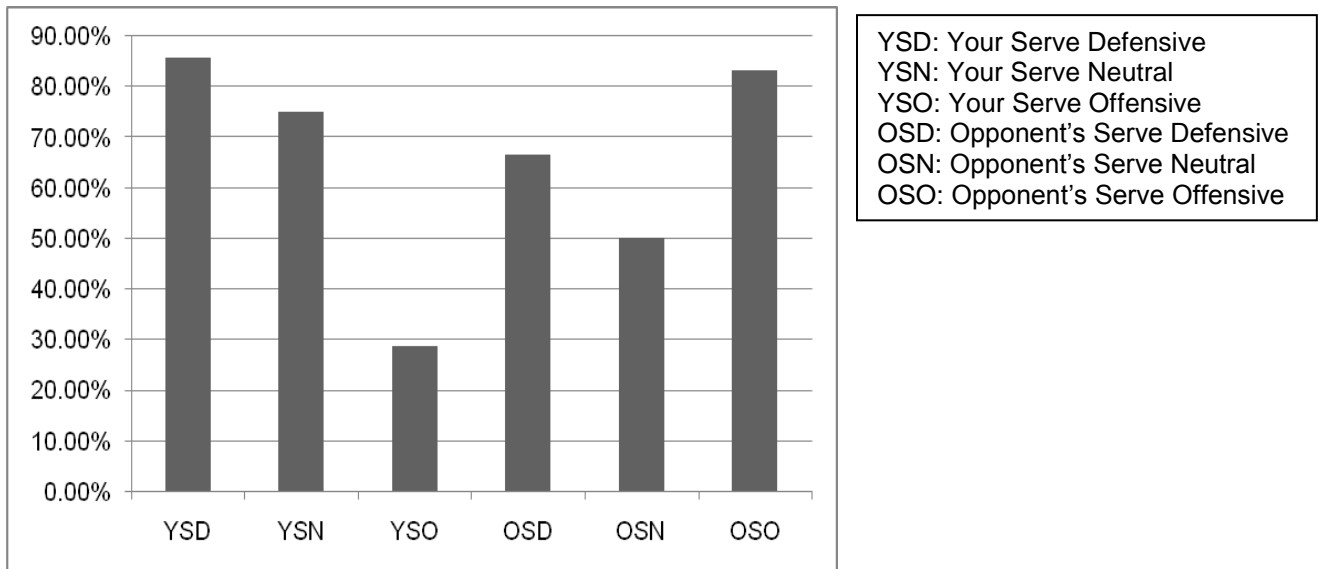


Figure 7. *Percentage of differences in tactical choices made by more experienced vs. less experienced coaches in each category of game states.*

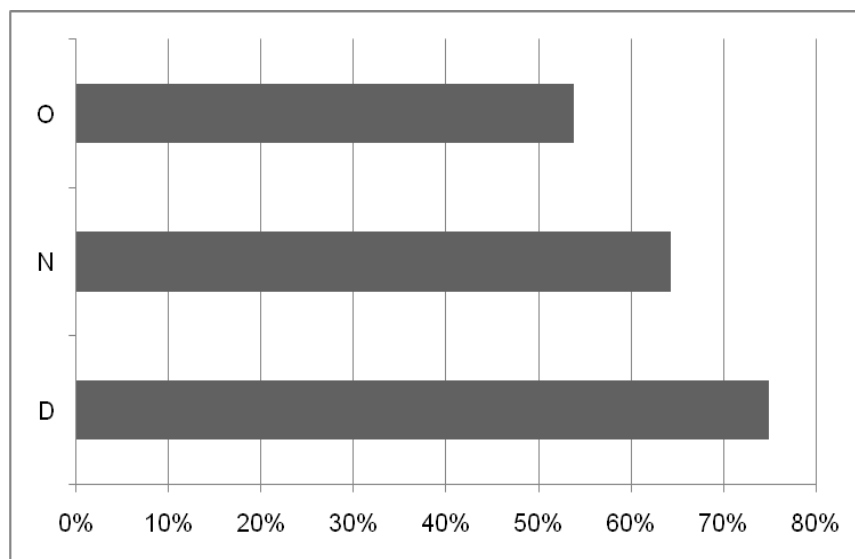


Figure 8. *Percentage of differences in tactical choices made by more experienced vs. less experienced coaches in game states setting up either offensive (O), neutral (N) or defensive (D) situations.*

The results seem to indicate that more experienced coaches have developed a broader and more sophisticated knowledge base which will lead to the reading of tactical situations differently. Defensive situations in particular may be more complex in terms of determining optimal tactical responses. In defensive situations, a player may defend, try to neutralise the situation or try to go on attack. In offensive situations, there is always the intention to attack. In neutral situations, there may be a tendency to remain in the neutral mode or try to attack. The results of the analysis may lead to the hypothesis that the experience level of the coaches lead them to see these complex situations in different ways.

How Coaches with Different Amounts of Coaching Experience Learned about Tactics

Table 8 is a summary of the percentage of more experienced vs. less experienced coaches who believed they had learned about tactics in tennis from the nine resources that are typically available. The percentage of all coaches who identified each of the resources is provided as a general reference point.

Table 8

How the more experienced (n=20) vs. less experienced (n=17) coaches learned about tactics in tennis compared to all of the coaches

How Coaches Learned about Tactics	All Coaches	Less Experienced	More Experienced
Learned by myself (trial and error)	94.6%	90%	100%
General tennis workshops/clinics	89.2%	85%	94.1%
Formal tennis education coaching courses	75.1%	70%	82.4%
Coaches explained tactics to me when I was a player	73.0%	90%	52.9%
Talking about tactics with other players	62.2%	60%	58.8%
Books, magazines and other written material	62.2%	50%	76.5%
DVD, videos and other visual material	56.8%	60%	52.9%
Internet	13.5%	20%	17.7%
Sports science courses or academic classes	13.5%	5%	23.5%

As can be seen in the table above there are a few differences in the way in which the less experienced and more experienced coaches learned tactics. Firstly, the less experienced coaches noted the role that their coaches had played in their learning of tactics. This suggests that the coaches who have more experience in coaching were more inclined to learn about tactics in some other way besides them being taught it. This is supported by the fact that the more experienced coaches reported that they learned more about tactics from sports science courses and formal education classes as well as books and other written materials than did the less experienced coaches. Based on these results, it would seem that the more experienced coaches took the extra time and effort to learn more about tactics than their less experienced counterparts.

Research Question Two

2. What was the effect of coaching players at different levels of performance on the choices of tactical options selected by the participants in this study?
 - 2a. Were there any differences in the how the coaches who work with players at different levels of performance reported they had learned about tactics in tennis?

The following tables present the results of the analysis of choices in the six different games states describe at the beginning of this chapter analysed according to the performance level of the tennis players that each coach identified as his/her primary focus group. This identification produced three groups: Coaches of regional level players (n=14), coaches of national level players (n=11) and coaches of international level players (n=12). Table 9 presents the results of the tactical choices made by the three different groups of coaches in the games state in which the participants took the position of the player who was serving and the situation led to a defensive situation for the player.

Table 9

Chi-square analysis of responses in YSD games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Your Serve Defensive (YSD)		
Scenario number	Chi-square value	p value
3	17.75	0.059
7	13.30	0.207
12	22.75	0.012*
17	17.86	0.022*
21	26.26	0.003*
31	26.15	0.004*
42	18.66	0.045*

*p≤ .05

These results indicated a significant difference was five out of seven of the tactical choices made in the “your serve defensive” game states among coaches who work with players at different levels.

Table 10 presents the results for those game states in which the participants took the point of view of the player who was serving and the point developed into a neutral situation (YSN).

Table 10

Chi-square analysis of responses in YSN games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Your Serve Neutral (YSN)		
Scenario number	Chi-square value	P value
4	7.31	0.696
6	7.91	0.638
16	12.65	0.244
29	11.84	0.296
30	10.25	0.418
34	9.20	0.513
35	13.31	0.102
39	17.92	0.056

*p≤ .05

These results indicated that no significant differences were found in the tactical choices made in the “your serve defensive” game states among made by coaches who work with different levels of players.

Table11 presents the results for those game states in which the participant took the point of view of the player who was serving and the point developed into an offensive situation (YSO).

Table 11

Chi-square analysis of responses in YSO games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Your Serve Offensive (YSO)		
Scenario number	Chi-square value	p value
5	14.95	0.134
10	8.78	0.553
18	12.34	0.137
22	12.19	0.272
26	13.14	0.107
27	7.30	0.294
38	8.83	0.548

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve defensive” game states among coaches who work with players at different levels.

Table 12 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in a defensive direction for the player (OSD).

Table 12

Chi-square analysis of responses in OSD games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Opponent’s Serve Defensive (OSD)		
Scenario number	Chi-square value	p value
1	11.04	0.354
9	15.99	0.998
15	13.97	0.174
19	21.23	0.196
24	19.63	0.033*
25	5.76	0.674
37	13.47	0.198
40	24.23	0.007*
41	17.34	0.067

*p≤ .05

These results indicated a significant difference was found in two out of nine tactical choices made in “opponent’s serve defensive” game states among coaches who work with players at different levels.

Table 13 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in a neutral direction for the player (OSN).

Table 13

Chi-square analysis of responses in OSN games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Opponent’s Serve Neutral (OSN)		
Scenario number	Chi-square value	p value
8	10.44	0.403
11	19.70	0.032*
14	13.74	0.185
20	18.03	0.054
33	20.61	0.024*
36	16.99	0.075

*p≤ .05

These results indicated a significant difference was found in two out of six tactical choices made in “opponent’s serve neutral” game states among coaches who work with players at different levels.

Table 14 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in an offensive direction for the player (OSO).

Table 14

Chi-square analysis of responses in OSO games states among coaches of regional (n = 14), national (n = 11) and international (n = 12) players

Opponent's Serve Offensive (OSO)		
Scenario number	Chi-square value	p value
2	25.95	0.004*
13	13.97	0.174
23	8.02	0.432
28	17.47	0.065
32	21.11	0.020*
43	22.53	0.013*

*p ≤ .05

These results indicated a significant difference was found in two out of six tactical choices made in "opponent's serve offensive" game states among coaches who work with players at different levels.

Summary of the Effects of Coaching Players at Different Levels on Tactical Choices

There were some differences found in four of the six categories of game states when the tactical choices of coaches who work with three different levels of player were compared. Figure 9 presents a comparison among the percentage of choices in which there were significant differences among these coaches who work with players at different levels.

In addition to looking at differences in tactical choices according to category of game state, it was also possible to compare percentages of differences in tactical choices in those situations setting up an offensive, neutral or a defensive situation. Figure 10 presents that comparison.

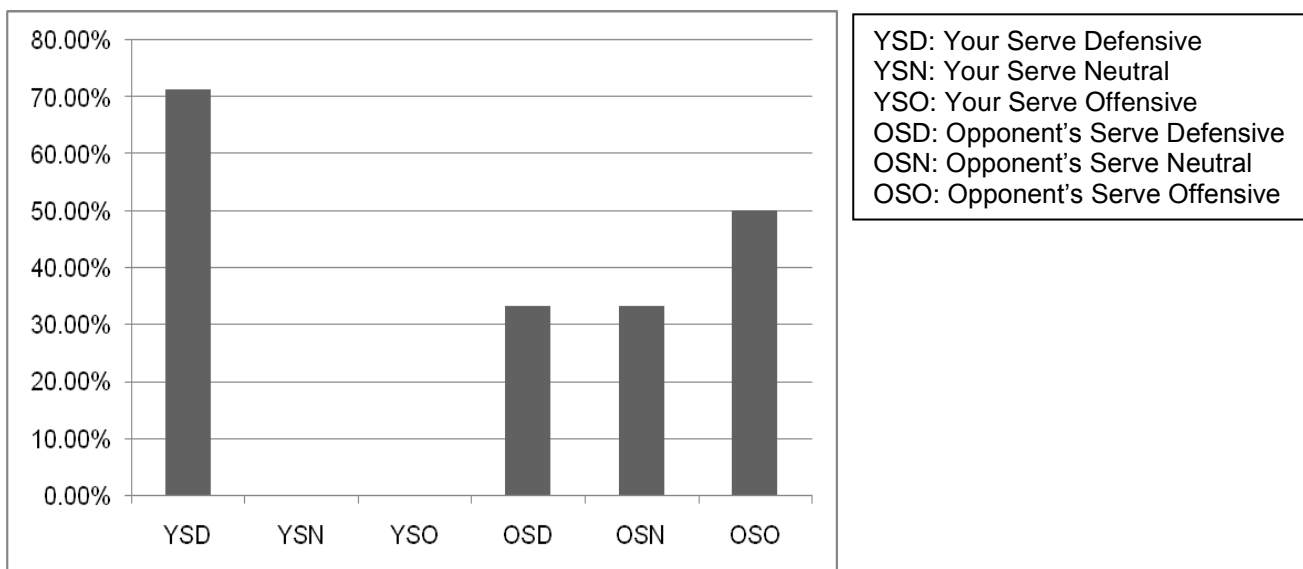


Figure 9. *Percentage of differences in tactical choices in each category of game states made by coaches who work with players at different levels.*

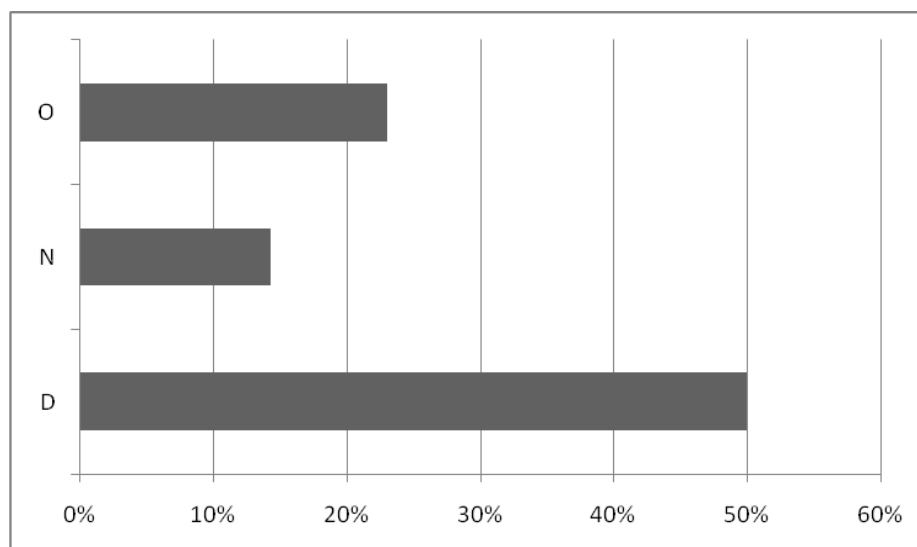


Figure 10. *Percentage of differences in tactical choices in game states setting up either offensive (O), neutral (N) or defensive (D) situations made by coaches who work with players at different levels.*

The statistical analysis shows that the biggest difference in tactical knowledge again occurred in defensive situations when analyzed by the highest level of player that the coaches coach. Specifically, there was a difference in the defensive situation when the player is serving. This may mean that the coaches may not be able to make the transition to coaching players at higher levels as they may be placed in more complex defensive situations than less advanced players. Regarding the specific differences in the situations where the player is serving, a possible explanation for this may be that the coaches who coach players at the lower levels are not concerned with the possibility that their player may become involved in a defensive situation while serving as the serve is supposed to be the dominant weapon in a player's arsenal.

The level of sophistication of thinking may also differ at the different levels of players coached due to the amount of skill possessed by the players themselves. If players do not possess the necessary skill to perform certain shots, then their tactical options will be limited to the amount of skill they possess. Coaches who coach players at lower levels may therefore not be thinking in the more complex manner that the coaches who coach more expert players do. Also, coaches of players at the lower level may believe that their players do not possess the necessary skill levels to respond to these situations.

How Coaches Who Coach Players at Different Levels Learned about Tactics

Table 15 is a summary of the percentage of coaches who were coaching regional players, national players and international players, believed they had learned about tactics in tennis from the nine resources that are typically available. The percentage of all coaches who identified each of the resources is provided as a general reference point.

Table 15

How coaches who worked with regional level players (n=14) vs. national level players (n=11) vs. international players (n=12) learned about tactics in tennis compared to all of the coaches

How Coaches Learned Tactics	All Coaches	Regional	National	Inter-national
Learned by myself (trial and error)	94.6%	100%	81.8%	100%
General tennis workshops/clinics	89.2%	85.7%	100%	83.3%
Formal tennis education coaching courses	75.1%	78.6%	81.8%	66.7%
Coaches explained tactics to me when I was a player	73.0%	85.7%	66.6%	66.7%
Talking about tactics with other players	62.2%	50%	63.7%	75%
Books, magazines and other written material	62.2%	57.1%	63.7%	66.7%
DVD, videos and other visual material	56.8%	50%	54.6%	66.7%
Internet	13.5%	7.1%	9.1%	41.7%
Sports science courses or other formal education classes	13.5%	7.1%	9.1%	25%

The results of this analysis show some interesting trends. There were five methods of learning tactics that show similar upward trends. Talking about tactics with other players, the use of books and other written materials, the use of DVD and other visual materials, the use of the internet and sports science and formal education courses all showed the trend of being more frequently used as the coaches coached players of higher levels. This corroborates the research by Nelson, Cushion and Potrac (2006) who contended that informal, self-directed sources of learning had

more impact than non-formal (coaching workshops and conferences) and formal (university degree) modes of learning.

Of particular interest is the large jump from coaches coaching nationally ranked players to those coaching internationally ranked players in the categories of internet usage as well as formal education classes. It seems that coaches who coach players at the highest level tend to be more formally educated and also use a form of interaction with other coaches via the internet, linking to some form of mentorship.

Research Question Three

3. What was the effect of the level of personal achievement as tennis players on the choices of tactical options selected by the participants in this study?
 - 3a. Were there any differences in the how the coaches who had played at a higher compared to a lower level of tennis reported they had learned about tactics in tennis?

The following tables present the results of the analysis of choices in the six different games states describe at the beginning of this chapter analysed according to the personal level of tennis performance reported by 29 of the 37 participants in this study. Only two levels of achievement were reported: 10 players had competed at the regional level and 19 had competed at the national level. Table 16 presents the results of the tactical choices made by the these two different groups of coaches in the games state in which the participants took the position of the player who was serving and and the situation developed in a defensive direction for the player (YSD).

Table 16

Chi-square analysis of responses in YSD games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Your Serve Defensive (YSD)		
Scenario number	Chi-square value	p value
3	7.71	0.173
7	3.14	0.678
12	8.68	0.122
17	5.27	0.261
21	5.13	0.399
31	8.60	0.126
42	5.23	0.389

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve defensive” game states among coaches who reached different levels of personal achievement as tennis players.

Table 17 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in a neutral direction for the player (YSN).

Table 17

Chi-square analysis of responses in YSN games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Your Serve Neutral (YSN)		
Scenario number	Chi-square value	p value
4	13.27	0.021*
6	5.00	0.416
16	3.20	0.700
29	11.87	0.037*
30	5.12	0.402
34	14.15	0.015*
35	12.42	0.014*
39	10.59	0.060

*p≤ .05

These results indicated that significant differences were found in four of the eight tactical choices made in “your serve neutral” game states among coaches who reached different levels of personal achievement as tennis players.

Table 18 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in an offensive direction for the player (YSO).

Table 18

Chi-square analysis of responses in YSO games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Your Serve Offensive (YSO)		
Scenario number	Chi-square value	p value
5	10.32	0.067
10	12.57	0.028*
18	2.60	0.627
22	8.95	0.111
26	4.29	0.368
27	5.34	0.148
38	7.96	0.158

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve offensive” game states among coaches who reached different levels of personal achievement as tennis players.

Table 19 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in a defensive direction for the player (OSD).

Table 19

Chi-square analysis of responses in OSD games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Opponent's Serve Defensive (OSD)		
Scenario number	Chi-square value	p value
1	6.10	0.296
9	10.72	0.057
15	1.17	0.947
19	2.83	0.727
24	4.67	0.458
25	3.49	0.480
37	9.51	0.090
40	9.96	0.076
41	6.19	0.288

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve offensive” game states among coaches who reached different levels of personal achievement as tennis players.

Table 20 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent's serve and the situation developed in a neutral direction for the player (OSN).

Table 20

Chi-square analysis of responses in OSN games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Opponent's Serve Neutral (OSN)		
Scenario number	Chi-square value	p value
8	4.08	0.538
11	6.86	0.231
14	0.54	0.991
20	4.84	0.436
33	4.76	0.446
36	6.26	0.282

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve neutral” game states among coaches who reached different levels of personal achievement as tennis players.

Table 21 presents the results for those game states in which the participant took the point of view of the player who was receiving the opponent’s serve and the situation developed in an offensive direction for the player (OSO).

Table 21

Chi-square analysis of responses in OSO games states among coaches who had played tennis at the regional (n = 10), national (n = 19) levels

Opponent’s Serve Offensive (OSO)		
Scenario number	Chi-square value	p value
2	3.27	0.659
13	9.23	0.100
23	5.70	0.222
28	6.31	0.277
32	10.01	0.075
43	0.97	0.965

*p≤ .05

These results indicated no significant differences were found in the tactical choices made in “your serve offensive” game states among coaches who reached different levels of personal achievement as tennis players.

Summary of the Effects of the Level of Personal Tennis Achievement on Tactical Choices

There were some differences found in two of the six categories of game states when the tactical choices of coaches were compared according to level of personal achievement. Figure 11 presents a comparison among the percentage of choices in which there were significant differences among coaches when compared according to the level of personal achievement.

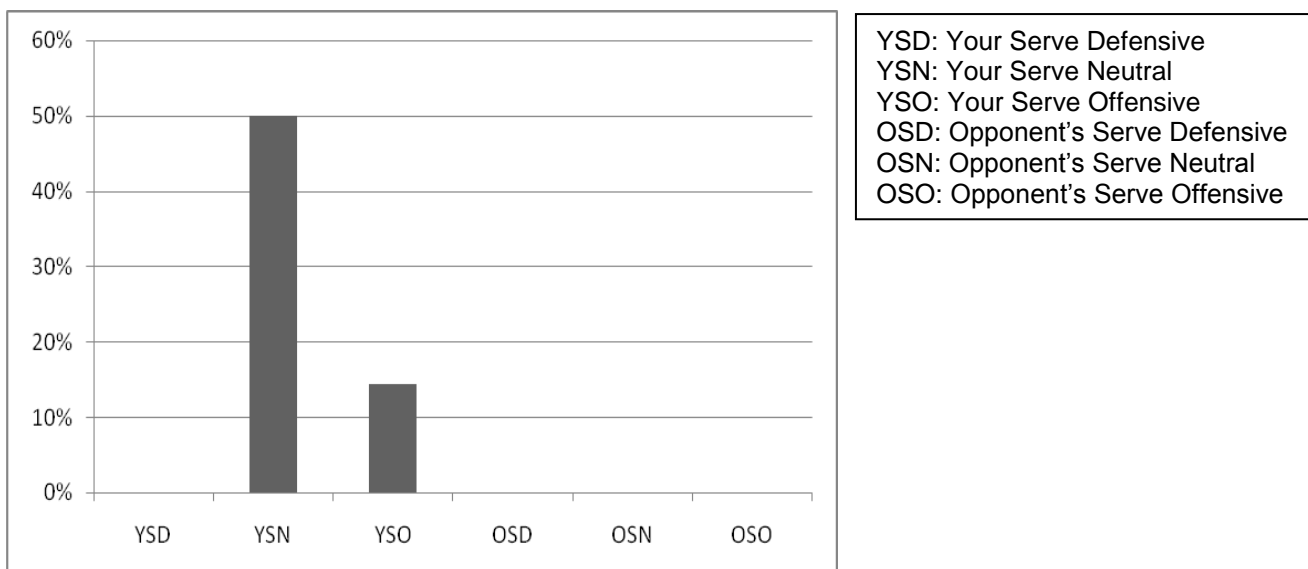


Figure 11. *Percentage of responses showing differences between players and coaches that played at regional (n = 10) and national (n = 19) levels for each of the possible point situations.*

In addition to looking at differences in tactical choices according to category of game state, it was also possible to compare percentages of differences in tactical choices in those situations setting up an offensive, neutral or a defensive situation.

Figure 12 presents that comparison.

