

**Factors Impacting the introduction of  
Information Technology Usage in Netball  
Coaching**

**J. Daniell**

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# **Factors Impacting the introduction of Information Technology Usage in Netball Coaching**

By

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## Declaration

I, Janine Daniell 20687516, hereby declare that the dissertation for MAGISTER TECHNOLOGIAE in INFORMATION TECHNOLOGY is my own work and that it has not previously been submitted for assessment or completion of any postgraduate qualification to another University or for another qualification.

A handwritten signature in black ink, appearing to read 'Janine Daniell', with a horizontal line underneath.

Janine Daniell

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## **Abstract**

With the growth in the use of technology in sports, there has been an improvement in sporting performances. Some may argue that the two go hand in hand, while others will write it off as coincidence. Nevertheless the use of technology in sport is seen on a daily basis. Cricket uses Hotspot, tennis uses Hawk-Eye and rugby uses slow motion video replays. In these sports codes, technology is already an aid to umpires. Little is known, however, about the technologies used to assist coaches in sports codes such as netball.

This study investigated the factors impacting the introduction of information technology in the coaching of netball. The study commenced with using the term technology in the broader sense of the word to gain an understanding from netball coaches as to how technology could be incorporated into the sport. It was later narrowed down more specifically to computer technologies. The investigation was done at the Spar National Netball Championships in 2012, where coaches were surveyed about the preparation for the tournament of the provincial teams. The surveys included questions to coaches regarding the technologies used in preparation for a national tournament.

The results obtained from the coaches were used to identify the current technologies used. Interviews were conducted after the analysis of the initial results to probe into the potential use of social media as a tool to assist coaches.

Based on the results of the study, a number of factors that impact on the introduction of technology in the coaching of netball were identified. The factors and basic guidelines were validated through expert focus groups. Based on the findings from the experts, the factors and guidelines were refined.

It is envisaged that the findings from this research can be used to assist netball coaches in deciding how to introduce the use of information technology into the sport.

Keywords: technology in coaching, netball, information technology

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# Chapter 1 Overview

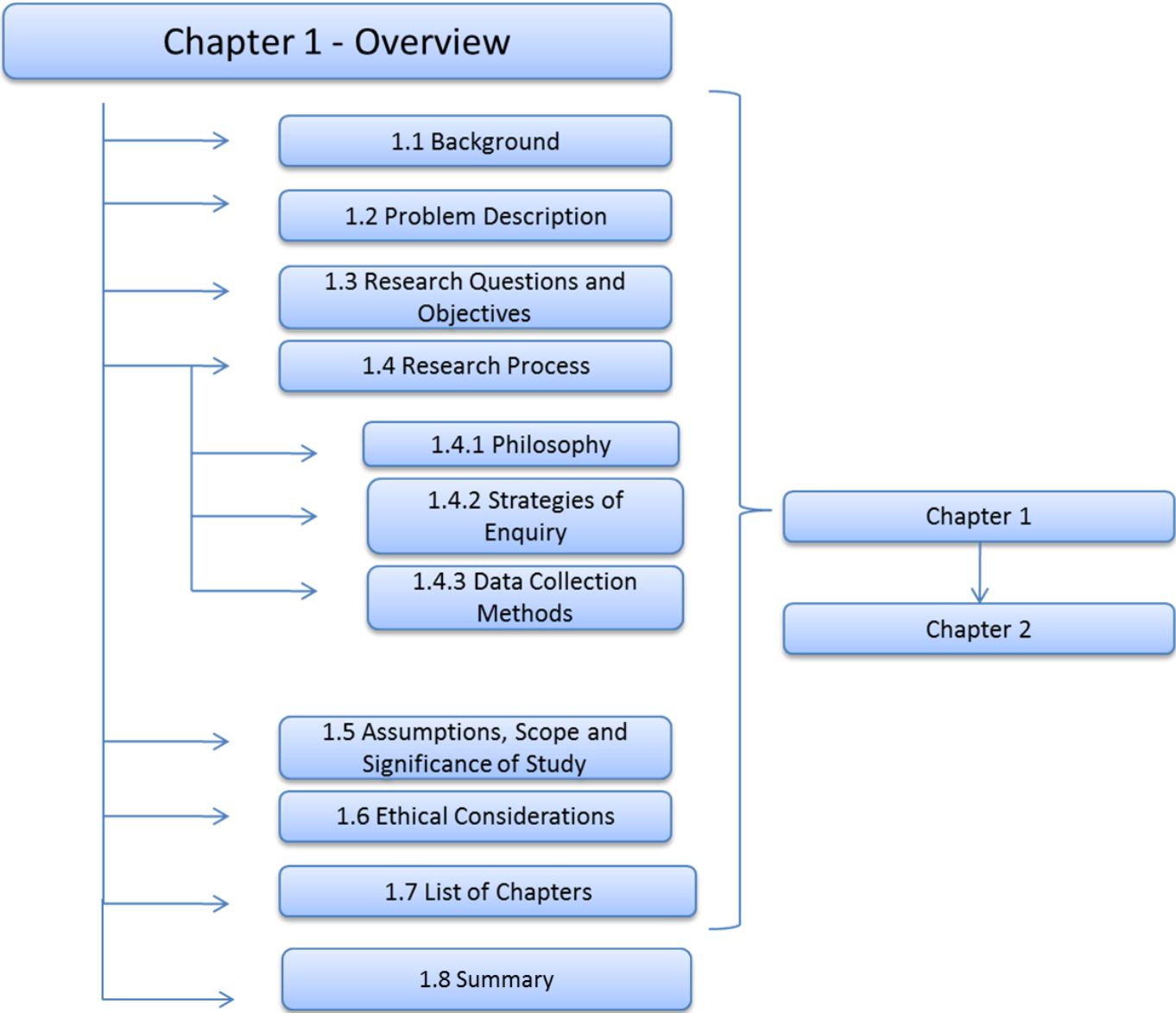


Figure 1.1 Chapter 1 Outline

## **1.1 Background**

The advancement in the usage of technology for sport has assisted both coach and players alike. Simple technologies such as a pedometer can give feedback on distances run and calories burnt. This information can be used by coaches to determine the toughness of practice routines as well as a player's energy output during match situations. The coach can then use this information to adjust training to mimic match situations closely and in the process, improve the athlete's performance.

