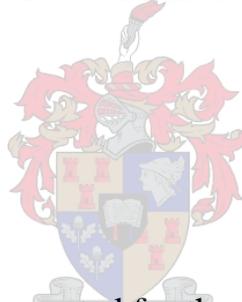


Methods of Coaching to Improve Decision Making in Rugby

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Study leader:
Prof ES Bressan

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Declaration

I, the undersigned, hereby declare that the work contained in this thesis is my own original work, and that I have not previously in its entirety or in part, submitted it to any university for a degree.

Signature

Date



Abstract

The purpose of this study was to describe the different methods used by coaches to improve decision making in rugby. The study included three coaches from the Western Cape area. Two of the three coaches worked with U/20A league teams and the third coach worked in the Super A league. Eight coaching sessions were video taped and analysed to identify the coaching method used when presenting skill development activities. The verbal behaviour each coach was also recorded. Five rugby games involving each of the teams were also analysed to determine which team had the highest success rates in key categories.

The results showed that Coach 1 integrated decision making with skill practice primarily through the method of verbal feedback during sessions where he used a direct teaching style. His comments to players during technical skill instruction were focussed on linking their skill performance to its tactical use in a game. The other two coaches followed the expected pattern of using indirect teaching styles to teach players how to apply tactics.

It was concluded that different coaches may use different teaching styles to improve players' decision making. The belief that the direct style of coaching focuses on technical learning at the expense of tactical understanding may be false. Much more research needs to be completed on coaching methods before specific recommendations can be made to coaches about optimal approaches to balancing the demand for good tactical decision making and sound technical skill performance.

Opsomming

Die doel van die studie was om die metodes van drie afrigters om besluitneming van rugbyspelers te verbeter, te beskryf. Drie afrigters van die Wes-Kaap is gebruik, twee het met 0/20 A spelers gewerk, terwyl die derde afrigter in die Super A liga betrokke was. Agt afrigtingsessies op op band opgeneem en ontleed om sodoende die afrigtingsmetode by aanbieding van vaardighede te identifiseer. Die verbale reaksie/gedrag van elke afrigter is ook nagegaan terwyl vyf wedstryde, waar elke span betrokke was, ook ontleed is om te bepaal watter span die meeste sukses in sleutelkategorieë behaal het.

Resultate dui aan dat afrigter 1 van geïntegreerde besluitneming gebruik maak gedurende vaardighedsafrigtingsessies deur middel van verbale terugvoering gedurende sessies waar die direkte afrigtingstechniek gebruik is. Terugvoering aan spelers tydens die aanleer van taktiese vaardighede het gefokus op die verband tussen hul vaardigheidsvlak en hoe dit takties binne 'n spelsituasie benut kan word. Die ander twee afrigters het die verwagte metode, naamlik die direkte onderrigstyl gebruik om spelers te leer hoe om taktieke toe te pas.

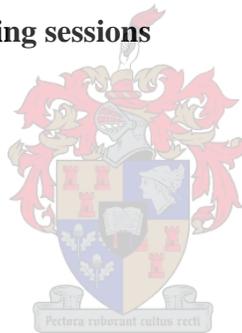
Die gevolgtrekking is dat verskillende afrigters verskillende metodes gebruik om spelers se besluitnemingsvermoëns in rugby aan te spreek. Die algemene persepsie dat die direkte afrigtingsstyl op tegniese leeraspekte dui, ten koste van taktiese begrip, kan verkeerd wees. Verdere navorsing van rugby-afrigtingsmetodes is nodig alvorens spesifieke aanbevelings aan afrigters gemaak kan word met betrekking tot die beste metode om goeie taktiese besluitneming en suksesvolle tegniese uitvoering van vaardighede te kan verseker.

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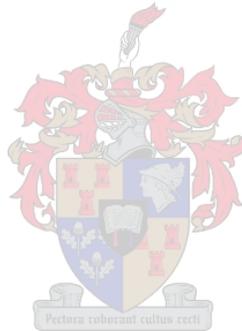
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Chapter One

Setting the Problem

“For all its physical character, rugby is a thinking game” (Dunn, 2006, p.1)

Rugby is a dynamic sport that requires a variety of skills and the ability to make quick decisions, as well as speed, endurance, strength, etc. (Edison, 2004). As the sophistication of the sport has increased, the demands have increased on coaches to become more systematic in their approach to teaching players how to make decisions during the game. In his model of coaching presented over 25 years ago, Worthington (1980) identified four critical aspects of teaching performance for coaches specifically during practice sessions (see Figure 1).

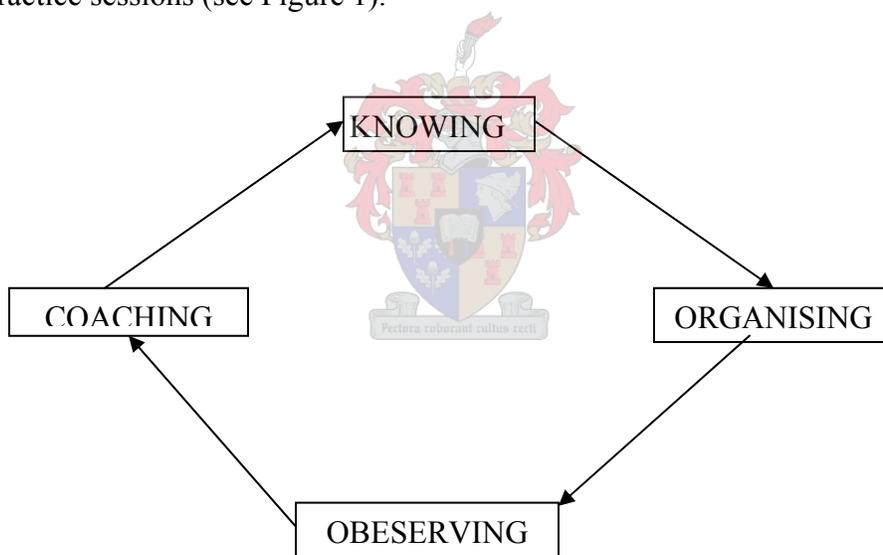


Figure 1. Four aspects of coaching during practice sessions (Worthington, 1980)

1. Knowing

Coaches must know a great deal about the sport itself. They also must know the players with whom they are working in terms of skill level, strengths, weaknesses, fitness, game awareness and group orientation, etc. This

knowledge is critical in helping each player fit in as a member of a cohesive team (Worthington, 1980).

2. Organising

Coaches have the responsibility for organising practise activities during practise sessions, which should be planned in detail to allow time for skill development (Worthington, 1980).

3. Observing

Because coaches must make changes in practice sessions according to how players respond, coaches must develop the ability to observe what is happening during practise. Learning how to observe is considered critical to becoming a capable coach (Worthington, 1980).

4. Coaching

Good coaching is personalised even though it may be in a team or a group setting (Worthington, 1980). Pyke (1991) stated that the coach has a role as a teacher. He/she must be able to explain, demonstrate, and provide feedback to correct mistakes, as well as be ready to praise and encourage. He/she must have the pedagogical skills to be able to use a range of teaching methods and to set expectations that are reasonable and within the scope of the players' skill levels.

These four aspects of the coaching process during practise sessions establish the point of view that a coach does have teaching responsibilities. In terms of rugby, this would mean that in addition to implementing practise sessions where the physical attributes of the game are developed (e.g. speed, endurance, strength, etc.), coaches must be prepared to teach the skills of rugby in a way that develops the players' ability to make quick decisions on the field.

The concept that coaches must also be prepared to fulfil teaching responsibilities is not a new one. When contrasting the “old” conception of coaching to the “new” conception of coaching, Resse and Ford, see p.65 (2005) listed a number of changes, but found teaching responsibilities in both approaches (see Table 1).

Table 1. *Comparison of the old to the new conception of coaching (Resse & Ford, 2005, p. 2) (Resse & Ford, 2005, p. 2)*

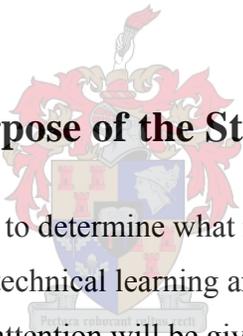
Old Conception	New Conception
Creates an atmosphere of fear of failure for athletes.	Creates high expectations, but does not demean athletes.
Seeks immediate short-term responses to commands.	Prefers open lines of communication with athletes.
Focuses on technical skill development of athletes.	Extends technical development to include tactical knowledge development of athletes.
Seeks players' undivided attention when speaking.	Gives and receives advice.
	Increases athletes' participation due to coaching style.
	Encourages of team leaders.

What is different in the new conception is that there has been a shift toward more indirect and open approaches of teaching and communicating with players.

According to Walsh (1984), it is important to accept that one of the main functions of coaching is to teach players the all of the skills necessary to perform well in pressure situations (i.e. to teach them the how and the when of skill performance). Evans, Horgan and James (1979) were clear that coaching must aim to stimulate and educate the players so they will improve their performances during game play, which in turn will have a positive impact on team performance. They mentioned specifically that the coach must help “...the team to realise its full potential by providing a framework of method and organisation within which the individual players can express themselves in a

confident and positive way on the field of play” (Evans *et al.* 1979, p. 7). This quotation is particularly applicable to rugby coaching, since teaching players how to make quick and correct decisions on the field is as essential an ingredient in the development of successful players as teaching them the correct skill techniques of rugby.

Edison (2004) was critical of the content of what he considered to be typical rugby practice sessions. He stated that while he could easily find training programmes to enhance the tangible and quantifiable factors such as speed, endurance and strength, and drills to develop technical rugby skills, he could not find a similar focus on the development of decision making abilities. Research has demonstrated repeatedly that knowing how to perform the skills of a particular sport does not guarantee good performance (Allard, Graham & Paarsalu, 1980). It is clear that modern rugby demands that in order to improve decision making in rugby, both technical and tactical learning be addressed.



Purpose of the Study

The purpose of this study is to determine what methods different rugby coaches use approach at the presentation of technical learning and tactical learning opportunities during practice sessions. Special attention will be given to looking at the differences in coaches in terms of their uses of direct versus indirect teaching methods (styles), and the differences noted in the game performances of teams whose coaches use different styles.

Significance of the Study

With rugby becoming more and more competitive, both offences and defences appear to be better organised, and the difference between winning and losing can often come down to a few decisions made by players on the field. Coaches have always appreciated good decision makers and have always been in search of them, but not all coaches have known how to develop it in their players (Dunn, 2006).

Although the technical aspects of rugby are crucial, rugby is played in a dynamic environment where players must make continuous decisions. Decision making in team sports involves the ability to make quick and accurate tactical decisions, and it has been identified as one of the most important aspects of successful performance (Tavares, 1997). The significance of this study is in its potential contribution to improving the quality of coaching rugby, by describing the methods that some top rugby coaches use to promote tactical learning, as well as how they maintain an appropriate concern for the learning of technical skills.

Research Questions

Because effective decision making in rugby requires both a decision and an action component, methods to improve decision making will have to address both tactical and technical learning. With that specific point of view in mind, the following questions guided this research:

1. Is there a difference among rugby coaches in terms of how they approach the teaching of skills and of tactics during practice sessions?
2. Is there a difference in the verbal behaviour of rugby coaches during practice sessions in terms of technical and tactical feedback?
3. Are there differences in the game performances of teams whose coaches use different styles for promoting technical and tactical learning?
4. Are there differences in the technical and tactical game performance of the same team when they play different opponents?

Methodology

It was decided to follow a descriptive study methodology, because the investigator was interested in a broad understanding of how some rugby coaches provide for technical and tactical learning during practice sessions. Since there is not enough

research completed in this area to make specific predictions, it was decided to look only for general trends or tendencies among the coaches who participated in this study.

Systematic observation of coaching sessions was accomplished through the analysis of videotapes according to predetermined category sets that allowed the investigator to identify how each coach approached technical and tactical learning. The analysis of game play also involved the analysis of videotapes of games according to predetermined category sets, which allowed the investigator to see if teams who have been coached differently demonstrate different patterns in their game play.

Limitations

The following limitations had an impact on this investigation and should be taken into account when looking at the results:

1. Only three coaches participated in this study. The fact that all three presented different approaches to technical and tactical learning illustrates how individual the assessment of coaching must be. This limits the generalisation of the results, although the results do highlight some important considerations.
2. Each coach was filmed for only a few sessions. It cannot be certain that the behaviour of the coaches as analysed in this study, is representative of their approach to technical and tactical learning.
3. Only a limited number of games were analysed. It is possible that the style of game play for a given team will change substantially, depending on the opponents.
4. The category sets used to analyse coaching behaviour and to analyze the games, were taken from established sources and face validity was accepted. Analysis using different category sets might have produced somewhat different insights into coaching styles, technical learning and tactical learning.

Definitions

Coaching

Only the aspect of coaching that refers to teaching is dealt with in this study.

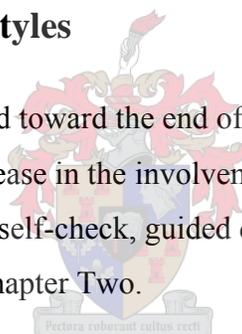
Teaching and coaching are used interchangeably in this research.

Direct coaching/teaching styles

Mosston's (1981) identification of teaching styles can be found along a continuum of learner involvement in decision making during the learning activity. The most direct styles are those in which learning involvement is minimal. This includes the command style and the practice styles. More detail is provided in Chapter Two.

Indirect coaching/teaching styles

The indirect styles are located toward the end of the Mosston (1981) continuum that represents a progressive increase in the involvement of the learning in decisions. This includes the reciprocal, self-check, guided discovery and divergent styles. More detail is provided in Chapter Two.



Methods for teaching decision making

The methods for teaching decision making were initially defined as the indirect coaching/teaching styles as defined above.

Technical skill learning

Gréhaigne, Godbout and Bouthier (1999) described skill technical learning as the learning of motor skills. Players can choose to perform only what they know how to do or can do, which are their actual motor skills.

Tactical learning

“Tactical learning implies the capacity of deciding, and deciding fast, and this capacity itself relies on the ability to conceive solutions” (Gréhaigne *et al.* 1999, p. 167). Tactics are not the same as strategies. Gréhaigne *et al.* (1999) identified the fundamental difference between tactics and strategy to be one of time. Tactics operate under strong time constraints because they must be decided upon and then implemented under pressure during game play. Strategies can involve more elaborate cognitive processes because decisions can be made without time constraints, since strategies are determined before a game begins.

Teaching games for understanding

Teaching games for understanding (TGFU) is regarded as a method for teaching players decision-making in an integrated way with skills that was introduced by Bunker and Thorpe (Bunker, Thorpe & Werner, 1996. p). The terms “game sense approach” is used interchangeably with teaching games for understanding.



Chapter Two

Review of Literature

A major advance in the study of coaching was the publication of the article *The Foundations of Tactics and Strategy in Team Sports* (Gréhaigne *et al.* 1999). In this article, the authors proposed a theoretical framework that was specifically designed to deal with the complex combinations of open and closed-skill situations found in team sports. A distinguishing feature of this framework was that coaching was presented as a teaching process in which “didactic choices” about the style of coaching/teaching (i.e., from direct teaching styles to indirect teaching styles) are made based on the strategic focus of practice activities (i.e., set plays vs. tactical performance) and the perceived need to focus on skill technique development (i.e., technical learning) (see Figure 2).

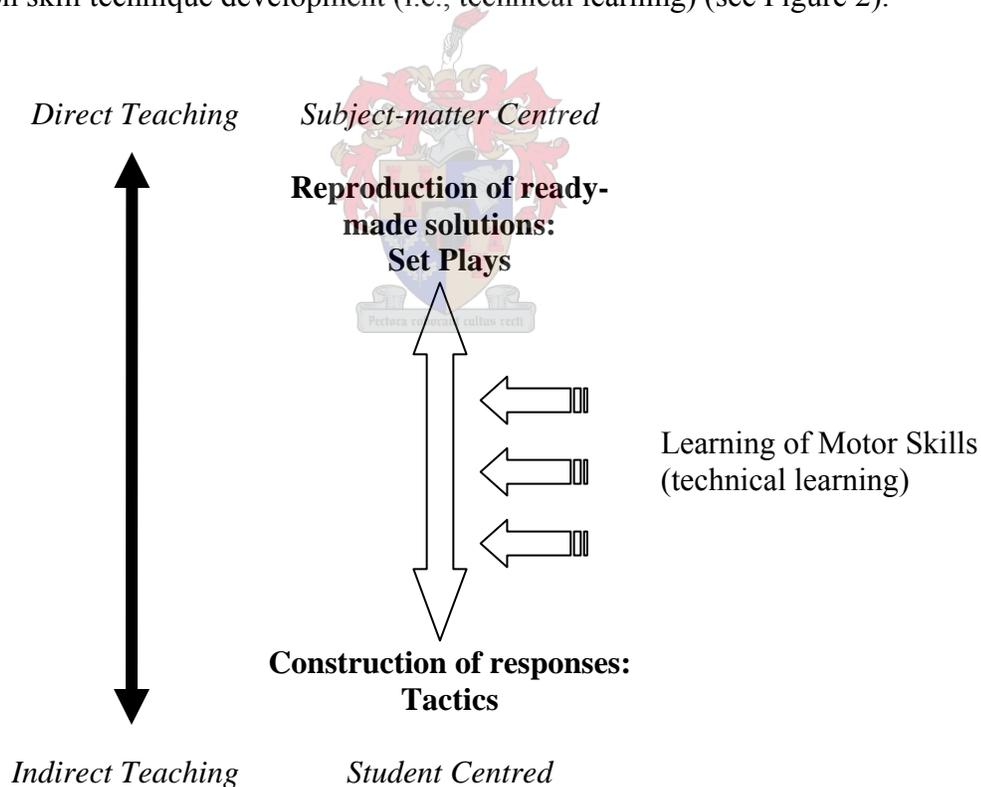


Figure2. A simplified version of the didactic choices at a coach’s disposal

(Gréhaigne *et al.* 1999, p. 162).

In the Gréhaigne *et al.* (1999) framework, the coach chooses a teaching style based on the ways in which the technical skills (motor skills) must be performed either in set play situations and/or in dynamic tactical situations. Set plays are better learned with more direct styles and tactical play is better encouraged by the more indirect styles. The technical learning of skills can be accommodated at all places along the continuum of teaching styles (from direct to indirect), but the coach must think about which style is most compatible with the way in which the skills will be used during game play.

Gréhaigne *et al.* (1999) stated that their framework could help team sport coaches focus their thinking on important didactic decisions, for example:

- Should a practice session be focused more on technical or on tactical learning (or some combination)?
- Which activities during a practice session call for more direct teaching styles and which call for more indirect teaching styles?
- Are the players gaining mastery of the subject matter (i.e., are they using the appropriate tactics and strategies during actual game play)?

The authors also stated that their framework could provide structure for the development of the body of knowledge about teaching team sports. They suggested that the following four areas define the key issues that must be resolved in the debate surrounding the development of optimal approaches to teaching/learning team sports:

1. Technical vs. tactical 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. This is also called “pedagogical content knowledge.”

4. The identification and development of successful tactics and strategies within each sport.

Because the Gréhaigne *et al.* (1999) theoretical framework was designed specifically for coaching/teaching team sports, it was selected to guide this review of literature. The first section deals with a brief conception of coaching. The second section reviews literature that addresses technical and tactical learning in team sports. The third section of this chapter integrates information about learning strategies with pedagogical content into a single section on coaching and teaching styles. The fourth section is focused specifically on rugby-specific tactics and strategies.