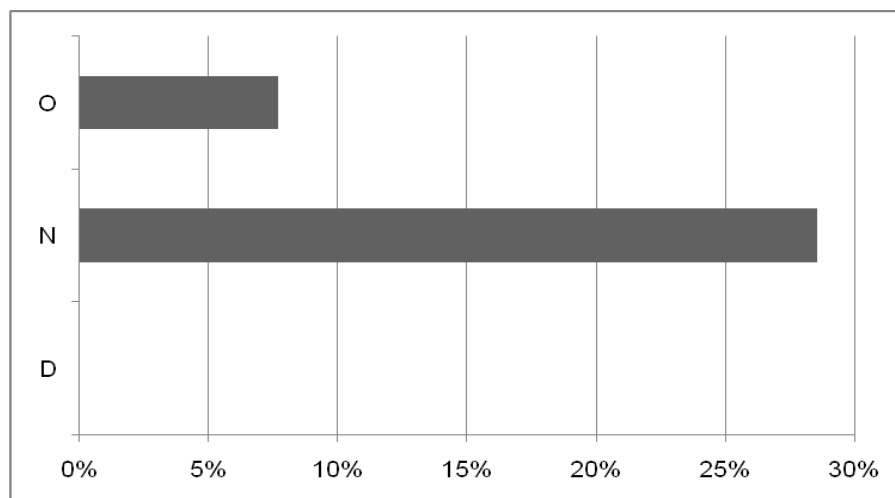


Figure 12. *Percentage of responses that showed differences between players and coaches that played at regional (n = 10) and national (n = 19) levels for each of the general point situations. Offensive (O), neutral (N) or defensive (D).*

Level of play attained shows no real discrepancies in tactical knowledge. This is contrary to the findings of McPherson (1999b) who found that expert tennis players who had more years of training and competed at higher levels had more tactical, extensive and associated structures of condition-action concepts. This means that coaches who have reached a higher level of play do not approach matches and situations differently, in term of tactics employed, to those who have not reached the same levels. From a playing perspective this means that the more advanced players are not more advanced in their tactical knowledge of situations than less advanced players. This could have profound implications for the coaching situation in South Africa. From a coaching perspective it can be concluded that, in South Africa, coaches do not necessarily have to have played the game in order to achieve the similar levels of coaching.

This is disagrees partially with the research done by Coté (2006) who contended that the majority of coaches learn to coach through their experiences as athletes. Gilbert, et al. (2006) also showed that successful high school coaches in volleyball, softball and football had participated in thousands of hours of training during their own careers as athletes before becoming coaches. This leads to the conclusion that there is some sort of gap that exists or did exist with regards to the training of South African tennis players during their development as the players who have reached higher levels, who should have a better understanding of tactics than those who did not, are not currently equipped with a different organization of tactical knowledge than players who did not excel that well.

How Coaches Who Achieved Different Levels as Players Learned about Tactics

Table 22 is a summary of the percentage of coaches who achieved regional level as players and national level as players, believed they had learned about tactics in tennis from the nine resources that are typically available. The

percentage of all coaches who identified each of the resources is provided as a general reference point.

Table 22

How coaches who played at the regional level (n=10) and the national level players (n=19) learned about tactics in tennis compared to all of the coaches

How Coaches Learned about Tactics	All Coaches	Played at Regional	Played at National
Learned by myself (trial and error)	94.6%	83.3%%	91.7%
General tennis workshops/clinics	89.2%	100%	83.3%
Formal tennis education coaching courses	75.1%	66.%7	75%%%
Coaches explained tactics to me when I was a player	73.0%	100%	83.3%
Talking about tactics with other players	62.2%	66.7%	50%
Books, magazines and other written material	62.2%	50%	41.7%%%
DVD, videos and other visual material	56.8%	83.3%%%	33.3%
Internet	13.5%	20%	17.7%
Sports science courses or academic classes	13.5%	16.7%	0%

The only real discrepancy revealed in the analysis of how coaches learned about tactics when analysed by the level they had reached as players was seen in the visual material usage with the least expert players using this more than their more expert counterparts as a method by which to learn more about tactics.

Additional Insight into Tactical Choices

It was clear that for this group of participants, significant differences in tactical choices were seldom found either among coaches who worked with players at different levels or between coaches who had achieved different levels of personal achievement as tennis players. However, significant differences were often found

when more experienced coaches were compared with less experienced coaches, especially in situations that led toward the player being in a defensive position.

The researcher was curious whether or not the pattern of differences was dominated by one or more of the tactical options proposed by Tiley (2002) that has guided construction of the scenarios on the knowledge test. To explore this, the researcher examined only the first tactical choice selected by each coach for each scenario, then determined if any tactical options were favoured more often by the more experienced vs. the less experienced coaches. It was found that the differences between the two groups were most pronounced in scenarios involving the application of three of Tiley's (2002) tactical options:

1. Know the zones

The concept "know the zones" involves understanding where in the court you are and what tactical options are optimal for this part of the court.

The more experienced coaches applied this tactic in defensive situations as their first choice much more often (16.7% of the time vs. 1.4% of the time) than did the less experienced coaches in the same scenarios. The more experienced coaches in this study may have recognised when their player's position on the court in a scenario was weak in terms of control of the game state and so they chose to apply a defensive tactic. However, the less experienced coaches may not have realized that their player often was not in a controlling position in these scenarios and did not choose a tactical option that had their player taking defensive actions.

2. Use target areas

Tiley (2002) noted that in different scenarios, different places on the court become viable target areas. For example, there may be a "safe spot" on the other side of the court for hitting a shot. The location of those spots will dictate how the shot must be made (e.g. hitting a ball high creates depth and

the closer the player is to the net when ball contact is made, the greater the potential angle).

The less experienced coaches employed the tactic of hitting to the safe spot as their first option more often (23.9% of the time vs. 11.1% of the time) in defensive situations than the more experienced coaches did in the same scenarios. Perhaps less experienced coaches applied tactics that called either for the player to hit the ball to a safe spot (i.e. just get it back over the net safely) or to try to hit the ball to a high risk spot that – if successful – would probably result in winning the point. Experienced coaches may favour the application of other tactics in defensive situations, rather than simply trying to stay in a rally or trying to take a very high risk shot.

3. Implement a 1-2 sequence

This concept focuses on winning the point with the second shot in the defensive situation in which a player finds him/herself. The idea behind this is not to take too much risk in the defensive situation, but rather to use the first shot to reply in a manner that would allow one to regain control of the point with the first shot and then finish the point on the second shot.

The more experienced coaches selected the first shot to regain control as their first tactical choice more often (44.4% of the time vs. 22.8% of the time) than the less experienced coaches in the same scenarios. More experienced coaches may see no need to take an unnecessary risk in a defensive situation and have confidence they can use subsequent shots try to 'work their way out' of it. They may be more patient. Less experienced coaches may see situations from one of two extremes. It is possible that they would prefer to play the most defensive of options and take almost no risk at all. However, in the particular scenarios in this study, they tended to select taking a bold shot to try to get the point immediately.

Summary

This study did not reveal many differences in the ways in which South African coaches view tactics. The differences that were identified were primarily found between more experienced and less experienced coaches when choosing tactical responses in defensive situations. The more experienced coaches tended to be slightly less aggressive than the less experienced coaches. They chose option that showed more assertiveness in regaining control of the point, whereas the less experienced coaches took a greater risk in an attempt to win the point.

Very few differences were found when the data were analysed comparing the coaches' choices of tactics according to the levels of players they coached. This creates a question about the potential contribution of these coaches to the tactical development of players in South Africa. Should the coaches of players at the higher levels have a different/more sophisticated understanding of tactics than the coaches of players at lower levels? Perhaps the coaches in this study were not sufficiently different in terms of the levels of players whom they coached, but the question remains an important one when thinking about coaching education.

Very few differences were found when the data were analysed comparing the coaches' choices of tactics according to the levels of level of personal achievement they had achieved as tennis players. Once again the coaches in this study may have been too similar in backgrounds. The coaches in this study had all played competitive tennis for number of years at least at the regional level. None of the coaches could be classified as beginner or even intermediate level tennis players. However, there is no conclusive evidence in the literature that playing a sport is necessary for becoming a coach in that sport.

Chapter Five

Interview Results and Discussion

Individual interviews were conducted to gather perceptions from selected coaches about coaching tennis and coaching tactics. Additional questions were asked to gain insight in their perceptions about tennis in the South African context. Five tennis coaches who had completed the knowledge test of tennis tactics that comprised the first part of the data collection for this study, volunteered to participate in an individual long interview conducted by the researcher. A description of the coaching background of each of these coaches is presented in Table 23.

Table 23

Background of each of the coaches who was interviewed

Coach	Gender	Age	Years as Coach	Level as Player	Level Coach	Level of players coached
1	Female	53	35	Provincial	Professional	Beginners to Provincial
2	Male	29	11	SA Students	ITF Level 1	National
3	Male	40	9	International	ATP Professional	National & International
4	Female	28	6	National, USA College	ITF Level 1	Intermediate
5	Male	22	3	Provincial	ITF Level 1	Intermediate & Advanced

The approximate length of an interview was 40 minutes. The audio tape of each interview was transcribed verbatim by the researcher to produce a transcript that was provided to the two analysts according to the process described in Chapter Three. The analysis of each transcript first produced quotes from the coaches that represented units of meaning. The units (quotes) from all five interviews were then clustered into related themes. These themes were then

grouped according to commonality to form more general themes (higher order themes), and these general themes were then consolidated into major categories.

The results of the analysis of the transcripts from the interviews with the coaches in this study produced four major categories of meaning:

1. Qualities of a tennis player.
2. Tactics involved in tennis.
3. Coaching tennis.
4. The South African situation.

Qualities of an Expert Player

The themes and higher order themes identified from the analysis of the interviews that were labelled by the analysts as describing the qualities of an expert tennis player are presented in Figure 13. This section was of importance as these qualities are deemed necessary for players to possess in order to be tactically efficient. The units of meaning (quotes) that were used to produce this Figure are presented in Appendix H. The higher order themes were Cognitive Aspects (three themes), Psychological Aspects (three themes), Physical Aspects (five themes) and Skill Aspects (one theme).

Cognitive Aspects

Three themes emerged from the analysis that dealt with processing information and thinking about the game: Decision Making, Knowledge of the Game and Perceptual Skills.

Decision Making

Although none of the coaches described the details of information processing, they did identify decision making as one of the crucial skills that distinguished a more expert from a less expert player. As one coach noted "Decision making is an important aspect."

Research completed by McPherson (1999) found that proficiency in decision making skills was central to the performance of expert tennis players. Previous research by Thomas and Thomas (1994) has also documented this conclusion, but they cautioned that expertise in tennis required successful motor performance on the court.

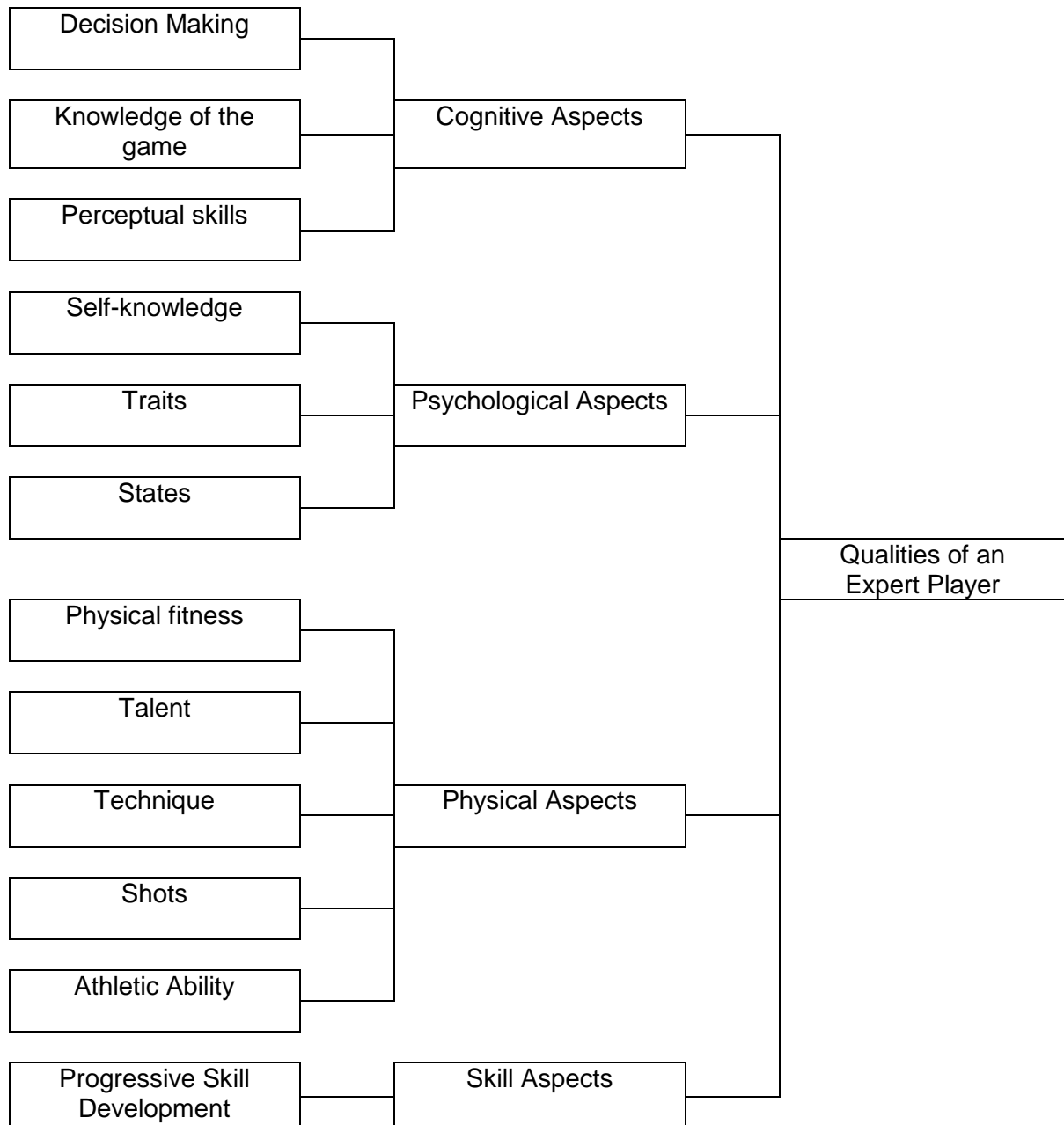


Figure 13. *The framework of higher order themes and themes that comprise the category Qualities of an Expert Player.*

Knowledge of the Game

Only one coach identified knowledge of the game as a characteristic of more expert tennis players. Williams and Davids (1995) contended that is a result of higher skill levels and not a result of experience. Starkes and Allard (1993), however, found that domain specific knowledge and practice to be the precursors to skilled behavior.

Perceptual Skills

The ability to perceive what is happening on court was noted as being an important difference between levels and was described as “how the person sees the ball and how early they see it”. In the same vein, good “vision” was deemed necessary. According to the information processing stages proposed by Tenenbaum (2003), perception of the situation is the first stage when deciding on what to do in that situation.

Psychological Aspects

The analysis of the quotes from the coaches yielded three themes that were grouped under the general theme of Psychological Aspects: Self-knowledge, Traits and States.

Self-knowledge

When speaking about expert tennis players and those qualities that separate them from less skilled players, one coach repeatedly spoke about self knowledge which he associated with a players’ knowledge of his/her own game.

Traits

The coaches also identified enduring psychological qualities that they believed players needed to possess in order to practice as well as perform at a high level. They referred to the need to be “mentally strong” and to have a “strong work ethic”.

States

Other psychological qualities mentioned by the coaches were considered to be just as important, but they acknowledged that players could experience variation in them from match to match, game to game, and sometimes even point to point. The states identified by the coaches were confidence, attitude and the will to win. One coach attributed excellent performance in a match as a matter of “who is more confident (on the court),” and which player has “a great attitude on the court.” Another coach replied that he could tell which players were going to well based on their “body language during the course of a certain match.”

Physical Aspects

The coaches regarded physical fitness, talent, technique, some specific shots and athletic ability as physical qualities that were required if players were to achieve the expert level.

Physical Fitness

The achievement of a high level of fitness was mentioned as a critical, with the coaches’ emphasis on strength, agility and speed.

Talent

Only one of the coaches mentioned the need for talent as a necessary ingredient to achieve expert performance. The comment was quite general and even after being asked to elaborate, the coach only referred to “all the talent stuff.”

It is possible that the other coaches subscribe to Ericsson’s (1998) theory that attributed expertise in large part to deliberate practice (approximately 10 000 hours of deliberate practice for attaining expert level) and proposed that talent plays a more limited role in achieving a high standard of play than many people might think. Tan (1997) expressed the need to modify this position when considering sport expertise, stating that he believed the role of talent cannot be entirely disregarded because of the biological/physical demands of many sports.

Technique

All of the coaches interviewed identified skill technique as a distinguishing quality of the expert player. They all noted that experts have “Very good, sound skills.” One coach remarked that the expert needs “As good a technique as possible” in order to excel and another coach described “A 95% technique” as a pre-requisite to success at the elite level.

Shots

Two coaches identified the ability to hit specific shots plays an indicator of the level of mastery achieved. One said “a big serve” (is needed at more advanced playing levels) and then added “if you can pull that shot off”.

Nielsen and McPherson (2001) found that professional level tennis players had better control of their shots compared to less skills players, but did not mention any specific shots that were characteristic of experts.

Athletic Ability

Of all the physical aspects identified by the coaches, the one that elicited the most detail in commentary were those grouped under the theme of Athletic Ability. Their remarks describing expert players included:

“How well they move towards it (the ball).”

“Footwork and hand-eye co-ordination and that kind of stuff.”

“Movement is a big point.”

“There it is all about athletic ability” (at the elite level).

Their observations were compatible with the findings of Nielsen and McPherson (2001), whose research documented that professional tennis players moved to get into optimal positions to hit shots whereas novices did not.

Skill Aspects

Some of the coaches shared their belief that going through the stages of motor skill development in a progressive manner was the route followed by expert players. As one coach observed, as an expert you “work on your own strengths” and “improve your weakness”.

Conclusions about Qualities of an Expert Player

Turner and Martinek (1999) noted that in order to make decisions in sport, and thereby increase the chances of success, it is necessary to possess skill and knowledge in the given sport. Based on the analysis of the interview, the coaches who participated in the study seem to conform to this conclusion. In the Starkes *et al.* (2004) model of how skills are acquired and maintained in expert performance it is contended that there is a constant interaction between the perceptual-cognitive stream and the perceptual-motor stream. This means that in order to move into higher levels of expertise it is necessary to understand what you perceive during training and competition as well as to be able to execute skills to the desired degree. Thus all the cognitive and physical aspects mentioned need to be developed in order to become an expert tennis player.

Tactics in Tennis

Because the central focus of this research was on coaches’ knowledge about tactics in tennis, a portion of the quotes taken from the interview transcripts directly addressed this focus. The framework of higher order themes and themes that were categorised as Tactics in Tennis are presented in Figure 14. The units of meaning (quotes) that were used to produce this Figure are presented in Appendix I. There were three higher order themes: Choice of Tactics (3 themes), Relation of Tactics to Level of Expertise (3 themes) and Factors that Modify the Choice of Tactics (5 themes).

Choice of Tactics

Three themes were identified in the coaches’ comments about how tactics were chosen or determined for a particular player. These themes included an

analysis of the strengths and weakness of both the player and his/her opponent, as well as more dynamic considerations about game play.

The Player

Most of the comments made by the coaches in the analysis of their players were general in nature. Comments mentioned planning their game and shots, as well as the use of their strengths. “Knowledge of your own game” (is important), said one coach. They must learn about “planning their game” and how to use “their strengths work against those weaknesses” (noticed in their opponents).

The Opponent

The general comments made noted it was important to “analyse your opponent” and know how the opponent plays “in order to use this information to gain an advantage” during a match. Successful tactics were described as “If you can make the player hit shots that he wouldn’t normally practice basically.” It was also considered helpful to determine specific weaknesses in opponents, for example if the opponent “doesn’t “like high balls or low balls,” if “he fatigues very easily in long matches” or if “he gets angry and he gets mad with himself. “

One quote stood out from the rest and the author of this study believes it encompasses tactics in a general sense: (You) “try to make the other person uncomfortable”.

The Game

Coaches also mentioned the need to consider the dynamic nature of game play when determining what tactics to apply: “So you try that game plan and if it doesn’t work then you have to compromise and do something else.”

McPherson’s (1993; 1999) research showed that expert tennis players were better able to analyse the game as shown by the goal, condition and action concepts they generated. This research was conducted through the use of on-court, between-point interviews. Subsequent research by McPherson’s (2000) found that elite tennis players planned strategies according to the task at hand,

using a combination of action, condition and/or goal-oriented conceptual knowledge and procedures.

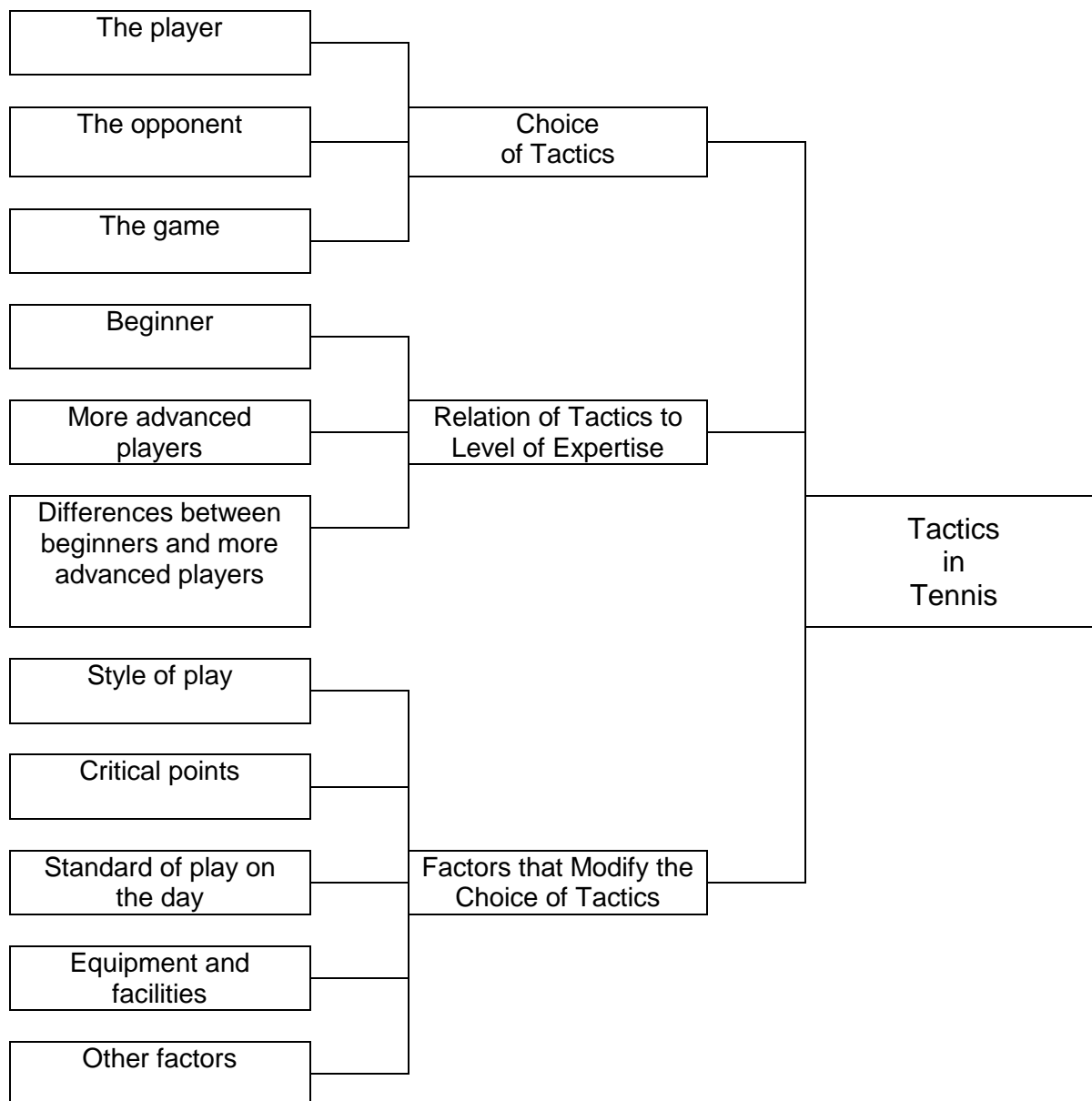


Figure 14. *The framework of general themes and themes that comprise the category Tactics in Tennis.*

Relation of Tactics to Level of Expertise

Another theme was drawn from the coaches' responses to a series of questions dealing with the use of tactics: the Relation of Tactics to Level of Expertise. Coaches differentiated between beginners and more advanced players in terms of the nature of tactics at the two different levels and also made general

statements contrasting the use of tactics by beginners versus those used by more advanced players.