Other technologies used in sport such as motion analysis or video analysis give coaches an opportunity to scrutinise athletes during the different phases of movement. The body positions of the athletes during a specific phase of movement can be compared against biomechanics. Where an athlete is highlighted as veering from the correct biomechanical movement in a particular phase, the coach can step in to adjust the difference. Before these technologies were available many of the biomechanical analyses during motion was done through line of sight. Cricket coaches performed analysis on a bowler's bowling action using a combination of line of sight and the coach's opinion of what the action should look like (Woolmer, Noakes & Moffet, 2008).

If every coach had a different opinion on what the bowling action should look like and if one player has been coached by five different coaches in his/her career, then he/she could potentially have had to learn five different bowling actions. This problem could also appear in netball, where it would be the shooter's shooting action that is under scrutiny.

The use of technology in coaching has benefits for both the coach and the athlete alike. Technologies as simple as the videotaping of a game can already have benefits for coaching (Stevens, 2013). Team sports, such as netball, where the coach cannot observe and correct all players on court in real time during a match, can benefit from this.

The concept of using information technology for the benefit of sport or the improvement of athlete performance is not new. The information technologies that have been used in netball by a top ranking team such as Australia are said to have given them an edge over their competitors. This was stated in an article in the online magazine Netball Scoop (2013).

From this article it can be seen that technology usage in Australian netball is rife and these technologies are being implemented and tested at different age group levels (Ian, 2013).

Comparatively little is known about the technology usage in netball in South Africa. This study aims to investigate the technologies available to netball. Additionally this study looks at whether or not technology usage is implemented in South African netball at a provincial level.

## 1.2 Problem Description

There is currently little known about how technology is used to support the coaching of netball in South Africa. Different technologies are available to assist and support netball coaches. According to the University of Ulster, technologies can provide more accurate feedback on player movement analysis which in turn allows the coach to identify areas which need improvement (Wallace, 2009).

The problem statement for this research can therefore be defined as follows:

**There is limited knowledge on how technology can be used to support netball coaches within the South African context.**

## 1.3 Research Questions and Objectives

This research investigates the typical factors that are currently impacting on the incorporation of technology into the coaching of netball. In addition, the research will investigate the types of technologies available worldwide. Based on the available technologies found, recommendations will be made as to how technology can be incorporated into coaching of netball in South Africa. In order to support the problem statement described in Section 1.2, the research questions depicted in Table 1.1 are used to guide the research process.

Table 1.1 Research Plan

Question Type	Research Question	Research Objective	Research Method
Primary Research Question	What are the factors that impact on the introduction of information technology usage in netball	Provide factors that impact the introduction and or the use of information technology as a support tool for	Case study, data triangulation

Question Type	Research Question	Research Objective	Research Method
	coaching?	netball coaching in South Africa.	
Secondary Research Question	What information technologies are available to support sports coaching in general?	Identify technologies that are available to sport.	Literature review
Secondary Research Question	What information technologies are available to support netball coaching?	Identify the most popular technologies that are available to netball.	Literature Review
Secondary Research Question	What is the role of the coach in netball?	Explain the role of the coach and how one can become a netball coach.	Literature Review
Secondary Research Question	What is the status of technology usage in netball in South Africa?	Find out if South African netball utilises technology in training and which technologies are being used.	Questionnaire, Interviews, Focus Group

## 1.4 Research Process

This section provides a brief outline of the research process followed. A more detailed discussion is presented in Chapter 2.

### 1.4.1 Philosophy

The epistemological position concerning the study is based on the following standpoint: Data is contained within the perspective of people that are involved in the coaching of netball. Based on this, the researcher had to engage with the coaches to collect the data. The phenomenological methodology is best suited for this type of study as it allows for rich data to be obtained from the experiences of individuals. The phenomenological approach also gives a more in-depth understanding of the individual phenomena.

The intention of this research was to gather data regarding the perspectives of research participants on the phenomenon of the use of technology as a coaching aid for netball.

### 1.4.2 Strategies of Inquiry

Based on the research objectives listed in Table 1.1, a thorough literature review combined with a case study was used to identify the requirements for a roadmap to incorporate technology in the coaching of netball with the focus on netball at a national level.

A case study, based on it being defined as an empirical investigation of a particular current phenomenon within its real-life context, was used in this research (Saunders, Lewis & Thornhill, 2009). The case study was a representative case, intending to show the available



technologies utilised by coaches of provincial teams in the preparation of the Spar National Netball Championships of 2012.

### **1.4.3 Data Collection Methods**

The nature of this study was mainly to explore and compare. The methods used for data collection were a combination of quantitative and qualitative. Data was gathered using techniques that included questionnaires, interviews and available literature on the use of information technology in sport. Additionally a focus group was used as validation for the factors that were put forward.

## **1.5 Assumptions, Scope and Significance of the Study**

It was assumed that some teams who participated in the Spar National Netball Championships utilised technology during preparations for the Championships.

The study was limited to the South African netball environment. Participation in the study was voluntary and as such coaches involved in the Spar National Netball Championships were approached to participate in the study. Participation was limited to four of the nine provinces.

The scope of the study excludes the actual use of technology during the coaching phase. The primary focus of the study was to identify what was currently prohibiting the use of technology in the coaching of netball.

Based on evidence in literature, it can be assumed that the introduction of the use of information technology in support of coaching can be beneficial to netball. It is, however, outside the scope of this research to implement the use of technology.