Coaching

According to Martens in Portrac, Brewer, Jones, Armour and Hoff (2000), modern coaches are required not only to have extensive technical knowledge of their sport but also to have the pedagogical skills of a teacher, the counselling wisdom of a psychologist and the administrative leadership of a business executive. At top levels of competitive sport, one of the primary responsibilities of the coach is to assist athletes to become more proficient in their performance (Bompa, 1999), which means coaches at top level must be competent to guide the more specialized physical, technical, tactical and psychological preparation of a top athlete (Sherman, Fuller & Speed, 2002).

Research over the last decade has demonstrated that coaches depend primarily on their own experience and the observation of other coaches that as sources of knowledge (Cushion, Armour & Jones, 2003). Although it is widely acknowledged that the simple accumulation of years of involvement does not guarantee that one will become an effective coach (Gilbert & Trudel, 2005), it is largely through shared experiences that collective understandings begin to develop, and the shared meanings about the occupational culture of coaching starts to take shape (Cushion *et al.* 2003).

This is a problem for coaching education when a comprehensive model of the coaching process is examined. In Abrahams article the model designed by Abraham, Collins and Martendal's (2006) model, for example, demonstrates that a substantial body of declarative and procedural knowledge is needed for coaches to fulfil their

responsibilities (see Figure 3). In their presentation, coaching is a series of decisions and adjustments made in relation to the goal of coaching. Declarative and procedural knowledge continuously interact to help the coach make decisions about both practice and competitions. A portion of the model has been highlighted in the text to indicate those aspects of coaching that are of concern in this research.

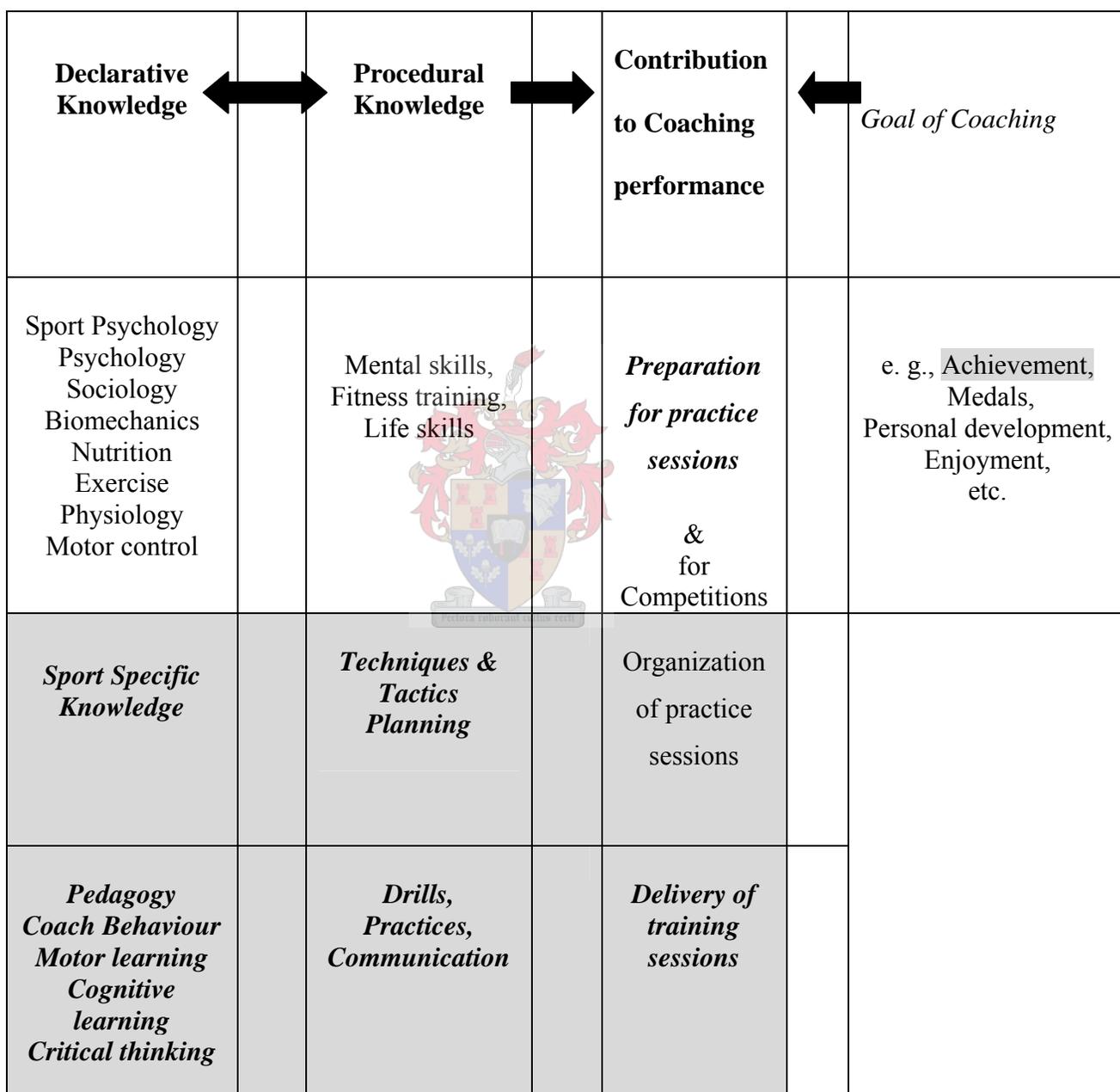


Figure 3. An adaptation of Abraham *et al.* (2006) conception of coaching (the highlighted portion indicates the processes of concern in this research).

DeMarco and McCullick (1997) were clear in saying that in order to improve their coaching, coaches needed to gain more knowledge. Voight (2002) also mentioned the development of a level of self awareness, in which coaches look at their specific coaching philosophy and behaviours in terms of the impact they may have on players. Chelladurai and Arnott (1985) specifically describe four decision making styles of the coach, including the Autocratic style, Consultive style, Participative Style and Delegative style. Elderton (2006) stated that a good coach will use different styles at different times and using the cooperative style most often when the situation calls for learning, decision making, and problem solving. The question of coaching styles is dealt with in a separate section of this chapter.

The flexible use of styles was recommended by Sherman et al. 2002. They stated that it may be necessary for the coach to engage in coaching behaviours to which the athlete is receptive. What may be an appropriate coaching behaviour to one athlete may be ineffective approach for another. Marshal (2006) concluded that successful coaching of high-level athletes involves a much more consensual process than the do-as-I-say approach. High-level athletes need input into goal setting and the structure of training. They also need to take responsibility for regulating themselves.

One of the most documented methods for improving skill and tactical execution is that of practicing game-like situations, supported by the provision of corrective feedback given by the coach during the practice session (Voight, 2002). According to Dunn (2006) feedback is a critical part of the learning process. Players need to know whether mistakes are tactical, technical or both. Coaches then need to address the appropriate aspect. In addition to feedback, modelling has also been identified as a critical factor in coaching success (Hodges & Franks, 2002). A third factor that has been identified is the content of coaches' verbal behaviour (what they say and how frequently they say it) (Lacy & Darst, 1985). However, the volume of research completed on coaching over the past decades has yet to answer a fundamental question: What style of coaching is most effective for consistently producing optimal performance? (Gilbert & Jackson, 2004).

Technical and Tactical Learning

In her extensive review of the development of expertise in sport, Thomas (1994) found that motor learning research has divided game performance into skill components (technical learning) and cognitive components (tactical learning). However, game performance was not conceived to be the sum of these two components, but rather the interaction between them. It is well known that practice situations should be similar to game performance in order to maximise transfer (Magill, 2001), which would suggest that practice sessions should also be characterised by the interaction of technical and tactical learning, with the objective of improving the quality of decision making by players on the field.

Technical learning

The process for learning technical skills can be described in terms of volume of practice and attention to correct skill technique in performance (Thomas, 1994). Research has found that although both modeling (demonstrations) and feedback are valuable coaching tools in teaching technical skills, their optimal use is not yet clear, especially for the performance of open skills (Franks, Hodges & Moore, 2005).

Skill learning is often conceived in terms of progressions, where first the fundamental skills are learned, then skill combinations, then the application of skills in games contexts. This linear approach has been rejected by some game specialists, who believe that skill learning can be learned in a more dynamic environment if skill practice is mixed with game play (Hopper & Kruisselbrink, 2006). Research has not been able to find clear differences between the linear approach and the integrated approach in terms of impact on quality of game performance at the beginning levels (Rink, 1996). At the elite level, however, it is well accepted that technical learning must be integrated with tactical learning in order to achieve expert performance (Thomas, 1994).

Tactical learning

In order to understand tactical learning, it is important to recognise how specific and practical a tactic is. The successful application of a tactic involves performing the right skill at the right time on the field to achieve the general strategic objectives of the game that were decided upon before the game started. Strategies refer to the general game plan. Tactics are related to strategies (see Table 2). Gréhaigne *et al.* (1999) identified the fundamental difference between tactics and strategy to be one of time. Tactics operate under strong time constraints because they must be decided upon and then implemented under pressure during game play. Strategies can involve more elaborate cognitive processes because decisions can be made without time constraints, since strategies are determined before a game begins. The specificity of tactics means that tactical learning cannot be easily separated from technical skill learning, since a tactic is only successful if performed skilfully.

Gréhaigne *et al.* (1999) found that a closer look at game play revealed that there are two different types of strategic actions in team sports: tactics and schemas of play (see Figure 4). Tactics, as described above, are decisions about how to move, when to move and where to move that are made in dynamic and at times unexpected situations in a game. Schemas of play, are pre-planned sets of actions, performed in a rehearsed manner (also called set plays). Set plays are practised until they can be performed automatically.

Table 2. *Differences between tactics and strategies*

Tactics	Strategies
Actions in response to the immediate game requirements generally organised according to a predetermined strategy Bouthier in Gréhaigne, 1999).	All plans or action guidelines decided upon before a match in order to organise the activity of the team and the players during the game (Bouthier in Gréhaigne, 1999).
The adaptation to new configurations of play and to the circulation of the ball (Gréhaigne, 1999).	The elements discussed in advance in order for the team to organise itself (Gréhaigne, 1999).
A team response to specific recurrent situations that you expect to encounter in every match (Greenwood, 2004).	A basic style or recurring pattern of play that characteristics the way in which an individual or team pressurizes opponents to create opportunities (Greenwood, 2004).

Tactics, however, can never be fully automated because they are performed in dynamic situations.

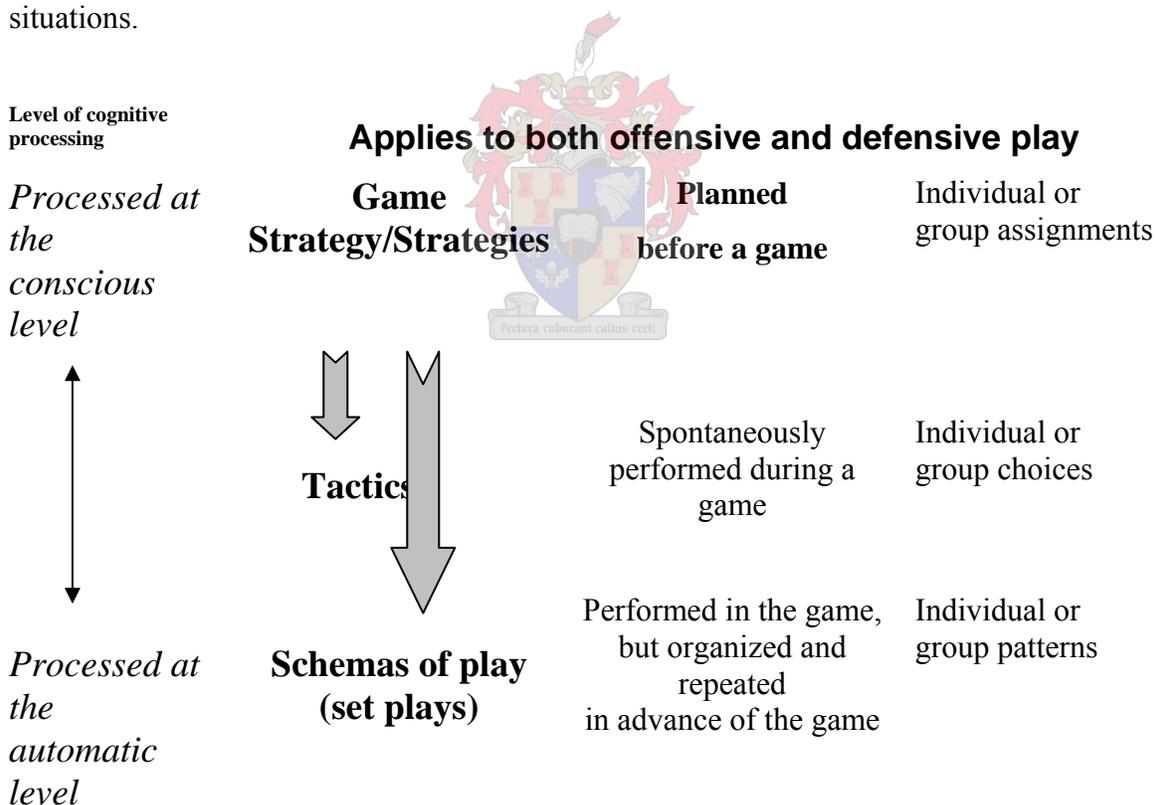
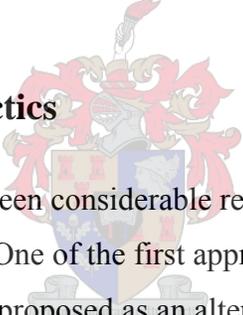


Figure 4. The main characteristics of strategy, tactics and schemas of game play (Gréhaigne *et al.* 1999, p. 168)

Evans et al. (1979) described strategy in rugby as the art of planning how to use skills to gain fair advantage over an opponent. A team's strategy is an attempt to map out the course of a game and control the competitive tempo. At the elite level of competition, more complex strategic planning will go into the preparation for game. They proceeded to associate tactics with the actual execution of skills during a game. Tactics are the means by which the strategy is put into action. The successful application of relies on each player's ability to assess the strengths and weaknesses of the opponent in relation to his own and his teams' strengths and weaknesses, and then to adjust his skill performance accordingly.

Approaches to Learning Tactics



Over the past decade there has been considerable research about the tactical approaches to teaching games. One of the first approaches, called Teaching Games for Understanding (TGFU) was proposed as an alternate to traditional approaches that focus on the development of skill technique before game play (Light, 2004). Teaching games for understanding is a problem-based approach to games teaching where skill development is put in the context of game play (Hopper, 2002).

Teaching games for understanding was first proposed by Bunker and Thorpe as an alternative to the traditional method of coaching (see Figure 5). They believed that their approach developed both tactical awareness and skill in performance. The model focuses on the teaching for understanding approach. Unlike the traditional approach to game-skill instruction, this model operates from the premise that game situations should be introduced to the learner first, so that learning specific skills will be contextualized throughout instruction (Turner and Martinek, 1995).

The traditional approach of coaching is a technique-led approach to game teaching and learning (Kirk & MacPahil, 2002). The traditional way of coaching in teaching games and sports has been to insure, first, in drill contexts, the mastery of a series of motor skills (techniques) seen as fundamental for the practice of the activity, and second, a progressive introduction to tactics in game contexts (Grehaigine *et al.* 1999). Techniques are practiced and developed before the learner is introduced to game play (Light, 2004).

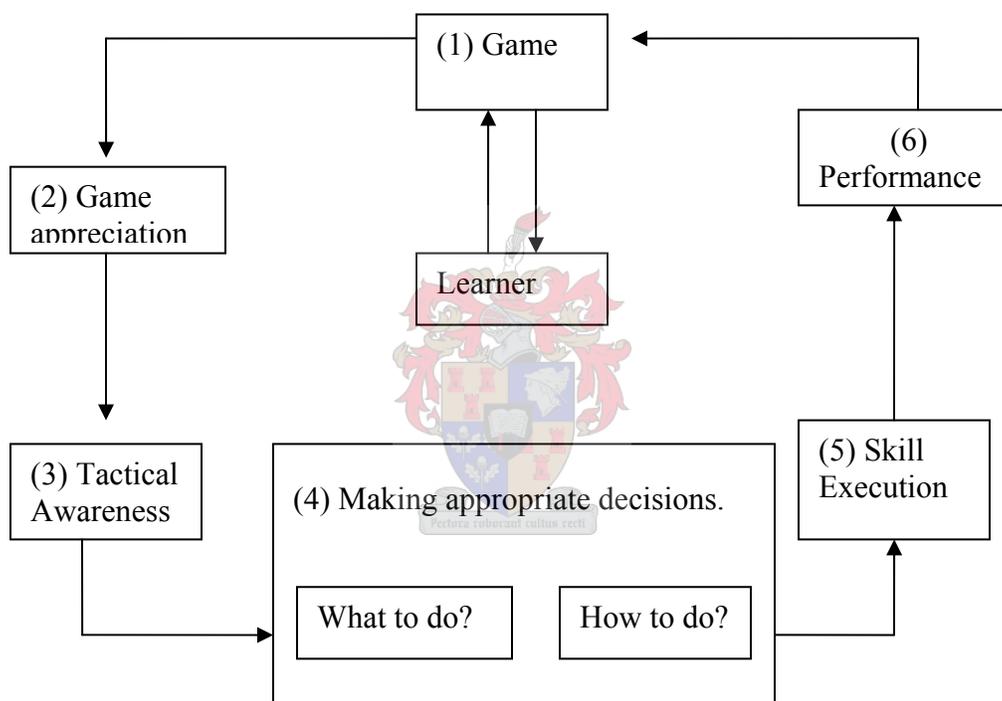


Figure 5. A simplified version of the TGFU model

- Stage one introduced to a variety of mini lead up games. For example, in rugby one could start with either touch rugby or mini rugby for the younger people.

- Stage two, the game appreciation stage emphasizes learning the rules of the game. In rugby, this would be to make a point of telling players those specific rules that apply to their play.
- Stage three, tactical awareness, involves the coach discussing the different options/the tactics involved in the game. For rugby, the group could practice different line outs and discuss the tactical advantages and disadvantages of each.
- Stage four, decision making, is a critical stage of the model, emphasising the link between deciding what to do and then doing it correctly. In rugby, the flyhalf must decide whether kick, pass or run with the ball, depending upon what will be the best outcome in the situation.
- Stage five, skill execution, this is when the skill performance of the learner is assessed within the context of the learner's ability and the demands of the game.
- Stage six, final performance, is an assessment stage as well. In this stage, a decision is made whether learners are ready to progress to more sophisticated versions of the game, or if they need to remain in the modified game (Turner& Martinek, 1995).

The traditional approach is in direct contrast to the TGFU approach, placing its emphasis on developing physical ability rather than on understanding the overall dynamics of game play (Turner& Martinek, 1995). Hastie (1998) was critical of the traditional approach, saying that skills are taught in isolation rather than as part of the natural context of executing strategy in game like situations. This interpretation was supported by the Scottish Rugby Union, who stated that traditionally, technique has been the focus of training sessions leaves skills often taught in isolation, without requiring players to think and bearing little to resemblance to the skills required in the game (*Rugby Sense*, 2006).