Beginners

The role of tactics in the outcome of tennis matches at the beginner level did not feature significantly in the research. The coaches did not believe that tactics play a significant role in the outcome of matches at the beginner level. At the “beginner level there’s not gonna be too much difference because tactics doesn’t really play a role.” Their conception of tactics at the beginner level was simplistic and coaches mentioned consistency and patience as the important factors at this level. At the “beginner level...(the winner is) who makes the least mistakes.” “Your tactic can be not to make mistakes at the beginner level.”

There were general comments about the use of tactics at the beginner level that identified the focus on ball control, “just by hitting the ball deep” or “just trying to get the ball over the net”.

More Advanced Players

Only one coach made the comment that he believed tactics did not play much of a role in the outcome of a match because all players possess good tactics: “Tactically it is not so important for me because everybody has good tactics.” However, the other coaches interviewed believed that tactics had some role to play in the outcome of a tennis match. “The tactical side is very, very important” commented one coach and “Players that are tactically strong generally have done better in events” observed another coach.

Comments were also made with regards to the importance of tactical ball control at the more advance level because you “can’t just hit the ball deep because players are moving better.” “Moving your player around a lot” was identified as a tactic and hitting so you “can open up the court by using angles.” “Opening up the court” was identified as a primary tactical objective.

McPherson’s (1999) analysis of beginners and more advanced tennis players during competition revealed that experts were more aggressive in their

play than those who possessed less skill. This quality was not mentioned by any of the coaches during their interviews.

Difference between Beginners and More Advanced Players

When the coaches were asked to describe the differences in tactics they see between beginners and more advanced players, they all referred to the way the players controlled the ball. It's "just the way they hit the ball" and (its) "how they are using the ball."

These comments corroborate the research by Nielsen and McPherson (2001) who revealed that professional tennis players executed forceful shots better than novices. They also found that experts had more control over their shots and made better tactical choices in shot selection.

Factors that Modify the Choice of Tactics

The coaches also mentioned a number of factors that they felt would modify a player's choice of tactics. These factors included Styles of Play, Critical Points, Standard of Play on the Day, Equipment and Facilities and a general theme labeled Other Factors.

Styles of Play

This will depend on the skills that the player possesses as well as the ability to apply these skills. In this section the coaches described desirable states required in the style of play:

(At the) "national/international level (you must be) aggressive in what you do"

(At the) "national/international level they hit shots that are percentage"

"You wait for the short ball (so that you can attack)"

The coaches suggested varying styles that they believed would lead to expert performance, such as "basically solid all rounder" and a player who could "attack well." They also mentioned trends in the style of play that have taken place in recent years:

“Moving to the net and serve and volleyers are coming up.”

“More percentage play.”

“Volleying comes back into it.”

They also noted some trends that they believed may take place in the future, including the belief that “there won’t be space for people who can’t hit every shot in the book.”

Critical Points

Some of the coaches noted the role that pressure may play in the implementation of tactics and skills. “It’s the thing of playing the important points well or making a double fault on a break point” (that separates experts from lesser skilled players). The capacity to execute when playing those points in the match that determine the outcome was identified as a factor that affected choice of tactics. The players who have options are those who “(under) pressure...can stay calm and (who) play on instinct...(if) their tactics are built in” (they will perform better).

The link between to psychological skills and the implementation of tactics is apparent here. This dimension of tennis was studied by O’Donoghue (2001) who showed that there was no significant difference in the proportion of points won at Grand Slam when compared by score. This shows that the best players in the world are able to win the critical points when under pressure.

Standard of Play on the Day

The standard or quality of play varies from player to player and may even change from match to match for a specific player. Some comments made by the coaches alluded to tactics that are being used during a specific match being somewhat dependant on how well or how badly the player is playing on the day. As one coach observed, (changes in tactics) “depend on the day how well they play.” Another coach had a different opinion about changing tactics on a given day, noting that players do “not necessarily tactically change something, but they will try and improve their level of play” (if they are losing). If a player is not hitting

the ball well, then some tactics may not be feasible due to the lack of ability, on the day, to execute specific shots necessary for that tactic. It would then be important for the player to realize this and adjust their tactics accordingly.

Equipment and Facilities

Technology, particularly in rackets, was regularly mentioned for having been responsible for the changes that took place in tennis over the years. “Technology has made major changes” and one coach specifically referred to the impact of “racket technology” on tactics in tennis. Other equipment was also deemed to have had an influence on how the game is currently being played. The “new beginner balls” were mentioned as well as the effect that playing surfaces have had on changes in tactics (e.g. the “court surface being faster”). In all of the comments made none of the coaches elaborated on how the changes in equipment have changed the game of tennis.

Other Factors

Comments of a general nature were made about tactics in tennis. Tactics “change according to the flow of the match” noted one coach. One response to struggling in a match was acknowledged as “Turning it around...(which) sometimes means tactically turning it around as well, not just mentally and physically.” One coach repeatedly mentioned that there was too much focus on tactics in recent years and believed that this trend would continue in the future. She felt there was “too much analysis” and that too much time was spent analysing the game and not enough playing.

Coaching Tennis

Another category emerging from the analysis of the interviews was labeled Coaching Tennis. This category was comprised of five general themes summarizing how the coaches described their beliefs about coaching and how they had learned to coach, with specific reference to the coaching of tactics. Reference was also made to what the coaches believed to be the necessary attributes of a good coach. They also provided their reasons for entering the coaching profession. The framework for this category is presented in Figure 15.

The units of meaning (quotes) that were used to produce this Figure are presented in Appendix J.

Personal Qualities of a Coach

Some of the personal characteristics required of a coach were mentioned in the interviews, including Leadership, Playing Ability and their Relationship with Players.

Leadership

The need for a coach to be able to lead their players was mentioned as being important. Simply phrased, the sentiment was that a coach must be “a good leader.”

Playing Ability

The possession of personal playing skills in tennis was mentioned as important in the coaching process. When working with more advanced level players, one coach expressed that “as the coach you’ll be playing more of the role as the player versus the other player instead of the teacher teaching the player.” Another coach took the position that “if you don’t know how to play a point yourself, you are not going to be able to teach it.”

Carter and Bloom (2003) found that six Canadian coaches all participated in sport prior to them moving into the coaching profession, thereby equipping them with the necessary playing skills to be able to coach more advanced players.

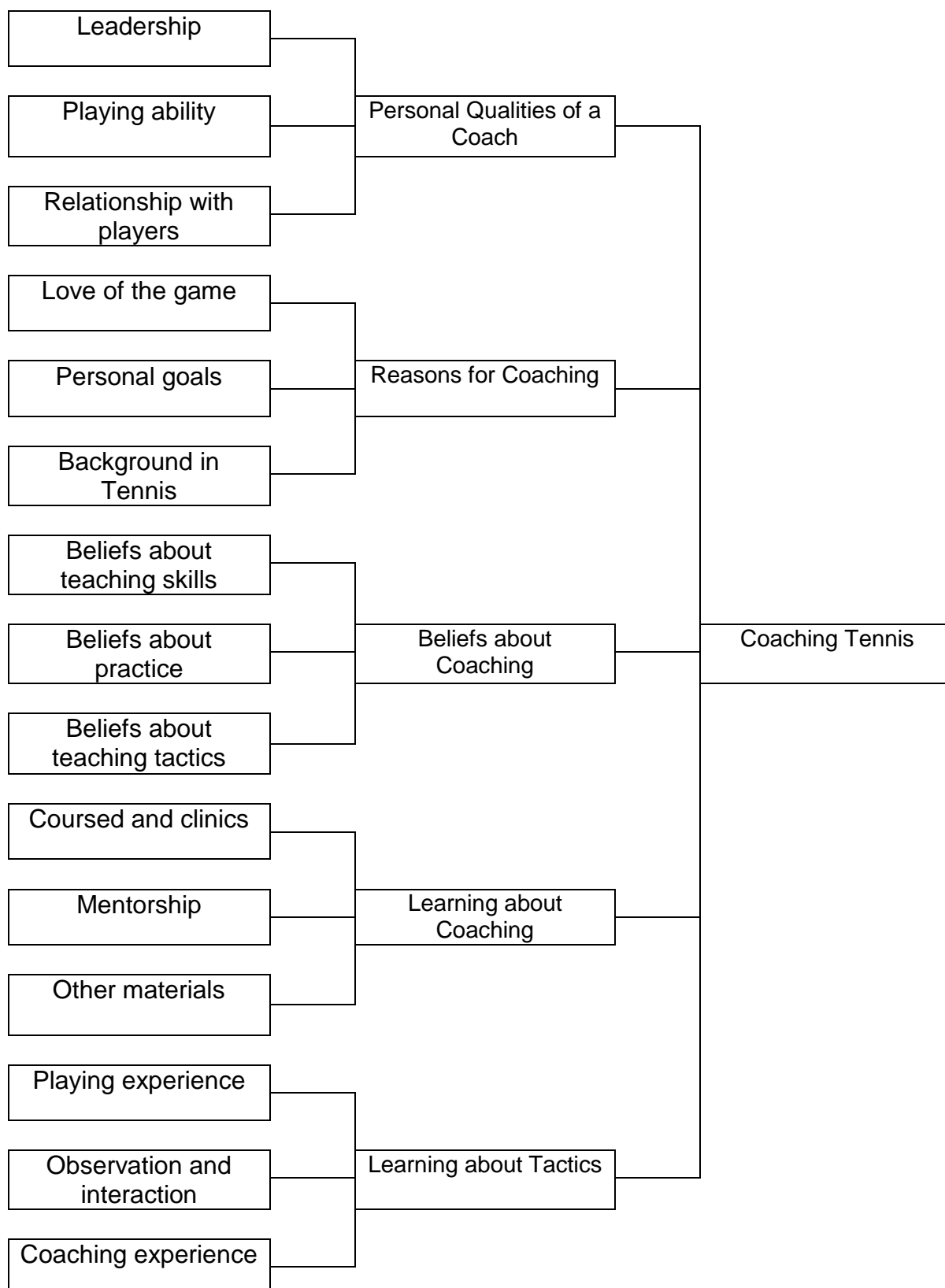


Figure 15. *The framework of general themes and themes that comprise the category Coaching Tennis.*

Relationship with Players

The coaches were most forthcoming when making comments about the nature of their relationship with players. They emphasized the importance of the relationship that exists between players and their coaches. They said that coaches “have to be patient” and “make the player feel that he can trust the coach.” A different direction was taken by one coach who suggested that a good coach “can make the player understand on their own instead of just pumping them with information”. Bloom and Salmela’s (2000) investigation into the personal characteristics of coaches revealed that communication and empathy were important factors to being a good coach.

Reasons for Coaching

When asked about why they had become coaches, each participant had an individual story that identified motivating factors. These included a Love of the Game, Personal Goals and their Background in Tennis.

Love of the Game

An affinity for the game of tennis played a pivotal role in why the interviewed coaches pursued a career in coaching:

“I have a passion for the game.”

(I started coaching) “just to stay in the game of tennis.”

“I enjoy the game and enjoy working with people.”

Personal Goals

The coaches expressed different personal goals that led them to choose coaching as a career, with one coach commenting “my goal was to have a tennis academy” and another stating that “the money was pretty good”.

Sage (1989) studied high school coaches’ entrance into their profession and found that personal characteristics and sports experiences, the desire to work

with youth and their devotion to their sport where pivotal factors in the coaches choosing that line of work.

Background in Tennis

The coaches' backgrounds in tennis also played a role in their decision to becoming coaches. One "wanted to play competitive" (tennis) but was not able to reach that goal, so coaching was his next option for staying in tennis. Another coach "used to be a professional tennis player" and coaching was a logical next step for him. Another coach described his introduction to the coaching profession as "helping my coach with smaller kids."

Beliefs about Coaching

When asked about the nature of the coaching process, the participants described their beliefs about Teaching Skills, Practice and Teaching Tactics.

Beliefs about Teaching Skills

Comments were made by the coaches that revealed their views on teaching skills. The coaching process was described that teaching skills was "individual, like the private (lesson) then you concentrate on technique." They also felt that when correcting players' skills, the players should "know why they are changing the technique." The coaches also recognised that teaching methods become more responsive as player develop: (as the players progresses in skill level) "teaching becomes more live instead of simply feeding players."

Thomas and French (1991) showed, through the use of combinations of instruction in motor skills, declarative knowledge and strategic knowledge that motor skill instruction is necessary for improvements in motor skill to occur.

Beliefs about Practice

There was consensus among the coaches that practice sessions are the key to the development of players. "Just hitting balls is a thing of the past," commented one coach. The basic beliefs they expressed regarding the content and general structure of practice sessions included:

“Working with beginner players, I would actually concentrate on one thing.”

“As soon as they get older and understand the game more then I can give more input into their game.”

“The skillful player can tend to want to vary things sooner that the less skillful player would like to do while they’re doing drills.”

“If they don’t practice it there is no ways they are going to implement it confidently in a match.”

Baker *et al.* (2003) examined the practice activities of expert decision makers and found that competition and organized training were important activities during practice sessions.

Beliefs about Teaching Tactics

The coaches shared various ideas about how they believed tactics should be taught. There was the recognition that players “learn from experience on where to hit and how to hit and to exploit.” They suggested:

“First teach the player where to hit it and then how to hit it.”

(I see) “a tactic as an understanding of the game and if you have that understanding I think you can start working on the technique, within that situation.”

“In your group (lesson) you concentrate on tactics.”

Gubacs-Collins (2007) found that teaching tennis using a tactical approach led to an improvement in tactical knowledge.

Learning about Coaching

In order to perform well in any profession it is necessary for the person to learn about that profession. There were various ways that participants had learned about coaching.

Courses and Clinics

Formal qualifications were one source of knowledge. The courses organized by the national tennis federation were identified, for example, a coach said he had learned about coaching from “the courses I have done.” Another coach said “You learn a lot of tactics from the ITF level 1.”

Côté and Hay (2002) believed that advanced coaching qualifications were important during the later stages of development of an athlete’s career.

Mentorships

Mentoring is the process by which coaches learn from more experienced coaches. Bloom *et al.* (1998) stressed the importance of mentorships in coaches’ and athletes’ development. The coaches interviewed had differing views on the existence of mentorships in South Africa. “I don’t think there are mentorships” remarked one coach. Another coach said it was “nice to interact or just listen to guys who obviously know a hell of a lot more than I do.” One coach referred to her role as a mentor and emphasized that “my students are very welcome to work with me, practice, get little jobs at the schools”. There was also one coach who may have had a different conception about the nature of mentorships. After identifying mentorships as a way of improving coaching skills, he concluded “if you’ve got a system where you can pass (players) on and you’re happy to pass them on, I think that interaction can be good.”

Other Materials

There are various kinds of materials available to coaches to supplement the courses and clinics they attend. However, the coaches in this study seemed to have access to these materials: “I don’t think there is enough access to DVDs and books.” The lack of access may also be a choice for two of the coaches. One remarked that “if you look at the manuals, there is very little on tactics” and another one observed that “they come out with the themes and I don’t think there is enough substance for the learner coach.”

Nelson *et al.* (2006) categorized the various methods used in coaching education according to formal sources (coaching certificates and university

degrees), informal sources (mentoring and experiences as an athlete) and non-formal (coaching workshops and conferences). Research by Erickson *et al.* (2007) into the development of sport coaches showed that experience as an athlete in their sport as well as mentorships were important in that development. In his research into the sources of knowledge of swimming coaches, Lynn (2007) found that mentoring, experience and trial and error were the most common sources, while other coaches and courses followed them and sources used to develop knowledge.

Learning about Tactics

The fourth important theme evolving from the analysis of the interview transcripts referred to how the coaches thought they had learned about tactics. Three methods were identified: Through Playing, Observation and Interaction and through Coaching Experience.

Through Playing

Some of the comments made by the coaches emphasized the need to play matches in order to learn tactics. "I played more matches when I was junior level than I was training"; "You just played"; "as a player, one does pick it up". It appeared that very little assistance in the learning of tactics was provided by their coaches during their playing days. "I didn't learn tactics almost at all from coaches"; "doesn't have an impact on me for tennis specifically that we were great on tactics", although one coach did receive some guidance "coach helped me a lot".

Observation and Interaction

Interaction with other coaches as well as watching tennis, either live or on television, were ways in which the coaches think they learned tactics. "I think you can almost learn as much by watching a lot of matches as compared to by playing them." Other comments included (I learned by) "listening, talking, reading, watching, by talking to other coaches" and by "reading and watching good play."

Coaching Experience

Limited reference was made to the learning of tactics through their coaching experiences. The comments were a bit vague as one coach described that his experience as a coach has led him to be able to “Seeing (tactics) from another player’s perspective which is the player that you are coaching.” “I learn a lot of tactics if I’m working with other people (colleagues and other coaches)”, commented another coach.

The methods the coaches used by coaches to learn about tactics agrees with the research of Nelson *et al.* (2006) who found that informal, self-directed methods of learning such as videos, internet sources and mentorships were higher impact activities than formal and non-formal learning activities.

The South African Situation

The framework of general themes and themes that were categorised as comments about the current South African Situation, are presented in Figure 16. The units of meaning (quotes) that were used to produce this Figure are presented in Appendix K. The first general theme dealt with the coaches’ perceptions of the current infrastructure that supports tennis in South Africa, and the second general theme identified a collection of themes that compared the situation in South Africa to their perceptions of what is happening in the rest of the world.

Infrastructure

Comments about Facilities, Finances, Travel and Competition and Coaching Education were considered reflections of the coach’s perceptions about the infrastructure supporting tennis in South Africa

Facilities

The coaches were reasonably satisfied with the tennis facilities in South Africa, although it was mentioned that the lack of clay courts is an issue, which was quite directly stated by one coach: “(we) don’t have any clay courts.”

Finances

The coaches believed that parents play too powerful a role in the development of tennis players in South Africa. They did acknowledge that the fact that they are the primary source of financial support for that development leads them to expect such influence: “They’re the ones that pay the bills so it automatically gives them a say.”

Comments were made about the financial challenges facing the national organizing body for South African tennis. As one coach reported, “They don’t actually have the funds to guide players and give them careers and push them into careers.” Another coach identified the challenge of finding sponsorships, stating “we don’t have money so we can’t have a lot of sponsorships.”

Travel and Competition

The lack of travelling opportunities and professional level tournaments is deemed as a potential problem in the quest for delivering professional tennis players from South Africa. There is a “lack of competitive tournaments – not enough competitive tournaments” was expressed. One coach concluded that “I don’t think the juniors travel enough.”

Some suggestions were provided by the coaches regarding how South Africa could produce more professional tennis players. Support for player development and for travel were mentioned as important in this regard. There was one coach who was adamant in his support for the re-introduction of the “older system that was in place with a South African squad that travelled, week in week out to compete (using) South Africa as a base where (players) travel for 1 month overseas and one month back for training.”

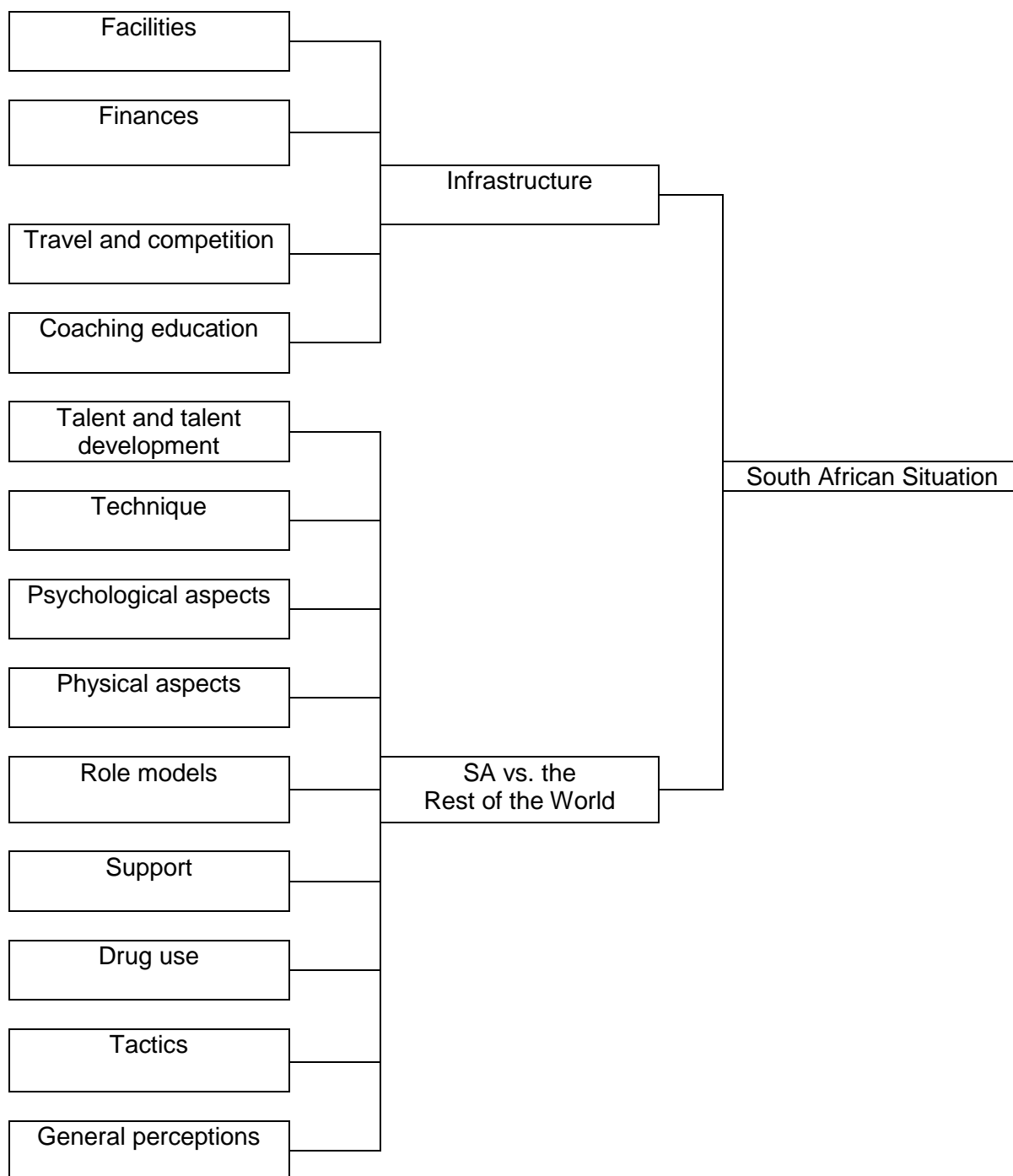


Figure 16. *The framework of general themes and themes that comprise the category South African Situation.*

Coaching Education

The coaches seemed to be positive with regards to the quality of coaches in South Africa: “(we have) “some of the most knowledgeable people in South Africa coaching wise.” They also were generally positive about the changes that have been introduced in the tennis coaching education system in South Africa:

“I think we’re gonna see the benefits of those coaching courses in the next 10 years.”

“The ITF coaching course now it was a good switch from the old system.”

“That’s just opening it up (opportunities to interact at coaching workshops).”

However, practical aspects surrounding the delivery of coaching education were deemed to be an issue. This included the difficulties finding opportunities to participate in the coaching courses. The “timing of the courses is a bit awkward” remarked one coach and “getting all the people to present the course is just a little bit tough.” Another coach expressed one concern about the quality of the courses. She felt that “Content-wise, they’re shuffling around.” By this the coach was alluding to the fact that the content of the coaching courses were constantly changing, making it difficult to understand what was relevant to coaching and what was not.

South Africa vs. the Rest of the World

The second theme that emerged was that of the situation in South Africa compared to the coaches’ perceptions of tennis in the rest of the world.

Talent and Talent Development

There was a general consensus among the coaches that South Africa has the same amount or more tennis talent than the rest of the world: “Talent - we have more than most” and “they (the South African players) have got talent.” However, they also expressed concern that the methods by which this talent is developed are not up to international standards.

“Systems...parent driven and not nationally driven.”

“Professional tournaments (are needed to develop this talent).”

One coach commented that although there was tennis talent in South Africa, that “rugby, cricket – they take all the good athletes.” He attributed this perceived drain of talent to his belief that “the systems are running smoothly” in those sports.

Technique

There did not seem to be any issues with regards to the technical abilities of South African players when compared to the rest of the world. “Technique - we’re actually pretty good.”

Psychological Aspects

There were doubts expressed that South African tennis players are “mentally behind the rest of the world.” As one coach summarized, “One thing is missing...the mental side of things.” Still another coach felt that “mentally. they (the international players) are just there.”

Physical Aspects

A few comments were made about how the South African girls and women are behind the rest of the world in terms of physical characteristics. In terms of “Physical ability - we have fallen behind (the rest of the world) a bit, I think, especially the girls”. One coach was of the opinion that “The girls (overseas) are a little bigger and they are physically way stronger than us.”