## **1.6 Ethical Considerations**

The participants in this research were independent federations that fall under the affiliation of Netball South Africa. As such it was not necessary to obtain approval from any authoritative departments or institutions.

Participants' rights (not to participate, to withdraw from the study at any given time, not to answer questions) and their privacy (anonymity, confidentiality) were preserved at all times throughout the study.

## 1.7 List of Chapters

Figure 1.2 shows the list of chapters that are covered in this dissertation.

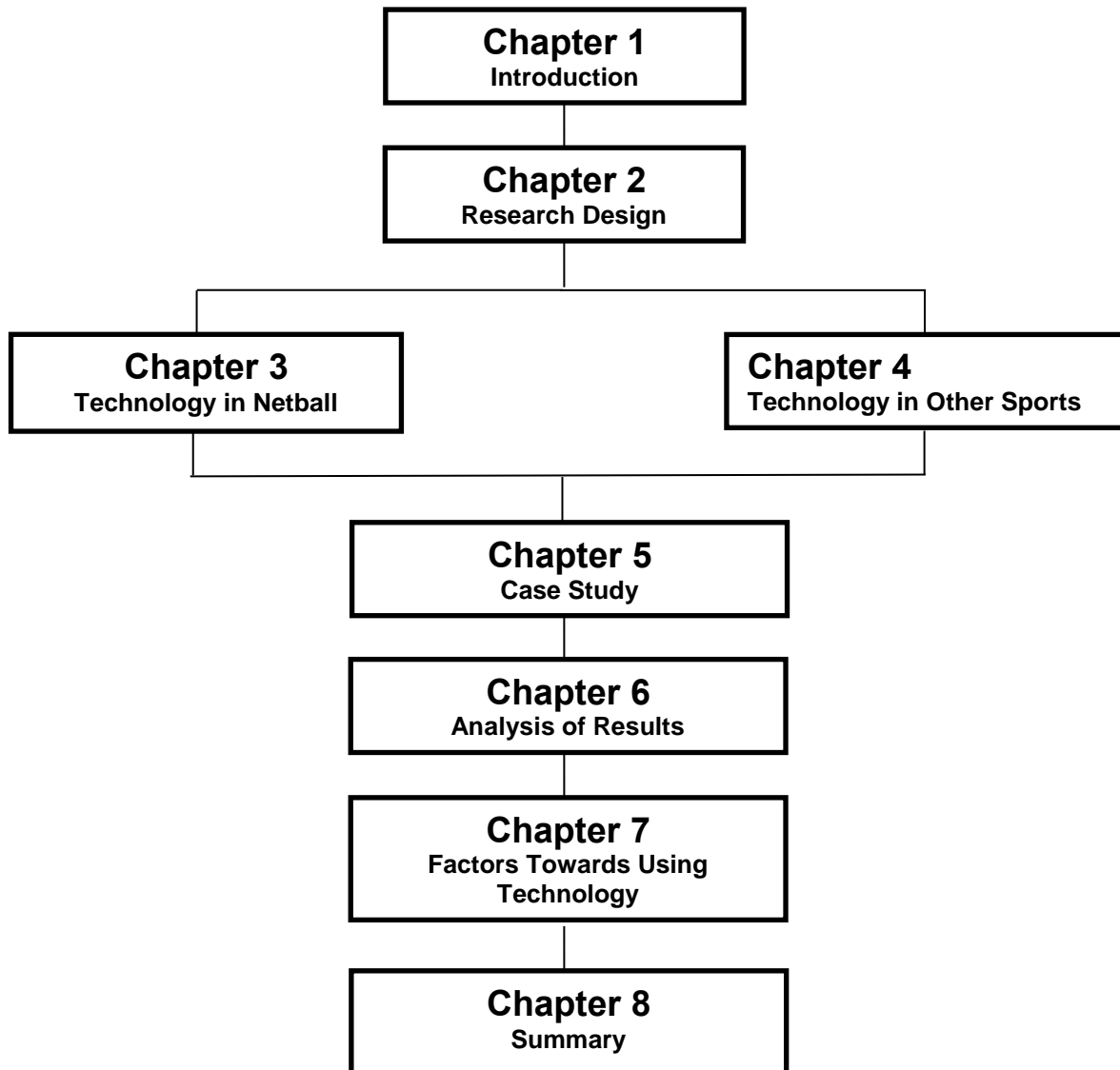


Figure 1.2 Chapter Outline

The chapter layout in Figure 1.2 can be laid out as follows:

- **Chapter 1** provided the background to the field of study;
- **Chapter 2** describes the research design that was implemented;
- **Chapter 3** forms part of the literature review. The focus on this chapter is technology usage in sport in general and netball in particular;
- **Chapter 4** contains information about the role of a coach;

- **In Chapter 5** a questionnaire is presented as a technique to obtain information about existing uses of technology for netball by other countries at university level;
- **Chapter 6** analyses the data obtained and based on this analysis, some factors are presented. These are factors that perhaps should be considered when implementing information technology in netball;
- **Chapter 7** produces the factors towards using technology in an assisting role for coaching netball;
- **Chapter 8** is the concluding chapter of the dissertation. It contains a summary of the findings.

## **1.8 Summary**

This chapter introduced the topic of this dissertation and gave a brief background into the dissertation. The next chapter will discuss the research methodology to be followed throughout the study.