An example can be made of the different approaches from coaching the line out in rugby. The coach would break down all the different skills that are involved in the line out and teach them individually. The coach would start on the proper way to jump, then the support that the jumper will have and then the throw in by the hooker. Once all of these skills have been learned to a level acceptable to the coach, the whole line out situation will be practiced with all the different skills in place. In the TGFU approach, the coach designs a modified version of a line out for the learners to practice so that they get an idea of a line out is organised and how it is used in the game. The coach will then step in and help with feedback and modelling to support individual skill development as needed.

Teaching games for understanding is an instructional model focused on developing learners' abilities to play games (Kirk & Macpahil, 2002). The priority is given to understanding the tactics related to the game (Werner, 1989). While technique itself is an important part of the overall game performance, there is limited value in technique practise that does not take into account the other factors involved in executing the skill, for example, making decisions on which pass to give, or deceiving the defender using evasion skills (*Rugby Sense*, 2006).

The TGFU approach has encouraged debate on games teaching which until recently has polarized into skills versus tactics arguments (Hopper & Kruisselbrink, 2002). According to Griffin, Mitchell, and Oslin (1997), the aim of the tactical approach is to improve players' game performance, which involves combining tactical awareness and skill execution. Kirk and Macphail (2002) found that students who were taught from a TGFU perspective perform better on tests of tactical knowledge than those taught from a technique led approach. Launder and Piltz (2006) found the TGFU approach encourages a play spirit that was helpful in drawing reluctant or resistant learners into game participation.

Decision making

Decision making in team sports is the ability to make quick and accurate tactical decisions and is one of the most important aspects of successful performance (Tavares,

1997). The quality and speed of a player decision-making during play depend on factors such as speed and accuracy of information reception, tactical knowledge, skill and experience. (Tavares, 1997). For example, a flyhalf during a scrum will have to answer some questions before deciding what to do (e.g., what is the position on the field, where is the opposite flyhalf and what is their defensive position, is the scrumhalf going to try to charge my kick down and I'm I in the right position to kick?).

A player makes decisions not only when he has the ball in his possession but also when his teammates or opponents are in possession of the ball. When in possession of the ball, a player must decide whether to run with it, or whether to retain possession, or whether to dispose of it. If he decides to dispose of it he must determine the teammate to whom it should be passed, the method of disposal, and when it is appropriate to pass the ball. Hadfield (2004) identified two types of knowledge that players need in order to make accurate decisions: declarative knowledge and procedural knowledge.

Declarative knowledge refers to knowledge about facts and things (Hadfield (2004). For example, knowing that if the opposition has huge forwards and your pack is smaller, your teams is best to play it out wider and try to run around them or knowing that if you've got an attacking scrum five meters out, on the left hand side of the field and your number eight is very quick, then a move involving the number eight to go blindside will has a high probability of success.

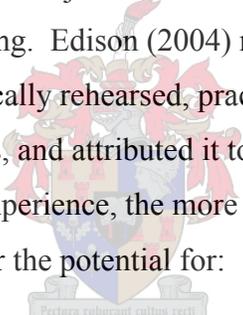
Procedural knowledge is processed in a different part of the brain. Procedural knowledge is knowledge about how/when to perform actions (Hadfield, 2004). For example, when a scrumhalf hears the referee say "crouch and hold, engage," he quickly and accurately feeds the ball into the scrum or when a flyhalf receives the ball from the scrum half while standing in his own in-goal area, he kicks effectively for touch.

Decision making in rugby is the central feature of the game because it is impossible to know how the opposition will react to a counter attack in progress. The best example of effective decision making would be for the ball carrier to make the right decision in relation to the defensive alignment of the opposition at the same time for the

support players to react appropriately to whatever initiative is taken by the ball carrier (Villpreux, 1993).

Hadfield (2004) also stated that there were two kinds of decision making in rugby. The first kind is an analytical decision making. This is a strategic or tactical type of decision where a player has time to weigh up the situation, consider the various options open to him, and perhaps even talk about it. It is the schema of play as described by (Gréhaigne *et al.* 1999) and is associated with set plays and direct styles of teaching during practice sessions. An example would be the type of move the flyhalf will decide on before an attacking scrum.

The other type of decision making is intuitive decision making (Hadfield, 2004). He described these as quick decisions made when there is no time to think consciously about things. When the player seems to just “react” to what he sees, hears or feels, it is regarded as intuitive decision making. Edison (2004) referred to intuitive decisions as being decisions that are not specifically rehearsed, practiced or scripted. He labeled it the ability to make “implicit” decisions, and attributed it to individual creativity, judgment and flair of the player. The more experience, the more confidence the better the implicit decision making will be, the greater the potential for:

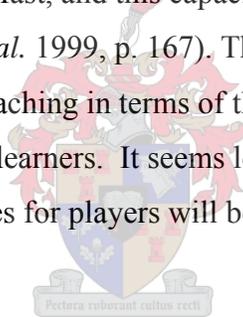
- 
- Creative passes.
 - Unique defensive adjustments.
 - Fakes, dummies.
 - Support.
 - Game changing actions.
 - Flair.

Smith (1984) said that when making decisions on the field, there are critical factors that must be taken into consideration. Examples include the game score, the period of time that has elapsed in the game and the location of the

player on the field. Critical factors may operate separately or collectively on one decision and require players to take greater risks in decision making to gain ball possession. For example, the closer a player is to the goal he is defending increases the necessity to make the right decision because the cost of an incorrect one is often greater than a mistake at the other end of the playing area.

Styles of Teaching and Coaching

A coach will chose a particular style or method of teaching based on the learning objectives of the practice session. If tactical learning is the objective of a session, the style of teaching should encourage tactical thinking. Tactical thinking "...implies the capacity of deciding, and deciding fast, and this capacity itself relies on the ability to conceive solutions" (Gréhaigne *et al.* 1999, p. 167). The following three models define different styles or approaches to teaching in terms of the ways in which they provide decision-making opportunities for learners. It seems logical that the styles that offer more decision-making opportunities for players will be more compatible with tactical learning.



Continuum of teaching styles

The definitive model for teaching styles in physical activity settings is Mosston's continuum of teaching styles (Mosston, 1981). According to Mosston (1981), every learning environment can be described in terms of who is making the decisions about what is happening. He identified two sources for decision-making: the teacher and the learners. At one extreme of his continuum were the direct styles of teaching in which all or most of the decisions were made by the teacher. At the other extreme of his continuum were the indirect styles in which most or almost all of the decisions were made by the learners (see Figure 6).

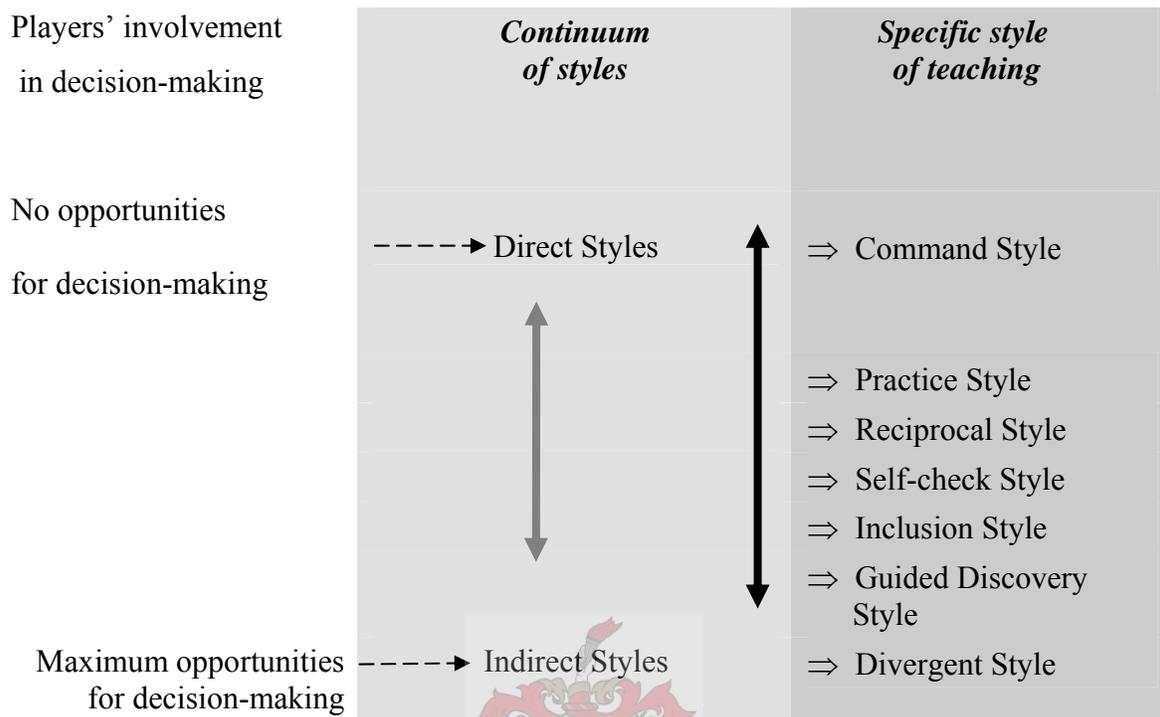


Figure 6. Mosston's (1981) continuum of teaching styles.

Mosston (1981) proceeded to define seven different teaching styles along this continuum. He encouraged teachers to think carefully which style to use, since he proposed that indirect styles would have a positive impact on the learner's ability to think for him/herself and to make decisions in activity situations.

1. The command style

The command style is characterized by the teacher making all of the decisions in the practice session. This includes decisions not only about what to do, but when to do it. In rugby, this style might be used by a coach when teaching a new skill in a predictable situation. The coach would not only demonstrate exactly what the players must do, but also provide them a cadence so that they can practise the skill at an externally set cadence. All the decisions about location, posture, starting time, pace and rhythm, stopping time, duration, and

interval are made by the coach. Every movement by the player would be performed according to the model presented by the coach (Mosston, 1981).

2. The practice style

In the practice style, the teacher makes most of the decisions, including the objectives of the practice session and the specific content to be taught. The learners have some decisions about the timing of their performance, but the skill must try to copy the model as provided by the teacher. This style is one of the most prevalent styles when teaching technical skills in rugby. The player in this style has the opportunity to start to think for himself and make some decisions with regards to skill performance. For example, when the coach has introduced a drill for learning an attacking skill in rugby, the players would be able to decide the pace at which the skill was performed. According to Mosston (1981), this small shift of decision-making toward the learner represents the beginning of the encouragement of independent thinking among learners. (Mosston, 1981).

3. The reciprocal style

In the reciprocal style, the teacher organises the learners into pairs, and then assigns tasks for each of them: one is the performer and the other is the observer. The observer's role is to provide feedback to the performer based on criteria prepared by the teacher. After feedback is provided, the two learners exchange roles (hence the name of the style). This style could be used by rugby coaches when players are working on set plays or closed skills, such as a line-out or a penalty kick. Players assigned to the role of observer could provide feedback to their partners following skill performance. It is a first-step toward the learner developing the thinking skills of analysis and application.

4. The self-check style

In the self-check style, the learner performs the task identified by the teacher and then evaluates his/her own performance based on criteria provided by the teacher (Mosston, 1981). In the rugby context, the coach would give the player a skill to perform and then observe the player giving himself feedback. The coach would not help him directly with his actual skill performance, but with his decisions about his self-evaluation. In this style, the learner experiences more sophisticated analysis and application. (Mosston, 1981)

5. The inclusion style

The inclusion style introduces a different concept of task design, where the teacher offers the learners multiple levels of difficulty in the performance of a particular task it is called the “inclusion style” style, because learners can decide on which level of difficulty they would like to participate. In the rugby context, a practice activity for the scrumhalves would be presented so that each player could decide the distance at which he can successfully give a pass away from either a scrum or a line out. Each scrumhalf could practice at his own ability level until he felt he wanted to increase the distance and challenge himself with a greater distance (Mosston, 1981).

6. The guided discovery style

In this style the learner is encouraged to think for himself. The most fundamental difference between the guided discovery and all the previous styles is that the teacher progressively shapes the learner’s thinking so that the learner comes up with insight into the content of the lesson (Mosston, 1981). The teacher identifies the objective of the lesson, gives the learning some choices. In the impact set, some of the subject matter decisions are shifted to the learner. For an example from rugby practice, the coach would ask the players when to kick for territory. Based on their answers, the coach would then ask them to explain which placements of the kick would be better under

certain circumstances. He would be very precise about the circumstances so that there is a “best answer,” because he will try to get the players to come up with the “best” answer themselves. This is a kind of convergent thinking where the players are led from a general answer for a group of general situations down to a specific answer for a specific situation. (Mosston, 1981)

7. The divergent style

While the previous style (guided discovery) represents the process of convergent thinking, the divergent style represents the process of divergent thinking (Mosston, 1981). It is sometimes called the “discovery style” because the teacher gives the learner a problem to solve and then the learner will explore and experiment until he/she finds a solution to the problem. The teacher will avoid giving feedback, but may ask clarifying questions to encourage the learner to find a solution that works. (Mosston, 1981)

Methods of coaching

Greenwood (2004) identified three general methods of coaching: Coaching by objectives, heuristic coaching and quality control/total quality control. The responsibility of the coach is different within each method, and each method is proposed to be useful in different situations. As with the Mosston (1981) model, the role of the learner/player in each method ranges from very little responsibility and control to a great deal of responsibility and control.

1. Coaching by objectives

The coaching by objectives method is a form of goal-setting in which the coach finds targets for each individual player from the beginning of the season to the end (Greenwood, 2004). For example, the coach would meet with a player to identify a performance objective to work toward, in order for him to improve his game. This could help a player who is struggling with a particular aspect of his game, such as his kicking. The coach would design practice activities to help the player meet his performance objective. Once the performance

objective is achieved, the coach has another meeting with the player to set his next performance objective. (Greenwood, 2004)

2. Heuristic coaching

The heuristic method of coaching promotes “self-coaching” (Greenwood, 2004). In this method, the coach acts more as a facilitator than a coach. This is done by asking the player questions relating to the specific situation. The coach asks questions that the player is able to answer. For example, when working in a scrum situation, the coach could ask a player, “Should your weight be on your left or right foot?” The coach encourages the player to figure out the answer by himself. (Greenwood, 2004)

3. Quality control and total quality control

The quality control and total quality control method are defined by Greenwood (2004) as allowing the individual players on a team to take responsibility for their own learning, so responsibility thus does not only fall on the coach, but also on the players. The coach does not focus on quality control over each player, but rather on the whole team. This includes creating an effective atmosphere, respecting players and encouraging them to respect each other, to lead them and not to just tell them, to open communication, to delegate responsibility, and to be personally organised. This method encourages the player to look after himself and his personal development, while the coach is looking after the whole team. (Greenwood, 2004)

Behavioural versus cognitive coaching

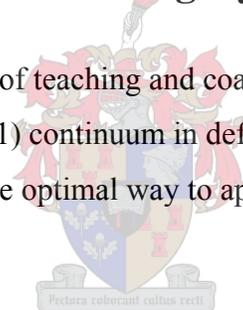
Gréhaigne and Godbout (1995) contrasted two styles of coaching in terms of two broad approaches: Behavioural and cognitive coaching. They defined behavioural coaching as the “games for understanding approach.” This approach is based on the premise that there is an understanding and learning of tactics related to the game or a sport that must occur very early in the learning process, and that specific technical skills

are best worked on when the need to learn them is perceived by the player. This is a form of coaching where the coach does not start with drills at the beginning of a practice session but rather starts with a mini-game where the players will attempt to play the game, rather than concentrate on learning any particular skill.

Gréhaigne and Godbout (1995) defined cognitive coaching as the traditional view of teaching games and sport. First, the learner engages in drills in order to achieve a level of mastery of a series of motor skills (techniques) that are considered to be fundamental for game play. Once skills are judged to be sufficient, there is a progressive introduction to tactics in game contexts. This straightforward approach begins with learning a simple skill, then going on to learn another skill or skill combinations, until a sufficient number of skills are mastered, followed by game play (Gréhaigne, 1999).

Summary of teaching and coaching styles

The three different models of teaching and coaching styles reviewed above support the value of Mosston (1981) continuum in defining the options open to a teacher/coach when deciding on the optimal way to approach the design of the learning environment.



- Coaching by objectives (Greenwood, 2004) and cognitive coaching (Gréhaigne & Godbout, 1995) can be associated with the more direct styles on the Mosston (1981) continuum (the command and practice styles).
- Heuristic coaching (Greenwood, 2004) is compatible with reciprocal, self-check and guided discovery styles, which lie toward the middle of Mosston's (1981) continuum.
- Quality control/total quality control (Greenwood, 2004) is compatible with the divergent style, which is the most indirect of all Mosston's (1981) styles.
- Behavioural coaching (Gréhaigne & Godbout, 1995) bridges the heuristic and quality control/total quality control method described by Greenwood (2004), which means it is compatible with the middle and indirect styles on Mosston's

(1981) continuum (reciprocal, self-check, guided discovery and divergent styles).

Skills and Tactics in Rugby

The following section highlights the scrum in rugby in order to provide an example of how the technical skills of the game must be integrated with tactical performance in order to be successful. Obviously, the decision making that occur during execution of the scrum can only be implemented successfully if players have the necessary technical expertise.

According to Williams (1977) the scrum is the most important single platform in the game. It makes such physical demands that it affects one's ability in the line outs, in the rucks and mauls, in supporting attacks and in covering defence. The scrum is awarded to one team, whenever either a knock-on or a forward pass has been made by the other team. The team who is awarded the scrum gets to "put the ball in." Scrumming is regarded to be one of the most difficult plays in rugby to master, since it relies on a high level of technical skill and a high level of tactical performance (New Zealand Coaching Manual, n.d.). There are eight players from each team directly involved in the performance of the scrum:

- 1 Loose head prop (on the left side of the scrum).
- 1 Tight head prop (on the right hand side of the scrum).
- 1 Hooker (in between the two props).
- 2 Locks (in the middle of the scrum, behind the props but in front of the Eighth man).
- 2 Flankers (on the side of the scrum).
- 1 Eighth man (at The back of the scrum, usually packed between the two locks).

The most important technical areas to consider in the performance of the scrum are the binding of the scrum, foot positioning and engagement/thrust of the scrum. The most important tactical areas are the put-in take-out of the ball, considerations about field position and wheeling the scrum (Evans et al. 1977).

Technical aspects of the scrum

The binding of the scrum takes place on the spot indicated by the referee. The team that binds the quickest and is ready to scrum usually has the advantage in the scrum because the opposition has to adjust to the position of the team that binds first, which puts them at an initial disadvantage (see Figure 7).

1. Binding of the scrum

Binding is the first step in performing a scrum, and if everyone should be bound tightly together before the scrum goes down (Evans *et al.* 1979). The aim of a tight bind is to make the scrum into one strong unit. If the binding is loose, then regardless of the power and skills of the individuals, the scrum will not be effective.

When the team arrives at the mark of the scrum, the props and hooker bind first. The loose head prop binds on the hooker and then the tight head prop binds on the hooker. The locks then bind between the legs of the props, with their heads in between the hooker and the two props. When the two locks are set, the two flankers bind on the locks and then the Eighth man binds between the locks, thus pulling the two locks closer together. The Eighth man will vary his bind according to the ball what channel in which the ball will be coming. The alternate bind is between the lock and the flanker. According to Williams (1977), this binding or “grip” among the players in the scrum requires extended practice to reach technical proficiency.