Role Models

One coach went into depth about his belief that the lack of role models for South Africa’s up and coming juniors is potentially a limiting factor in the development of professional tennis players. “They have nobody’s footsteps to follow.” He concluded, “the players - they understand everything (about the game and how it is played) but the bridge in between will be the professional players to see and to learn from.” He also stated that there was an advantage for the

“overseas juniors, because they spend time at academies where professionals train.”

Support

Some of the coaches commented that there was a difference in the amount of backing that the South African’s received compared to that received by international tennis players. “The backing is very different” said one coach, who went on to note that “the whole package they get is just different.” None of the coaches added much detail to provide insight into the exact nature of the “package,” but it was clearly more than a financial concept. Mental skills training, fitness, technology support, and media involvement were all mentioned.

Drug Use

One coach mentioned the possibility that some international players may be engaged in drug use, which he believed not to be happening in South Africa. His perception was that there are “illegal substances possibly taken overseas which we don’t really do in South Africa”.

Tactics

The coaches were split with regards to the tactical proficiency of South African’s versus the rest of the world. On the negative side, one coach said “I don’t think too many of the youngsters spend a lot of time gaining knowledge, general knowledge about the game of tennis...rules, etc. things.” Another coach who had felt there is a definite gap between tennis in South Africa and in the rest of the world, stated “Tactically I think we are also behind.” A third coach “I don’t see tactics (using strengths against opponents’ weaknesses)” coming through too much in South African tennis.”

On the other side, the observation that “They’ve (South African players) got great tactics” was made. The conclusion of another coach was that “He understands the game just as well and he is just as good.”

General Perception

With regards to the general perceptions about tennis, two negative directions in thinking were evident.

“Practice methods are not as intense.”

“Financially it’s a very different situation.”

Summary of the Interviews

Tennis players need to have certain abilities in order to succeed at the highest level. The coaches involved in the study recommended certain qualities that an elite tennis player needs to have to in order to be successful. These qualities were broken down into cognitive aspects, psychological aspects, physical aspects and skill aspects. The coaches mentioned numerous subdivisions in these aspects that were of importance to elite level play.

The coaches mentioned the how tactics fits into the game of tennis. They noted there was a certain analysis needed before choosing specific tactics. These factors were issues regarding the player themselves, the opponent as well as the game and the situations created during play. Differentiation was also made with regards to the level of play and how this affected the tactical responses of players. The role, characteristics and use of tactics was discussed for beginners and more advanced players and differentiation was also made between the two levels. The coaches commented on the factors that affected the choice of tactics during competition. These factors were the style of play that the player used, the pressure of a certain situation during the competition, the standard of play on the day, equipment and facilities as well as other general factors.

In the interview process the coaches also spoke about the coaching process. The qualities that the coach needs to have was not discussed in excessive detail, but the qualities mentioned were leadership, playing ability and the relationship with the player. The reasons why the coaches got into their profession centered around the love of the game, various goals and the backgrounds that they had in tennis. The coaches had certain beliefs about

coaching and specifically mentioned their beliefs about the teaching of skills, how practice should be conducted and the teaching of tactics. The coaches also learnt their skill in a variety of ways, namely through coaching courses and clinics; through limited mentorship; and also through the use of books, the internet and other materials.

Finally the situation in South Africa was discussed. The infrastructure in South Africa was compared to that of overseas countries and the general perception that the coaches had was that in terms of facilities, finances, travel and competitions and coaching education South Africa is not up to standard. When comparing the players and the support provided to them, the coaches were equivocal. With regards to talent and its development as well as technique it seems that South Africa is on par with international standards. Psychologically and physically South African players tend to be in behind that which is possessed by international players. The lack of role models and support for the players was noted as possible reasons for the lack of players making the transition to the professional level. Tactically, the coaches were split in their view of whether or not South Africa was up to the level of international players.

Chapter Six

Conclusions and Recommendations

In this chapter the researcher's emerging insights into South African tennis coaches' knowledge of tactics and their sources for learning about tactics, as well as their perceptions about tennis in South Africa with special reference to coaching tactics will be discussed. Recommendations for future study are then made.

Knowledge of Tactics

The results of the study showed that there was a significant difference in the choices of tactical options in 43 game scenarios between the less experienced and the more experienced coaches who completed the knowledge test. These differences were found predominantly in situations in which the player was in a more defensive position in a rally, rather than an offensive or neutral position. The researcher concluded that more experienced coaches may have a different understanding of tactics in tennis and read each situation in a game on its merit, while less experienced coaches may choose offensive or neutral tactical responses regardless of the probabilities afforded in each specific situation. An alternative conclusion is possible. Because the test only measured differences in choices and not the "correctness" of choices, it is possible that the more experienced coaches were reading the situations in a stereotypical way that does not reflect changes in the modern game, and that the less experienced players were making choices better suited to a generally offensive approach to game play.

The literature supports the finding of differences between novice and expert coaches based on the more sophisticated and better organised knowledge base associated with expertise. But in this study, the two groups could not be labelled novice and expert, but rather "less experienced" (< 15 yrs) and "more experienced" (≥15 years). This was a natural break in the years of experience of the coaches who participated in this study, all of whom were attending regional coaching courses. If the 10-year rule for the development of expert performance was in effect, many of the "less experienced" coaches had had the time to become

experts. However, they would have needed to engage in deliberate practice related to tennis coaching during that time in order to progress toward the expert level. Even if the more experienced coaches were found not to be experts, their group was still significantly different from the less experienced group regarding choices of tactics to apply in tennis. Why did the two groups see tennis differently?

The first democratic elections following the abolition of Apartheid in South Africa were held in 1994. It would be an understatement to say that in that year, everything in the country changed. The world before 1994 was very different from the world after 1994. Did these changes affect the development of tennis coaches in South Africa? All of the coaches in the “less experienced” group began their coaching careers after the election. In what ways could their professional development have been shaped by the new social, economic and political environment of post-Apartheid South Africa?

In the Coté and Gilbert (2009) model, athlete outcomes and coaching context are critical considerations in determining the nature of coaching. The post-Apartheid government had ambitions for the kinds of outcomes that could be delivered through sport participation. These outcomes were recently reinforced in the strategic policy document for 2009-2015 presented by the national government ministry, Sport and Recreation South Africa (SRSA). In the listing of these outcomes, no mention is made with regards to elite athlete development while mass participation is emphasised. These outcomes are aligned with the Millenium Development Goals and clearly establish sport participation as a means to impact health and economic development. Of the eight Millenium Development Goals, four have their roots in health promotion. It can be seen that there is not much of a focus from the national governing body of sport to improve the level of expertise in the country's sport.

It would be naïve to think that this kind of emphasis in the outcomes sought from national level for sport did not affect the coaching education and development experiences for the emerging generation of tennis coaches. Exactly how that emphasis affected coaching education is a matter for future research, but some insight may be available in an examination of the formal coaching education

courses offered by Tennis South Africa in 2010. Of the 32 courses and workshops offered, six were for Phase 1 of the ITF level 1 course (Instructor coach), six for Phase 2 of the ITF level 1 course (Instructor coach), none for Advanced Instructors or Professional coaches and 18 for the general movement foundation “Play and Stay” courses. This emphasis on mass sport participation is in line with SRSA’s commitment to an active nation and it demonstrates that the focus on competence in sport is not a priority in terms of government support. Going back to the Côté and Gilbert (2009) model, the coaching context is not a balanced one. The emphasis is not on the development of elite level performers, which must have an impact on the incentives to become an elite level tennis coach.

The results of this study research did not show differences in the tactical knowledge of South African coaches in terms of the level they had reached as players. It is possible that the coaches who participated in the current study met the minimal requirements for playing experience. Numerous researchers have shown that expert coaches participated in extensive hours of training and competition as players (Coté, 2006; Gilbert *et al.*, 2006). They have stated that there may be a minimal requirement for this participation as an athlete despite not having come to a consensus as to what this requirement actually is. The lack of a difference in the tactical choices of the coaches in this study may point to them having met these minimal requirements.

The level of players whom the participants in this study coached also did not make a difference in their choices of tactical responses. This is a disconcerting result because players who wish to excel at the highest levels of play need to possess a deeper and more sophisticated understanding of the game than those who participate at the lower levels. If this is the case, then their coaches should be able to provide them with leadership and facilitate player development to achieve a complex tactical understanding of situations in tennis. It would seem that there may not be sufficient tactical sophistication among the coaches of the higher level players in South Africa to help these aspiring to players develop toward elite level competition.

Sources of Learning

This study found that there were numerous sources of learning that are currently being underutilised by coaches in South Africa. One notable source was that of reflection. All of the coaches in this study valued opportunities to learn through experience. Finding a practical way extend the current traditional approach to coaching education courses to capitalise on this interest will be challenging since coaches are distributed throughout the country and transportation is at times very difficult and very expensive. Not every coach has access to easy communication via internet either. Looking in the direction of a mentoring approach is promising, but there are doubts about the number of coaches who could meet the expectations of being a valid mentor.

The lack of differences found in tactical knowledge among South African coaches who coach at different levels should be a red flag for the system of coaching education. It appears that the coaching needs of top level coaches are not addressed. A possible reason for this is the change that has taken place in the coaching education system. Currently only the ITF Level 1 coaching course is presented. The new system has not yet been in place for five years. It can be concluded there has not been enough time for the federation to implement a sequence of courses for coaches of different levels of players. Because the educational material for coaching advanced tactics is available internationally and over a five year period it could be argued that accommodation of the needs of all coaches at all levels was possible.

Recommendations

Coaching Education

The majority of the coaches in this study cited 'learned by myself' as the most frequent method by which they learned about tactics in tennis. Irwin *et al.* (2004) found that trial and error was the second most cited method by which gymnastics coaches gained knowledge, but the use of mentor coaches was deemed the most important source. It is thus of cardinal importance that the coach

be correctly educated in, amongst the other responsibilities, tactics in tennis. The coach must possess the correct tactical knowledge for all situations and the coach must know how to deliver this knowledge to the player.

For the governing body of South African tennis this would mean ensuring that there are sufficient opportunities for aspiring coaches to attend courses to continue their professional development. It is also imperative that there are more advanced courses available to those who want to coach players at the higher levels. This will help them to develop their ability as an expert coach. At the time of writing only one opportunity to attend the ITF level two coaching course had been available.

Another recommendation would be to establish a mentoring program in which the expert coaches lead those aspiring to be expert. Erickson et al. (2008) showed that coaches mentioned frequent interaction with coaching peers as a method used to gain tactical knowledge. This is not a common method used in South Africa as shown by the results of the interviews with five coaches. In order for coaches to improve their ability to coach, they need to be guided in the correct direction. Other, more experienced coaches have been through the process of professional development and have experienced pitfalls as well as success and could therefore impart their knowledge on the up-and-coming coaches. This program should include interaction with international coaches who have proven to be successful in the coaching of expert tennis players.

The use of mentors and interactive clinics would allow the learning coach to reflect on their skills (Irwin *et al.*, 2004) and facilitate further learning through experimentation. However, Knowles *et al.* (2005) found that the coaching education programmes examined in their research did not contain any form of direct teaching or cultivation of reflective skills. It would thus be a recommendation to the governing body of tennis in South Africa to ensure that this skill is accommodated in their coaching education programs.

Mitchell and Kernodle (2004) proposed a unique method for teaching tennis, using the multiple intelligence theory of Gardner (1983). This could potentially be a method that coaches could use to ensure the learning of tactics in

a more efficient nature. Eight of nine multiple intelligences (the last was not deemed applicable to movement skills) were explored in terms of implications for designing learning activities. The authors suggested that this approach could be applied to the secondary school tennis coaching and/or coaching for university basic instruction programs where inclusion of a broad spectrum of learners is common. Examples of activities associated with the eight intelligences included:

1. Verbal/linguistic: Individuals learn successfully by writing, reading, discussing materials to be learned and listening to verbal presentations. They tend to think in words rather than in pictures. Suggested methods to help with learning are having the learners write a tennis journal of strokes and strategies, completing a tennis crossword puzzle and discussing technique and tactics.
2. Visual/spatial: Individuals learn through visual stimuli. They tend to think in pictures and traditional methods of teaching use live modelling and/or video replay. Other methods that may be used are the use of visual tennis aids, mental tennis practice, the recognition of cues and self-analysis.
3. Bodily/kinesthetic: Individuals learn by interacting with the space surrounding them. Those with this form of intelligence are able to control their actions and manipulate objects with a great degree of skill. Suggestions for improving learning are shadow practice, passive and active guidance, and playing the role of the coach.
4. Naturalist: Individuals are aware of weather changes and are skilled at being able to distinguish among, classify and use features of the environment. Suggestions for learning include rating the shot, observing and recording their own serve, and establishing effective strategies for various weather conditions.
5. Musical/rhythmic: Individuals think in terms of melodies, rhythms and lyrics. They learn through music or with music playing in the background. Have them try to find a piece of music that suits their style of play or a certain part of their game. Playing music during training is also helpful.

6. Mathematical/logical: Individuals enjoy problem solving and determining outcomes. They quantify, sequence, analyse, synthesize, evaluate and apply numbers and relations well. The inclusion of drills that require creating, thinking, solving problems, analysing objects and situations.
7. Interpersonal: Individuals care about others and learn in co-operation. They will enjoy clinics and group sessions more than they would enjoy individual sessions and also enjoy being part of a team. Having them think about what it is to be on a team and the use of interviews helps these types of players with learning.
8. Intrapersonal: Individuals are in tune with their own strengths, ideals, beliefs, feelings and values. These types of players learn well when given time to reflect, process information and formulate their own ideas. They tend to prefer individual lessons and singles over group sessions and doubles. Training with a ball machine or against a wall are activities they may enjoy.

Incorporating this kind of training into the syllabus of coaching certification in South Africa could help coaches to find more innovative and productive way to develop talent amongst South African tennis players.

New Approaches to Learning Tactics

When Saviano (1999) looked at the High Performance Coaches Programme Philosophy in USA tennis, he mentioned the two most commonly used methods to develop high performance players.

- The games approach, which is a play/goal oriented method. Playing the game and simulated matches are used to teach the player. In this approach, techniques is acquired as a part of a holistic progression and the coach must break down and isolate technical instruction only when absolutely necessary and then also only for a short period.

- The traditional approach, which breaks down the technique required for individual skills and movements so as to achieve the objectives of playing the game. Players are taught how to hit the ball prior to playing the game.

Saviano (1999) stated that the traditional approach was the preferred method in the USA but that the USA Tennis Coaching Education Programme prescribed the use of the Games Approach. Recently, there has been a major shift in the USA under 10 tennis to use the Quick Start program, which is a mini-tennis format based on the games approach to teaching. This is a possible shift that South Africa could take in terms of their coaching philosophy as the Traditional Approach is also used extensively in this country.

Crespo (1999) presented the teaching methodology for tennis, describing the old and the new teaching methods.

- Old teaching method: This method attempts to adapt the player to the sport through the use of closed skills. The coach uses a command style based on teaching technique with a focus on projecting skills. The players learn in the same manner with no attention given to the stages of learning. Drills and technical mastery are the focus of this method and the coach applies one method to all players with correction of the model the norm. Tactics are only introduced once the player possesses the necessary skills.
- New teaching method: This method attempts to adapt the sport to the player through the use of open skills. Discovery styles are used by the coach through teaching situations and focusing on both reception and projection skills. The stages of learning are respected and players learn differently to the next. This is a games based approach and the tactical goal is first answered prior to the technical goal that makes the achievement of the tactical goal possible.

This follows the line of Saviano's (1999) recommendation, thereby giving more support to the possibility of an examination of the coaching methodologies used in South Africa. Pankhurst (1999) provided specific support for game-based coaching, explaining that tennis is a game that revolves around tactics,

understanding what to do and how to make use of the playing area. This approach allows the players to learn tactics first and then to understand that in order to improve their level of play, that technical development is necessary to achieve the tactical goals.

Future Research

Due to the narrow scope of the current study, there is much room for research to complement and supplement the findings of this study.

Recommendations for future research include:

- A larger sample group of coaches could be taken and the research could be reproduced, in its entirety, in all the regions of South Africa. Comparisons amongst regions could be done to ascertain whether the findings of the current study are isolated to the specific region in which the research took place.
- The research could be reproduced internationally and compared with the results of the South African coaches to discover if there is a discrepancy in the knowledge of tactics between South African and international coaches.
- The research also needs to be extended to players both locally in South Africa and internationally. This will help to show whether or not South African players differ in their understanding of tactics when compared to international players of the same age and level. Comparisons could also be done between the genders to establish if tactical knowledge for males differs to that needed for female tennis. The results of this research could then be compared to that of the coaches to determine if the coaches are able to transfer their knowledge to their players.
- A possible adaptation could be made to the research method by changing the surface on which the scenarios take place. It would be recommended to keep testing for different surfaces separate in order to prevent overlap of ideas.

- Further investigation is recommended into the nature of the coaching contexts in which any coach or group of coaches operate. This type of information will also have the effect of broadening the scope of the Côté and Gilbert (2009) model.

A Closing Thought

The assessment of coaches' knowledge of tactics was an extraordinarily challenging task. This research has contributed to the study of tactical knowledge and tactical thinking through the development of a unique written test which provided a specific method for assessing and then comparing the tactical knowledge of tennis coaches. The analysis of the results of this study also posed a challenge to the Côté and Gilbert (2009) model to explore more closely the larger social and cultural contexts in which coaches operate as a variable in their coaching behaviour.

There is a tremendous amount of work to be done in this area, however, it would be made more manageable if there were progressions in tactical knowledge in tennis available as a reference. The application of tactics by players is the key to their progress toward the elite level and until they have access to coaches whose expertise can guide them, South African tennis must not be surprised that aspiring juniors continue to look for opportunities to develop their game in other countries.

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Appendix A

Explanation the Purpose of Strategic Themes

1. Play consistent percentages: A simple plan to reduce the number of unforced errors committed by playing
2. Know the zones: This uses the analogy of a traffic light. Red represents the baseline area and safe, consistent play is recommended. The yellow zone represents the mid-court and proceeding through and approaching the net is recommended. The green zone represents the forecourt and it is recommended to try to finish the point from here.
3. Understand target areas: These are certain areas on the court that result in certain areas to which the ball may be played. They include: the closer to the net, the greater the angle that can be produced; height equals depth; safeline – an imaginary alley inside the sideline to use for approach shots; and safespots – predetermined target areas based on the situation in the point.
4. Limit direction changes: The probability of committing errors is augmented when attempting to hit a deep crosscourt ball down the line.
5. Center the ball: This limits the angles the opponent can generate.
6. Attack the short ball: Approach the net to your opponent's weaker side. Also use the safeline to get close to the net.
7. 1, 2 Sequence: Emphasis here is placed on winning the point with the second shot and using the first shot to set the winner up.
8. Defensive; Neutral; Offensive: When playing from the baseline, use the position relative to the baseline to dictate how you play: behind the baseline – defensive, on the baseline- neutral and inside the baseline – offensive.
9. Hold the line: On low volleys at the net, the best option is to hit down the line using the safeline.
10. Change gears: Used to change rhythm and tactics through the use of: more or less topspin, slice backhands, more height over the net, taking your time between points, staying on the baseline longer, varying the pace of your shots, attack very short balls and use your first serve as if it was your second serve.

Appendix B

Code Number: _____

Tactics of Tennis Test

Confidential
Participant Information Form

Personal Information		
Name:	Date:	
Gender: M F	Contact address:	
Age:		
Phone:		
Tennis Background		
How would you describe yourself now?	reyalp sinneT ¹	hcaoc sinneT ¹
Total Years involved in Tennis:	Total years involved in tennis as a player:	
	Total years involved in tennis as a coach:	
Current Level of Tennis		
If you are a player (check one box only)	(lanoiger) etaidemretnI ¹	(lanoitanretni) etilE ¹
	(lanoitan) dechnavdA ¹	lanoisseforP ¹
If you are a player (check one box only)	Aggressive Baseline	Serve and Volleyer
	Counterpuncher	All Courter
If you are a coach , check the highest level of the player(s) whom you coach.	(lanoiger) etaidemretnI ¹	(lanoitanretni) etilE ¹
	(lanoitan) dechnavdA ¹	lanoisseforP ¹
Sources of Knowledge about the Tactics of Tennis		
How did you gain your knowledge about the tactics of tennis? (check as many boxes as apply to you)		
.(rorre & lairt) flesym yb denraeL ¹	ot scitcat denialpxe sehcaoc ¹ me during practice.	htiw scitcat tuoba gniklaT ¹ other players
¹ Books, magazines and other written material about tennis	rehto dna soediv ,s'DVD ¹ visual material about tennis	tenretnI ¹
scinilc/spohskrow sinnet lareneG ¹	gnihcaoc sinnet lamroF ¹ education courses	ro sesruoc ecneicS tropS ¹ other formal education courses.
What was the most effective way for you to learn the tactics of tennis?		

Code Number: _____

Tactics of Tennis

The following questionnaire describes game situations that occur during a tennis match. Please read through each of the scenarios and indicate what you think are the BEST 3 options from the list provided by ranking them in order from 1 (your first choice) to 3 (your third choice).

The format for each scenario is presented as a description accompanied by a diagram. Only the last three actions of the ball are marked on the grid. The diagram would be too confusing if all actions of the ball were marked. If there are more than three actions on a ball, the written description is provided, but shaded in grey. If a description is shaded in grey, you will not find those actions illustrated with arrows in the diagram. The following is an example:

Description of the match situation:					
Your opponent is serving in the 2 nd set (1-0 in your favour).					
Score in this set 4-3.					
Score 15-30 in this game.					
Opponent: All-courter.					
Description of the specific situation:					
Your opponent hits a body serve (intersection of 23 and 26).					
You return with a backhand slice to 16. Your opponent hits a forehand to 10. You hit to 15. Your opponent hits an approach shot to 27 that you contact at 32. You hit to 26 and your opponent volleys to 9. You contact the ball at 8.					
Optional responses from which to choose:					
Rate your 1 st , 2 nd and 3 rd choices for hitting your shot.					
<input type="checkbox"/>	Attempt forehand pass down the line (27/28)				
<input type="checkbox"/>	Topspin lob to 28				
<input type="checkbox"/>	Attempt pass to 12				
<input type="checkbox"/>	Dipping shot to feet in 12				
<input type="checkbox"/>	Dipping shot to feet in 25				
<input type="checkbox"/>	Defensive lob to 21				

6	7	18	19	30	31
5	8	17	20	29	32
4	9	16	21	28	33
3	10	15	22	27	34
2	11	14	23	26	35
1	12	13	24	25	36
36	25	24	13	12	1
35	26	23	14	11	2
34	27	22	15	10	3
33	28	21	16	9	4
32	29	20	17	8	5
31	30	19	18	7	6





Your side of the net.

The tennis court is marked with a grid numbered 1-36 on your side of the net and 1-36 on your opponent's side of the net. This is to allow specific reference to where on the court the ball is hit or should be hit, where you are standing, etc.

The actions of the ball are indicated by arrows.

- A solid line indicates the flight of the ball before it bounces. →
- A dotted line indicates the flight of the ball after it bounces.
- **Red indicates your opponent's shots** and **blue indicates your shots.**
- **A black dotted line indicates specific court movements of a player.**

To help you follow the sequence of shots, the grid position from which

-  Your final shot is taken is highlighted in solid blue
-  Your opponent's last shot is taken is highlighted in pink
-  Your second last shot is highlighted in shaded blue.
-  If applicable, your opponent's second last shot is highlighted in shaded pink.

To help you consider your selection of options for your shot, the choices have been **highlighted in light green**, and the corresponding spots on the grid have been similarly highlighted. You indicate your choices by writing in the empty blocks:

	Attempt forehand pass down the line (27/28)
1	Topspin lob to 28
	Attempt pass to 12
3	Dipping shot to feet in 12
2	Dipping shot to feet in 25
	Defensive lob to 21

Basic Assumptions when ranking your choices:

1. All matches take place on a hard court and are best of 3 tiebreaker sets.
2. The wind is not blowing and the sun has no effect on either player.
3. Your opponent is right-handed unless specifically stated that he/she is left-handed.
4. In all situations, your opponent hits a topspin drive of rally speed on all shots, not attempting to force the issue/point, unless otherwise stated.
5. Unless stated otherwise, assume all first serves are hit hard and flat. All second serves are hit with topspin.
6. Your opponent remains on the baseline unless stated otherwise.
7. Your opponent will play with one of the following game styles:
 - Serve and Volleyer.
 - Aggressive baseliner.
 - Counter-puncher.
 - All-courter.