## Chapter 2 Research Design

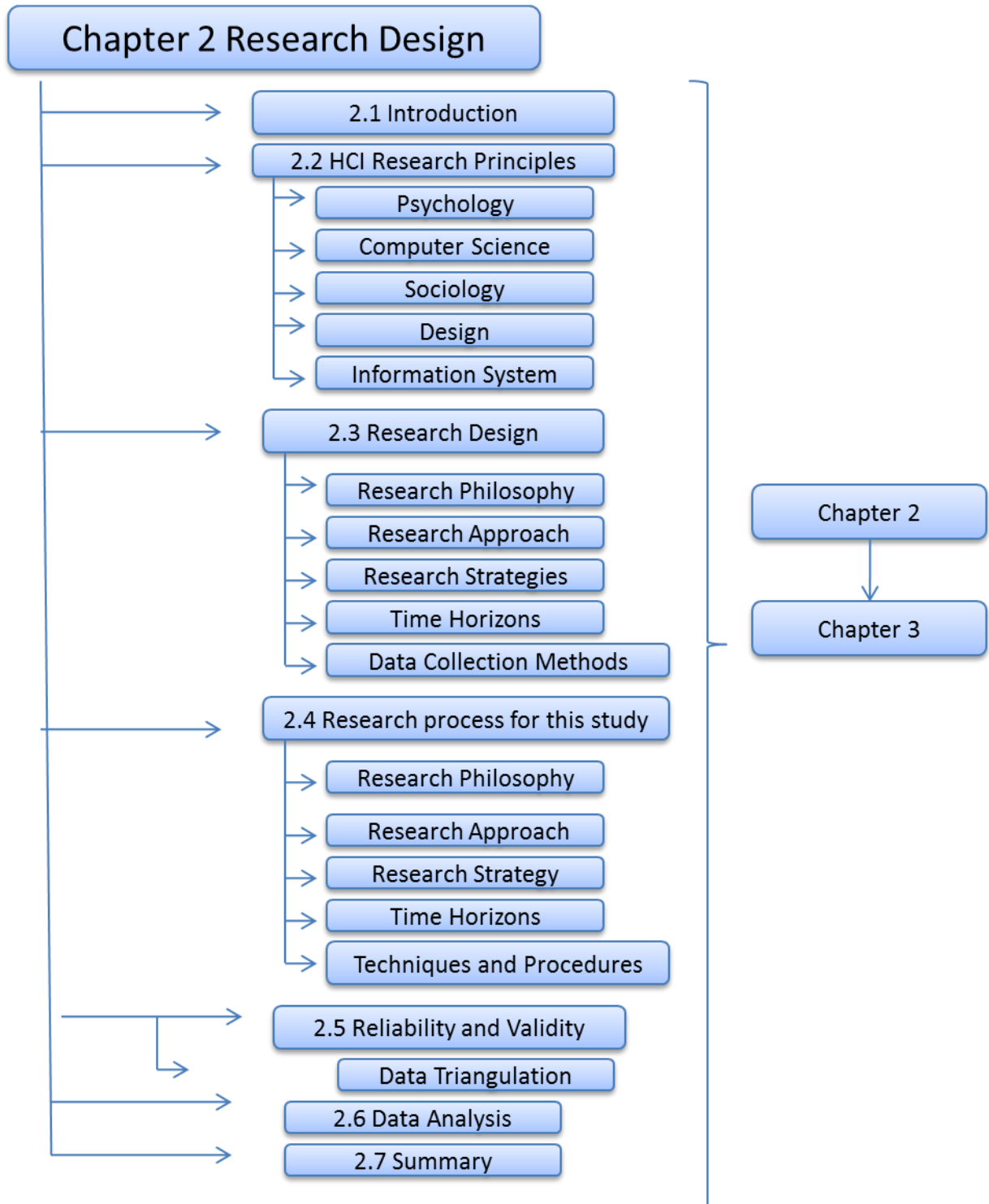


Figure 2.1 Chapter 2 Outline

## 2.1 Introduction

This chapter provides an overview of research methodologies applicable to this type of research. Once this study is positioned within the Human Computer Interaction (HCI) domain, the discussion proceeds to give an overview of appropriate research methodologies and their respective approaches. This is followed by an outline of the actual process followed in this study. The chapter concludes with how the validity and reliability of the research will be evidenced by means of data triangulation.

## 2.2 HCI Research Disciplines

Human Computer Interaction (HCI) came to light in the early 1980's as an area of study, and was a field which originally focused on computer science. In the last few decades the evolution of HCI has allowed the field to grow beyond computer sciences (Carroll, 2009).

HCI is the study of the relationship between a human and a computer and how people interact with computers as well as how computer applications are developed for a particular successful interaction with humans. Although HCI has evolved, it could be said that many computer systems are still not developed with the user in mind and that there is still a gap between the user and the computer system (Lorenzi, 1999).

This section aims to act as an introduction to the HCI research disciplines. Figure 2.2 illustrates the different fields that are influenced by HCI (Richter, 2004).

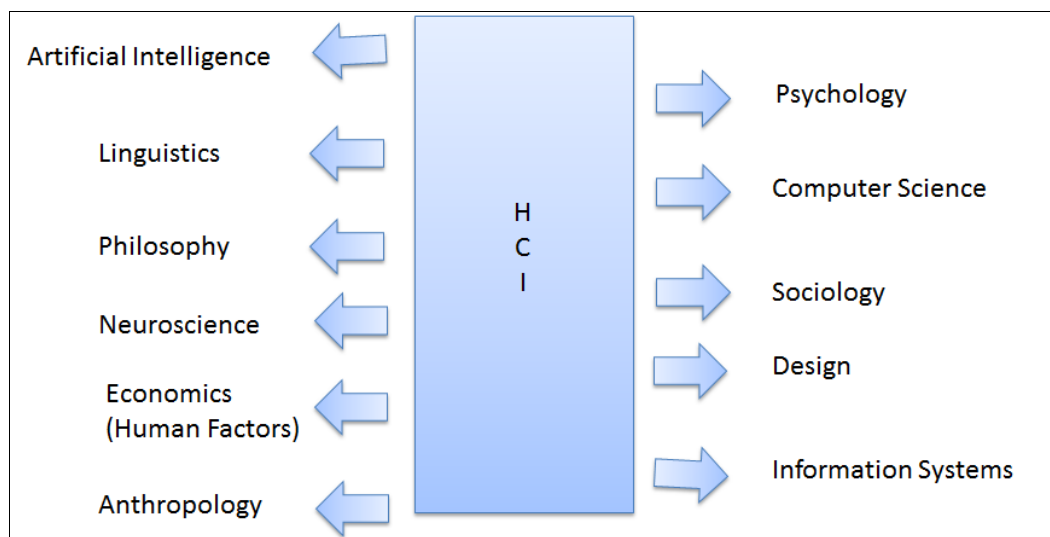


Figure 2.2 The Different Fields of HCI

HCI is a complex area of study because of its multidisciplinary nature. For this dissertation applications aimed at assisting netball coaches in South Africa are investigated. Disciplines that are involved in Human-Computer Interaction in a sporting environment are discussed.