2. Foot position and body position.

Williams (1977) emphasized that correct foot positioning is essential for a successful scrum. Pushing through channel one produces good ball if the ball is struck cleanly and quickly. If the ball is slow coming back, then channel 2

must be used to create a good place for the scrum half to pick up the ball. One of the other major reasons the foot positioning must be correct is when the ball has been hooked and the ball is travelling through the scrum backwards towards the eighth man, the lock on the loose head side has to remember that the ball is coming through his feet and his feet must not be in the way. This is also important for the loose head prop because all the balls are hooked through his legs. The foot positioning of the Eighth man is critical since the ball ends up at his feet.

Foot positioning has an impact on the success of the shove/push of the scrum. According to Marks (1977) unless all 16 feet of the layers are placed optimally, the chances of the ball coming out are negligible. Foot position is a factor in determining the amount of power generated by the scrum.

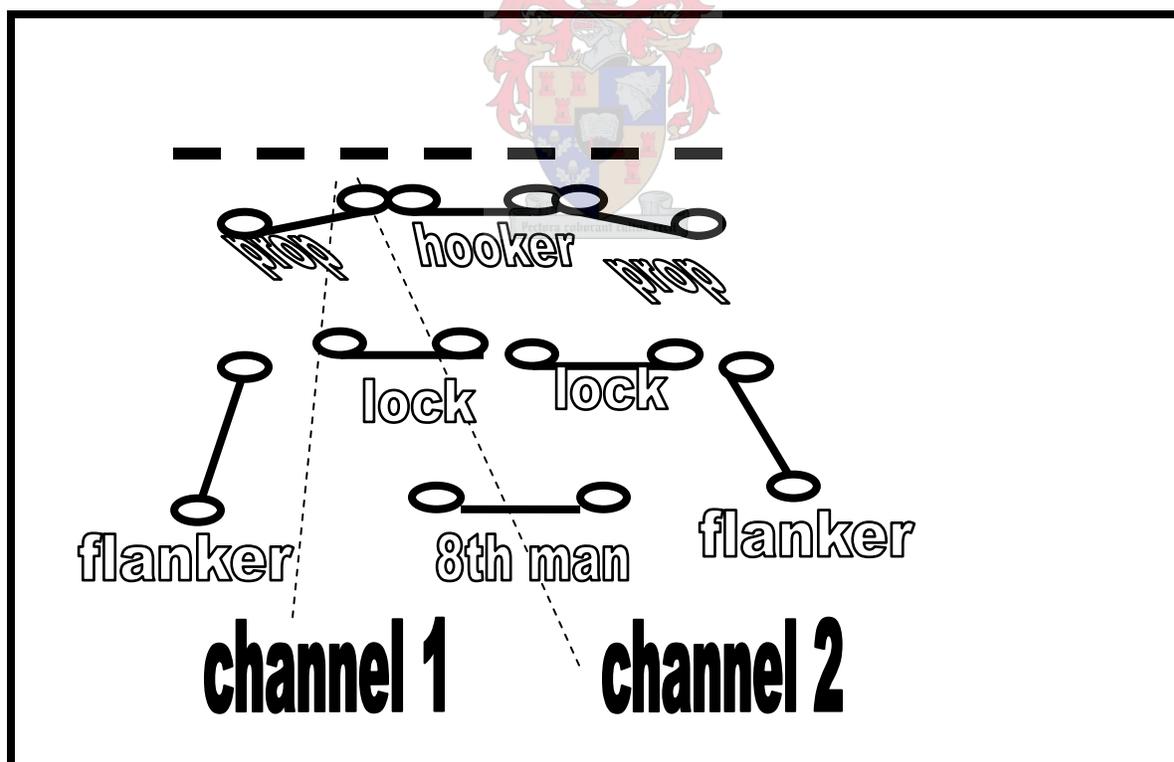


Figure 7. The scrum, with basic foot positioning indicated before players decide whether push through channel 1 or channel 2 when attacking the defence (Williams, 1977, p. 81)

There is a general rule for body positioning that the shoulders always be slightly higher than the hips. This prevents players from falling to the ground during a scrum. Players lift their heads, causing their backs to straighten. Players' hips remain in line behind their shoulders to ensure that their power thrust is forward (Joubert & Groenewald, 1998).

3. Engagement/thrust.

The engagement is when the two teams connect with one another. The referee will then call, crouch and hold, engage. This is when the two teams bind together. One of the most important things in the engagement is for the front row is to get down as quickly as possible. The front row which is underneath its opponents will always be at an advantage (Marks, 1977).

According to Walsh (1977) the weight must be applied at the right time and in the right direction in the scrum. To achieve this, all members of the unit must be in the correct positions, and the seven forwards supporting the hooker must concentrate on delivering the thrust at the appropriate time. In order for the push to be in the right direction, the hips of the locks and the props must be in line.

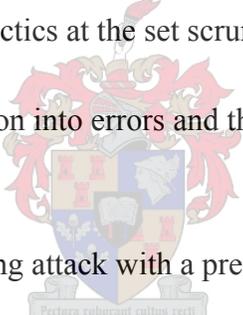
Once the engagement has occurred and the ball is about to be put in, there will be a call to let everyone know that the ball is being put in the scrum, which everyone it is time to shove. Each team binds tighter, dips their knees lower and then explodes into the shove. Once the initial shove has occurred, the legs should keep on driving and pumping in order to keep the opposition on the back foot. The defensive team tries to drive the offensive team backwards in order to put their scrumhalf under pressure so that he makes a mistake when picking up the ball.

Tactics of the scrum

Evans *et al.* (1979) identified some of factors that affect the tactical aspects of the scrum:

- The position on the field of play of the scrum.
- The scrummaging ability of both packs of forwards in terms of control, channelling and quality of ball.
- The actions of the opposing team.
- The ability of the back row and halves individually and as a unit.

Some of the tactics which are used with the scrum, this will include the different sides in which the player can either pass or pick up the ball. According to Evans *et al* (1979), there are many defensive tactics at the set scrum, including the following:

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- Forcing the opposition into errors and then to capitalize on any mistakes made as a result.
 - Stopping the opposing attack with a pressing defense.
 - Preventing close breaks to the scrum by the opposing scrumhalf and loose forwards, covering each other as necessary.
 - Preventing the opposing fly half from penetrating.
 - Preventing any penetration from scissors between the opposing three quarters.
 - Covering across the field as near to the ball as possible.
 - Winning every break down wherever it occurs by being there first.

1. The tactics of the put in and take out of ball.

The role of the put in is to ensure that the advantage gained in obtaining the “put in” is not lost by infringing the scrum law (New Zealand coaching accreditation manual, n.d.). The put in is a link between the scrumhalf and the hooker. The hooker usually signals the scrumhalf once he is ready for the ball. This is done by a tap on the loose head’s back, which indicates that the hooker is ready for the hook.

The ball is then put in quickly and hooked by the hooker into one of two channels: quick balls in Channel One and slower balls in Channel Two. When attacking from the scrum, there are two main options that the attacking team can take. The Eighth man can pick up the ball and decide to either pass or drive it forward himself. The other option is that of the scrumhalf to pick up the ball and decide to either pass off, to pick up and run with the ball, to kick the ball for the wingers to chase, or to kick out.



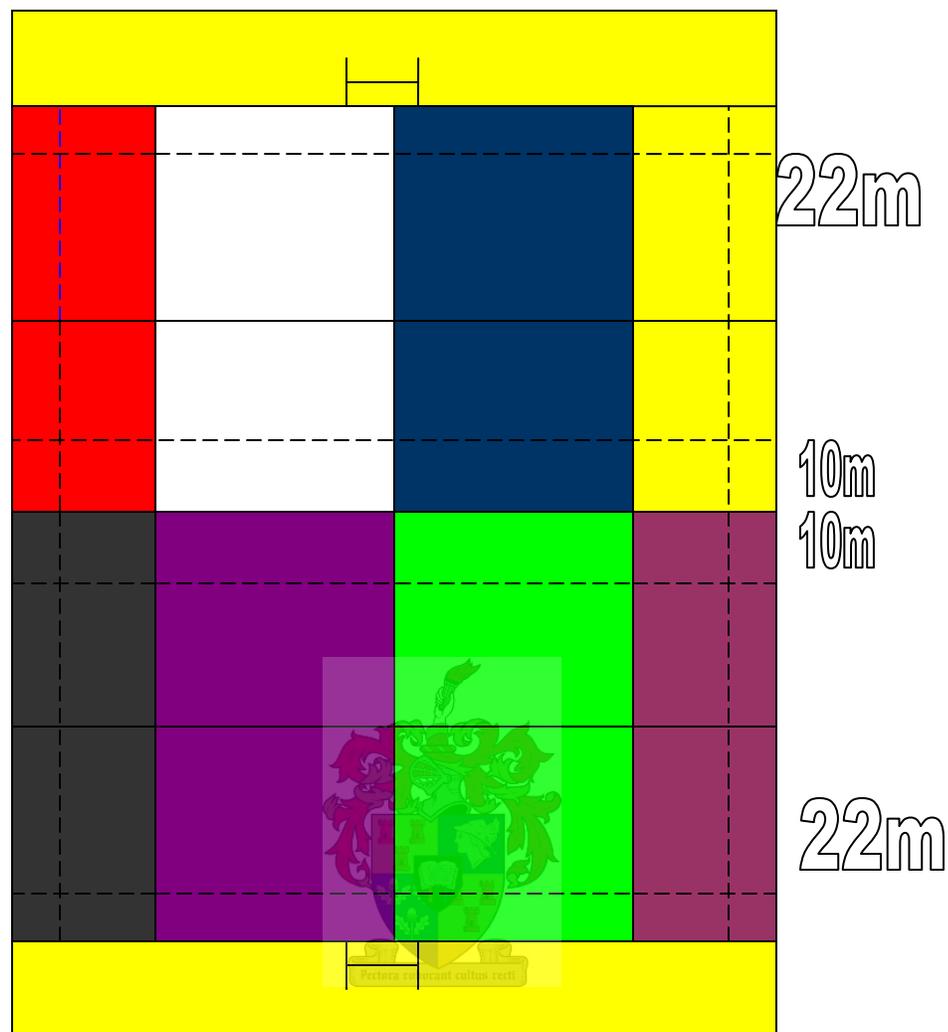


Figure 8. The attacking positions on field
(Dunn, 2006).

2. Positioning on the field.

A scrum occurs at a particular position on the field (see Figure 8). The position on the field has an influence on the performance of the scrum. This includes on what shoulder the team is going to scrum. For example, when on the right side

of the field, a right shoulder scrum is favoured in order to attack the short/blind side. When the scrum occurs on the left hand side of the field, a left shoulder scrum is favoured if there is enough space on the short/blind side to attack from the scrum.

3. The wheeling of the scrum.

For the defensive team, the wheel of the scrum can be used to advantage. When the scrum is wheeled by the defending team, a lot of pressure is put on the attacking team. The scrum can become disorganized and mistakes can be made by the Eighth man or the scrumhalf. The law is that if the scrum is wheeled 90⁰ and the ball is not out of the scrum, it is ruled a turn over ball and the defending side gets the ball and becomes the attacking side in a new scrum. (Greenwood, 2004)

Conclusion

Rugby is an invasion game that demands a high level of technical proficiency as well as tactical decision making. Those tactics must be executed in both set play situations (which can be rehearsed carefully practice sessions) and in open play situations where tactical decisions must be made intuitively by players who do their best to read the situation in which they find themselves. Rugby coaching must respond to the challenge of the game.

Effective instruction is crucial to the pursuit of optimal sporting performance. The more effective the instruction, the more fully the instructor's role will benefit athlete performance. Therefore, the practice sessions itself can be considered a critical element in the design of the practice environment and subsequently aid in the modification of athlete behaviour (Hodges & Franks, 2001, p. 27).

This study will attempt to describe how some coaches organise and implement their practice sessions, in relation to their responsibilities to address both technical (skill) and tactical development of players.

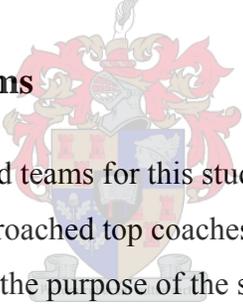
Chapter Three

Methodology

This study is descriptive. It is focused on describing how selected rugby coaches present their coaching sessions to players, with specific attention paid to how they present opportunities for technical and tactical learning. Two under 20 teams in the A level provincial league and one team in the senior Super A provincial league team were selected for this investigation. A total of eight coaching sessions were video taped and coaching behaviour was analyzed.

Procedures

Selection of coaches and teams



The selection of coaches and teams for this study represents a sample of convenience. The investigator approached top coaches with whom he had worked in the past. Following an explanation of the purpose of the study, two coaches from the under 20 A provincial league volunteered to have some of their coaching sessions recorded and their team's game performance analysed. Both coaches are highly regarded and have five years or more of experience coaching at the provincial A level. Both coaches are approached regularly by the South African National rugby team to assist with specialist coaching. A third coach from the more advanced Super A league also volunteered to have a coaching session and a game analysed. Because he coached at a higher level of expertise, it was decided that his results could provide some insight into whether or not the coaching style is related to a change in the level of expertise of the players.

Permission to film and analyse

Permission to film the coaching sessions and the games was obtained during a formal meeting with each coach. It was decided that permission of the coach was sufficient since it was the coach's behaviour that was the focus of the research.

Filming

The filming of coaching behaviour during practice sessions was done at each team's practice venue. The filming of the rugby games was completed at the competition venue. All games were filmed using a Panasonic 50Hz digital video camera. The following steps were completed during the filming process:

- Confirming availability of camera tripod and Digital Video (DV) tapes.
- Assessing suitability of practise and match venue for filming.
- Setting up video camera and tripod in a suitable position for best filming of practise sessions and games.
- Testing for video camera and positioning errors.
- Continuous filming of coaching sessions with the focus of the camera on the movement of the coach.
- Continuous filming of games with a wide focus of the camera on the ball in order to include as many players as possible in the frame. Filming was only stopped during the games at half time.
- Thanking coaches for their participation in the filming session.

Analysis of coaching sessions and games

In this study, both coaching behaviour and game play were analysed.

Analysis of coaching behaviour

Categories of coaching behaviours

The first step in analyzing coaching behaviour was the identification of a system for observing and coding those behaviours. For the purpose of this study, the observational instrument developed by Moore and Franks (1996) was used (see Figure 9). This type of analysis is referred to as event recording. According to Rink (1985), event recording is one of the most commonly used methods for observing teaching/coaching behaviour. The frequency of the event is determined by counting the number of times it is used in a lesson.



Category	Coaching Behaviour Observed		
1. Type of activity	Players repeat the same action over and over again (Direct style)	Players make decisions about actions (Indirect style)	Other
2. Cognitive focus of the Activity	Skill Technique	Tactical play	Other
3. Modelling	Modelling of a skill or tactic	No specific Modelling	
4. Instruction and/or Feedback <u>during</u> the activity	Made to group or team	Made to individuals	No feedback
5. Instruction and/or Feedback <u>after</u> the activity	Made to group or team	Made to individuals	No feedback

Figure 9. The category set used for the analysis of coaching behaviour during a practice session.

Every coaching event (a single activity presented as part of the coaching session) was coded first as to type (was the event a repetitive drill presented in a direct teaching style, or was it an activity that demanded player decision-making presented in an indirect style) or as “other event” (the category reserved when an activity or its presentation style could not be categorized as either a drill/direct style or a decision-making activity/indirect style).

Each type of coaching event was then coded down through the next three levels in order to determine:

- Its cognitive focus (skill technique or tactical learning).
- The use (or not) of modelling by the coach.
- The target of feedback or instructional comments during the practice activity.
- The target of feedback or instructional comments after the practice activity.

Once a recording of a coaching session was completed, the investigator was able to return to the office and play/replay the tape in order to apply the category set to the analysis of each coaching events identified. This was a straightforward method for determining how much, how many and how often a particular event occurs

Analysis of verbal behaviour

In addition to looking at the types of events that coaches include in practice sessions, their use of verbal (oral) commentary during practise sessions provides insight into how they approach technical and tactical learning experiences. In order to gain this information, a list of comments was compiled from the soundtrack of each coaching session. This list identified the comment(s) made by each coach and the frequency with which those comments were made during a session. The comments were then grouped into one of four categories:

1. Comments that provided information focused on technical performance.
2. Comments that provide information focused on tactical performance.
3. Comments intended to be encouraging and motivational.
4. Comments without tactical, technical or motivational focus.

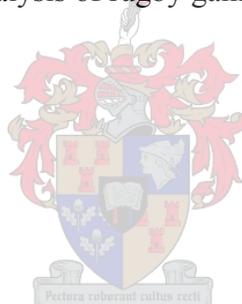
Rugby games analysis

Rugby matches were filmed at the competition venues during regular league play. The recorded version of each game was downloaded to a computer on which the Focus X2 software programme had been installed. This software is aimed at elite sports performance analysis and allows for the organising of parts of a match into video clips of events as deemed important by a coach or sport technologist. The programme also calculates match statistics identified by a coach or sport technologist.

The first step in games analysis is the development of a useful way to organize the video clips. This way of organising is called a category set. A category set is used to structure the way in which the sport technologist (the investigator in this study) uses the Focus X2 software programme to analyse a game. The coaches who participated in this study requested that the games be analysed using a category set that they had developed earlier in conjunction with the investigator (see Figure 10). The investigator was comfortable using this category set because it allowed the calculation of frequencies of good or poor skill performances and good or poor tactical performances, in a variety of rugby situations (scrums, line-outs, kick-offs, penalties and tries). These frequencies could serve as the basis for the comparison of game play between the teams in this study, in terms of their successes due to either skill or tactical play.

Level 1. Team	Team A		Opponents		
Level 2. Type of play	Scrum	Line-outs	Kick-offs	Penalties	Tries
Level 3. Results of play	Retained ball		Lost ball		
Level 4. Reasons	Good skill or tactical performance	Poor skill or tactical performance	Turnover due to opponents good play		
Level 5. Where event happened	Opposition Half	Opposition 22m	Own Half	Own 22m	

Figure 10. Category set for the analysis of rugby games.



Establishing validity, reliability and objectivity

Validity, reliability and objectivity of the description of coaching behaviour

Information about coaching behaviour was systematically observed and notations were made. The observational system designed by Moore and Franks (1996) was accepted as having face validity. It was published by experts in the refereed *Journal of Sport Sciences*. This type of validity is called face validity, which means that experts consider the instrument to be a reasonable way to measure what it claims to measure (Thomas & Nelson, 2001).

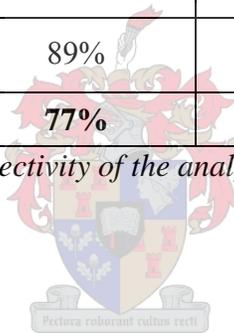
The reliability of an instrument refers to the repeatability of its results. If an instrument cannot yield the same results when administered at different times, then the test cannot be trusted (Thomas & Nelson, 2001). The reliability of the instrument for assessing coaching behaviour was established using the test re-test method. The investigator initially analysed all of the coaching sessions. One month later, the recordings for two different games were randomly selected, then re-analysed by the investigator.