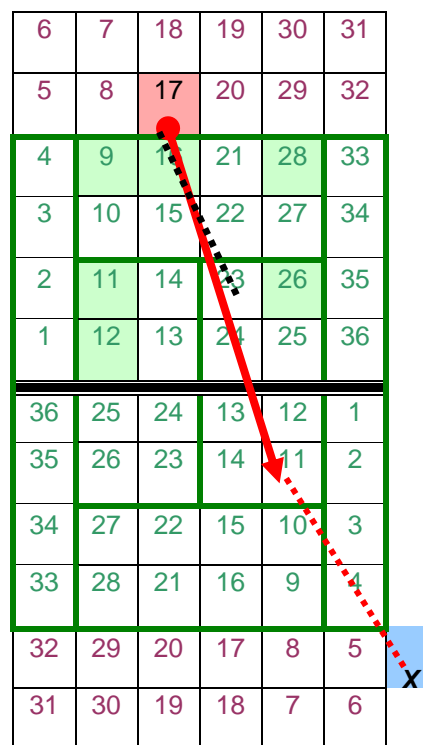
Please respond to all situations by ranking your choices. All shots listed as options are viable choices. The purpose of this survey is to determine which options you think are optimal for an all-courter.

1. Your opponent is serving in the 1st set.
 Score in this set 3-3.
 Score 30-30 in this game.
 Opponent: Serve-and-volleyer.”

Opponent’s first serve is wide to 11, and you contact the ball from outside of 5.

Rate your 1st, 2nd and 3rd choices for the return you want to hit?

<input type="checkbox"/>	Attempt winner to 28
<input type="checkbox"/>	Hit to 26
<input type="checkbox"/>	Hit down the middle to opponent’s feet at 16
<input type="checkbox"/>	Lob to 9
<input type="checkbox"/>	Hit to 11
<input type="checkbox"/>	Hit to 12



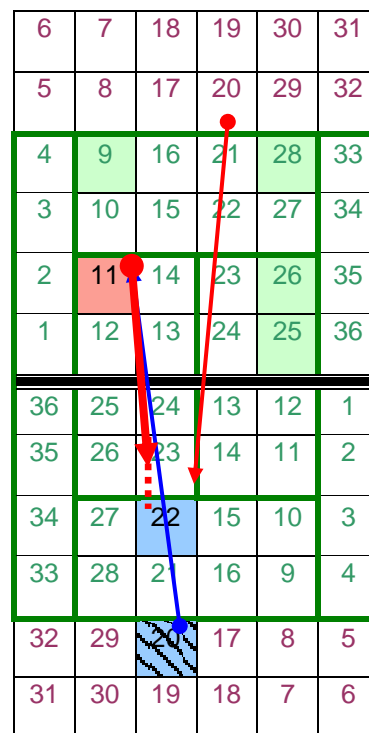
Your side of the net.

2. Your opponent is serving in the 2nd set
 (1-0 in your favour).
 Score in this set 5-5.
 Score 15-30 in this game.
 Opponent: “Serve and Volleyer.”

Your opponent hits a second serve to 23. You contact at 20 and hit an aggressive return to 11. Your opponent contacts at 11 and hits a weak, floating volley that lands in 23 that you contact at 22.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Hit backhand to 26
<input type="checkbox"/>	Hit forehand to 26
<input type="checkbox"/>	Hit forehand to 11
<input type="checkbox"/>	Hit backhand to 25
<input type="checkbox"/>	Offensive lob to 28
<input type="checkbox"/>	Hit down the line to 9



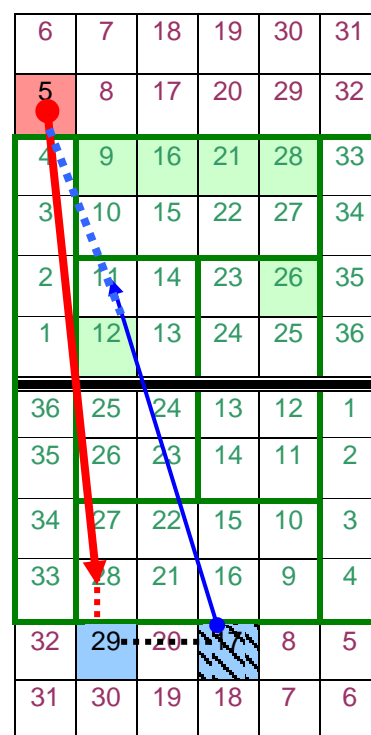
Your side of the net.

3. You are serving in the 2nd set (1-0 in your favour).
 Score in this set 1-3.
 Score 40-15 in this game.
 Opponent: "Aggressive baseliner."

You hit a first serve to 11. Your opponent contacts the ball in 5 and hits an aggressive return to 28 which lands on the baseline that you contact at 29.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Hit ball down the line to 9
- Slice to 28
- Drive to 28
- Short cross-court to 26
- Hit ball high and down the middle of the court (16/21)
- Drop shot to 12



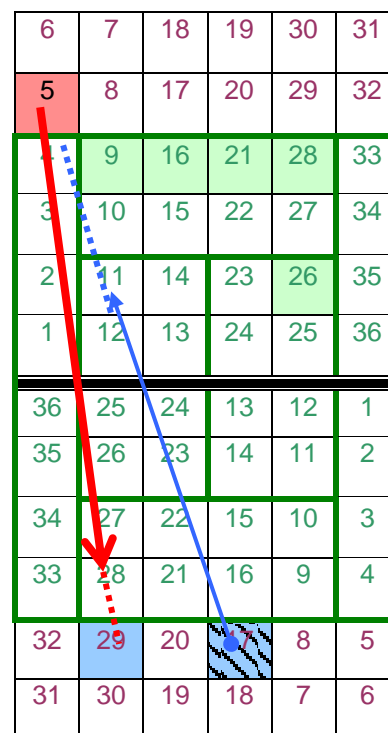
Your side of the net.

4. You are serving in the 3rd set (score tied 1-1).
 Score in this set 5-5.
 Score 30-30 in this game.
 Opponent: "Counter-puncher."

You hit your first serve to 11, your opponent returns to 28, and you contact the ball at 29.

Rate your 1st, 2nd and 3rd choices for hitting your next shot.

- High and deep to 28
- Aggressive shot to 28
- Aggressive shot to 9
- Deep down the middle (16/21)
- Crosscourt to 26
- Slice to 28



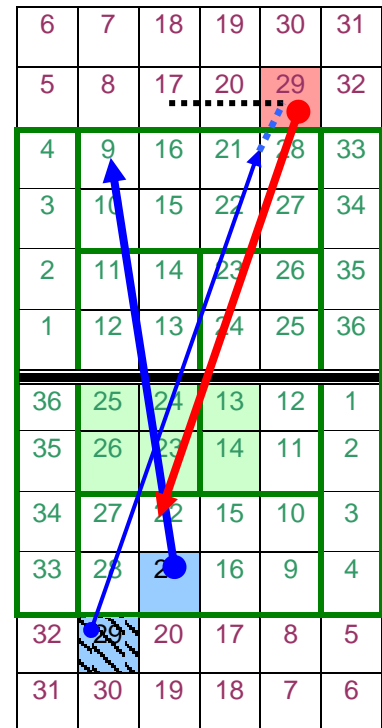
Your side of the net.

5. You are serving in the 2nd set (1-0 in favour of your opponent).
 Score in this set 2-3.
 Score 30-30 in this game.
 Opponent: "Aggressive baseliner."

You hit a second serve to 14. Your opponent hits hard to 16. You hit to 15. Your opponent hits to 16. You hit to 15. Your opponent hits an aggressive shot to 28. You slice to 28. Your opponent contacts at 29 and slices to 22. You contact the ball at 21 and hit a backhand approach to 9.

Rate your 1st, 2nd and 3rd choices for the optimal place to move on the court.

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Move to 23 and cover the line |
| <input type="checkbox"/> | Stay on service line at intersect of 23 and 14 |
| <input type="checkbox"/> | Get as close to the net as possible on the centre line (24/13) |
| <input type="checkbox"/> | Move to 26 to cover the line |
| <input type="checkbox"/> | Move to 25 to cover the line |
| <input type="checkbox"/> | Move to middle of 24 |



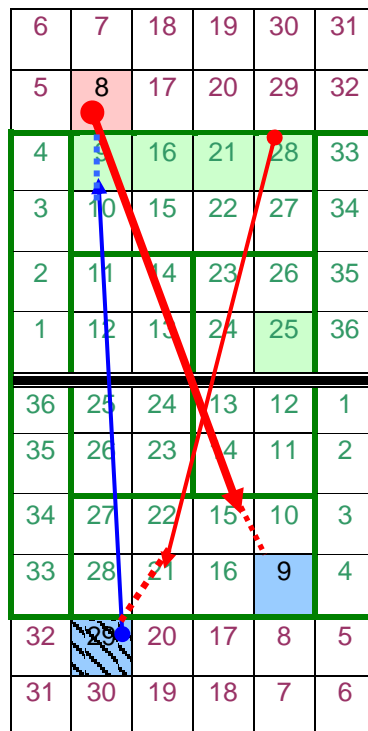
Your side of the net.

6. You are serving in the 2nd set (1-0 in your favour). The score in this set is 2-2. The score is 15-15 in this game. Opponent: "Counter-puncher."

Your serve to 14. Your opponent slices to 22. You hit to 21. Your opponent hits to 22. You hit to 21. Your opponent hits to 21. You hit to 28. Your opponent hits to 21. You make contact at 29 and hit to 9. Your opponent makes contact at 8 and hits to 15. You contact the ball at 9.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand approach to 28
- Forehand to 11
- Forehand to 9
- Forehand to 28
- Forehand down the middle (16/21)
- Drop shot to 25



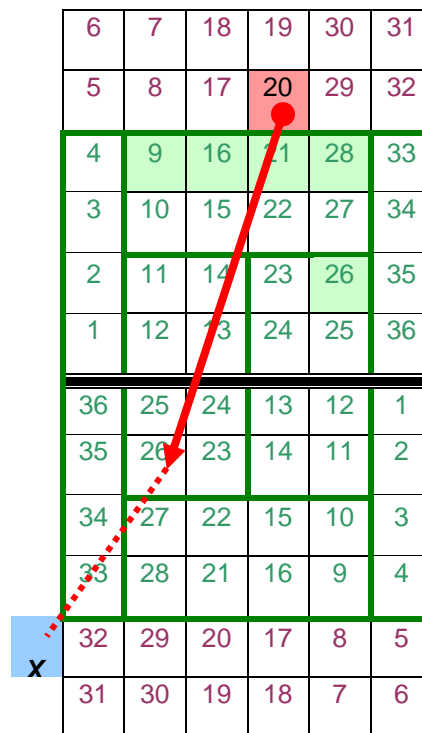
Your side of the net.

7. Your opponent is serving in the 1st set. Score in this set 3-4. Score 30-40 in this game. Opponent: "Aggressive baseliner."

Opponent's second serve is to 26, and you contact the ball at shoulder height just outside of 32.

Rate your 1st, 2nd and 3rd choices for the return you want to hit?

- Aim high over the net and hit to 28
- Aggressive return to 9
- High and deep down the middle of the court (16/21)
- Slice to 26
- Drive to 26
- Slice to 28



Your side of the net.

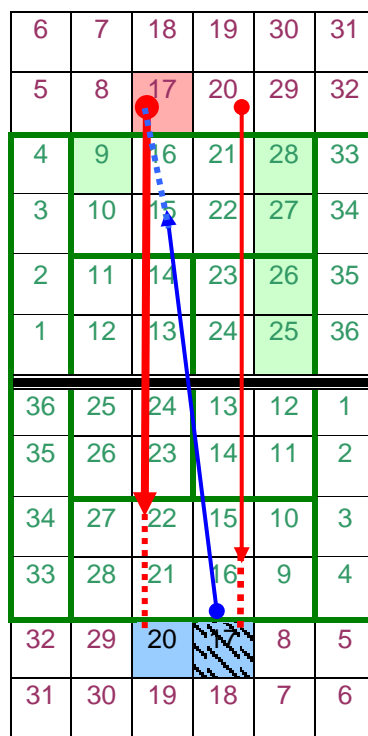
8. Your opponent is serving in the third set (score is tied at 1-1).

Score in this set 3-2.
 Score 0-30 in this game.
 Opponent: "All-courter."

Your opponent serves to 14. You return to 22 with a slice. Your opponent hits to 27. You hit to 28. Your opponent hits to 22. You hit a forehand to 22. Your opponent hits a forehand to 16 that you contact at 17. You hit to 15. Your opponent contacts the ball at 17 and hits to 22. You contact the ball at 20.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Backhand to 9
- Forehand to 27
- Drop shot 25
- Forehand to 9
- Backhand to 28
- Backhand to 26



Your side of the net.

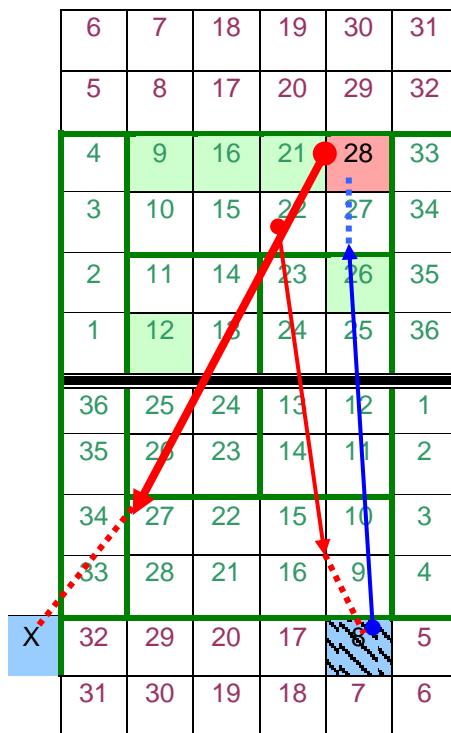
9. Your opponent is serving in the 2nd set (1-0 in opponent's favour).

Score in this set 4-2.
 Score 30-40 in this game.
 Opponent: "Aggressive Baseline."

Your opponent hits a first serve to 26. You return to 22. Your opponent hits a forcing forehand to 9. You contact it at 8 and hit to 27. Your opponent contacts it at 28 and hits a forcing shot to your 27. You are in outside the tramlines next to 32 when you contact the ball.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Backhand crosscourt to 26
- Backhand to 28
- Backhand down the line to 9
- Slice backhand to 28
- Drop shot to 12
- Backhand down the middle of the court (16/21)



Your side of the net.

10. You are serving in the 2nd set (1-0 in your opponent's favour)

Score in this set 4-4.

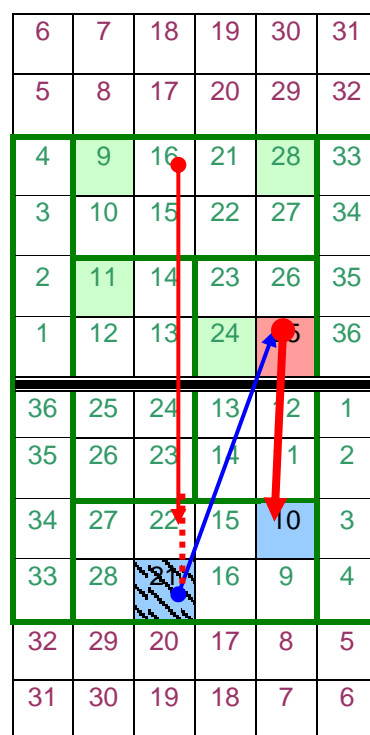
Score 30-30 in this game.

Opponent: "Serve and Volleyer."

You hit a second serve to 14. Your opponent hits a slice approach shot to 22. You hit a dipping shot to 25. Your opponent hits a weak, floating volley that lands in 10. You contact the ball at shoulder height.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Offensive lob to 9
<input type="checkbox"/>	Attempt winner to 28
<input type="checkbox"/>	Attempt winner to 11
<input type="checkbox"/>	Hit straight at opponent (24)
<input type="checkbox"/>	Forehand to 25
<input type="checkbox"/>	Offensive lob to 28



Your side of the net.

11. Your opponent is serving in the 2nd set (1-0 in your opponent's favour).

Score in this set 2-2.

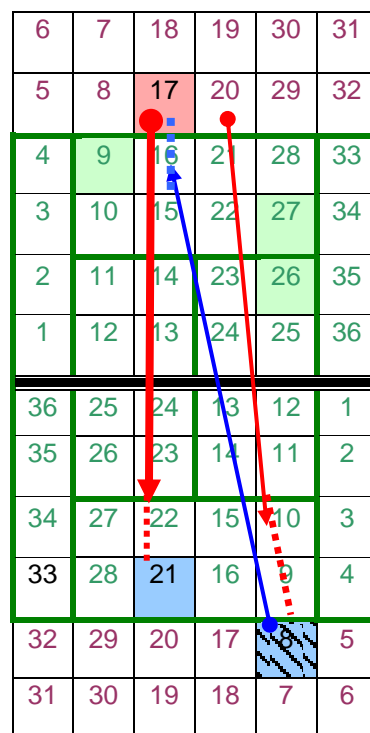
Score 15-15 in this game.

Opponent: "Aggressive baseliner."

Your opponent serves to 11. You return to 22. Your opponent hits to 28. You hit to 21. Your opponent hits a forehand to 10 that you contact at 8. You hit to 16 and your opponent contacts at 17 and hits to 22. You contact the ball at 21.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Aggressive Forehand to 27
<input type="checkbox"/>	Backhand down the line to 9
<input type="checkbox"/>	Backhand crosscourt to 27
<input type="checkbox"/>	Slice backhand approach to 9
<input type="checkbox"/>	Backhand down the middle (16/21)
<input type="checkbox"/>	Backhand to 26



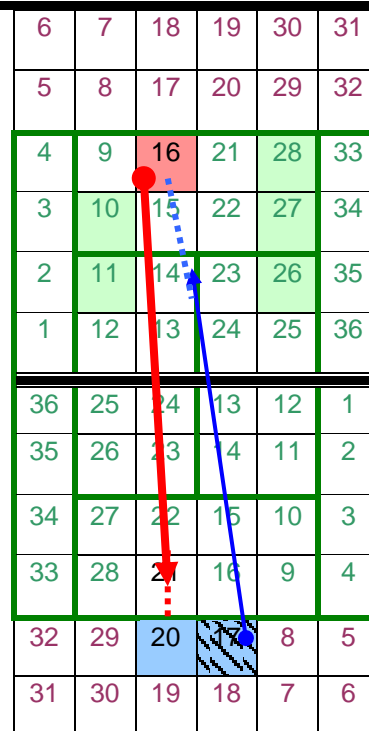
Your side of the net.

12. You are serving in the 1st set.
 Score in this set 4-4.
 Score 30-30 in this game.
 Opponent: "Serve and volleyer."

You hit a second serve to 14. Your opponent hits a backhand slice approach shot to 21 that you contact at 20.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Defensive lob to 28
<input type="checkbox"/>	Attempted pass to 26
<input type="checkbox"/>	Dipping shot to 11
<input type="checkbox"/>	Attempt passing shot to 27
<input type="checkbox"/>	Attempt passing shot to 10
<input type="checkbox"/>	Topspin lob to 28



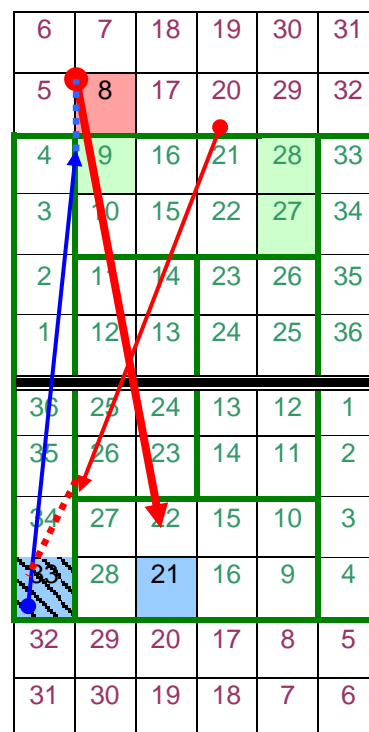
Your side of the net.

13. Your opponent is serving in the 2nd set
 (1-0 in your opponent's favour).
 Score in this set 3-4
 Score 30-15 in this game.
 Opponent: "Counter-puncher."

Your opponent serves to 26. You contact the ball at 33 and hit to 9. Your opponent contacts the ball at 8 and hits a defensive shot to 22, which you contact at 21.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Move to 21 and attempt forehand winner to 28
<input type="checkbox"/>	Hit backhand approach to 9
<input type="checkbox"/>	Hit backhand approach to 28
<input type="checkbox"/>	Hit backhand to 28
<input type="checkbox"/>	Hit backhand to 9
<input type="checkbox"/>	Hit forehand to 27



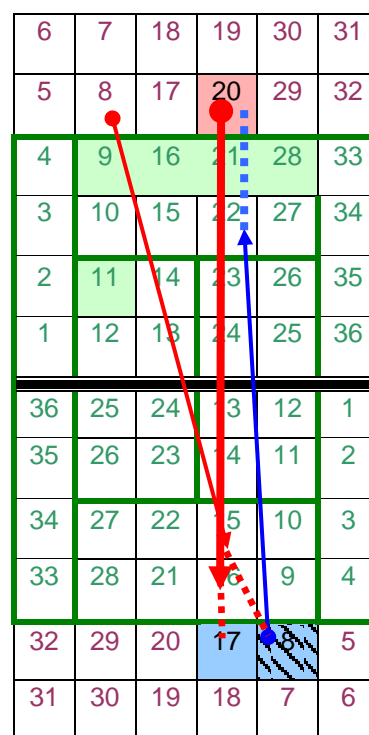
Your side of the net.

14. Your opponent is serving in the 2nd set (1-0 in your opponent's favour).
 Score in this set 3-2.
 Score 15-30 in this game.
 Opponent: "All-courter."

Your opponent serves to 23. You return to 16. Your opponent hits to 28. You hit to 27. Your opponent hits to 10. You hit to 9. Your opponent hits to 15 and you contact the ball at 8. You hit to 22 and your opponent contacts the ball at 20. Your opponent hits a slice to 16 that you contact at 17.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Drive to 9
<input type="checkbox"/>	Forehand to 11
<input type="checkbox"/>	Forehand to 28
<input type="checkbox"/>	Deep down the middle (16/21)
<input type="checkbox"/>	Aggressive forehand to 9
<input type="checkbox"/>	Aggressive forehand to 28



Your side of the net.

15. Your opponent is serving in the 2nd set (1-0 in your favour).

Score in this set 4-3.

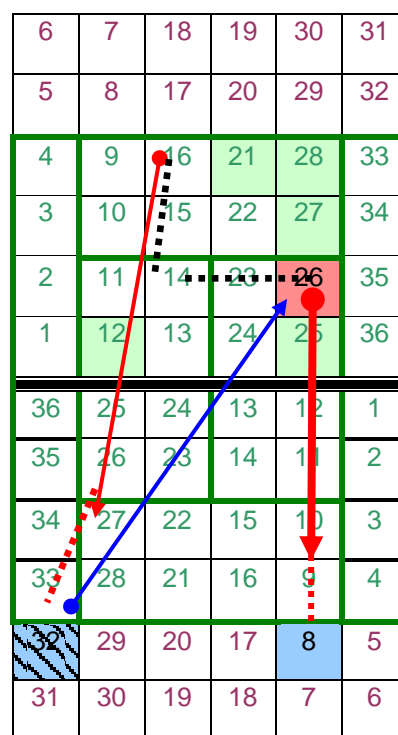
Score 15-30 in this game.

Opponent: All-courter.

Your opponent hits a body serve (intersection of 23 and 26). You return with a backhand slice to 16. Your opponent hits a forehand to 10. You hit to 15. Your opponent hits an approach shot to 27 that you contact at 32. You hit to 26 and your opponent volleys to 9. You contact the ball at 8.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Attempt forehand pass down the line (27/28)
<input type="checkbox"/>	Topspin lob to 28
<input type="checkbox"/>	Attempt pass to 12
<input type="checkbox"/>	Dipping shot to feet in 12
<input type="checkbox"/>	Dipping shot to feet in 25
<input type="checkbox"/>	Defensive lob to 21



Your side of the net.

16. You are serving in the 2nd set (1-0 in your opponent's favour).

The score in this set is 2-3.