The following are some disciplines in Human-Computer Interaction in a sporting environment (Carroll, 2005):

- Psychology;
- Computer science;
- Sociology;
- Design;
- Information systems.

### **2.2.1 Psychology**

It is often the mind-set of the user that prevents the user from using a given system correctly. Therefore, a key aspect for the successful delivery of a system, application or device is to understand the end user's needs. Characteristics such as age, personality and disability can affect the attitude of the user towards a system as well as how the user is able to interact with the system or application. Therefore, older coaches may be more reluctant to use technology. There may also be difficulty in understanding how the technology operates. This would need to be taken into consideration when developing a technology for the coaching of netball (Carroll, 2005).

### **2.2.2 Computer science**

The necessary software tools to develop interfaces and systems or applications are provided by the computer science as well as engineering disciplines. These systems or applications are intended to interact with the end users to assist the users in achieving particular tasks. Some development tools include C#, Visual Basic and Java, which are all software languages used to create the applications. Using computer sciences to create technologies to be used for netball is possible. The computer science or software is the driving force behind applications which may be created to calculate goal averages or shooting motions of shooters in netball.

### **2.2.3 Sociology**

As related to HCI, sociology deals with the socio-technical matters. These matters relate to what impact, the use of technology in a sporting environment, has on the social situations. It contributes methods and techniques such as observational studies and ethnography that are applied from the social sciences. Technologies such as social media could be used for

communication. This would directly impact the sociology of the relationships between players and coach as well as from player to player (Carroll, 2005).

#### **2.2.4 Design**

Issues with the layout or interfaces of applications form part of the design field of the HCI. Common issues that are relevant here are the colours used in an application or the positioning of text, graphic or images on the display screen. With sporting equipment often relying on cameras and camera angles providing feedback to a software system, the placement and positioning of the cameras and how they relay images to a system is important. With netball being a fast paced sport, the positioning of items such as cameras around the court would be very important to ensure all movements are captured. Also if systems are deemed too advanced, or the review of data captured is too difficult because of the design, systems will probably be utilised incorrectly or not at all (Carroll, 2005).

#### **2.2.5 Information systems**

The focus of this discipline is on how people interact with information or technologies from both an organisational and business point of view, as well as a managerial point of view. A system will only be as good as the information it provides. When technology is used, data has to be stored. Stored data can be used to track the progress of players, or even compare the performance among a number of players (Carroll, 2005).

### **2.3 Research Design**

The HCI disciplines were introduced in section 2.2. The purpose of this section is to discuss a structured way in which research can be conducted.

The research process expects that the researcher asks the following questions:

- To which research questions does she/he want answers to?
- How can one go about obtaining these answers?

Practical steps are stated by Saunders, Lewis and Thornhill (2003) to assist researchers in answering the questions above. Research methodologies are available as a means to guide a researcher into solving the problem presented in the primary research question. The researcher typically chooses a research process best suited to the nature of the topic being researched.

Mondofacto (2010) defines research as *“The ordered set of activities focused on the systematic collection of information using accepted methods of analysis as a basis for drawing conclusions and making recommendations”*.

Figure 2.3 shows the different research processes as stated by Saunders in the research onion model (Saunders *et al.*, 2003).