The objectivity of an instrument refers to the consistency in results produced when the instrument is applied by different investigators (Thomas & Nelson, 2001). If an instrument is objective, its results are considered to be trustworthy because the results are not overly sensitive to the subjective judgments of the person who was administering the test. In this study, objectivity was calculated as an agreement rate between the analysis of one coaching session by the investigator compared to the analysis of the same coaching session by two established coaching educators, determined during a process called consensual validation (see in the following section a description of how the process of consensual validation was implemented to establish the validity of the category set for games analysis).

According to Rink (1985), a minimum agreement rate of 70% is acceptable when comparing the results of a video analysis of coaching behaviour. The results of the calculation of reliability and objectivity are presented in Table 3.

	Reliability for Coaching Session 1	Reliability for Coaching Session 2	Objectivity: Investigator to Established Coaching Educators
Agreement about type of activity	83%	89%	88%
Agreement about Modelling	72%	67%	83%
Agreement about feedback during activity	67%	99%	77%
Agreement about feedback after activity	77%	83%	83%
Agreement about cognitive focus	89%	83%	100%
Total Rate of Agreement	77%	85%	86%

Table 3: Reliability and objectivity of the analysis of coaching behaviour



There was a noticeable discrepancy in the categorisation of the coaches' feedback provided during activity. For session 1, there was only a 67% inter-rater agreement in the first assessment regarding whether feedback during activity was directed at an individual player or toward a group or team. This can be attributed to the difficulty in determining to whom a coach is speaking to during a practical session. Although the rate of agreement was almost perfect (99%) for the second session, this difference from the first session highlights the difficulty in accurately determining to whom a coach is speaking in field situations. This difficulty might also explain the slightly lower inter-rater agreement rates (77% and 83% respectively) regarding to whom a coach is speaking after an activity. This is clearly an area where data collection could be improved.

The reliability of the category set was accepted because total rate of test re-test agreement was 81% (77% for session 1 and 85% for session 2). The objectivity of the category set was accepted because the total rate of agreement between the investigators and the judges was 86%.

Validity and reliability of the games analysis

Face validity can be established through a method called “consensual validation.” (Scanlan, Stein & Ravizza, 1991). In this method, judges work together to analyse a game, attempting to apply the category set provided by the investigator. They first review the category set and discuss whether or not it is reasonable. If they agree it is reasonable, they then apply the set to analyse a randomly selected rugby game. As they watch the game and apply the category set to the different events, they are encouraged to discuss their decisions. If they initially disagree, they continue their discussion until a consensus is reached regarding how to categorise each event. Once they have achieved agreement, they compare their categorization to the categorisation produced by the investigator to determine whether or not the investigator can apply the category set in a valid manner.

For the purpose of this study, the investigator set a goal of achieving a minimum agreement rate of 80% with the judges, for acceptability of the validity of the category set and its application to rugby games. Two games at each level were randomly selected to serve as the games on which validity would be assessed.

Invitation to coaching educators

Two individuals with experience in coaching education at the senior level were invited to serve as the judges whose opinions would be used to validate the category set. Both judges also were experienced in games analysis.

The validation session

The validation session for the category set and application process was approximately three hours long. The session followed these steps:

1. Orientation to games analysis.

It was not necessary to orient the judges to the Focus X2 software since it is a programme that they use regularly.

2. Orientation to the category set.

The investigator provided the judges with a copy of the category set.

3. Confirmation of the category set.

Judges were asked if they thought the category set was reasonable and appropriate for the analysis of rugby games.

4. Trial practice using games analysis.

It was not necessary for the judges to practice applying the set since they are experienced at the application of category sets to games.

5. Explanation of process of consensual validation.

It was explained to the judges that they would watch the rugby games and identify the types of events in the game (scrums, line-outs, kick-offs, penalties and tries). Once they achieved agreement on the identification of events, the judges were told to apply the rest of the category set to determine the outcome for each event and the reason for the outcome. They discussed their categorization of each event, and once consensus was reached, it was recorded by the investigator as their judgment.

Accepting validity

After they completed their analysis of two games, the judges agreed that the category set developed for this study was reasonable and valid.

Calculating reliability and objectivity

In order to determine reliability, a comparison was made between the investigator's analysis and that of the judges. The purpose of this comparison was to identify differences between the judges and investigator in either the determination of the events, the outcomes of events or the reasons for the outcomes (see Appendix A). Rink (1985) stated that a percentage of agreement of at least 70% was acceptable. A summary of the results of these comparisons is presented in Table 4.

It is interesting to note the difference in test re-test agreement rate when categorizing the result of play (as either ball retained, ball lost, or a turnover due to good play on the part on the opponents. For Game 1 the rate was quite high (92%) but for game two it was only 79%. The reasons for this discrepancy could be difficulty in determining the difference between what constitutes a lost ball due to team error, as opposed to a ball lost in a turnover due to opponent's good play. This category was also the weakest when assessing the objectivity of the instrument (82% agreement rate when comparing the investigator's results to the judges' results).

Table 4: *Reliability and objectivity of the games analysis process*

	Reliability for Game 1	Reliability for Game 2	Objectivity: Investigator to Established Coaching Educators
Agreement about type of play	100%	100%	100%
Agreement about result of play	92%	79%	82%
Agreement about reason for result	85%	86%	92%
Total Rate of Agreement	92%	88%	91%

The reliability of the games analysis process was accepted because total rate of test re-test agreement was 90% (92% for session 1 and 88% for session 2). The objectivity of the games analysis was accepted because the total rate of agreement between the investigators and the judges was 91%.

Analysis of Results

The results of the analysis of the coaching behaviours of three coaches were recorded in table form (see Appendix B). The information needed to determine how they presented opportunities for technical and tactical learning was drawn from these tables. The results of the games analysis was also recorded in table form (see Appendix C) This information was gathered to gain insight into whether or not there were differences in the game performance of the teams coached by the three different coaches.

Chapter Four

Results and Discussion

Research Question One

1. Is there a difference among rugby coaches in terms of how they approach the teaching of skills and of tactics during practise sessions?

In order to answer this question, a complete analysis was made of the coaching behaviours of each coach during each of his practise sessions (see Appendix B). Table 5 presents a summary of the coaching behaviours according to the category set.

Variables for Analysis from the Category Set	Average Frequency per Session		
	Coach 1	Coach 2	Coach 3
Type of activity			
• Players drills/repeat actions (direct styles)	52%	43%	81%
• Players make decisions (indirect styles)	48%	57%	13%
• Other type of activity	0%	0%	6%
Modelling			
• Specific Modelling	52%	0%	64%
• No specific Modelling	48%	100%	36%
Feedback & instruction during activity			
• Comments to group or team	77%	73%	88%
• Comments made to individuals	23%	16%	5%
• No comment	0	11%	7%
Feedback & interaction after activity			
• Comments to group or team	64%	56%	78%
• Comments made to individuals	16%	36%	9%
• No comment	20%	8%	13%
Cognitive focus of activity			
• Skill Technique	91%	26%	76%
• Tactics	9%	74%	20%
• Other	0%	0%	4%

Table 5: Complete analysis of the coaching behaviours of the three coaches

In order to be more specific in the answer to Research Questions One, each variable in the category set was examined either individually or in the context of one or more of the other variables in the category set.

Type of activity and cognitive focus

The relationship between having the players drill and repeat their actions (associated with the direct styles of teaching) and having the players make decisions during the activities (associated with the indirect styles of coaching) is an indicator of how much emphasis the different coaches place on involving the players in decision-making during practices (see Table 6. The frequency of player involvement in decision-making is high for Coach 1 (41%) and for Coach 2 (54%). However, for Coach 3, drills dominate his approach to the players (70%) and there is minimal player involvement in decision-making (13%). In order to gain insight into the relevance of these choices about player involvement, the type of activity was related to the focus of the activity, either a technical learning focus or a tactical learning focus.

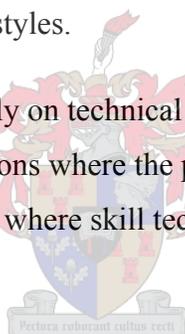
Cognitive focus of activity compared to type of activity	Coach 1	Coach 2	Coach 3
Tactical learning focus	9%	74%	20%
Players make decisions	7%	54%	7%
Players drill/repeat actions	2%	20%	13%
Skill learning focus	91%	26%	76%
Players make decisions	41%	3%	6%
Players drills/repeat actions	50%	23%	70%
Other learning/practice activities	0%	0%	4%

Table 6 *Relationship between types of practice activities and either a technical or tactical focus*

Although Coach 1 spent 91% of this practice time focused on skill development, he used indirect teaching styles almost half of the time (7% when working on tactical learning and 41% when working on technical skill learning). Coaching technical skills is often associated with set plays and direct styles of teaching. This coach appears to believe he can work on both players' decision-making skills as well as their technical rugby skills at the same time. This is a somewhat progressive idea that is not typical of the traditional approaches to coaching rugby.

Coach 2 shows more of a focus on tactical learning (74%) and within tactical learning spent the majority of his efforts in activities where players make decisions (54%). When focused on skill development, the majority of those activities were presented as drills where players do not have decisions (23%). This follows the traditional approach where skill development typically uses direct styles and tactical development typically used indirect styles.

Coach 3 was focused primarily on technical skill learning (76%), and almost all of those efforts used drills/repeated actions where the players made no decisions (70%). This reflects the traditional approach where skill technique development typically used direct styles of teaching.



As a partial answer to Research Question One, it can be seen that there are differences in the ways in which coaches approach technical versus tactical learning in terms of the types of activities and the use of direct versus indirect styles of teaching (see Table 7)

Styles of teaching	Coach 1	Coach 2	Coach 3
Players drill/repeat actions (direct styles)	52%	43%	87%
Players make decisions (indirect styles)	48%	57%	13%

Table 7: Summary of activities in which players drill/repeat actions (direct styles of teaching) vs. activities in which players make decisions (indirect styles of teaching)

Modelling

As can be seen on Table 5, Coach 1 was balanced in the way he chose to provide models (52%) or not (48%), during practice sessions. This could be due to a number of reasons the coach could have modelled the activities during the season and the players know what drill they will be doing, he might think there is no need for him to show the players and the players learn for themselves in the way they do the activity and the coach will correct them when needed.

Coach 2 did not use modelling at all (100%), which is odd even though his emphasis was on tactical learning (57%). He did use drills regularly (43%) that often included modelling as part of their explanation. It could be that the players had already done the drills that were performed during the taped session, therefore the activities did not need modelling.

Coach 3 used modelling the majority of the time (64%), which may reflect his commitment to skill learning in drills (81%).

As a partial answer to Research Question One, it can be seen that there are differences in the ways in which coaches use modelling. Coach 1 used modelling about half the time, although the emphasis was on skill development which often is associated with a very high frequency of modelling. Coach 2 did not use Modelling at all, which is difficult to explain despite his tactical emphasis. Coach 3 showed the traditional association of modelling with the emphasis on skill development activities that often involve demonstrations, etc.

Feedback and instruction during activity

All three coaches focused their comments associated with feedback and instruction during the activities, primarily on the group or team. Coach 1 had the highest rate of comments to individuals (23%) which may have reflected his focus on technical skill development. There were occasions when Coach 2 and 3 did not comment at all to either individuals or to a group/team. It appears that Coach 1 always had something to say.

As a partial answer to Research Question One, it can be seen that there was not much of a differences in the focus of feedback and instruction during activity for these coaches. All coaches focused primarily on the group or team. It is interesting to note that Coach 1 always provided feedback or instructional comments and that individuals were more likely to receive feedback and/or instruction in his coaching sessions.

Feedback and interaction after activity

Again, all three coaches showed a similar pattern of focusing their comments on the group/team rather than individuals. Coach 2 did have the highest frequency of comments to individuals (36%) and Coach 3 the highest frequency (78%) to the group or team. The content of these comments was not recorded specifically, so it is not known whether the comments were related to rugby or to other things. In any case, Coach 1 was the least likely to make comments to any individual or group after the activity (20%). This could be due to the coach always has some thing to say during the activity therefore he had often said all that he had to say to the individual or group during the activity.

As a partial answer to Research Question One, it can be seen that there was not much of a differences in the focus of feedback and interaction after activity for these coaches.

Answer to Research Question One

The answer to Research Question One is “yes,” coaches do use different approaches to coaching skills and tactics. It appears that the sources of these differences are in the use of direct versus indirect teaching styles.

- Coach 1 is the most flexible in the way in which he freely used indirect styles for both technical skills coaching as well as tactical learning. Coach 1 integrated decision making with skill practice because it brings the skill learning closer to tactical use. The balance is that of knowing when and where to coach the skill the traditional way or the “new” way of coaching (TGfU). The traditional approach is used by the other two coaches. Coaches 2 and 3 followed the more traditional pattern of using direct styles for coaching skills and indirect styles for coaching tactics (although Coach 3 seldom taught tactics, this could be an artefact of the sessions selected for taping).
- There are differences in the ways in which coaches use modelling. One coach chose not to use modelling at all, while the other two coaches showed a similar pattern of balance between the use of modelling and no use of modelling.
- There were not many differences in the focus of feedback and instruction during activity or after activity for these coaches. All coaches focused primarily on the group or team.

Research Question Two

2. Is there a difference in the verbal behaviour of rugby coaches during practice sessions in terms of technical and tactical feedback?

The list of the words and phrases used by the coaches during the sessions are recorded in Appendix D. A calculation of the percentage of comments made in the categories of technical comments, tactical comments, motivational comments and “other comments” is presented in Table 8.

	Technical focus in activities	Tactical focus in activities	Technical Comments	Tactical Comments	Motivational Comments	Other Comments
Coach 1	91%	9%	18%	36%	26%	20%
Coach 2	26%	74%	19%	26%	26%	29%
Coach 3	76%	20%	11%	23%	37%	29%

Table 8: *Frequency of comments used during practice sessions in four categories of verbal behaviour*

It is interesting to note that the majority of comments by Coach 1 were focused on tactical learning (36%), although only 9% of his time was spent on tactical learning activities. He focused 18% of his comments on technical learning, although 91% of his activities had a technical focus. This suggests he incorporates both technical and tactical comments in activities that have a technical focus. The inclusion of tactical comments in a technical activity could encourage players to think about the tactical uses of the skills that they are practicing, which might have benefits for applying skills in tactical situations on the field.

The main focus for Coach 2 was on comments in the “other” category, with a rate of tactical comments at only 26% despite the focus on tactical activities at a rate of 74%.

This suggests that either Coach 2 believes that the tactical activities do not require his verbal involvement, or that he is so general in his comments during these activities that they were classified as “other.” In either case, the mismatch between technical activities and tactical comments indicates that Coach 2 approaches his verbal involvement in technical and tactical learning differently than Coach 1.

The main focus for Coach 3 was on motivational comments (37%) and comments in the “other” category (29%). High rate with Coach 3 for motivational comments may reflect his coaching philosophy, where he feels that the coach is a motivator. His comments aimed at tactical improvement were also more frequent than those aimed at technical learning.

Answer to Research Question Two

The answer to Research Question Two is “yes,” there is a difference in rugby coaches in terms of verbal behaviour during lessons regarding technical and tactical learning. While all three coaches were more tactical than technical in their verbal behaviour, only Coach 3 was predominantly more tactical in terms of total verbal behaviour. Coaches 2 and 3 provided mostly motivational or “other” comments during practice sessions. One problem with their focus on motivational and “other” comments is that such comments do not have informational value. It is difficult to be critical when only a few sessions were analysed, but if motivational and “other” comments dominate the majority of practice sessions, it could compromise the rate of learning skills and tactics.

Research Question Three

3. Are there differences in the game performances of team whose coaches use different styles for promoting technical and tactical learning?

A games analysis was completed on one actual rugby match played by each of the teams of the three coaches involved in this study. The results of the games analysis in terms of the critical events in a rugby match are presented in Table 9. Comments are organised according to the different events in the match (scrums, line outs, kick offs and penalties)

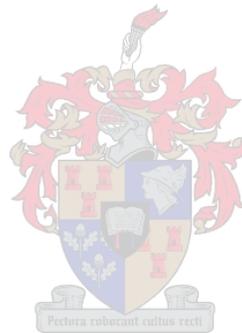


Table 9: Summary of games analysis statistics for the teams of the coaches included in this study

	Total of events	Retained	Lost	% possession retained
Team 1 (Coach 1: Direct Styles 52% and Indirect Styles 48%)				
Scrum s	9	9	0	100%
Line out s	15	9	4	60%
Kick off s	7	3	4	33%
Penaltie s	4	3	1	75%
Team 2 (Coach 2: Direct Styles 43% and Indirect Styles 57%)				
Scrum s	3	1	2	33%
Line out s	17	11	5	65%
Kick off s	7	2	5	29%
Penaltie s	2	1	1	50%
Team 3 (Coach 3: Direct Styles 87% and Indirect Styles 13%)				
Scrum s	11	11	0	100%
Line out s	10	9	1	90%
Kick off s	5	1	4	20%
Penaltie s	3	1	2	33%

Scrum

Team 2 retained only 33% of their scrums, while the other two teams retained 100% of their scrums. This difference in the success rate in the scrums could be due to a number of reasons, including the opposition being better at scrums, lack of control at the back of the scrum, lack of communication, etc. However, since Team 2 only had three scrum opportunities compared to nine for Team 1 and 2 for Team 3, their low rate of success which could be misleading.

Line outs

Team 3 performed to the best standard of success (90%). Team 1 and 2 were very similar (60% and 65% respectively). The line out is a set play that is usually practiced in drills with a technical focus. Coach 3 (Team 3) had a high technical focus in his practice sessions. However, although at international level one should try achieve 100% success in ball retention in line outs, at the provincial level this may be an unrealistic goal. Many mistakes lead to a loss of possession in the line out, such as pressure on the hooker and jumpers, causing the hooker to throw skew and missing the jumper. These technical mistakes may have led to the lower success rates for Teams 1 and 2. see table 9



Kick offs

It is difficult to compare success rates in the kick off because tactically, sometimes ball is kicked deeper, sometimes it is kicked out intentionally to gain field position, etc. For example, if a team kicks deep and has a good chase, the opposition is forced to make a bad kick or kick out in their 22m or half, which puts pressure on them in their own half.

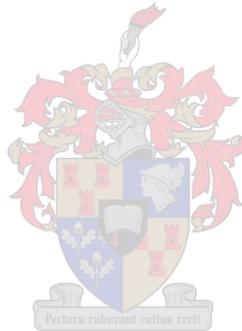
Penalties

There were few penalties in any of the games, but it is noted that Team 1 was the most successful in retaining the ball (75%). Success in retaining the ball after penalties can be due to who takes the quick tap, where the ball goes in terms of the field, and to

whom the ball goes. In general good discipline was displayed by all the teams. See table 9

Answer to Research Question Three

The answer to Research Question Three is a partial “yes,” there are some differences in the team’s performances, with Team 1 appearing to be the most generally successful (scrums retained 100%, penalties retained (75%), and kick off s retained (33%). Team 1 (Coach 1) is the “most different” of the coaches. He balances direct and indirect teaching styles, but spends more time making tactical comments than either of the other two coaches. It appears that both the style of coaching (direct and indirect) and the focus for comments (technical or tactical) may be critical indicators of technical and tactical learning in rugby.



Research Question Four

4. Are there differences in the technical and tactical game performance of the same team when they play different opponents?

Team 1 was selected to answer this research question since its coach was the most progressive in terms of his use of tactical comments within a commitment to technical learning. Table 10 presents the results of the analysis of three games by Team 1.