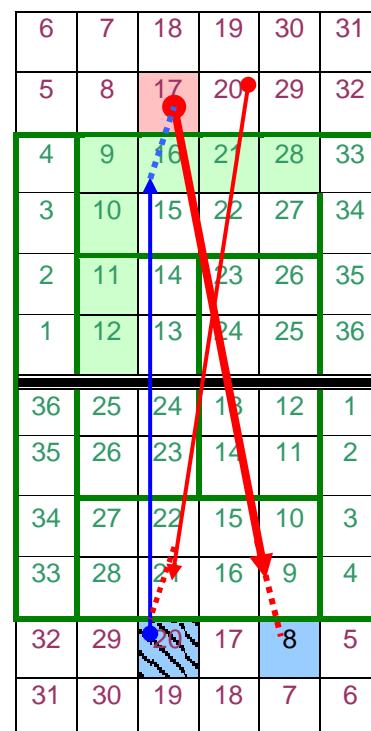
The score is 15-30 in this game.

Opponent: "All-courter."

You hit a second serve to 26. Your opponent slices to 9. You hit to 16. Your opponent hits to 15. You hit to 21. Your opponent slices to 21 and you make contact at 20. You hit to 16 and your opponent makes contact at 17 and hit the ball to 9. You contact the ball at 8.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Forehand to 9
<input type="checkbox"/>	Forehand to 11
<input type="checkbox"/>	Deep down the middle (16/21)
<input type="checkbox"/>	Aggressive forehand to 28
<input type="checkbox"/>	Drop shot to 12
<input type="checkbox"/>	Forehand to 10



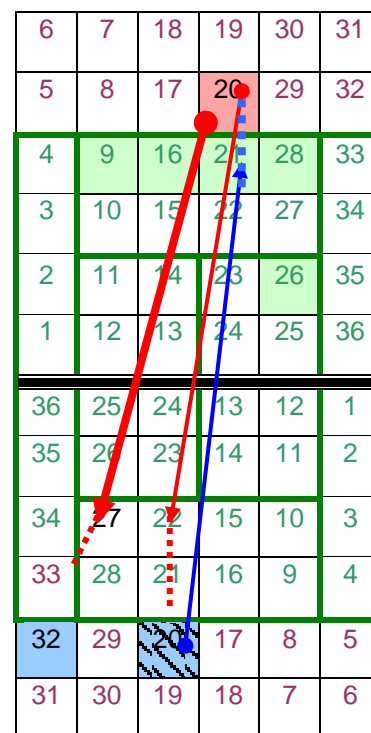
Your side of the net.

17. You are serving in the 2nd set (1-0 in your favour).
Score in this set 3-4.
Score 30-40 in this game.
Opponent: "Counter-puncher."

Your first serve is to 23, and your opponent returns to 21. You hit to 22. Your opponent hits to 21. You hit to 22. Your opponent hits to 22. You contact the ball at 20 and hit to 21. Your opponent makes contact at 20 and hits an aggressive forehand to 27 that you contact at 32.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Crosscourt to 26
<input type="checkbox"/>	Crosscourt to 28
<input type="checkbox"/>	Attack down the line to 9
<input type="checkbox"/>	Slice to 28
<input type="checkbox"/>	Slice down the middle (16/21)
<input type="checkbox"/>	Topspin down the middle (16/21)



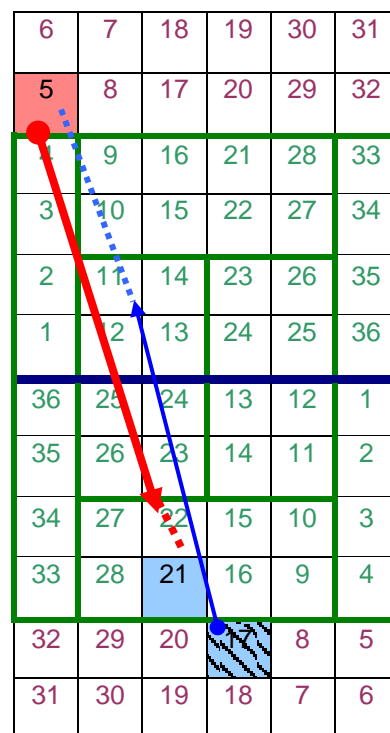
Your side of the net.

18. You are serving in the 2nd set (1-0 in your favour).
Score in this set 4-3.
Score 40-15 in this game.
Opponent: "Aggressive Baseline."

You hit your first serve to 11, and your opponent contacts the ball at 5 and hits a weak return to 22 that you can contact at 21.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Aggressive Forehand to 28
<input type="checkbox"/>	Backhand to 28
<input type="checkbox"/>	Forehand to 9
<input type="checkbox"/>	Aggressive Forehand to 27
<input type="checkbox"/>	Approach to 9
<input type="checkbox"/>	Backhand to 9



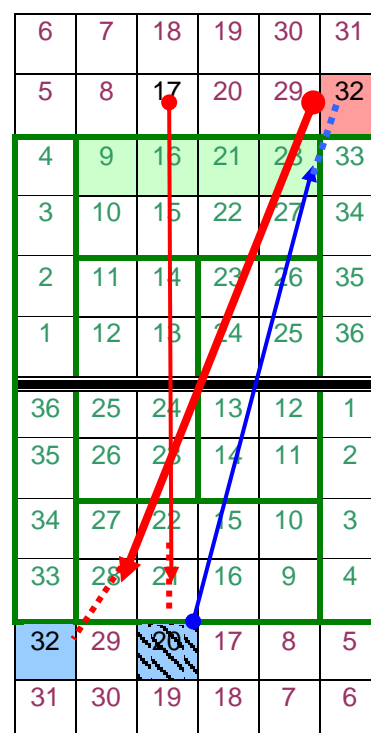
Your side of the net.

21. You are serving in the 2nd set (1-0 in your favour).
Score in this set 3-3.
Score 0-30 in this game.
Opponent: "All-courter."

You serve to 14. Your opponent contacts the ball at 17 and returns to 21. You contact the ball at 20 and hit a forehand to 28 that your opponent contacts at 32. Your opponent then hits an aggressive shot to 28 that you contact at 32.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- | | |
|--------------------------|-------------------------------|
| <input type="checkbox"/> | Crosscourt slice to 28 |
| <input type="checkbox"/> | Crosscourt drive to 28 |
| <input type="checkbox"/> | Down the line slice to 9 |
| <input type="checkbox"/> | Down the line drive to 9 |
| <input type="checkbox"/> | Down the middle slice (16/21) |
| <input type="checkbox"/> | Down the middle drive (16/21) |



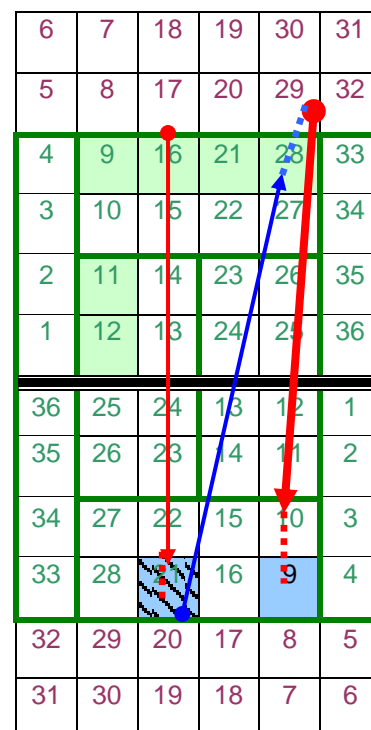
Your side of the net.

22. You are serving in the 2nd set (1-0 in your favour).
Score in this set 6-6.
Score 4-5 in the tie-breaker.
Opponent: "Aggressive baseliner."

You serve to 23. Your opponent returns to 16. You hit to 15. Your opponent hits an aggressive shot to 21 that you contact at 21. You hit an aggressive shot to 28. Your opponent contacts the ball at 29 and slices to 10. You contact the ball at 9.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- | | |
|--------------------------|------------------------------|
| <input type="checkbox"/> | Forehand to 11 |
| <input type="checkbox"/> | Approach to 28 |
| <input type="checkbox"/> | Deep down the middle (16/21) |
| <input type="checkbox"/> | Forehand to 9 |
| <input type="checkbox"/> | Drop shot to 12 |
| <input type="checkbox"/> | Approach to 9 |



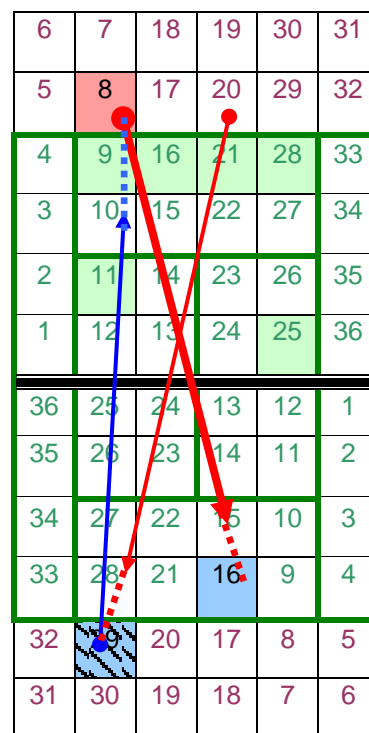
Your side of the net.

23. Your opponent is serving in the 1st set.
 Score in this set 4-4.
 Score 30-40 in this game.
 Opponent: "Aggressive baseliner."

Your opponent serves to your body (intersection of 23 and 26). You hit a slice return to 22. Your opponent hits to 28. You contact the ball at 29 and slice to 10. Your opponent makes contact at 8 and hits a slow, looping shot to 15 that you contact in 16.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Drop shot to 25
<input type="checkbox"/>	Forehand to 11
<input type="checkbox"/>	Forehand approach to 28
<input type="checkbox"/>	Forehand to 9
<input type="checkbox"/>	Forehand winner to 28
<input type="checkbox"/>	Forehand deep down the middle (16/21)



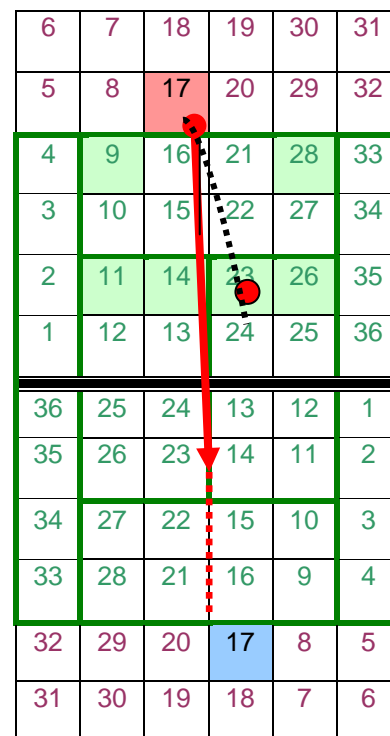
Your side of the net.

24. Your opponent is serving in the 2nd set (1-0 in your favour).
 Score in this set 4-4.
 The score 40-40 in this game.
 Opponent: "All-courter."

Your opponent serves and volleys to 14, and you contact the ball at 17.

Rate your 1st, 2nd and 3rd choices for the return you want to hit?

<input type="checkbox"/>	Return to 14
<input type="checkbox"/>	Return to 23
<input type="checkbox"/>	Return to 26
<input type="checkbox"/>	Return to 11
<input type="checkbox"/>	Return to 9
<input type="checkbox"/>	Return to 28



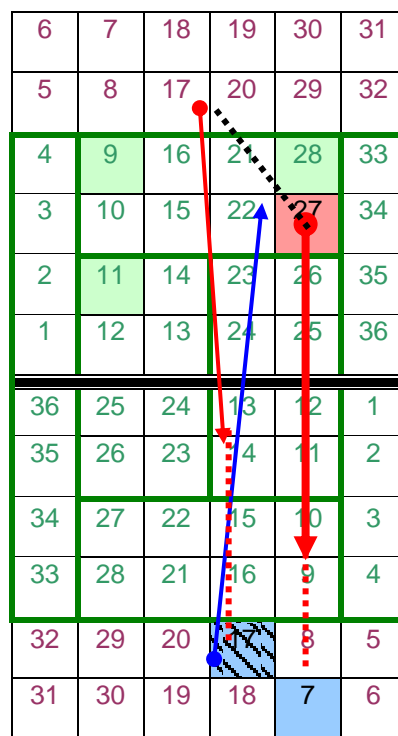
Your side of the net.

25. Your opponent is serving in the 3rd set (score tied at 1-1)
 Score in this set 5-3 in this set.
 Score 0-0 in this game.
 Opponent: "All-courter."

Your opponent serves and volleys on the first serve hit to 14. You contact at 17 and return with a floating slice that would have landed in 27. Your opponent volleys to 9 and you make contact at 7.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand pass down the line (28)
- Topspin lob to 9
- Topspin lob to 38
- Defensive lob to 9
- Forehand pass to 11
- Defensive lob to 28



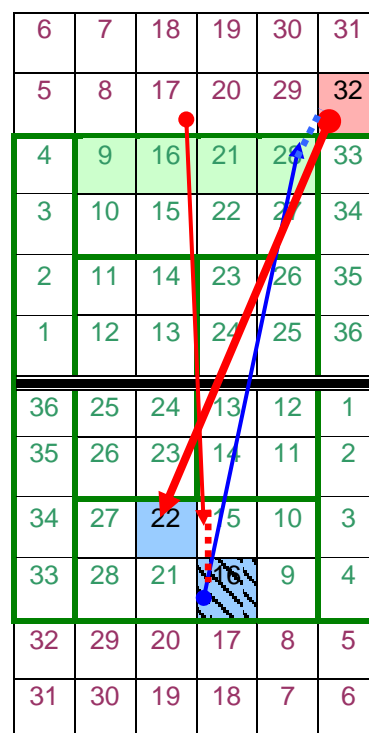
Your side of the net.

26. You are serving in the 1st set.
 Score in this set 3-3.
 Score 40-15 in this game.
 Opponent: "All-courter."

You serve to 11. Your opponent returns to 27. You hit to 27. Your opponent slices to 28. You hit to 21. Your opponent hits a forehand to 16. You hit to 16. Your opponent hits to 15. You contact at 16 and hit an aggressive shot to 28. Your opponent contacts at 32 and slices to 22. You contact the ball at 22.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Approach to 9
- Winner to 9
- Forehand to 28
- Forehand to 9
- Forehand approach to intersection of 16 and 21
- Backhand deep down the middle (back of 16/21)



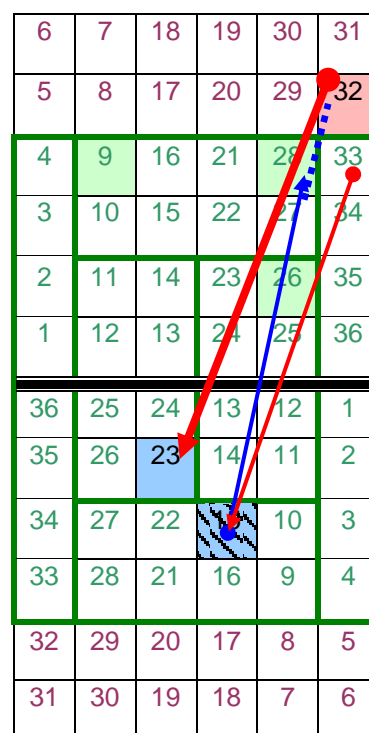
Your side of the net.

27. You are serving in the 2nd set (1-0 in your favour).
 Score in this set 5-4.
 Score 30-15 in this game.
 Opponent: "All-Courter"

You serve to 26. Your opponent contacts the ball at 33 and hits a slice return to 15. You hit an approach shot to 28 that your opponent contacts at 32. Your opponent hits a defensive lob. You contact the ball while standing in 23.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Smash to 28
<input type="checkbox"/>	Smash to 9
<input type="checkbox"/>	Smash to 26
<input type="checkbox"/>	Backhand smash to 9
<input type="checkbox"/>	Let ball bounce and smash to 28
<input type="checkbox"/>	Let ball bounce and smash to 9



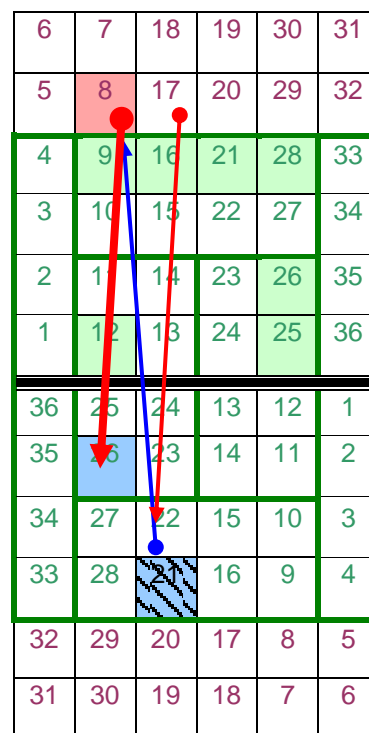
Your side of the net.

28. Your opponent is serving in the 3rd set (score is tied)
 Score in this set 2-2.
 Score 15-15 in this game.
 Opponent: All-courter.

Your opponent hits a second serve to 14. You return to 16. Your opponent hits to 22. You contact at 22 and hit an aggressive approach shot to 9. Your opponent contacts ball at 8 and attempts a passing shot to 28 that you contact at 26.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Volley to 9
<input type="checkbox"/>	Volley to 28
<input type="checkbox"/>	Volley to 26
<input type="checkbox"/>	Drop volley to 12
<input type="checkbox"/>	Drop volley to 25
<input type="checkbox"/>	Volley to intersect of 16 and 21 near baseline



Your side of the net.

29. You are serving in the 2nd set (1-0 in your favour).
 Score in this set 3-4.
 Score 30-15 in this game.
 Opponent: "Serve and volleyer."

You miss your first serve.

Rate your 1st, 2nd and 3rd choices for hitting your second serve.

- Short and wide to intersection of 25 and 26
- Deep into corner of 26
- Body serve to intersect of 23 and 26
- Deep in 23
- Serve and volley to 23
- Serve and volley to 26

6	7	18	19	30	31
5	8	17	20	29	32
4	9	16	21	28	33
3	10	15	20	27	34
2	11	14	23	26	35
1	12	13	24	25	36
36	25	24	13	12	1
35	26	23	14	11	2
34	27	22	15	10	3
33	28	21	16	9	4
32	29	20	17	8	5
31	30	19	18	7	6

Your side of the net.

30. You are serving in the second set (1-0 in your opponent's favour).
 The score in this set is 4-3.
 The score is 30-30 in this game.
 Opponent: "Aggressive baseliner."

You hit a second serve to 14. Your opponent hits an aggressive return to 16. You contact the ball at 8 and hit to 27. Your opponent contacts the ball at 29 and slices to 22. You make contact at 21.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand to 9
- Forehand to 27
- Backhand to 28
- Backhand to 9
- Backhand approach to 9
- Backhand approach to 16/21

6	7	18	19	30	31
5	8	17	20	29	32
4	9	16	21	28	33
3	10	15	22	27	34
2	11	14	23	26	35
1	12	13	24	25	36
36	25	24	13	12	1
35	26	23	14	11	2
34	27	22	15	10	3
33	28	21	16	9	4
32	29	20	17	8	5
31	30	19	18	7	6

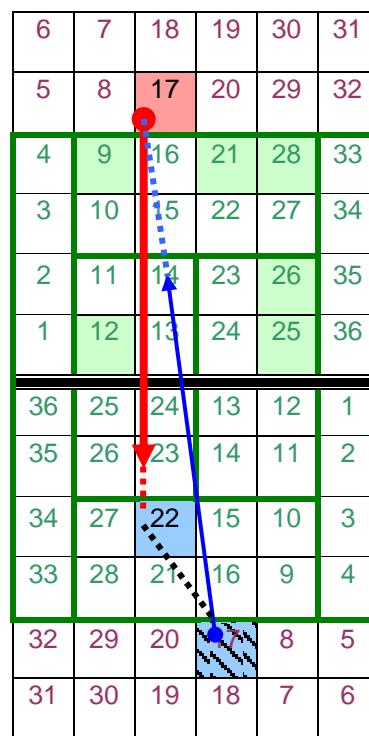
Your side of the net.

31. You are serving in the 1st set.
 Score in this set 4-4.
 Score 30-30 in this game.
 Opponent: Counter-puncher.

You serve and volley to 14. Your opponent contacts the ball in 17 and returns with a backhand slice to 23. You hit a half volley while in block 22.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Hit to 21
- Drop shot to 12
- Drop shot to 25
- Hit to 28
- Hit to 9
- Hit to 26



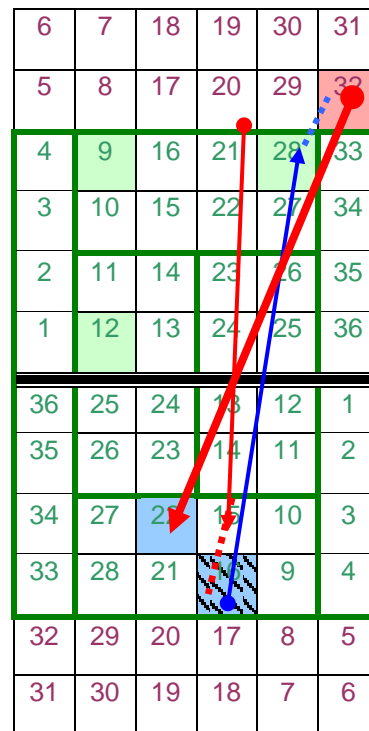
Your side of the net.

32. Your opponent is serving in the 1st set.
 Score in this set 6-6.
 Score 4-4 in this game.
 Opponent: "Counter-puncher."

Your opponent serves to 11. You hit a forehand return to 15. Your opponent hits an aggressive shot to 21. You hit to 22. Your opponent hits to 27. You slice to 28. Your opponent hits to 28. You slice to 21. Your opponent hits to 15. You contact at 16 and hit an aggressive shot to 28. Your opponent contacts at 32 and slices a shot that floats to 22. You contact at 22 between waist and shoulder height.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand to 28
- Backhand approach to 9
- Forehand to 9
- Drop shot to 12
- Backhand to 9
- Backhand to 28



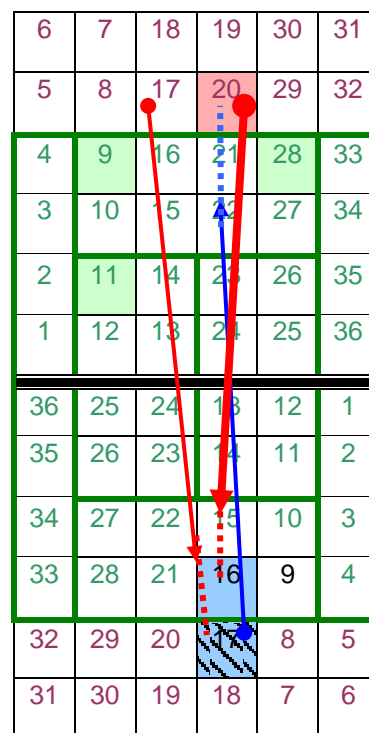
Your side of the net.

33. Your opponent is serving in the 1st set. Score in this set 1-2.
 Score 30-15 in this game.
 Opponent: "Counter-puncher."

Your opponent serves to 23. You return to 16. Your opponent contacts at 17 and hits to 16. You hit to 22. Your opponent hits to 15 and you contact at 16.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand approach to 9
- Attempt winner to 9
- Attempt winner to 28
- Approach to 28
- Crosscourt to 11
- Drive to 28



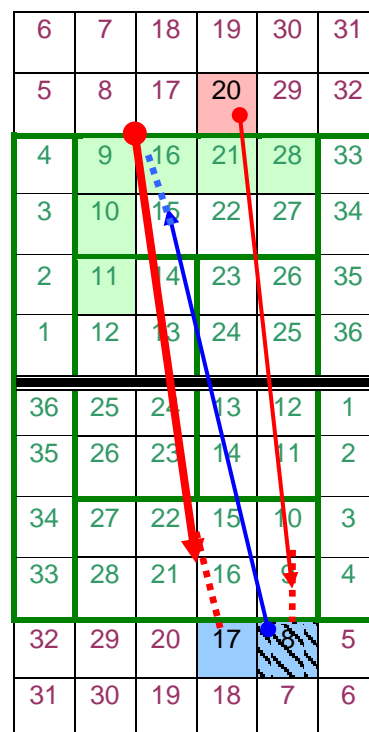
Your side of the net.

34. You are serving in the 1st set.
 Score in this set 4-4.
 Score 30-30 in this game.
 Opponent: "Aggressive baseliner."