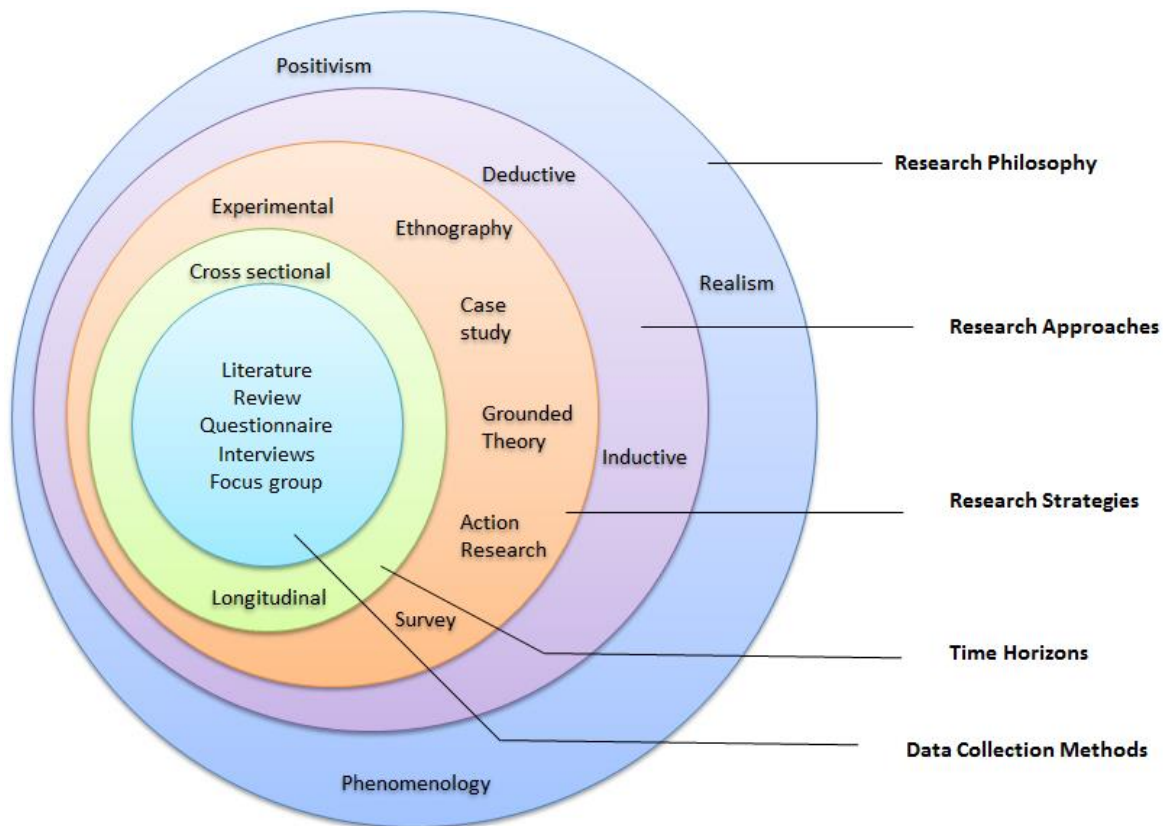


Figure 2.3 The research onion model.

The methodology followed in this research project is guided by the research onion model which aims to provide a thorough explanation of the research process.

The different layers of the research onion will be discussed in the following section.

### 2.3.1 Research philosophy

Three different research philosophies were identified in the research onion, namely positivism, realism and phenomenology (Saunders *et al.*, 2003).

**Positivism** applies scientific perceptions to the process of constructing knowledge (Saunders *et al.*, 2007). **Realism** identifies social objectives which can have an effect on human interactions, and this is used in order to create knowledge (Saunders *et al.*, 2003).

The third layer of the philosophy, **phenomenology**, is an approach that identifies a phenomena as it is perceived by the users in a specific situation. This approach deals with studying experiences rather than assumptions (Lester, 1999).



### 2.3.2 Research approach

When conducting research, it can have an inductive or deductive approach.

The deductive approach is typically associated with scientific research. First a hypothesis is formulated. The researcher then tests and examines it in order to establish a theory (Hussey & Hussey, 1997).

The Inductive research approach formulates a theory based on research data. More flexibility is provided in this approach as the researcher has the ability to modify the research focus based on the findings throughout the research process (Easterby-Smith, Thorpe & Lowe, 2002).

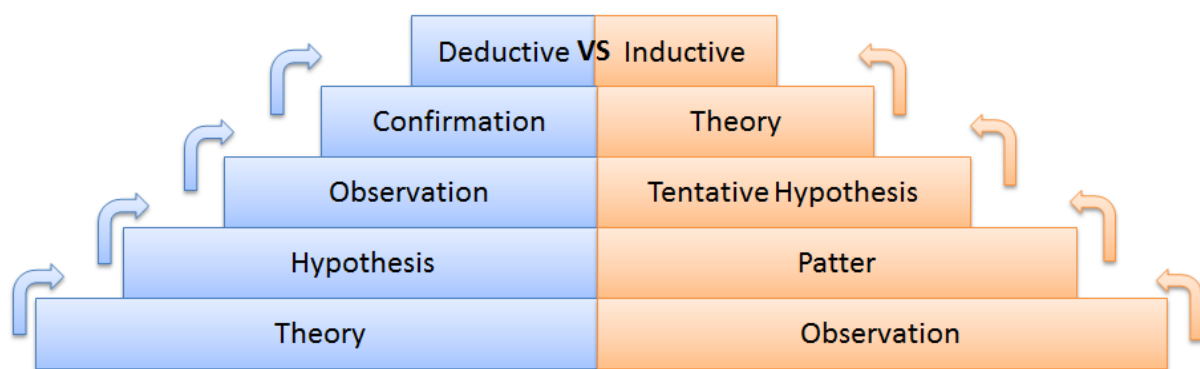


Figure 2.4 Deductive vs. Inductive

Figure 2.4 adapted from Trochim and Donnelly (2006) displays both the inductive and deductive research processes. The deductive approach starts with the theory and concludes with a confirmation, while the inductive approach starts with observation and concludes with the theory.

There are many definitions of research methods. For example, Mouton (1996) defines research methods as a plan or blueprint of how one intends conducting research. Mouton further explains that a research method focuses on the end product, point of departure and the logic of research.

There are two types of research methods, namely, qualitative and quantitative (Yin, 2004):

- **Quantitative research** is concerned with quantifying a relationship or comparing two or more groups;
- **Qualitative research** is concerned with studying objects in their natural settings. A qualitative researcher attempts to interpret a phenomenon based on explanations that people bring to them.

Qualitative evaluation approaches involve the use of predominantly qualitative methods to describe and evaluate the performance of programs in their natural settings, focusing on the process of implementation rather than on outcomes (Mouton, 1996). Baker (1988) states that qualitative research attempts to understand how an entire social unit such as a group, organisation or community operates in its own terms.

Quantitative research is also used to “answer questions about relationships among measured variables with the purpose of explaining, predicting and controlling phenomena”. This approach is sometimes called the traditional, experimental, or positivist approach (Leedy & Ormrod, 2005). Quantitative research is mainly from the researcher’s viewpoint and therefore is an approach that makes use of numbers and figures.

### **2.3.3 Research Strategies**

Six strategies are highlighted in the research onion by Saunders *et al.* (2003). These are discussed in more detail in this section.

#### **2.3.3.1 Case study strategy**

The case study strategy requires that the researcher conducts an investigation of an observation in a specific context. This could reveal new empirical information within a real life phenomenon (Yin, 2008).

Common fields of research that utilise case studies are psychology, political sciences, community planning, sociology, social work and business (Yin, 2003). It is commonly used in these fields because of its in-depth analysis of groups, organisations or individuals and the aim to increase knowledge in these areas.