Table 10: *Results of the analysis of three games of Team 1 (Coach 1)*

	Team 1 Coach 1: Direct Styles 52% and Indirect Styles 48% Technical Comments and Tactical Comments			
	Total	Retained	Lost	% retained
Scrums total	34	34	0	
Game 1	9	9	0	100%
Game 2	14	14	0	100%
Game 3	11	11	0	100%
Line outs total	29	22	5	
Game 1	15	9	4	63%
Game 2	4	4	0	100%
Game 3	10	9	1	90%
Kick offs total	16	5	11	
Game 1	7	3	4	33%
Game 2	3	1	2	33.3%
Game 3	6	1	5	16.6%
Penalties total	12	11	1	
Game 1	4	3	1	75%
Game 2	5	5	0	100%
Game 3	3	3	0	100%

Scrums

Team 1 was consistent in scrum success rate, retaining 100% of its scrums for all three games. This is a set play and teams should strive to get 100% whenever they put the ball in.

Line outs

Team 1 was not consistent in retaining possession in line outs (63%, 90% and 100%). Line outs are also set plays, but may be technically more difficult than the scrums. There also may be a tactical aspect to the line outs that requires attention.

Kick offs

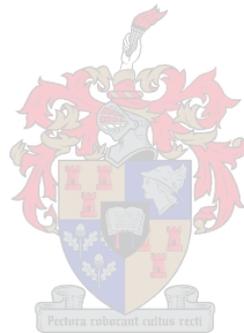
There was moderate consistency in retention of kick offs (33%, 33% and 17%). The analysis of this aspect of rugby is very complex, since different coaches may have different tactics on the kick off. For example, one team may prefer to kick the ball deep to put pressure on the opponents to kick it out, while another team might kick it short and allow the forwards to chase and try retrieve the ball back. The tactic could also change depending on the match score, time in the match, etc.

Penalties

Although Team 1 did not commit many penalties, their retention rate was consistently high (75% - 100% - 100%). This may reflect the technical focus of the coach.

Answer to Research Question Four

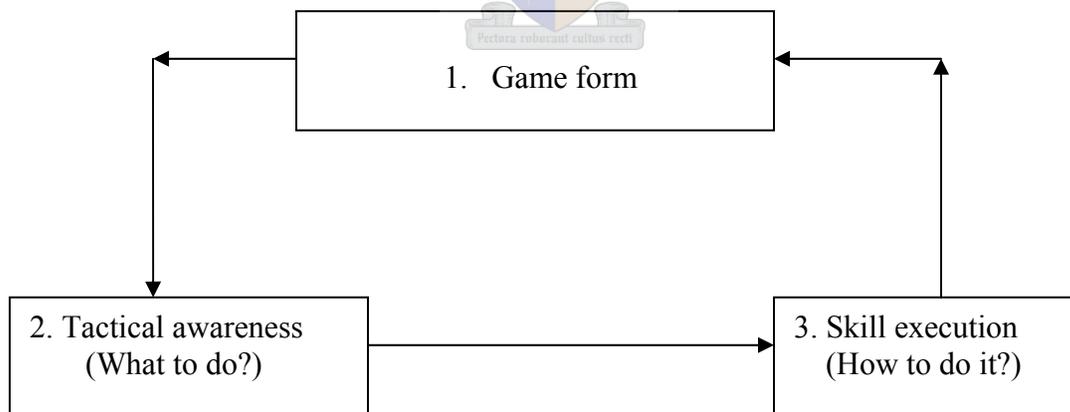
The answer to research Question four is a partial “yes,” the same team is relatively consistent in their game play against different opponents. However, it is reasonable to assume that there must be some variations due to opponents played. More games must be analysed in order to answer this question with confidence.



Chapter Five

Conclusions

The purpose of this study was to determine if different coaches use different methods in coaching decision making. Both physical educators and coaches have long been concerned with issues relating to how to best teach sports and games to students (Rink 1996). According to Griffin, Mitchell & Oslin (1997), one of the most critical questions to answer is how to teach for tactical awareness. They proposed a simple model in which games were modified to focus is on a tactical concept, but emphasised that success in the game also depended upon skilful performance (see Figure 11). This approach to teaching tactical awareness has been called the Teaching Games for Understanding (TGFU) approach (Bunker & Thorpe, 1982). Games are simplified by making changes to the game structures, as reducing the area of play, playing with fewer players, adapting rules to players' needs, using lighter equipment and slower moving objects (Hopper, 2002).



*Figure 11 . A tactical approach to teaching games.
(Griffin, Mitchell & Oslin, 1997).*

This approach is a major shift in the way that not only tactics can be coached but also the ways in which skills are developed. Light (2006) pointed out that in this approach, skill is developed along with “game sense” (i.e., is developed contextually). This means that this approach is less explicit than approaches that focus strongly on the development of skill technique before game play.

A review of literature revealed that tactical play involved decision making, and that decision making is thought to be best developed using indirect teaching styles. There was also research that emphasized the contribution that the verbal behaviour of the coach can make to the learning environment. Feedback has been long established as critical to all kinds of learning.

Launder (2003) stated that good coaches have always taught elements of game sense, they just never defined it. If Launder’s position is correct, then top level coaches who work with teams that must balance high levels of technical skill execution with good tactical performance, must be using some methods to balance the development of the two. They must be teaching both skills and decision making.

This study described the coaching behaviour of three experienced coaches to see how they were dealing with this need to balance skill development with the development of decision making in tactical situations. The results of this study led to the following conclusions:

- The methods for teaching decision making.

Literature would suggest that indirect styles of teaching which are focused on cognitive aspects of play, would be an effective approach to teaching decision making. Dunn (2004) said that educators have long known that we gain a better understanding of concepts through active learning, it is time for coaches to embrace this also. The indirect style includes methods to improve decision making because the coach/teacher shifts his/her role from controller of information to facilitator in a more learner-centred environment (McBride & Xiang, 2004). Ross (2001) was convinced that the decision making process can

be improved by innovative and realistic training, which would include the need for players to make decisions.

In this study, it was found that although coaches used indirect styles, direct styles were favoured, even when the practise activity had a cognitive focus. Direct styles are traditionally associated with technical skill learning. It is possible that the coaches are not very familiar or comfortable with indirect styles and as a result, do not use them to their full potential.

- The literature was also clear that the verbal behaviours of the coach can have an impact on what players learn. Coach 1 was the most skill orientated of the three coaches, yet the majority of words and phrases he directed at individuals and groups were mainly tactical. This brings up an important dimension to the challenge to balance technical learning with tactical learning. Coach 1 often used verbal behaviour to set the tactical context for skill performance, even though the practise activity itself was technically oriented and deliver with a direct style of teaching. More *et al.* (2002) purports that effective coaching instruction is an essential component in the development of expertise, and that the most important variable for the learning of motor skills is feedback. The quality and focus of the words spoken in the actual session constitute feedback. By providing players with feedback about the tactical dimension of their skill performance, Coach 1 may have been contributing to their declarative and/or procedural knowledge about rugby, which could make a contribution to their decision making capabilities.
- Despite TGFU literature suggesting modified games and mini-games are optimal ways to integrate technical learning with tactical learning, there were no specific instances in any of the coaching sessions where they were used as a method of teaching. This could be due to a number of reasons. Coaches at the upper levels may think these methods are for beginners only. It may be that they do use them, but only at the beginning of the training year during the foundation phase (the coaching sessions analysed in this study were during the competitive phase of the season). Light and Fawn (2003) said that with the TGFU approach to teaching,

the game skills are developed within games that are designed to provide for the simulations development of perception, decision making ability and the appropriate performance of the motor skill. The approach certainly holds potential at all levels of play, although top level coaches need to work with the methods involved to ensure that development of the balance between technical and tactical learning is appropriate.

The results of this study show that different coaches will use different methods of coaching when they approach the learning of tactics and strategies. Two of the three coaches in this study used indirect styles some of the time, but there was no clear match between indirect styles and the cognitive focus of an activity on tactical learning. Coaches used direct styles most often, even when there was a cognitive focus to the activity. Feedback about tactical aspects in the form of verbal behaviour appeared to be the preferred method for including the development of tactical and strategic understanding. The coach, who was most active in terms of this kind of feedback, also had the team who performed most successfully in actual rugby matches, so the use of feedback regarding tactic must be added to the list of methods to improve decision making.

There is a concern that if a coach persists on doing drills using direct teaching styles and focuses only on technical skill development those players will not develop as thinking players. Launder and Plitz (2006) stated that technical ability in playing ball games must be underpinned by:

- An understanding of rules.
- An understanding of tactics.
- An understanding of strategy.

These three aspects form a basis which enables players to “read the game.” Practice sessions must be provided that enable players to develop this declarative knowledge base as well as the procedural knowledge base of tactical performance.

It can be concluded that coach a can incorporate technical and tactical learning into different styles of teaching (direct and indirect) and shape the focus of sessions with feedback on technical and tactical aspects.

Recommendations

Recommendations for coaching education

Coaches at all levels can benefit from continuing their education in rugby. In this study, it was clear that coaches seldom used indirect styles, despite the research literature that suggested they are viable methods for improving decision making abilities. The potential of indirect styles may be unknown to them. With this in mind, the following recommendations are made for coaching education:

- To coach at the advanced levels, the coach should become more of an expert in his/her sport (Voight, 2002). Coaches should broaden their knowledge by observing the behaviour of more experienced coaches during practise and games and by listening during informal periods leaves its mark on novice coaches. It is largely through such experiences that collective understandings begin to develop, and the shared meanings about the occupational culture of coaching starts to take shape. (Cushion *et al.* 2003). This is one of the ways that the coach will become a better coach.
- Another way for the coaches to improve their understanding of their sport is to consult with each other on a regular basis as “students of the game.” This will give experienced and novice coaches a chance to learn from one another and to good and bad ideas that they have learnt over the years of what works on the and off the field when coaching teams or individuals. This includes sharing coaching philosophies and outlooks on their particular sport. It will also give an opportunity for young coaches to learn from other coaches rather than learning it out of a text book not knowing the practical side of coaching.

- Allow coaches to experience the difference in the coaching ways getting out of the old routine and trying the new coaching styles. Not only should coaches be given the opportunity to learn about and work with indirect teaching styles, but more exposure to the TGFU approach may allow these methods to gain in sophistication and applicability to the more advanced levels of play.

Recommendations for future research in rugby coaching

Very little research was found on different methods of coaching during practise sessions in order to improve players' decision making. Future research possibilities that follow from the insights gained in this study include:

- Because the training year is scheduled in phases, practise sessions within each phase will have different objectives. It would be interesting to identify a larger group of coaches at the top level, then to record multiple sessions from each coach during different phases of the season (beginning, in-season and post season) to see how technical and tactical learning is addressed and how the balance between the two changes according to the phase of training. It is possible that different methods for improving decision making are used at different times during the year.
- The use of tactical comments is unexplored, but may be a powerful method for improving players' decision making. The analysis of the verbal behaviour of coaches and its impact on technical and tactical performance is a direction for future research. It is possible that the verbal behaviour of the coach is as important as the teaching style in terms of improving players' decision making.
- It would be very interesting to investigate how rugby coaches could incorporate the TGFU model at intermediate and advanced levels of play. Complementary research could explore the effectiveness of indirect styles on players decision making at all levels of the game.

- Not only should research be organised according to different levels of rugby, but there could be interesting insights gained from coaches who work in different countries. The style of learning of the players was not addressed in this study, and it is known that culture has an impact on learning style. Different countries do have different styles of play (different strategic approaches to playing rugby) and an investigation into the different coaching styles that correspond to those different strategic approaches could help us to understand the relationship between coaching methods and tactical learning.
- It would be beneficial to have more coaches and more coaching sessions involved in any data analysis. This would allow for a statistical treatment of the data (chi-square statistics), rather than the use of frequencies and percentages in order to identify patterns in the data.

Concluding Remarks

The discovery of methods of coaching to improve decision making is an important direction for future research in sport science. New styles of coaching that defines the coach as a facilitator rather than an autocratic leader must be tested in real world sport situations. Indirect styles that pass decision making responsibilities over to players have been effective in children's games setting, but a lot has yet to be learned about how they can be used at the intermediate and advanced levels. Future research in sport science must include the practise session as a laboratory where data can be collected, analysed and interpreted in order to improve the outcomes of the session. Computer-based analysis of game play has created a new dimension for evaluating the success of coaching interventions. How the players improve in their actual game performance can now be determined through the application of a category set to an analysis of their play. In this way, technology can help to gather and interpret data.

This study has been exploratory in nature and revealed that the balance between technical and tactical leaning in rugby may still be tilting toward technical instruction. On order to improve players decision making, more detailed studies must be completed in

order to develop the declarative and procedural knowledge of players so that they can not only make better decisions, but also can implement them successfully in the game.



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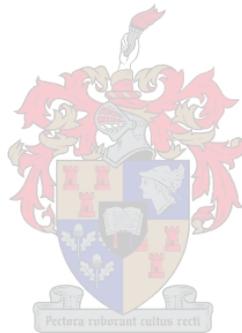
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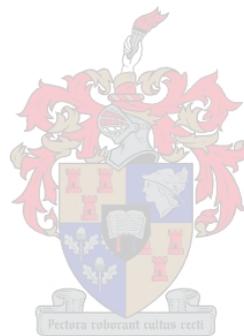
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Appendix A



Appendix A

		objectivity: investigator to established coaching educators				
Event	Video Time	Type of Activity	Prior Modelling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:15:20	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
2	00:03:06:01	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
3	00:05:01:18	players drills/repeat actions	Specific modelling	comments made to individuals	Group or team	Skill Technique
4	00:07:00:18	players drills/repeat actions	Specific modelling	comments to group or team	individual	Skill Technique
5	00:08:52:17	players drills/repeat actions	Specific modelling	comments made to individuals	Group or team	Skill Technique
6	00:10:31:00	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
7	00:11:57:20	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
8	00:13:33:18	players drills/repeat actions	Specific modelling	comments to group or team	individual	Skill Technique
9	00:18:46:09	players drills/repeat actions	Specific modelling	comments made to individuals	Group or team	Skill Technique
10	00:21:06:21	players drills/repeat actions	No specific modelling	comments to group or team	Group or team	Skill Technique
11	00:24:31:14	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
12	00:26:20:18	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
13	00:27:12:02	players make decisions	Specific modelling	comments made to individuals	individual	Tactics
14	00:28:39:17	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
15	00:31:34:18	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
16	00:35:52:04	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
17	00:39:59:07	Other type of activity	No specific modelling	comments made to individuals	Group or team	Tactics
18	00:44:18:13	Other type of activity	No specific modelling	comments to group or team	Group or team	Tactics

Inter-rater Reliability Coaching Session 1						
Event	Video Time	Type of Activity	Prior Modelling	Feedback & instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:03:00	players drills/repeat actions	Specific modelling	Individual	Group or team	Skill Technique
2	00:03:09:30	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
3	00:05:0:09	players drills/repeat actions	No specific modelling	comments to group or team	individual	Skill Technique
4	00:06:44:09	players drills/repeat actions	Specific modelling	Individual	Group or team	Skill Technique
5	00:07:02:06	players make decisions	Specific modelling	comments to group or team	Group or team	Skill Technique
6	00:08:56:02	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
7	00:10:29:30	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
8	00:11:59:49	players drills/repeat actions	No specific modelling	comments to group or team	Group or team	Skill Technique
9	00:13:36:20	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
10	00:18:47:20	players drills/repeat actions	No specific modelling	comments to group or team	individual	Skill Technique
11	00:21:02:55	players drills/repeat actions	Specific modelling	Individual	Group or team	Skill Technique
12	00:24:31:20	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
13	00:26:31:40	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
14	00:27:14:00	players make decisions	Specific modelling	Individual	individual	Tactics
15	00:28:40:20	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
16	00:35:43:10	players drills/repeat actions	Specific modelling	Individual	Group or team	Tactics
17	00:40:11:56	Other type of activity	No specific modelling	comments to group or team	individual	Tactics
18	00:44:20:10	Other type of activity	Specific modelling	Individual	Group or team	Tactics

Inter-rater Reliability for Coaching Session 2						
Event	Video Time	Type of Activity	Prior Modelling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:05:00	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
2	00:03:08:10	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
3	00:05:02:09	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
4	00:06:44:09	players drills/repeat actions	Specific modelling	comments to group or team	individual	Skill Technique
5	00:07:00:06	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
6	00:08:57:02	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
7	00:10:29:21	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
8	00:12:01:07	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
9	00:13:37:06	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
10	00:18:42:22	players drills/repeat actions	No specific modelling	comments to group or team	Group or team	Skill Technique
11	00:21:04:19	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
12	00:24:31:23	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
13	00:26:31:17	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
14	00:27:13:18	players make decisions	Specific modelling	comments to group or team	Group or team	Tactics
15	00:28:39:13	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Skill Technique
16	00:35:43:02	players drills/repeat actions	Specific modelling	comments to group or team	Group or team	Tactics
17	00:40:12:05	Other type of activity	No specific modelling	comments to group or team	Group or team	Skill Technique
18	00:44:20:05	Other type of activity	Specific modelling	comments to group or team	Group or team	Tactics

Appendix A reliability games

Objectivity: investigator to established coaching educators							
1	00:00:40:05	12:17:10 AM	Team 1	Kick off	Retained	Good	Opp. Half
2	00:02:41:02	01:17:10 AM	Team 1	Line out	Lost	Bad	Opp. Half
3	00:04:04:22	02:17:10 AM	Team 1	Line out	Retained	Good	Opp. 22
4	00:05:13:03	03:17:10 AM	Team 1	Penalties	Retained	Turnover	Opp. 22
5	00:05:39:11	04:17:10 AM	Team 1	Scrum	Retained	Turnover	Opp. 22
6	00:09:40:18	05:17:10 AM	Team 1	Kick off	Lost	Bad	Opp. Half
7	00:12:43:20	06:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
8	00:15:12:21	07:17:10 AM	Team 1	Line out	Lost	Turnover	Opp. Half
9	00:17:09:21	08:17:10 AM	Team 1	Scrum	Retained	Good	Opp. Half
10	00:22:23:05	09:17:10 AM	Team 1	Kick off	Retained	Good	Team 1Half
11	00:22:47:10	10:17:10 AM	Team 1	Line out	Lost	Turnover	Opp. Half
12	00:23:48:15	11:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
13	00:30:21:23	12:17:10 PM	Team 1	Kick off	Retained	Turnover	Opp. Half
14	00:33:28:10	01:17:10 PM	Team 1	Line out	Lost	Bad	Opp. Half
15	00:35:16:14	02:17:10 PM	Team 1	Scrum	Retained	Bad	Opp. Half
16	00:37:11:12	03:17:10 PM	Team 1	Penalties	Lost	Bad	Opp. Half
17	00:41:01:16	04:17:10 PM	Team 1	Kick off	Lost	Bad	Opp. Half
18	00:42:37:23	05:17:10 PM	Team 1	Line out	Lost	Bad	Team 1 Half
19	00:43:41:08	06:17:10 PM	Team 1	Scrum	Retained	Bad	Team 1Half
20	00:44:58:21	07:17:10 PM	Team 1	Scrum	Retained	Turnover	Team 1Half
21	00:47:36:14	08:17:10 PM	Team 1	Kick off	Lost	Turnover	Team 1Half
22	00:48:44:21	09:17:10 PM	Team 1	Line out	Retained	Turnover	Opp. Half
23	00:49:59:05	10:17:10 PM	Team 1	Line out	Retained	turnover	Opp. Half
24	00:53:07:13	11:17:10 PM	Team 1	Line out	Retained	turnover	Opp. Half
25	00:54:45:15	12:17:10 AM	Team 1	Line out	Retained	Good	Team 1Half
26	00:56:03:24	01:17:10 AM	Team 1	Line out	Retained	Good	Opp. Half
27	00:57:45:18	02:17:10 AM	Team 1	Scrum	Retained	Bad	Opp. Half
28	00:58:52:09	03:17:10 AM	Team 1	Line out	Lost	Bad	Team 1Half
29	00:59:39:19	04:17:10 AM	Team 1	Line out	Retained	turnover	Team 1Half
30	01:00:00:10	05:17:10 AM	Team 1	Penalties	Retained	Turnover	Team 1Half
31	01:00:17:07	06:17:10 AM	Team 1	Penalties	Retained	Bad	Team 1 Half
32	01:02:33:24	07:17:10 AM	Team 1	Line out	Retained	turnover	Opp. Half
33	01:03:23:24	08:17:10 AM	Team 1	Line out	Retained	Good	Opp. 22
34	01:04:00:01	09:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
35	01:06:30:06	10:17:10 AM	Team 1	Scrum	Retained	Turnover	Team 1Half
36	01:07:56:22	11:17:10 AM	Team 1	Kick off	Lost	Bad	Opp. Half
37	01:09:04:24	12:17:10 PM	Team 1	Scrum	Retained	Bad	Opp. 22
38	01:10:16:07	01:17:10 PM	Team 1	Try	Retained	Good	Opp. 22
39	01:13:05:10	02:17:10 PM	Team 1	Scrum	Retained	Turnover	Opp. Half