You serve to the body (intersection of 11 and 14).
 Your opponent hits a forehand to 28. You slice to 21.
 Your opponent contacts the ball at 20 and hits to 9.
 You contact the ball at 8 and hit to 15. Your opponent hits to 16 and you contact the ball at 17.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand crosscourt to 9
- Forehand crosscourt to 11
- Forehand down the line to 28
- Forehand deep down the middle (16/21)
- Aggressive forehand to 28
- Forehand to 10



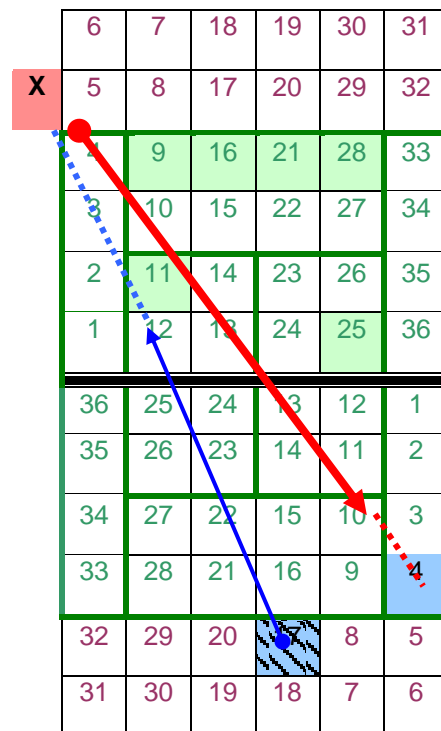
Your side of the net.

35. You are serving in the 1st set. Score in this set 2-4.
 Score 15-15 in this game.
 Opponent: "All-Courter."

You hit your first serve to 12, and your opponent contacts it outside of 5 and returns it to 10. You then contact the ball at 4.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Aggressive shot to 28
- Crosscourt to 11
- Deep down the middle
- Crosscourt to 9
- Approach to 28
- Drop shot to 25



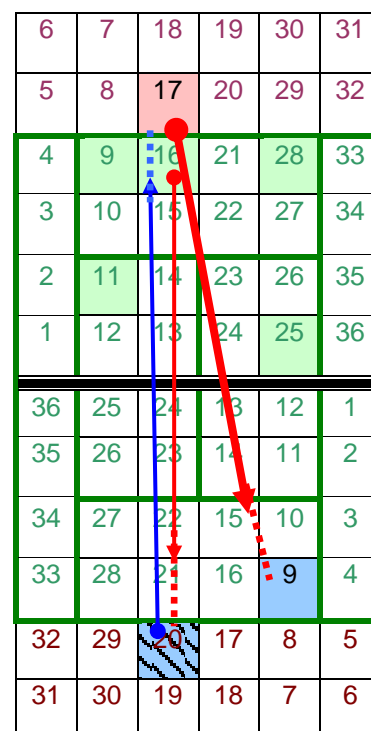
Your side of the net.

36. Your opponent is serving in the 2nd set (1-0 in your opponent's favour).
 Score in this set 2-3.
 Score 40-30 in this game.
 Opponent: "Counter-puncher."

Your opponent hits a second serve to 26. You return to 21. Your opponent hits a forehand to 28. You hit a slice to 28. Your opponent hits to 16. You hit to 16. Your opponent hits a forehand to 22 that you contact at 20. You hit to 16. Your opponent makes contact at 17 and hits to 15. You make contact with the ball at 9.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Crosscourt Forehand to 16
- Attempt winner to 28
- Approach to 28
- Drop shot to 25
- Forehand to 11
- Attempt winner to 9



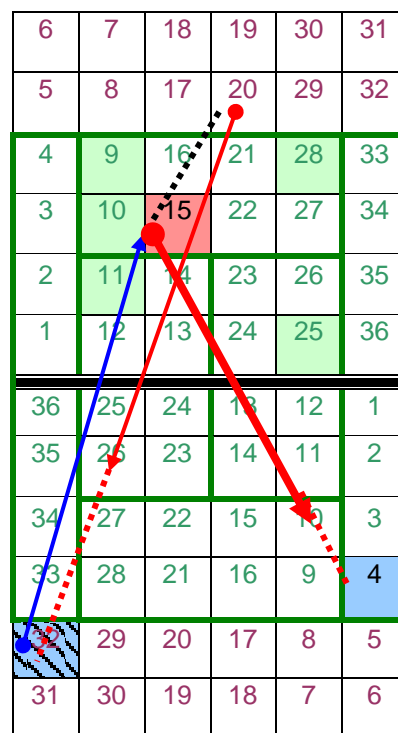
Your side of the net.

37. Your opponent is serving in the 2nd set (1-0 in your opponent's favour).
 Score in this set 3-3.
 Score 40-30 in this game.
 Opponent: "Serve and Volleyer."

Your opponent hits a first serve to 26 that you contact at 32 and hit to 16, but your opponent comes in and hits a volley to 10 that you contact at 4.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Attempt a passing shot to 28
- Attempt a passing shot to 10
- Defensive lob to 9
- Offensive lob to 9
- Dipping topspin shot to opponent's feet landing in 25
- Dipping topspin shot to opponent's feet landing in 11



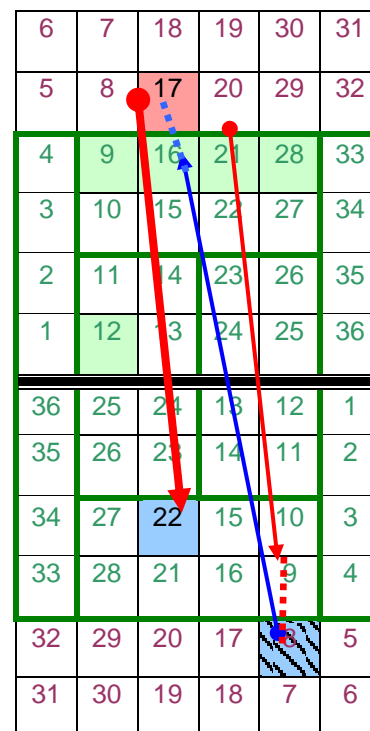
Your side of the net.

38. You are serving in the 3rd set (score is tied).
 Score in this set 3-3.
 Score 15-30 in this game.
 Opponent: "Counter-puncher."

You hit a second serve to 26. Your opponent returns to 27. You hit to 21. Your opponent slices to 9. You hit to 16. Your opponent contacts at 17 and hits a slow, looping shot that you contact at shoulder height at 22.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand winner to 28
- Forehand to 9
- Forehand approach to 28
- Backhand approach deep down the middle (16/21)
- Backhand approach to 9
- Drop shot to 12



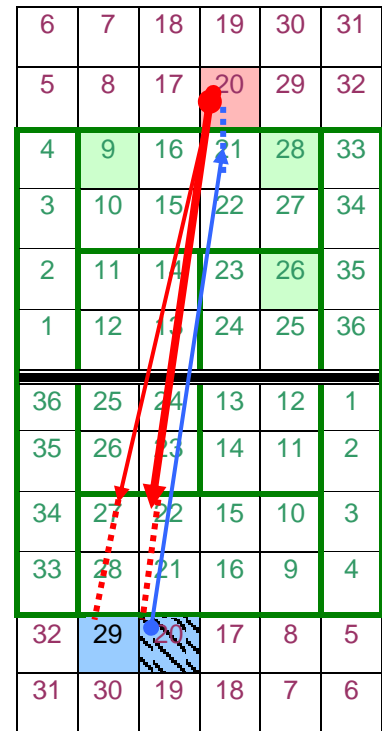
Your side of the net.

39. You are serving in the 3rd set (score is tied at 1-1).
 The score in this set is 2-3
 The score is 40-15 in this game.
 Opponent: "Serve and volleyer."

You serve to 11. Your opponent returns to 10. You hit to 21. Your opponent hits to 22. You make contact at 20 and hit the ball to 21. Your opponent makes contact at 20 and hits to 27. You make contact at 29.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Hit crosscourt backhand to 28
- Hit backhand down the line to 9
- Aggressive backhand to 9
- Backhand to 26
- Slice approach to 9
- Drive approach to 9



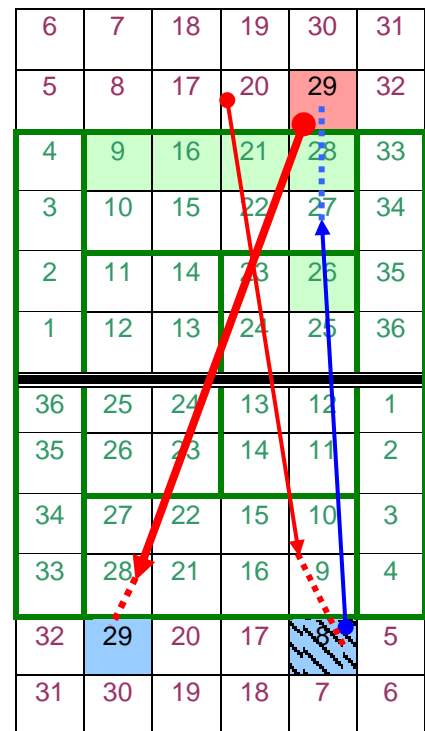
Your side of the net.

40. Your opponent is serving in the 3rd set (score tied at 1-1).
 Score in this set 5-5.
 Score 30-30 in this game.
 Opponent: "Counter-puncher."

Your opponent hits a second serve to 14. You return to 21. Your opponent returns it to 9. You contact it at 8 and hit to 27. Your opponent contacts it at 29 and hits to 28. You contact it at 29.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Backhand slice to 28
- Backhand down the line to 9
- Hit deep ball down the middle of the court (16/21)
- Short crosscourt to 26
- Slice to 21
- Aggressive shot to 9



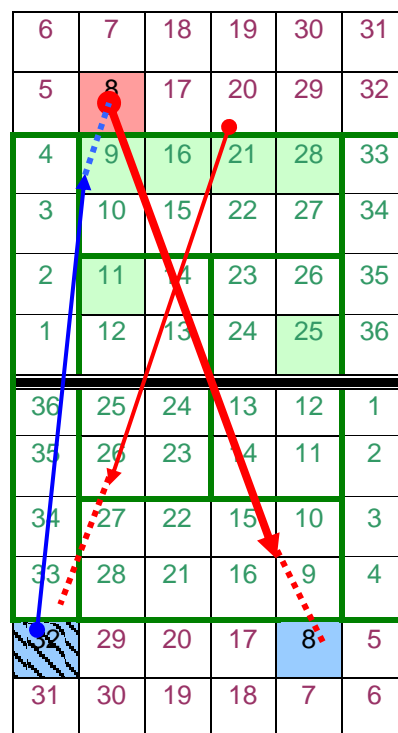
Your side of the net.

41. Your opponent is serving (1st set).
 Score in this set 2-4.
 Score 30-40 in this game.
 Opponent: "Aggressive baseliner."

Your opponent hits a second serve to 26, and you contact the ball at 32 and return it to 9.
 Your opponent contacts the ball at 8 and hits a forcing shot to your 9 that you contact at your 8.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Forehand to 16
- Return ball high and deep down the middle (16/21)
- Forehand to 9
- Aggressive forehand to 28
- Forehand to 11
- Drop shot



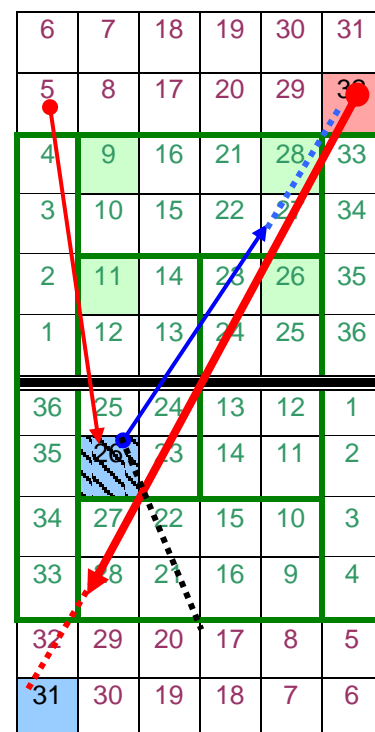
Your side of the net.

42. You are serving in the 1st set.
 Score in this set 5-4.
 Score 40-15 in this game.
 Opponent: "Aggressive baseliner."

You serve and volley to 11. Your opponent contacts the ball in 5 and returns it to 26. You hit a volley to 27 and close the net. Your opponent hits a defensive lob to 28, and you contact the ball at 31.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- Lob to 28
- Backhand slice to 9
- Backhand drive to 9
- Backhand crosscourt to 26
- Lob to 9
- Backhand slice to 11



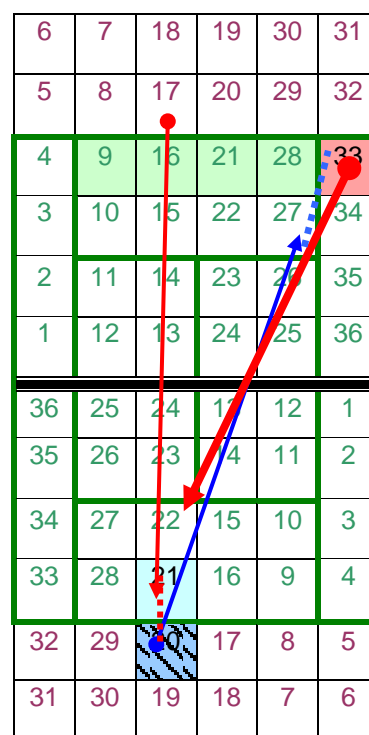
Your side of the net.

43. Your opponent is serving in the 3rd set (score is tied).
 Score in this set 5-5.
 Score 40-30 in this game.
 Opponent: "Aggressive baseliner."

Your opponent hits a second serve to 26. You slice your return to 9. Your opponent hits to 15. You hit to 16. Your opponent hits to 21 and you contact the ball at 20. You hit a slice to 27 that your opponent contacts at 33. Your opponent slices short to 22 that you contact in 22.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

<input type="checkbox"/>	Slice approach to 9
<input type="checkbox"/>	Slice approach to intersect of 16 and 21
<input type="checkbox"/>	Drive approach to 9
<input type="checkbox"/>	Attempt winner to 9
<input type="checkbox"/>	Forehand to 28
<input type="checkbox"/>	Backhand to 28



Your side of the net.

Appendix C

Conversion to Tactics

(Tactics per Option in Each Scenario)

1		2		3		4		5		6		7		8	
1	K	1	G	1	D	1	A	1	I	1	F,H,J	1	C,D	1	D
2	G	2	G,H	2	H	2	J	2	K	2	D	2	K	2	H
3	A,E,G	3	D	3	B	3	D	3	K	3	A,D	3	E	3	G
4	D,H	4	G,J	4	J	4	E	4	I	4	B	4	H	4	J
5	D,G	5	K	5	E	5	J	5	J,H,I	5	E	5	H,J	5	A
6	D,J	6	D,H	6	K	6	H	6	J,H	6	K	6	D	6	G
9		10		11		12		13		14		15		16	
1	J	1	K	1	J	1	H	1	J	1	A,H	1	D	1	C,D
2	D	2	D,F,H	2	D	2	J	2	B,D,H	2	G,J	2	C	2	G,J
3	J	3	F,H,J	3	A	3	G	3	B,H	3	D	3	K	3	E
4	D,H	4	E	4	F,J	4	A	4	C	4	E	4	G	4	J
5	K	5	D,F,H	5	E	5	D	5	D	5	J	5	D	5	K
6	F	6	K	6	J	6	J	6	J	6	J	6	H	6	D
17		18		19		20		21		22		23		24	
1	J	1	F	1	D	1	E	1	A,B,D	1	J	1	K	1	D,E
2	D	2	A,C	2	C,D	2	B	2	D	2	A,F	2	J	2	E
3	K	3	D	3	E	3	D	3	A,J	3	E	3	C,F	3	C
4	A,B	4	F,J	4	J	4	B	4	J	4	C	4	D	4	C
5	C,E	5	D,F	5	G	5	D	5	E	5	G	5	F	5	H
6	E	6	D	6	A	6	A,E	6	E	6	F	6	E	6	A
25		26		27		28		29		30		31		32	
1	D	1	B,G	1	D	1	A,D,I	1	J	1	B,H	1	E	1	D
2	A	2	F	2	C,H	2	H	2	A,C	2	J	2	D	2	H
3	D	3	D	3	J,H	3	C	3	C	3	E	3	K	3	C
4	B	4	A	4	K	4	I	4	E	4	A	4	C	4	J
5	G	5	C,E,F	5	A,D	5	J	5	E	5	G,H,J	5	H	5	C
6	H	6	E	6	A,C,H	6	A,E	6	K	6	E	6	K	6	A,D
33		34		35		36		37		38		39		40	
1	G,H	1	C,D	1	H,J	1	D,E	1	J	1	F,J	1	D	1	D,H
2	H,J	2	J	2	J	2	H	2	D	2	D	2	H	2	G
3	H,J	3	B	3	E	3	G	3	A,B,D	3	G,H	3	J	3	E
4	D,G	4	E	4	B,D	4	G	4	C,D	4	E,G,H	4	J	4	J
5	J	5	J	5	G	5	J	5	G	5	H	5	G	5	H
6	D	6	D	6	K	6	D	6	D	6	K	6	G	6	J
41		42		43											
1	C,E	1	A,C,D,H	1	H										
2	B,E,H	2	H	2	E,G										
3	D	3	K	3	F,G,H										
4	J	4	D	4	F,G,H										
5	J	5	H	5	D										
6	K	6	H	6	D										

Key to Tactics

A	Play consistent percentages
B	Know the zones
C	Understand the target areas
D	Limit direction changes
E	Centre the ball
F	Attack the short ball
G	1-2 sequence
H	D.N.O.
I	Hold the line
J	Change gears
K	Random tactic

Appendix D

Example of Adjustments Made by Experts

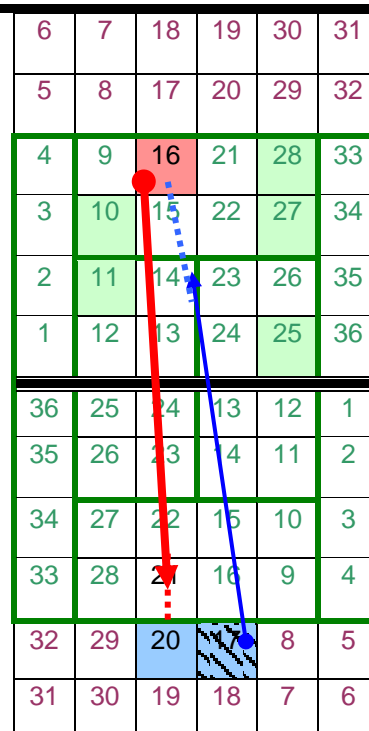
16. You are serving in the 1st set.
 Score in this set 4-4.
 Score 30-30 in this game.
 Opponent: "Serve and volleyer."

You hit a second serve to 14. Your opponent hits a backhand slice approach shot to 21 that you contact at 20.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- | | |
|--------------------------|----------------------------|
| <input type="checkbox"/> | Defensive lob to 28 |
| <input type="checkbox"/> | Dipping shot to 25 |
| <input type="checkbox"/> | Dipping shot to 11 |
| <input type="checkbox"/> | Attempt passing shot to 27 |
| <input type="checkbox"/> | Attempt passing shot to 10 |
| <input type="checkbox"/> | Topspin lob to 28 |

It seems that often a logical passing shot, C/C to the cell inside the service line (26) is not offered as an option, yet would be a logical choice.



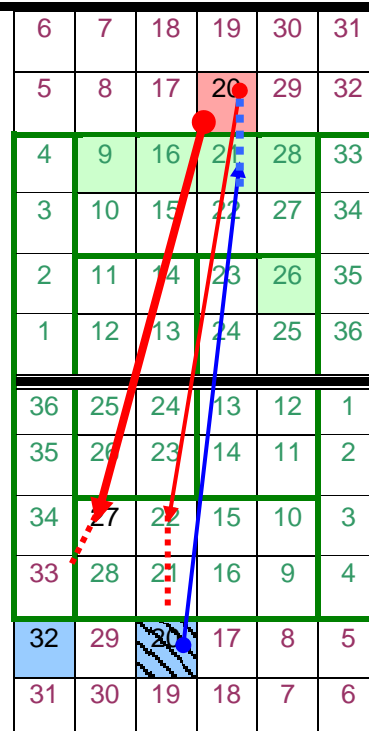
Your side of the net.

17. You are serving in the 2nd set (1-0 in your favour).
 Score in this set 3-4.
 Score 30-40 in this game.
 Opponent: "Counter-puncher."

Your first serve is to 23, and your opponent returns to 21. You hit to 22. Your opponent hits to 21. You hit to 22. Your opponent hits to 22. You contact the ball at 20 and hit to 21. Your opponent makes contact at 20 and hits an aggressive forehand to 27 that you contact at 32.

Rate your 1st, 2nd and 3rd choices for hitting your shot.

- | | |
|--------------------------|---------------------------------|
| <input type="checkbox"/> | Crosscourt to 26 |
| <input type="checkbox"/> | Crosscourt to 28 |
| <input type="checkbox"/> | Attack down the line to 9 |
| <input type="checkbox"/> | Slice to 28 |
| <input type="checkbox"/> | Slice down the middle (16/21) |
| <input type="checkbox"/> | Topspin down the middle (16/21) |



Your side of the net.

Appendix E

STELLENBOSCH UNIVERSITY INFORMATON TO PROSPECTIVE PARTICIPANTS INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Tactics in Sport (Tennis)

You are invited to participate in a PhD research project conducted by Brendan Thomas from the Department of Sport Science at Stellenbosch University.

You were selected as a possible participant in this study because you are a coach who is involved at either the intermediate, advanced, elite or professional level of tennis.

1. PURPOSE OF THE STUDY

The purpose of this study is to describe the knowledge about tactics in tennis that is found among coaches at the intermediate, advanced, elite and professional levels of South African tennis.

2. PROCEDURES

If you volunteer to participate in this study, we will be asked to complete a 43 item questionnaire. The questionnaire will contain descriptions and accompanying diagrams of a variety of game situations in which you have the opportunity to make a choice about what shot you would like to play. You will be given six options and asked to rank your 1st, 2nd and 3rd choices for each situation.

This is a pencil-and-paper questionnaire. You will be provided with a comfortable venue and may take as long as you want to rank your choices.

3. POTENTIAL RISKS AND DISCOMFORTS

There will be no risks for you as participant.

4. POTENTIAL BENEFITS

Since you are a serious tennis coach, it is hoped that you will enjoy going through each situation and thinking about the options.

It is hoped that the results will help those of us interested in the development of tennis players and in coaching education to learn more about the tactical knowledge base of current players and coaches in order to determine if any improvements should be made at either the intermediate, advanced, elite and/or professional levels in South African tennis.

5. PAYMENT FOR PARTICIPATION

There is no payment for participation in this study.

6. CONFIDENTIALITY

In order to keep your responses on the questionnaire confidential, a code number will be assigned to your name on a general information form on which you provide some personal details about your tennis background. This code number is then written at the top of your questionnaire rather than your name. I keep a master list of the names of all participants and their code numbers so that I can process the data later according to your level of tennis expertise. No one else will have access to this list so no one else can determine which questionnaire belongs to which participant.

The results of this study will be shared with Tennis South African as well as the South African Professional Tennis Coaches Association, however, they will not be provided with a list of the names of the participants.

Although the results of the research will be published, no personal reference to any of the participants will be mentioned.

7. PARTICIPATION AND WITHDRAWAL

Participation in this study is entirely voluntary. Even if you agree to complete the questionnaire, if you decide during the process that you want to stop, you may do so without negative consequences of any kind.

You may also refuse to respond to any of the game situations on the questionnaire and still remain in the study.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions regarding or concerns about the research, please feel free to contact:

Principal Investigator: Brendan Thomas 0764167262

Department of Sport Science, Stellenbosch University
South Africa

Supervisor: Prof. E.S. Bressan 021-808-4722

Department of Sport Science, Stellenbosch University
South Africa

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Unit for Research Development.

SIGNATURE OF PARTICIPANT OR LEGAL REPRESENTATIVE

The information above was described to me by Brendan Thomas in English, and I am/the subject is/the participant is in command of this language or it was satisfactorily translated to me/him/her. I/the participant/the subject was given the opportunity to ask questions and these questions were answered to my/his/her satisfaction.

I hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study. I have been given a copy of this form.

Name of Participant

Name of Legal Representative (if applicable)

Signature of Participant or Legal Representative

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ (name of participant) and/or [his/her] legal representative _____. [He/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in English.

Signature of Investigator

Date

Appendix F

Semi-Structured Interview Questionnaire

DEFINITIONS

Beginner level: Players who are not competitive at local tournaments.

Intermediate level: Players who are chosen to represent their province/region to compete against each other as provinces.

National/International level: Players who are chosen to represent their country and compete in international tournaments.

Tactics: Methods employed by a player to gain an advantage over an opponent via the use of ball placement, type of shot and spin used.