As mentioned earlier, case study research is an empirical inquiry, investigating existing phenomenon in its natural setting. Harling (2002) states that:

- The phenomenon can range from programs, events, activities and problems to individuals;
- The context in which the phenomenon occurs is defined as the natural setting;
- A holistic inquiry is the in-depth collection of detailed data involving multiple sources of information including direct observations and interviews.

#### **2.3.3.2 Single vs. Multiple Case Studies**

Single case studies typically refer to a case in which the phenomenon has not been previously observed by many, whereas multiple case studies are used when the findings from a case occur in other cases with an attempt to generalise them. In multiple case study examples, a replication rather than a sampling logic must be used; and when no other cases are available for replication, the researcher is limited to a single case design (Yin, 2009).

A single case study is appropriate in several situations. Yin (2009) believes there are five different justifications for the use of a single case study. One justification includes a situation where the single case represents a critical case in testing a well-formed theory. A second justification is where the case represents an extreme or unique case. A third example is where a representative or typical case exists where the objective is to capture circumstances for an everyday common occurrence.

Revelatory cases form the fourth justification of a single case study, while the fifth justification is the longitudinal case study, which is studying the same single case over two or more different points in time.

### **2.3.3.3 Exploratory Case Study**

There are three case study approaches according to Yin (2009). These three approaches are exploratory, explanatory and descriptive. In exploratory case studies, the data collection and fieldwork can be undertaken prior to the definition of the research questions or hypothesis. The aim would be to look at patterns or ideas, rather than testing for confirmation of the hypothesis.

A descriptive case study goes further in that it tries to explain the different characteristics of a phenomenon. This type of case study requires that the researcher begins with a descriptive theory. Here a hypothesis with a cause and effect relationship is formed.

Explanatory case study research is suitable for doing casual studies. The design tries to explain the course of events and relate how things have happened.

### **2.3.3.4 Case Study Design**

A research design can be defined as the logical sequence that connects empirical data to a study's research question (Yin, 2009). This can also be seen as a blueprint for research dealing with problems such as what questions to study, what data is relevant, which data to collect and how to analyse the results (Philiber, Schwab & Sloss, 1980).

Avoiding situations in which the evidence does not address the initial research questions is the primary aim of a research design.

According to Yin (2009) case studies are yet to have a comprehensive "catalogue" of research design developed. Until recently, case study designs have always been considered a subset or variant of the research designs used for other methods, such as experiments. With the lack of appropriate codification for case-study research, Yin (2004) recommended the use of a case-study protocol consisting of five major components: The

study questions, its propositions, the units of analysis, the logical linking of the data to the propositions, and the criteria to be applied for interpreting the findings.

Soy (1997) represented a different approach that holds six steps in conducting case study research. These steps include: Determining and defining research questions, selecting the case and determining data gathering and analysis techniques, preparing to collect data, collecting data in the field, evaluating and analysing the data, and preparing the report.

#### **2.3.3.5 Survey strategy**

A survey strategy is commonly used in health services and social research studies. The term survey is used in many ways, but usually refers to selecting a large sample of people. This sample group represents a wider population on whom the research is based (Kelly, Clark, Brown & Sitzia, 2003).

Interviews or questionnaires are the primary data collection strategy followed for surveys. The purpose of a survey is to produce a portrait of how things are at a specific point in time. As the researcher cannot change any of the variables used in a survey, the researcher has no power over the conditions (Kelly, Clark, Brown & Sitzia, 2003).

#### **2.3.3.6 Experiment strategy**

The use of the experiment strategy is often seen as the more traditional approach to research. This particular research strategy tests theories and demonstrates relationships between variables in order to predict facts. It is often used in sciences where researchers demonstrate a cause and effect between variables through experiments (Saunders *et al.*, 2003).

#### **2.3.3.7 Grounded theory strategy**

Grounded theory strategy provides many ways that a researcher can use to approach research. According to Strauss and Corbin (1998), researchers can navigate the research in a way that is the most appropriate to their research. This is due to the fact that the approaches can be either flexible or inflexible (Mavetera & Kroeze, 2009).

#### **2.3.3.8 Ethnography strategy**

Ethnography strategy has roots in both social and cultural anthropology and requires the researcher to spend a significant amount of time in the field. The time spent in the field acts as an opportunity for ethnographers to get involved with the lives of the people they are studying. Phenomena under the study are therefore placed in a social and cultural context (Myers, 1997).

### **2.3.3.9 Action research**

Action research is a valid research method in the organisational development and education fields (Myers, 1997).

### **2.3.4 Time horizons**

Two options are highlighted in the research onion model for time horizons, namely, longitudinal and cross-sectional.

#### **2.3.4.1 A longitudinal study**

A longitudinal study conducts investigations over an extended period of time. The researcher is required to perform continuous collection and analysis of data over the time period (Babbie, 2005). The variables used by the researcher are more easily controlled.

#### **2.3.4.2 Cross sectional study**

In a cross-sectional study, the investigation is conducted on a phenomenon or phenomena over a particular period of time. It is most common in academic work with pre-determined deadlines (Babbie, 2005). Researchers are not able to manipulate the variables, but rather observe and record information from the population of interest. The purpose of cross-sectional studies is to describe characteristics that currently exist in the population of interest, and not determine cause and effect between the variables (Cherry, 2012).

### **2.3.5 Data collection methods**

Data collection methods help the researcher to collect data and to analyse the findings. Saunders *et al.* (2003) depicts the different data collection methods as:

- Literature review;
- Questionnaire;
- Interviews;
- Focus Group.

#### **2.3.5.1 Literature Reviews**

Literature Reviews are normally conducted to search existing material on a particular topic. It also assists in the identification of other research that might be in progress in the same field of study.