Reliability of Games analysis - First Analysis of Game 1							
Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
1	00:00:40:05	12:17:10 AM	Team 1	Kick off	Retained	Good	Opp. Half
2	00:02:41:02	01:17:10 AM	Team 1	Line out	Lost	Bad	Opp. Half
3	00:04:04:22	02:17:10 AM	Team 1	Line out	Retained	Good	Opp. 22
4	00:05:13:03	03:17:10 AM	Team 1	Penalties	Retained	Good	Opp. 22
5	00:05:39:11	04:17:10 AM	Team 1	Scrum	Retained	Turnover	Opp. 22
6	00:09:40:18	05:17:10 AM	Team 1	Kick off	Lost	Bad	Opp. Half
7	00:12:43:20	06:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
8	00:15:12:21	07:17:10 AM	Team 1	Line out	Lost	Turnover	Opp. Half
9	00:17:09:21	08:17:10 AM	Team 1	Scrum	Retained	Good	Opp. Half
10	00:22:23:05	09:17:10 AM	Team 1	Kick off	Retained	Good	Team1 Half
11	00:22:47:10	10:17:10 AM	Team 1	Line out	Lost	Turnover	Opp. Half
12	00:23:48:15	11:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
13	00:30:21:23	12:17:10 PM	Team 1	Kick off	Retained	Turnover	Opp. Half
14	00:33:28:10	01:17:10 PM	Team 1	Line out	Lost	Bad	Opp. Half
15	00:35:16:14	02:17:10 PM	Team 1	Scrum	Retained	Bad	Opp. Half
16	00:37:11:12	03:17:10 PM	Team 1	Penalties	Lost	Bad	Opp. Half
17	00:41:01:16	04:17:10 PM	Team 1	Kick off	Lost	Bad	Opp. Half
18	00:42:37:23	05:17:10 PM	Team 1	Line out	Lost	Bad	Team 1Half
19	00:43:41:08	06:17:10 PM	Team 1	Scrum	Retained	Bad	Team 1Half
20	00:44:58:21	07:17:10 PM	Team 1	Scrum	Retained	Turnover	Team 1 Half
21	00:47:36:14	08:17:10 PM	Team 1	Kick off	Lost	turnover	Team 1 Half
22	00:48:44:21	09:17:10 PM	Team 1	Line out	Retained	Turnover	Opp. Half
23	00:49:59:05	10:17:10 PM	Team 1	Line out	Retained	turnover	Opp. Half
24	00:53:07:13	11:17:10 PM	Team 1	Line out	Retained	turnover	Opp. Half
25	00:54:45:15	12:17:10 AM	Team 1	Line out	Retained	Good	Team 1 Half
26	00:56:03:24	01:17:10 AM	Team 1	Line out	Retained	Good	Opp. Half
27	00:57:45:18	02:17:10 AM	Team 1	Scrum	Retained	Bad	Opp. Half
28	00:58:52:09	03:17:10 AM	Team 1	Line out	Lost	Bad	Team 1 Half
29	00:59:39:19	04:17:10 AM	Team 1	Line out	Retained	turnover	Team 1 Half
30	01:00:00:10	05:17:10 AM	Team 1	Penalties	Retained	turnover	Team 1 Half
31	01:00:17:07	06:17:10 AM	Team 1	Penalties	Retained	Bad	Team 1 Half
32	01:02:33:24	07:17:10 AM	Team 1	Line out	Retained	turnover	Opp. Half
33	01:03:23:24	08:17:10 AM	Team 1	Line out	Retained	Good	Opp. 22
34	01:04:00:01	09:17:10 AM	Team 1	Try	Retained	Good	Opp. 22
35	01:06:30:06	10:17:10 AM	Team 1	Scrum	Retained	Turnover	Team 1 Half
36	01:07:56:22	11:17:10 AM	Team 1	Kick off	Lost	Bad	Opp. Half
37	01:09:04:24	12:17:10 PM	Team 1	Scrum	Retained	Bad	Opp. 22
38	01:10:16:07	01:17:10 PM	Team 1	Try	Retained	Good	Opp. 22
39	01:13:05:10	02:17:10 PM	Team 1	Scrum	Retained	Turnover	Opp. Half

Appendices reliability

Reliability for game 1							
Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
1	00:00:38:45	12:05:39 AM	Team 1	Kick off	Retained	Good	Opp. Half
2	00:02:43:02	01:05:39 AM	Team 1	Line out	Lost	Bad	Opp. Half
3	00:04:04:10	02:05:39 AM	Team 1	Line out	Retained	Good	Opp. 22
4	00:05:12:45	03:05:39 AM	Team 1	Penalties	Lost	Turnover	Opp. 22
5	00:05:40:01	04:05:39 AM	Team 1	Scrum	Retained	Turnover	Opp. 22
6	00:09:41:03	05:05:39 AM	Team 1	Kick off	Lost	Bad	Opp. Half
7	00:12:43:20	06:05:39 AM	Team 1	Try	Retained	Good	Opp. 22
8	00:15:12:25	07:05:39 AM	Team 1	Line out	Lost	Turnover	Opp. Half
9	00:17:10:08	08:05:39 AM	Team 1	Scrum	Retained	Good	Opp. Half
10	00:22:22:55	09:05:39 AM	Team 1	Kick off	Retained	Good	Team 1 Half
11	00:22:47:01	10:05:39 AM	Team 1	Line out	Lost	Turnover	Opp. Half
12	00:23:47:59	11:05:39 AM	Team 1	Try	Retained	Good	Opp. 22
13	00:30:21:23	12:05:39 PM	Team 1	Kick off	Retained	Turnover	Opp. Half
14	00:33:29:00	01:05:39 PM	Team 1	Line out	Lost	Bad	Opp. Half
15	00:35:16:10	02:05:39 PM	Team 1	Scrum	Retained	Bad	Opp. Half
16	00:37:10:47	03:05:39 PM	Team 1	Penalties	Lost	Bad	Opp. Half
17	00:41:00:56	04:05:39 PM	Team 1	Kick off	Lost	Bad	Opp. Half
18	00:42:38:00	05:05:39 PM	Team 1	Line out	Lost	Bad	Team 1 Half
19	00:43:41:02	06:05:39 PM	Team 1	Scrum	Retained	Bad	Team 1 Half
20	00:44:58:13	07:05:39 PM	Team 1	Scrum	Retained	Turnover	Team 1 Half
21	00:47:36:10	08:05:39 PM	Team 1	Kick off	Lost	turnover	Team 1Half
22	00:48:45:21	09:05:39 PM	Team 1	Line out	Retained	Turnover	Opp. Half
23	00:50:00:05	10:05:39 PM	Team 1	Line out	Retained	turnover	Opp. Half
24	00:53:04:18	11:05:39 PM	Team 1	Line out	Retained	turnover	Opp. Half
25	00:54:44:20	12:05:39 AM	Team 1	Line out	Retained	Good	Team 1 Half
26	00:56:01:56	01:05:39 AM	Team 1	Line out	Retained	Good	Opp. Half
27	00:57:43:18	02:05:39 AM	Team 1	Scrum	Retained	Bad	Opp. Half
28	00:58:55:34	03:05:39 AM	Team 1	Line out	Lost	Bad	Team 1 Half
29	00:59:38:40	04:05:39 AM	Team 1	Line out	Retained	turnover	Team 1 Half
30	01:00:04:40	05:05:39 AM	Team 1	Penalties	Retained	turnover	Team 1 Half
31	01:00:15:18	06:05:39 AM	Team 1	Penalties	Retained	Bad	Team 1 Half
32	01:02:36:24	07:05:39 AM	Team 1	Line out	Retained	turnover	Opp. Half
33	01:03:27:28	08:05:39 AM	Team 1	Line out	Retained	Good	Opp. 22
34	01:04:00:50	09:05:39 AM	Team 1	Try	Retained	Good	Opp. 22
35	01:06:30:58	10:05:39 AM	Team 1	Scrum	Retained	Turnover	Team 1 Half
36	01:07:57:52	11:05:39 AM	Team 1	Kick off	Lost	Bad	Opp. Half
37	01:09:05:26	12:05:39 PM	Team 1	Scrum	Retained	Bad	Opp. 22
38	01:10:16:59	01:05:39 PM	Team 1	Try	Retained	Good	Opp. 22
39	01:13:06:10	02:05:39 PM	Team 1	Scrum	Retained	Turnover	Opp. Half

Reliability of Games Analysis - Second Analysis of Game 2						
		game 2				
Event	Video Time	Teams	Events	Outcome	Result	Area
1	00:03:44:09	RPC	Scrum	Retained	Good	Team 1 Half
2	00:04:26:08	RPC	Penalties	Retained	Good	Team 1 Half
3	00:05:27:00	RPC	Penalties	Retained	Bad	Opp. Half
4	00:09:11:03	RPC	Scrum	Retained	Good	Team 1 22
5	00:12:33:24	RPC	Line out	Retained	Good	Opp. Half
6	00:12:50:01	RPC	Try	Retained	Good	Opp. 22
7	00:16:44:09	RPC	Scrum	Retained	Good	Opp. Half
8	00:19:02:15	RPC	Kick off	Retained	Good	Opp. 22
9	00:19:27:14	RPC	Scrum	Retained	Good	Opp. 22
10	00:19:48:00	RPC	Penalties	Retained	Bad	Opp. 22
11	00:21:24:08	RPC	Try	Retained	Good	Opp. 22
12	00:30:38:17	RPC	Scrum	Retained	Good	Opp. 22
13	00:34:56:01	RPC	Scrum	Retained	Good	Team 1 Half
14	00:37:31:14	RPC	Kick off	Lost	Bad	Opp. 22
15	00:38:10:00	RPC	Scrum	Retained	Good	Opp. 22
16	00:39:09:22	RPC	Scrum	Retained	Good	Opp. 22
17	00:44:45:03	RPC	Scrum	Retained	Good	Opp. Half
18	00:48:16:23	RPC	Scrum	Retained	Good	Opp. Half
19	00:49:32:12	RPC	Scrum	Retained	Good	Opp. Half
20	00:51:58:02	RPC	Kick off	Lost	Bad	Opp. 22
21	00:53:05:16	RPC	Line out	Retained	Good	Opp. 22
22	00:54:17:09	RPC	Scrum	Retained	Good	Opp. 22
23	00:55:20:01	RPC	Scrum	Retained	Good	Opp. 22
24	00:57:37:14	RPC	Scrum	Retained	Good	Opp. 22
25	01:01:02:08	RPC	Penalties	Retained	Good	Opp. 22
26	01:01:55:00	RPC	Penalties	Retained	Good	Opp. 22
27	01:04:43:01	RPC	Line out	Retained	Good	Opp. 22
28	01:08:44:17	RPC	Line out	Retained	Good	Opp. 22

Appendix A game 2

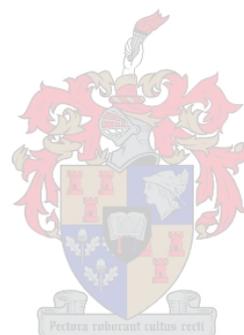
	game 2 reliability					
Event	Video Time	Teams	Events	Outcome	Result	Area
1	00:03:44:09	RPC	Scrum	Retained	Good	Team 1 Half
2	00:04:26:08	RPC	Penalties	Retained	Good	Team 1 Half
3	00:05:27:00	RPC	Penalties	Lost	Turnover	Opp. Half
4	00:09:11:03	RPC	Scrum	Retained	Good	Team 1 22
5	00:12:33:24	RPC	Line out	Retained	Good	Opp. Half
6	00:12:50:01	RPC	Try	Retained	Good	Opp. 22
7	00:16:44:09	RPC	Scrum	Retained	Good	Opp. Half
8	00:19:02:15	RPC	Kick off	Retained	Good	Opp. 22
9	00:19:27:14	RPC	Scrum	Retained	Good	Opp. 22
10	00:19:48:00	RPC	Penalties	Retained	Good	Opp. 22
11	00:21:24:08	RPC	Try	Retained	Good	Opp. 22
12	00:30:38:17	RPC	Scrum	Retained	Good	Opp. 22
13	00:34:56:01	RPC	Scrum	Retained	Good	Team 1 Half
14	00:37:31:14	RPC	Kick off	Lost	Bad	Opp. 22
15	00:38:10:00	RPC	Scrum	Retained	Good	Opp. 22
16	00:39:09:22	RPC	Scrum	Retained	Good	Opp. 22
17	00:44:45:03	RPC	Scrum	Lost	Good	Opp. Half
18	00:48:16:23	RPC	Scrum	Retained	Good	Opp. Half
19	00:49:32:12	RPC	Scrum	Retained	Good	Opp. Half
20	00:51:58:02	RPC	Kick off	Lost	turnover	Opp. 22
21	00:53:05:16	RPC	Line out	Retained	Good	Opp. 22
22	00:54:17:09	RPC	Scrum	Retained	Good	Opp. 22
23	00:55:20:01	RPC	Scrum	Retained	Good	Opp. 22
24	00:57:37:14	RPC	Scrum	Retained	Good	Opp. 22
25	01:01:02:08	RPC	Penalties	Lost	turnover	Opp. 22
26	01:01:55:00	RPC	Penalties	Retained	Good	Opp. 22
27	01:04:43:01	RPC	Line out	Retained	Good	Opp. 22
28	01:08:44:17	RPC	Line out	Retained	Good	Opp. 22

Coach 3 session 1						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:13:03:09	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
2	00:15:53:07	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
3	00:17:00:06	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
4	00:17:29:06	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
5	00:19:30:07	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
6	00:19:48:24	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
7	00:23:32:00	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
8	00:28:27:10	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
9	00:32:33:16	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
10	00:33:14:17	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Tactics
11	00:43:43:04	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
12	00:45:07:18	players drills/repeat actions	Specific modeling	comments made to individuals	Group or team	Skill Technique
13	00:45:49:01	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
14	00:45:58:05	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
15	00:47:24:19	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique

Coach 3 session 2						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:15:20	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
2	00:03:06:01	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
3	00:05:01:18	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
4	00:07:00:18	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
5	00:08:52:17	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
6	00:10:31:00	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
7	00:11:57:20	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
8	00:13:33:18	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
9	00:18:46:09	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
10	00:21:06:21	players drills/repeat actions	Specific modeling	comments to group or team	individual	Skill Technique
11	00:24:31:14	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Tactics
12	00:26:20:18	players make decisions	Specific modeling	comments to group or team	Group or team	Tactics
13	00:27:12:02	players make decisions	Specific modeling	comments made to individuals	individual	Tactics
14	00:28:39:17	players make decisions	Specific modeling	comments to group or team	Group or team	Tactics
15	00:31:34:18	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Tactics
16	00:35:52:04	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Tactics
17	00:39:59:07	Other type of activity	Specific modeling	comments to group or team	Group or team	Tactics
18	00:44:18:13	Other type of activity	Specific modeling	comments to group or team	Group or team	Tactics

Coach 3 session 3						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:01:06:02	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
2	00:02:20:04	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
3	00:02:56:16	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
4	00:04:13:02	players drills/repeat actions	Specific modeling	no comments	Group or team	Skill Technique
5	00:15:01:16	Other type of activity	Specific modeling	comments to group or team	No comments	Other
6	00:18:25:05	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Tactics
7	00:20:09:18	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
8	00:21:47:01	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
9	00:23:29:24	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
10	00:26:41:07	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
11	00:27:57:19	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
12	00:29:30:22	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
13	00:31:41:08	players make decisions	No specific modeling	comments made to individuals	individual	Skill Technique
14	00:36:10:06	players make decisions	No specific modeling	comments to group or team	No comments	Tactics
15	00:38:38:17	players drills/repeat actions	No specific modeling	no comments	Group or team	Skill Technique
16	00:45:23:04	players drills/repeat actions	Specific modeling	no comments	Group or team	Tactics
17	00:45:46:03	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique

18	00:47:59:23	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
19	00:50:41:12	players drills/repeat actions	No specific modeling	comments to group or team	individual	Skill Technique
20	00:51:48:24	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
21	00:58:16:00	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
22	01:00:28:10	players drills/repeat actions	No specific modeling	no comments	individual	Skill Technique



Coach 1 session 1						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:04:00	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
2	00:01:24:18	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
3	00:02:22:21	players make decisions	No specific modeling	comments made to individuals	individual	Skill Technique
4	00:03:06:03	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
5	00:04:43:01	players drills/repeat actions	No specific modeling	comments made to individuals	No comments	Tactics
6	00:05:15:11	players make decisions	No specific modeling	comments made to individuals	individual	Skill Technique
7	00:06:03:00	players make decisions	No specific modeling	comments made to individuals	individual	Skill Technique
8	00:06:33:14	players make decisions	No specific modeling	comments made to individuals	Group or team	Skill Technique
9	00:08:01:00	players make decisions	No specific modeling	comments made to individuals	Group or team	Skill Technique
10	00:09:58:12	players drills/repeat actions	Specific modeling	comments made to individuals	Group or team	Skill Technique
11	00:11:50:21	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
12	00:13:47:16	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
14	00:15:31:23	players make decisions	No specific modeling	comments to group or team	No comments	Skill Technique
15	00:18:08:16	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique
16	00:20:02:01	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
17	00:20:55:04	players make decisions	No specific modeling	comments made to individuals	No comments	Skill Technique