Skill technique: The execution of various strokes in tennis. i.e. The mechanics of the:

- Forehand groundstroke
- Backhand groundstroke
- Forehand volley
- Backhand volley
- Serve
- Overhead smash
- Dropshot

Interview Question	Helps address which Research Question?
1. How long have you been a coach?	Background
2. What lead you to become a coach?	Background
3. What level of players do you coach?	Background
4. What is your highest qualification as a coach?	Background
5. What is the highest level you reached as a player?	Background
6. As a player, did you have a full time coach?	Background
7. In your opinion, what makes a good coach?	Background
8. If you were watching a tennis match between two	4a

unknown players, how would you differentiate between the stronger and the weaker player?	
9. What components/attributes do you believe should the perfect player at national/international level have?	4a
10. What do you think is the role of tactics in the outcome of a tennis match at:	4c
a. The beginner level	
b. The provincial level	
c. The national/international level	
11. Does one set of tactics work for all players at:	4c
a. The beginner level?	
b. The provincial level?	
c. The national/international level?	
12. How did you learn tactics as:	4b
a. A player?	
b. A spectator?	
c. A coach?	
13. If you were coaching a male tennis player in the finals of the Australian Open against [REDACTED], how would you decide on what tactics to employ?	4c
14. What attributes separate a tactically sound player from one who is tactically less effective at:	4c
a. The beginner level?	
b. The provincial level?	
c. The national/international level?	
15. How do tactics used in a match change over time?	4c
16. Have tactics changed in the last decade? If yes, how?	4c
17. Do you see any changes happening in the future with regards to tennis tactics?	4c
18. How do you see the interaction between skill techniques and tactics in tennis?	4b; 4c
a. What are the implications of this interaction for	

practice?	
19. What kinds of opportunities exist in South Africa in terms of coaching education with regards to:	4b; 4d
a. Clinics and courses?	
b. Access to DVDs?	
c. Mentorships?	
20. Are tactics taught during coaching education opportunities?	4b; 4d
21. Are you taught how to teach tactics during coaching education opportunities?	4b; 4d
22. Are discrepancies/parallels drawn/explained between tactics for lower level players and those necessary for elite performers?	4a; 4b; 4d
23. Are tactics at different levels taught differently?	4b;4d
24. Do you see any difference between South African tennis players and the rest of the world with regards to talent/tactics/physical ability/level of player? If so, what are they?	4a; 4c; 4d
25. Do you think there are any differences in physical ability and the comparative cognitive knowledge of the game in South African tennis players in general? Is there a difference in this discrepancy between South Africa and the rest of the world?	4a; 4d
26. In your opinion, why are there so few South African tennis players who make it through the ranks to excel at the professional level?	4d

Appendix G

Informed Consent for Semi-Structured Interview

STELLENBOSCH UNIVERSITY

INFORMATON TO PROSPECTIVE PARTICIPANTS

CONSENT TO PARTICIPATE IN RESEARCH

Tactics in Sport (Tennis)

You are invited to participate in a PhD research project conducted by Brendan Thomas from the Department of Sport Science at Stellenbosch University.

You were selected as a possible participant in this study because you are a coach who is involved at either the intermediate, advanced, elite or professional level of tennis.

PURPOSE OF THE STUDY

The purpose of this study is to describe the knowledge about tactics in tennis that is found among coaches at the intermediate, advanced, elite and professional levels of South African tennis.

PROCEDURES

If you volunteer to participate in this study, you will participate in a semi-structured interview. A general conversation will be started in order to set the tone for the interview. Once the interview begins all conversations will be audio taped so as to make the transcription of the interview more accurate.

POTENTIAL RISKS AND DISCOMFORTS

There will be no risks for you as participant.

POTENTIAL BENEFITS

The results of the interviews will hopefully help in your profession and how you conduct your coaching. It will also potentially provide you with another way of reflecting on your own coaching.

It is hoped that the results will help those of us interested in the development of tennis players and in coaching education to learn more about the tactical knowledge base of current coaches in order to determine if any improvements should be made at either the intermediate, advanced, elite and/or professional levels in South African tennis.

PAYMENT FOR PARTICIPATION

There is no payment for participation in this study.

CONFIDENTIALITY

In order to keep the results confidential, the interviews will be transcribed without attaching any names to the verbatim transcriptions. Any references to you or your colleagues specifically, will be blocked out from the transcription. The audio of each transcript will be kept in a locked cabinet at the Sport Science department along with the master copies of the written transcripts.

The results of this study will be shared with Tennis South African as well as the South African Professional Tennis Coaches Association, however, they will not be provided with a list of the names of the participants.

Although the results of the research will be published, no personal reference to any of the participants will be mentioned.

PARTICIPATION AND WITHDRAWAL

Participation in this study is entirely voluntary. Even if you agree to participate in the interview, if you decide during the process that you want to stop, you may do so without negative consequences of any kind.

You may also refuse to respond to any of the questions asked and still remain in the study.

IDENTIFICATION OF INVESTIGATORS

If you have any questions regarding or concerns about the research, please feel free to contact:

Principal Investigator: Brendan Thomas 0764167262

Department of Sport Science, Stellenbosch University
South Africa

Supervisor: Prof. E.S. Bressan 021-808-4722

Department of Sport Science, Stellenbosch University
South Africa

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SIGNATURE OF PARTICIPANT OR LEGAL REPRESENTATIVE

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I hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study. I have been given a copy of this form.

Name of Participant

Name of Legal Representative (if applicable)

Signature of Participant or Legal Representative

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ (name of participant) and/or [his/her] legal representative _____. [He/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in English.

Signature of Investigator

Date

Appendix H

Units of Meaning (quotes) for Qualities of An Expert Player

<p style="text-align: center;">Decision making</p> <ul style="list-style-type: none"> • Decision making is an important aspect • attributes separate the tactically sound player...decision making • Decision making • decision making comes with self-knowledge as you get older 	<p>player</p> <ul style="list-style-type: none"> • technically, you can look at who looks better from the side • As good a technique as possible • A 95% technique
<p style="text-align: center;">Knowledge of the game</p> <ul style="list-style-type: none"> • knowledge of the game 	<p style="text-align: center;">Shots</p> <ul style="list-style-type: none"> • the serve • a big serve • strength serves. • if you can pull that shot off • Have they got specific weapons
<p style="text-align: center;">Perceptual</p> <ul style="list-style-type: none"> • Vision • A good eye • next thing...how the person sees the ball and how early they see it 	<p style="text-align: center;">Athletic ability/Movement</p> <ul style="list-style-type: none"> • Movement is a big point • Brilliant feet • how well they move towards it (the ball) • about athletic ability • footwork • hand eye co-ordination • footwork and hand-eye co-ordination and that kind of stuff • their physical ability is great • Agility • Speed • Speed
<p style="text-align: center;">Self knowledge</p> <ul style="list-style-type: none"> • He knew what he could do, he had the self-knowledge • must be self-knowledge 	<p style="text-align: center;">Progressive skill development</p> <ul style="list-style-type: none"> • developed your own weapons • basically your weaknesses would be sorted out • take only patience, so all they working on is their defenses instead of their attacking abilities at a stage • work on your own strengths • improve your weakness
<p style="text-align: center;">Traits</p> <ul style="list-style-type: none"> • worth ethic • strong work ethic • Mentally strong. • strong mentally. 	
<p style="text-align: center;">States</p> <ul style="list-style-type: none"> • good attitude • will to win (on the court) • very strong will to win (on the court) • very great attitude on the court • who's more confident (on the court) • body language during the course of a certain match • body language 	
<p style="text-align: center;">Fitness</p> <ul style="list-style-type: none"> • fitter • stronger • fitness • fitness of players • fitness 	
<p style="text-align: center;">Talent</p> <ul style="list-style-type: none"> • And then all the talent stuff 	
<p style="text-align: center;">Technique</p> <ul style="list-style-type: none"> • good technique you can become a good 	

Appendix I

Units of Meaning (quotes) for Tactics in Tennis

<p>Choice of tactics – The player</p> <ul style="list-style-type: none"> • planning their game • planning their shots. • knowledge of your own game • and use my strength • if my player was a more consistent type of player I would try and lengthen the match • using their own strength • incorporate that or use it to the best of their ability • use your weapons • actually use your strengths • their strengths work against those weaknesses • have to look at my player's strengths first • look at the choice of shot and shot selection (player's) 	<ul style="list-style-type: none"> • So you try that game plan and if it doesn't work then you have to compromise and do something else • only in extreme cases would they maybe vary from that way of playing • Possibly half way through the second set and they find themselves in trouble they will start doing something tactically different • kids think a little bit more • what they up against • who they up against • strength and weakness kind of thing • when you get to a situation when it doesn't work, you have to be aware of when to switch • on the provincial level it's very hard to see which tactic will work for you • how to exploit weaknesses • learn from experience on where to hit and how to hit and to exploit • try to make the other person uncomfortable • how I would employ them • younger guys it's all about taking risk and managing risk
<p>Choice of tactics – The opponent</p> <ul style="list-style-type: none"> • you analyse the opponent a lot more than in the earlier days. • analyse your opponent • knowledge of the opponent's game. • knowledge of the players • (opponent doesn't) like high balls or low balls • the guy can't move • see what's the opponent's weaknesses • just moving the opponent around and try to exploit his weaknesses • break his forehand down • he gets angry and he gets mad with himself • he fatigues very easily in long matches • definitely attack the forehand side • players playing each other, they know the weaknesses • if you can make the player hit shots that he wouldn't normally practice basically • and to exploit weaknesses 	<p>Beginner</p> <ul style="list-style-type: none"> • beginner level...just to put the ball into play and make more balls than your opponent • make your opponent run • trying to get the ball over the net • don't know if the beginner would have the ability to think about tactics at all • beginner level there's not gonna be too much difference because tactics doesn't really play a role • who makes the most unforced errors • keeping the ball going as a tactic. • just keeping the ball going • beginner level...who makes the least mistakes • tactics should be patience there • No (tactics not important at beginner level)
<p>Choice of tactics – The game</p>	

- beginner level, where shot selection is just to get the other guy to make mistakes
- only thing you can do differently ...steal some time from the opponent
- if you could sneak in and do something different
- move forward a bit and just hit a quick shot like an angle or something, you know
- beginner level your decision making is, your main objective is to make (more balls)
- your tactic can be not to make mistakes at the beginner level
- if...teach him how to serve and volley he's gonna probably lose every match that he plays
- hitting the ball deep
- just by hitting the ball deep
- physical conditioning at the provincial level is less important

More advanced players

- Tactically it is not so important for me because everybody has good tactics
- They have their own tactics
- And they stick to their game plan not matter what, if they are winning or losing
- if the tactics are paying off then they win
- Murray is such a clever player so he's thinking on the court and he's trying to find a way to exploit his opponent and to make him work
- have a game plan for each player they play
- Tactically strong (important aspects of national/international player)
- Players that are tactically strong generally have done better in events
- If things don't go well as the match goes on they might try to change that, but more often than not that wouldn't work
- My tactics would be almost more mental than physical.
- attributes I think would obviously be mental
- slice backhand into play
- Sometimes that consistent player again is just (difficult to play against)

- moving your player around a lot
- must have some backup (plan)
- wouldn't change too many things, if it works
- make a difference to the aggressive side rather than to the defensive side
- the tactical side is very, very important
- provincial level your main objective is to try to hit a shot that is in first and then makes a difference
- double backhands are slicing a lot more tactically
- more than they did two or three years ago
- understands tactics
- you can actually win matches if you know what you are doing
- becomes more personalized
- is gets more detailed
- which means that tactically I think that it will play a very strong role
- Shot selection
- shot selection
- can't just hit the ball deep because players are moving better
- they are hitting the ball better
- can open up the court by using angles
- opening up the court
- I think you are trying your best to stay with your game plan no matter if you are losing because at some point it must pay off
- you must play your game plan and keep going with it

Differences between beginner and advanced

- just the way they hit the ball
- see where the ball lands.
- how deep they are hitting
- how they are using the ball.
- where they hit the ball

Style of play

- basically solid all rounder.
- moving to the net and serve and volleys are coming up

<ul style="list-style-type: none"> • taught to make a lot of balls • then wait for the short ball • they are coaching the players to get, as soon as possible, towards the net and close the net and finish the ball at the net • doesn't have to come the net because he can scramble and run everything down and his movement side to side on the court is just unbelievable • specialists that the net game would become more part of tennis • attack well • power • what type of players you are going to get • were always a lot of guys serving and volleying • people staying back • more percentage play • Volleying comes back into it • serve as a weapon now, not just as a cannon • national/international level they hit shots that are percentage • national/international level...aggressive in what you do • everybody's great athletes again • athletic ability picked up • there won't be space for people who can't hit every shot in the book • because of the pace that the game is played at • I don't see the guys having time to react at the net • I totally disagree with that viewpoint because I don't believe the game will get any slower
<p style="text-align: center;">Critical points</p> <ul style="list-style-type: none"> • putting my opponent under pressure • It's the thing of playing the important points well or making a double fault on a break points • pressure the people that can stay calm and play on instinct and the

tactics are built in
<p style="text-align: center;">Standard of play on the day</p> <ul style="list-style-type: none"> • not necessarily tactically change something, but they will try and improve their level of play • depends on the day how well they play that • if you player's good enough
<p style="text-align: center;">Equipment and facilities</p> <ul style="list-style-type: none"> • racket technology • the balls • Rackets are more powerful • Technology • technology has made major changes. • court surface being faster • balls or whatever • equipment • Luxilon strings • new equipment • new beginner balls
<p style="text-align: center;">Other factors</p> <ul style="list-style-type: none"> • So every tennis player will try to stick to what works for them which is one form of tactics • players that are strong mentally would have a better chance to implement the tactical part of their especially when things start getting tight • Turning it around sometimes means tactically turning it around as well, not just mentally and physically • change according to the flow of the match • keep it basic, • too much analysed. (drawback of focus on tactics) • game is still simple and you should keep it simple. • going to use more tactics (in the future) • area where we need to spend more time.

- you'll do very, very well...not necessarily gonna means that you're gonna be a great player one day
- you're not really talented...I'd go for the defensive option
- consistency versus risk-taking (balance when choosing tactics)
- people take tactics a little too far, some of the coaches.
- nowadays people maybe read too much into tactics instead of just playing the game.
- earlier days it was one or two things and you went with that, not a whole lot of things.
- Before it was just sort of you went on and played

Appendix J

Units of Meaning (quotes) for Coaching Tennis

<p style="text-align: center;">Leadership</p> <ul style="list-style-type: none"> • a good leader 	<ul style="list-style-type: none"> • things didn't work out, money wise. • the money was pretty good. • then I decided to pursue it as a career
<p style="text-align: center;">Playing ability</p> <ul style="list-style-type: none"> • as the coach you'll be playing more of the role as the player vs. the other player instead of the teacher teaching the player • if you don't know how to play a point yourself, you are not going to be able to teach it 	<p style="text-align: center;">Background in tennis</p> <ul style="list-style-type: none"> • things in my past went not right • wanted to play competitive • I used to be a professional tennis player. • I played the game on a reasonably high level • helping my coach with smaller kids • I got quite good
<p style="text-align: center;">Relationship with player</p> <ul style="list-style-type: none"> • make the player feel that he can trust the coach • have to be patient • somebody that can communicate. • doesn't break a player down or other coaches. • understands the person he works with. • Communication first • Non-verbal examples second • important that you can speak on the level that the person understands • they can make the player understand on their own instead of just pumping them with information 	<p style="text-align: center;">Beliefs about teaching skills</p> <ul style="list-style-type: none"> • individual, like the private then you concentrate on technique • then...working on technique • then perfect the technique from there • it's very hard to learn new skills beyond the age of 12 or 13 for a person • they would know why they are changing the technique
<p style="text-align: center;">Love of the game</p> <ul style="list-style-type: none"> • just to stay in the game of tennis • enjoy the game and enjoy working with people • interested in the mechanics and the tactics and the game itself • passion for the game • have a passion for the game • passion for the game of tennis • I started actually liking what I'm doing. • enjoy the game and enjoy working with people • became quite fun 	<p style="text-align: center;">Beliefs about practice</p> <ul style="list-style-type: none"> • working with beginner players, I would actually concentrate on one thing • as soon as they get older and understand the game more then I feed you can give more input into their game • can actually guide instead of teach • must first learn where to hit the ball and then how to hit the ball • on the practice court, must just take a chance and practice his shot • The skillful player can tend to want to vary things sooner that the less skillful player would like to do while they're doing drills • skillful player getting bored quicker • practicing skill, then the more skilled player is going to perform better. • practising basic things then I would say no. • you've got to practice what you want
<p style="text-align: center;">Personal goals</p> <ul style="list-style-type: none"> • my goal was to have a tennis academy • At the beginning I didn't want to be a tennis coach. 	

<p>in matches</p> <ul style="list-style-type: none"> • If they don't practice it there is no ways they are going to implement it confidently in a match • Just hitting balls is a thing of the past • a real match situation coaching method • create activity • especially international level some of other aspect of the game become more important as in preparation 	<p>through playing matches</p> <ul style="list-style-type: none"> • the player who has more knowledge of the tactics will benefit from it
<p>Beliefs about teaching tactics</p> <ul style="list-style-type: none"> • tactics comes before technique • first teach the player where to hit it and then how to hit it • Tactics are being taught more than technique • So they are using the tactical side to implement the technical side • implement tactics before you implement technique. • the beginner level more technique and not so much tactics. • Tactics and then technique. • tactics first. • tactic as an understanding of the game and if you have that understanding I think you can start working on the technique, within that situation • Mostly tactics and then technique afterwards • in your group you concentrate on tactics • By help of targets • strong move towards the tactical side in teaching all levels • would have the tactical part at a more evolved level • Yes, I believe they are • yes, it's mostly tactics in the ITF course. • if...they understand space and how to use space and how to create opportunities • ITF...says form follows function • teaching becomes more live instead of feed • lot slower so the people can actually teach themselves how to play tactics • I believe tactically you grow mostly 	<p>Courses and clinics</p> <ul style="list-style-type: none"> • you learn a lot of tactics from the ITF level 1 • the courses I have done • definitely a lot of clinics • mental course
<p>Mentorship</p> <ul style="list-style-type: none"> • I don't think there are mentorships • Knowledge is something I felt I can always carry over to a young coach • shared ideas • I got somebody in • just drifted away • interact or just listen to guys who obviously know a hell of a lot more than I do. • my students are very welcome to work with me, practice, get little jobs at the schools • they were very willing to help • wouldn't know if the coaches are doing that know • if you've got a system where you can pass them on and you're happy to pass them on, I think that interaction can be good • So to have someone that is overseas a lot and that sees the game a lot and that goes to all the Grand Slams to come and talk you to about tennis is quite, it works. 	<p>Other materials</p> <ul style="list-style-type: none"> • I don't think there is enough access to DVDs and books • the ITF website itself has a lot of DVDs • Many academies worldwide has DVDs • Thanks to the internet things have become easier • DVDs I would say I suppose there is enough • try to get what we can • Especially on the mental side • if you look at the manuals, there is very little on tactics • No, not enough • I've asked the course leaders to put

<p>something on paper</p> <ul style="list-style-type: none"> • they come out with the themes and I don't think there is enough substance for the learner coach • All coaches that coach in South Africa are members of iCoach • so we can start exploit or using iCoach as a tool
<p style="text-align: center;">Playing experience</p> <ul style="list-style-type: none"> • I didn't learn tactics almost at all from coaches • I played more matches when I was junior level than I was training. • learnt tactics from myself, • coach helped me a lot, • I'm not sure • pulling from different games, different sports • doesn't have an impact on me for tennis specifically that we were great on tactics • as a player, one does pick it up • I played • You just played • must be experience
<p style="text-align: center;">Observation and interaction</p> <ul style="list-style-type: none"> • I think you can almost learn as much by watching a lot of matches as compared to by playing them • by watching television • more info you had as a player and try to see is it being implemented. • listening, talking, reading, watching, by talking to other coaches • watching people coach • sharing • reading and watching good play

<ul style="list-style-type: none"> • Especially on TV • (seeing) where people go when they are attacked, professionals (by watching TV)
<p style="text-align: center;">Coaching experience</p> <ul style="list-style-type: none"> • Seeing it from another player's perspective which is the player that you are coaching • Each player that you work with has a different way of seeing the game of tennis and a different way they approach. • learnt a lot of tactics if I'm working with other people

Appendix K

Units of Meaning (quotes) for The South African Situation

<p style="text-align: center;">Facilities</p> <ul style="list-style-type: none"> • don't have any clay courts 	<ul style="list-style-type: none"> • the ITF coaching course now it was a good switch from the old system. • the earlier days not so much. (tactics) • it was very technically orientated • I just don't think it should almost be a pre-requisite • timing of the courses is a bit awkward • date in the middle of their exams • Content-wise, they're shuffling around • I think they trying to everything • courses need to have more substance there (tactics) • get it jacked up • accessibility is a little tricky • For 3 years I've been sitting here, this is the third year, not being able to get students to in for the exams and things • So you'll see a lot more clinics and courses coming in and they're doing their best • getting all the people to present the course is just a little bit tough • most of the videos are 45 minutes long and you know about the download time in South Africa • There could be more clinics • That's just opening it up (opportunities to interact at coaching workshops) • Nationally it is a problem (mentorships) • there's a lot of people on the same level coaching-wise but not on the same level experience-wise • in South Africa, experience counts a lot more for you than qualification • some of the most knowledgeable people in South Africa coaching wise
<p style="text-align: center;">Finances</p> <ul style="list-style-type: none"> • money so we can't have a lot of sponsorships • Financial support and whatever goes with it. • national body, they don't actually have the funds to guide players and give them careers and push them into careers • money comes from parents • they're the one that pays the bills so it automatically gives them a say 	
<p style="text-align: center;">Travel and competition</p> <ul style="list-style-type: none"> • lack of competitive tournaments, enough competitive tournaments • lack of exposure to strong senior tournaments • our players don't travel • don't get the opportunity to play. • we don't get a lot of tournaments in South Africa. • don't think the juniors travel enough • they don't have a lot of tournaments in South Africa • so-called super squads that used to travel • level that's just about to go to pro as well as the level that's just underneath it • if you have money you can get exposure without it coming to you • South Africa as a base where travel for 1 month overseas and 1 month back for training • older system that was in place with the SA squad that travelled week in week out 	
<p style="text-align: center;">Coaching education</p> <ul style="list-style-type: none"> • We were limited in this country until about 2 or 3 years ago • I think that's hugely improved recently • I think we're gonna see the benefits of those coaching courses in the next 10 years 	<p style="text-align: center;">Talent and talent development</p> <ul style="list-style-type: none"> • Talent, we have more than most • they've got talent • I can't see why not

<ul style="list-style-type: none"> • professional tournaments • systems are running smoothly... rugby, cricket – they take all the good athletes • they come in the system too late • Systems...parent driven and not nationally driven • Yes, they do. (have the same amount of talent)
<p style="text-align: center;">Technique</p> <ul style="list-style-type: none"> • Technique we're actually pretty good
<p style="text-align: center;">Psychological aspects</p> <ul style="list-style-type: none"> • is the mental side • mentally they just there. • One thing is missing...mental side of things
<p style="text-align: center;">Physical aspects</p> <ul style="list-style-type: none"> • fitness included • The girls are a little bigger and they are physically way stronger than us • Physical ability we have fallen behind a bit, I think, especially the girls
<p style="text-align: center;">Role models</p> <ul style="list-style-type: none"> • they have nobody's footsteps to follow • overseas juniors, I think because they spend time at academies where professionals train • the players they understand everything but the bridge in between will be the professional players to see and to learn from • they set an example of how hard to work to get there • Getting people in South Africa that play tennis to grow the game • lot of pressure on becoming the pioneer
<p style="text-align: center;">Support</p> <ul style="list-style-type: none"> • the backing is very different • the whole package they get is just different • player's package • is the analysis included
<p style="text-align: center;">Drug use</p> <ul style="list-style-type: none"> • illegal substances possibly taken overseas which we don't really do in

South Africa
<p style="text-align: center;">Tactics</p> <ul style="list-style-type: none"> • tactically I think we are also behind • they've got great tactics • I don't think there is a difference • He understand the game just as well and he is just as good • I don't see it coming through too much (using strengths against weaknesses in SA)
<p style="text-align: center;">General perceptions of tennis</p> <ul style="list-style-type: none"> • money will change everything • financially it's a very different situation • Yes, there's a huge difference • Yes, definitely. (A difference) • but I don't think they do. (have a balance between physical and cognitive ability) • At the level I coach...I'd say we've got the goods • I think we're behind with that as well, with knowledge full stop (as players) • They know what they doing • practice methods are not as intense • I think we're behind with that as well, with knowledge full stop • I don't think too many of the youngsters spend a lot of time gaining knowledge, general knowledge about the game of tennis...rules, etc. things