18	00:21:18:12	players drills/repeat actions	No specific modeling	comments made to individuals	individual	Skill Technique
19	00:22:08:18	players drills/repeat actions	No specific modeling	comments to group or team	individual	Skill Technique
20	00:22:35:21	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
21	00:23:04:19	players drills/repeat actions	Specific modeling	comments made to individuals	No comments	Skill Technique
22	00:23:52:10	players make decisions	Specific modeling	comments made to individuals	No comments	Skill Technique
23	00:24:57:16	players make decisions	No specific modeling	comments made to individuals	No comments	Skill Technique
24	00:25:43:01	players make decisions	No specific modeling	comments to group or team	No comments	Skill Technique
25	00:26:32:01	players drills/repeat actions	No specific modeling	comments to group or team	individual	Skill Technique
26	00:27:05:13	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique
27	00:27:46:19	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
28	00:28:25:20	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique
29	00:28:42:12	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
30	00:29:47:15	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
31	00:30:59:11	players drills/repeat actions	No specific modeling	comments made to individuals	individual	Skill Technique
32	00:32:05:10	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
33	00:32:50:12	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
34	00:33:14:09	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
35	00:34:42:06	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique
36	00:35:11:03	players drills/repeat actions	Specific modeling	comments to group or team	No comments	Skill Technique

Coach 1 session 2						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:03:44:21	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
2	00:05:52:06	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
3	00:07:08:19	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
4	00:09:27:09	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
5	00:12:26:10	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
6	00:13:24:22	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
7	00:17:38:04	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
8	00:20:45:13	players drills/repeat actions	Specific modeling	comments made to individuals	individual	Skill Technique
9	00:23:27:02	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
10	00:27:16:17	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
11	00:31:05:02	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
12	00:33:02:20	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
13	00:35:31:00	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
14	00:39:25:09	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
15	00:46:06:06	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
16	00:46:23:01	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
17	00:49:01:23	players make decisions	Specific modeling	comments made to individuals	individual	Tactics

Coach 1 session 3						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:37:20	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
2	00:01:42:20	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique
3	00:04:07:01	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
4	00:05:27:08	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
5	00:07:41:20	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
6	00:09:28:19	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
7	00:12:02:11	players drills/repeat actions	Specific modeling	comments to group or team	Group or team	Skill Technique
8	00:17:01:21	players drills/repeat actions	No specific modeling	comments to group or team	individual	Skill Technique
9	00:19:02:23	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
10	00:19:52:11	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
11	00:24:18:04	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
12	00:32:25:10	players make decisions	Specific modeling	comments to group or team	Group or team	Skill Technique

Coach 2 session 1						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:00:16:13	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
2	00:00:57:05	players drills/repeat actions	No specific modeling	no comments	Group or team	Skill Technique
3	00:01:55:24	players drills/repeat actions	No specific modeling	no comments	Group or team	Skill Technique
4	00:02:40:10	players drills/repeat actions	No specific modeling	no comments	Group or team	Skill Technique
5	00:09:08:18	players drills/repeat actions	No specific modeling	no comments	Group or team	Skill Technique
6	00:11:04:24	players drills/repeat actions	No specific modeling	comments made to individuals	Group or team	Skill Technique
7	00:12:00:01	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
8	00:12:36:12	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
10	00:15:40:16	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
11	00:15:59:00	players make decisions	No specific modeling	comments to group or team	individual	Tactics
12	00:17:01:20	players make decisions	No specific modeling	comments to group or team	individual	Tactics
13	00:17:43:06	players make decisions	No specific modeling	comments to group or team	individual	Tactics
14	00:17:51:07	players make decisions	No specific modeling	comments to group or team	individual	Tactics
15	00:18:03:10	players make decisions	No specific modeling	comments to group or team	individual	Tactics
16	00:18:40:18	players make decisions	No specific modeling	comments to group or team	No comments	Tactics
17	00:19:24:20	players make decisions	No specific modeling	comments to group or team	individual	Tactics

18	00:20:11:06	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
19	00:20:58:19	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
20	00:21:32:04	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
21	00:22:12:24	players make decisions	No specific modeling	no comments	individual	Tactics
22	00:23:58:17	players make decisions	No specific modeling	comments to group or team	No comments	Tactics
23	00:26:13:23	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
24	00:26:35:09	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
25	00:26:52:10	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
26	00:29:36:24	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
27	00:30:36:04	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
28	00:32:15:21	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
29	00:33:01:22	players make decisions	No specific modeling	comments to group or team	individual	Tactics
30	00:34:03:05	players make decisions	No specific modeling	comments made to individuals	individual	Tactics
31	00:34:39:13	players drills/repeat actions	No specific modeling	no comments	No comments	Skill Technique
32	00:49:09:07	players drills/repeat actions	No specific modeling	comments to group or team	No comments	Skill Technique
33	00:54:10:24	players drills/repeat actions	No specific modeling	comments made to individuals	individual	Skill Technique
34	00:57:01:03	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique

Coach 2 session 2						
Event	Video Time	Type of Activity	Prior Modeling	Feedback& instruction during activity	Interaction after activity	Cognitive focus of Activity
1	00:02:24:18	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
2	00:04:10:10	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
3	00:10:28:24	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
4	00:11:19:16	players drills/repeat actions	No specific modeling	comments to group or team	individual	Tactics
5	00:11:39:05	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
6	00:14:42:15	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
7	00:17:40:03	players make decisions	No specific modeling	comments to group or team	individual	Tactics
8	00:18:07:01	players make decisions	No specific modeling	comments to group or team	Group or team	Skill Technique
9	00:19:08:11	players drills/repeat actions	No specific modeling	comments to group or team	individual	Tactics
10	00:23:08:19	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Skill Technique
11	00:23:11:10	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
12	00:25:47:21	players drills/repeat actions	No specific modeling	comments to group or team	individual	Tactics
13	00:27:43:22	players drills/repeat actions	No specific modeling	comments to group or team	individual	Tactics
14	00:29:10:04	players drills/repeat actions	No specific modeling	no comments	Group or team	Tactics
15	00:30:13:08	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics

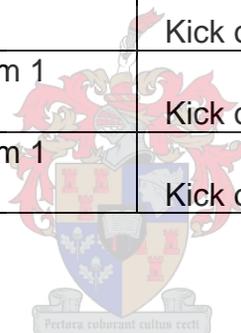
16	00:31:18:07	players drills/repeat actions	No specific modeling	comments to group or team	individual	Tactics
17	00:34:15:11	players drills/repeat actions	No specific modeling	comments to group or team	Group or team	Tactics
19	00:37:16:05	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
20	00:38:06:08	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
21	00:39:10:08	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
22	00:39:38:05	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
23	00:40:45:11	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
24	00:43:06:15	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
25	00:44:08:01	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
26	00:44:52:09	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
27	00:47:29:21	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
28	00:54:05:20	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics
29	00:55:53:17	players make decisions	No specific modeling	comments to group or team	Group or team	Tactics

Appendix C
Scrum team 1

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
6	00:05:39:11	12:05:39 AM	Team 1	Scrum	Retained	Turnover	Opp. 22
14	00:17:09:21	12:17:10 AM	Team 1	Scrum	Retained	Good	Opp. Half
28	00:35:16:14	12:15:27 AM	Team 1	Scrum	Retained	Bad	Opp. Half
37	00:43:41:08	12:07:22 AM	Team 1	Scrum	Retained	Bad	Team 1 Half
38	00:44:58:21	12:08:40 AM	Team 1	Scrum	Retained	Turnover	Team 1 Half
48	00:57:45:18	12:01:37 AM	Team 1	Scrum	Retained	Bad	Opp. Half
59	01:06:30:06	12:10:21 AM	Team 1	Scrum	Retained	Turnover	Team 1 Half
62	01:09:04:24	12:12:56 AM	Team 1	Scrum	Retained	Bad	Opp. 22
67	01:13:05:10	12:16:57 AM	Team 1	Scrum	Retained	Turnover	Opp. Half

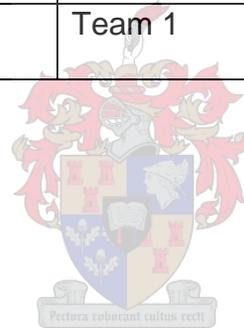
Team 1 kick offs

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
1	00:00:40:05	12:00:40 AM	Team 1	Kick off	Retained	Good	Opp. Half
8	00:09:40:18	12:09:41 AM	Team 1	Kick off	Lost	Bad	Opp. Half
17	00:22:23:05	12:02:34 AM	Team 1	Kick off	Retained	Good	Team 1 Half
23	00:30:21:23	12:10:32 AM	Team 1	Kick off	Retained	Turnover	Opp. Half
33	00:41:01:16	12:04:42 AM	Team 1	Kick off	Lost	Bad	Opp. Half
39	00:47:36:14	12:11:17 AM	Team 1	Kick off	Lost	Ground	Team 1 Half
60	01:07:56:22	12:11:48 AM	Team 1	Kick off	Lost	Bad	Opp. Half



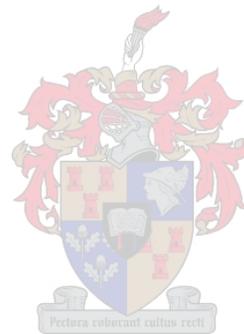
Team 1 penalties

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
5	00:05:13:03	12:05:13 AM	Team 1	Penalties	Retained	Ground	Opp. 22
31	00:37:11:12	12:00:52 AM	Team 1	Penalties	Lost	Bad	Opp. Half
52	01:00:00:10	12:03:52 AM	Team 1	Penalties	Retained	Ground	Team 1 Half
53	01:00:17:07	12:04:08 AM	Team 1	Penalties	Retained	Bad	Team 1 Half



Team 2 scrums

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
3	00:03:13:16	12:03:14 AM	Team 2	Scrum	Lost	Turnover	Opp. Half
36	00:43:20:13	12:07:01 AM	Team 2	Scrum	Lost	Turnover	Team 1 Half
44	00:54:18:18	12:18:00 AM	Team 2	Scrum	Retained	Good	Team 1 Half



Team2 line outs

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
9	00:10:20:22	12:10:21 AM	Team 2	Line out	Lost	Turnover	Team 1Half
10	00:11:48:23	12:11:49 AM	Team 2	Line out	Lost	Turnover	Opp. Half
16	00:19:59:08	12:00:10 AM	Team 2	Line out	Retained	Bad	Team 122
21	00:27:24:24	12:07:35 AM	Team 2	Line out	Retained	Turnover	Opp. Half
22	00:28:24:15	12:08:35 AM	Team 2	Line out	Retained	Turnover	Team 1Half
24	00:31:26:07	12:11:37 AM	Team 2	Line out	Retained	Bad	Opp. Half
25	00:31:50:09	12:12:01 AM	Team 2	Line out	Lost	Turnover	Opp. 22
27	00:34:42:13	12:14:53 AM	Team 2	Line out	Lost	Bad	Team 1Half
29	00:35:50:21	12:16:01 AM	Team 2	Line out	Retained	Bad	Opp. Half
32	00:38:36:09	12:02:17 AM	Team 2	Line out	Retained	Bad	Team 1 Half
34	00:41:55:17	12:05:37 AM	Team 2	Line out	Retained	Bad	Teeam 1 22
46	00:55:21:14	12:19:02 AM	Team 2	Line out	Retained	Turnover	Team 1 Half
49	00:58:15:16	12:02:07 AM	Team 2	Line out	Retained	Bad	Opp. Half
54	01:00:57:16	12:04:49 AM	Team 2	Line out	Retained	Turnover	Team 1 Half
63	01:09:33:12	12:13:25 AM	Team 2	Line out	Lost	Good	Opp. 22
64	01:10:16:00	12:14:07 AM	Team 2	Line out	Retained	Bad	Opp. 22

Team 2 kick offs

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
1	00:00:02:01	12:10:28 AM	Team 2	Kick off	Retained	Good	Opp. Half
10	00:19:52:18	12:30:47 AM	Team 2	Kick off	Lost	Bad	Opp. Half
15	00:31:04:16	12:41:59 AM	Team 2	Kick off	Lost	Bad	Team 1 Half
23	00:43:32:21	12:54:37 AM	Team 2	Kick off	Lost	Bad	Team 1 Half
32	00:53:34:14	01:04:38 AM	Team 2	Kick off	Lost	Bad	Opp. Half

Team 2 penalties

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
42	00:52:20:23	12:16:02 AM	Team 2	Penalties	Retained	Bad	Opp. Half
61	01:08:07:18	12:11:59 AM	Team 2	Penalties	Lost	Turnover	Opp. Half

Team 3 scrums

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
7	00:11:38:00	12:22:04 AM	Team 3	Scrum	Retained	Bad	Opp. Half
11	00:20:39:02	12:31:34 AM	Team 3	Scrum	Retained	Good	Team 1 22
12	00:22:14:01	12:33:09 AM	Team 3	Scrum	Retained	Good	Team 1 22
13	00:27:11:08	12:38:06 AM	Team 3	Scrum	Retained	Bad	Opp. Half
16	00:33:30:02	12:44:25 AM	Team 3	Scrum	Lost	Bad	Opp. 22
22	00:41:23:02	12:52:27 AM	Team 3	Scrum	Lost	Bad	Team 1 Half
28	00:49:22:18	01:00:27 AM	Team 3	Scrum	Retained	Good	Opp. Half
33	00:54:22:04	01:05:26 AM	Team 3	Scrum	Retained	Good	Team 1 Half
34	00:58:00:02	01:09:04 AM	Team 3	Scrum	Retained	Good	Team 1 Half
35	00:58:48:22	01:09:53 AM	Team 3	Scrum	Lost	Bad	Team 1 Half
36	00:59:51:07	12:00:21 AM	Team 3	Scrum	Retained	Good	Team 1 Half

Team 3 line outs

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
4	00:05:27:12	12:15:53 AM	Team 3	Line out	Retained	Good	Opp. 22
6	00:09:59:10	12:20:25 AM	Team 3	Line out	Retained	Turnover	Team 1 Half
8	00:12:42:01	12:23:08 AM	Team 3	Line out	Retained	Good	Team 1 22
17	00:35:28:20	12:46:23 AM	Team 3	Line out	Retained	Good	Opp. Half
18	00:37:27:16	12:48:22 AM	Team 3	Line out	Retained	Good	Opp. 22
19	00:38:11:19	12:49:06 AM	Team 3	Line out	Retained	Good	Team 1 Half
24	00:44:05:20	12:55:10 AM	Team 3	Line out	Lost	Bad	Opp. Half
25	00:45:05:11	12:56:09 AM	Team 3	Line out	Retained	Good	Opp. 22
29	00:49:46:22	01:00:51 AM	Team 3	Line out	Retained	Good	Team 1 Half
31	00:51:18:16	01:02:22 AM	Team 3	Line out	Retained	Good	Team 1 Half

Team 3 Kick offs

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
1	00:00:02:01	12:10:28 AM	Team 3	Kick off	Retained	Good	Opp. Half
10	00:19:52:18	12:30:47 AM	Team 3	Kick off	Lost	Bad	Opp. Half
15	00:31:04:16	12:41:59 AM	Team 3	Kick off	Lost	Bad	Team 1 Half
23	00:43:32:21	12:54:37 AM	Team 3	Kick off	Lost	Bad	Team 1 Half
32	00:53:34:14	01:04:38 AM	Team 3	Kick off	Lost	Bad	Opp. Half

Team 3 Penalties

Event	Video Time	Clip Time	Teams	Events	Outcome	Result	Area
3	00:04:54:02	12:15:20 AM	Team 3	Penalties	Lost	Bad	Opp. Half
20	00:38:49:13	12:49:44 AM	Team 3	Penalties	Retained	Bad	Team 1 Half
26	00:46:00:17	12:57:04 AM	Team 3	Penalties	Lost	Bad	Team 1 Half

coach 3 words		coach 1		coach 2	
encouragement	73	encouragement	51	encouragement	54
Negative feedback	14	pace on the ball	22	Angled running	18
Depth	11	step	15	Communication	17
Communication	11	depth	14	Acceleration	16
straighten the line	5	acceleration	10	Hand speed	15
running lines	5	look where u pass	9	Negative feedback	12
concentrate	5	space	8	Step into space	9
test the defense	4	angles	7	Ball Carrier	9
Talking	4	work with legs	6	Depth	6
Speed on the ball	4	crowd the ball carrier	5	Placing the ball	5
running inside pass outside	4	draw and pass	5	Play the situation	4
Pass	4	negative feedback	5	Too Flat	4
no mistakes	4	timing	5	Drift	4
close down	4	ball do the work	4	Tempo	3
wide base	3	fix up	4	Position	3
turn in contact	3	quick feet	4	No Forward passing	3
stay in channel	3	turn in tackle	4	Depth	3
Shift	3	use your feet	4	Straighten the line	3
quick hands	3	defensive lines	3	Soft hands	2
play the space	3	play the holes	3	Fall back in position	2
no spin passes	3	hands thru the tackle	2	Balance	2
Intensity	3	no balls on the ground	2	Pace on the ball	2
Intensity	3	short bursts	2	Forward movement	2
Channels	3	soft hands	2	Moving to early	2
ball carrier	3	drop the hands when passing	1	Space	2
work with legs	2	keep ball away from contact	1	Wide	1
Quality	2	trail him	1	Support	1
No forward passes	2	total comments	199	Quick ball	1
short passes	1			Repetition	1
Cleaning	1			Soft hands	1
work forward	1			Short passes	1
total comments	195			Advantage line	1
				Position	1
				total comments	210

Coach 1

Tactical	
pace on the ball	22
depth	14
draw and pass	5
space	8
keep ball away from contact	1
quick feet	4
turn in tackle	4
angles	7
play the holes	3
defensive lines	3
total	71
Motivation	
encouragement	51

Technical	
look where u pass	9
work with legs	6
drop the hands when passing	1
step	15
hands thru the tackle	2
use your feet	4
Total	37
Other	
negative feedback	5
crowd the ball carrier	5
ball do the work	4
fix up	4
no balls on the ground	2
short bursts	2
soft hands	2
trail him	1
timing	5
acceleration	10

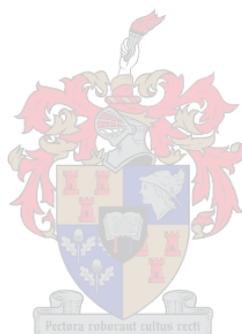
Coach 2

motivation	25.7%
Encouragement	54

Technical	19%
Hand speed	15
Ball Carrier	9
Placing the ball	5
Soft hands	2
Support	1
Advantage line	1
Too Flat	4
Wide	1

other	29.04
Communication	17
Acceleration	16
Negative feedback	12
Position	3
No Forward passing	3
Fall back in position	2
Balance	2
Forward movement	2
Moving to early	2
Repetition	1
Position	1

Tactical	26
Angled running	18
Step into space	9
Depth	6
Play the situation	4
Drift	4
Tempo	3
Depth	3
Straighten the line	3
Pace on the ball	2
Space	2
Short passes	1
Quick ball	1



Coach 3

other		encouragement	73
ball carrier	3		
Negative feedback	14		
Communication	11		
concentrate	5		
Talking	4		
no mistakes	4		
close down	4		
wide base	3		
no spin passes	3		
Intensity	3		
Quality	2		

tactical		technical	
Intensity	3	Speed on the ball	4
Channels	3	running inside	4
quick hands	3	pass outside	
play the space	3	Pass	4
test the defense	4	turn in contact	3
straighten the line	5	stay in channel	3
running lines	5	Shift	3
Depth	11		
Intensity	3	work with legs	2
Channels	3	Speed on the ball	4
quick hands	3	running inside	4
		pass outside	
		Pass	4