Literature can be obtained from Primary, Secondary or Tertiary sources. Primary sources include reports, theses, conference proceedings, company reports or some government publications. Secondary sources range from journals, books, or newspapers while tertiary sources can be obtained from indexes, abstracts, catalogues, encyclopaedias, dictionaries, bibliographies or citation indexes (Saunders *et al.*, 2009).

### **2.3.5.2 Questionnaires**

Questionnaires are commonly used by researchers in order to understand the sample group. It develops answers through the distribution of characteristics, attitudes and beliefs of the sample under study. Honesty and accuracy of participant responses is of key importance to successful data collection for this method. The questions within a questionnaire are structured in such a way that allows persons to pick a response out of a response category. Questionnaires are typically used on small groups (Yin, 2009).

A questionnaire can be defined as a document that contains questions and other types of items to extract information that is appropriate for analysis (Babbie, 2005). Factors to consider when creating a questionnaire is the length thereof and its effect on the response rate. The researchers should also consider the likelihood of misunderstandings in the questionnaire. It is advisable to do a pilot test of the questionnaire (Bernardo, 2005).

### **2.3.5.3 Interviews**

Interviews are relied on extensively by qualitative researchers. This method is often described as interviewing with a purpose (Yin, 2009). Interviews could be a method applied by itself or it could form part of several methods that are employed in a study. Interviews can be informal conversations, or can follow a general interview guide or be in an open-ended format (Patton, 2002).

Qualitative interviews follow a more conversational path. The preparation of the interviewer is very important as the success of the interview can depend on it. The researcher would typically explore general topics that helps uncover the participant's views and perspectives on the topic (Yin, 2009).

### **2.3.5.4 Focus Group**

Focus groups can be used for a number of different purposes. Used in an independent manner, they can be the foundation for a complete study. When used in other methods they can simply supplement other preliminary methods or combine other qualitative methods (McQuarrie, 1996).

## 2.4 Research Process for this Study

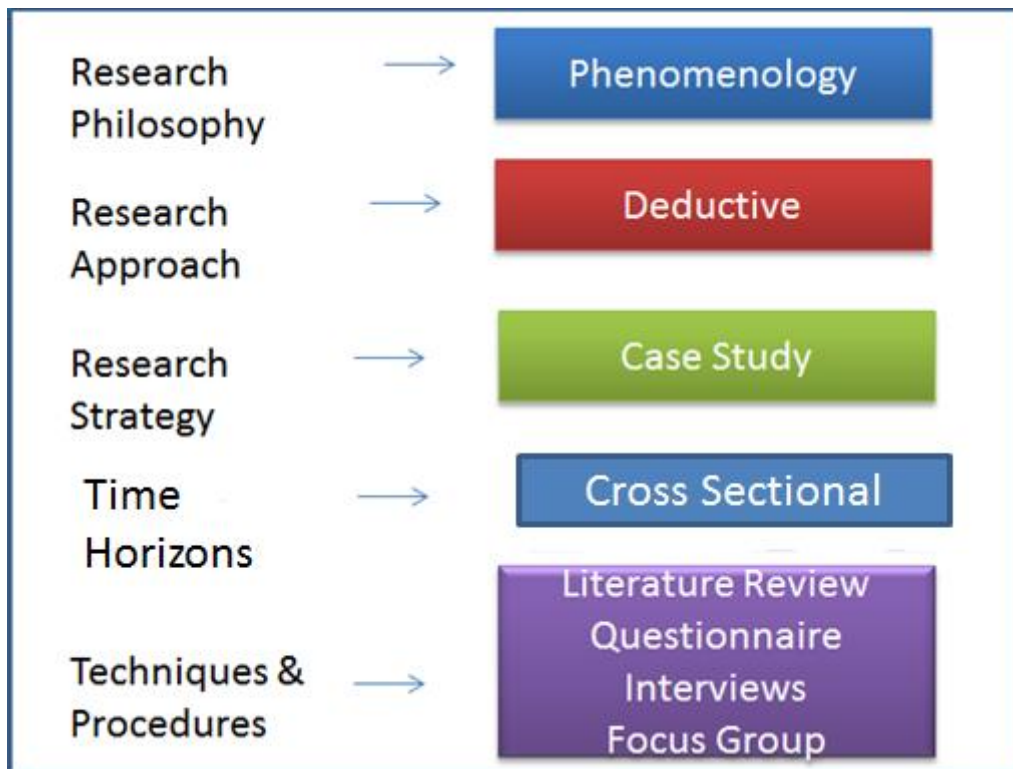


Figure 2.5 Process applied for this study

Figure 2.5 demonstrates which processes from the research onion were adopted for the purpose of this study.

For this study the willingness of a coach to utilise technology is firstly very important. Therefore the mind-set of coaches towards the use of technology should be investigated. If coaches are reluctant to use technology, then the underlying psychological objection should be determined. If coaches are found to be using a technology in the preparation of tournaments for netball, the design of existing systems should be investigated to see if it is of an acceptable nature. Another important component of the interaction between coaches and technology will be to find out how coaches store data obtained from technologies. To acquire a technology and set it up for use might not be a problem for coaches, but the data obtained and what is done with that data is important. The design of systems is important and if data analysis is a tedious task coaches might not use the information supplied by the systems else they might use it in an incorrect manner.

HCI therefore forms part of this study due to the fact that a determination of how coaches (humans) use (interact with) technologies (computers) for preparation in training of netball was undertaken.

#### **2.4.1 Research Philosophy**

The Research philosophy followed a phenomenological approach in this study as the researcher's stance is that of being involved within netball in South Africa as a participating player. The phenomenological approach is therefore best suited for this type of study. Other than with positivists, a phenomenologist believes that the researcher cannot be detached from his/ her deductions.

#### **2.4.2 Research Approach**

The deductive approach was used in this study. Firstly a theory was formulated in that netball in South Africa does not utilise technology in training. The hypothesis that the utilisation of technology can enhance sporting performance was applied. Observations via a case study which is supported by questionnaires and interviews were conducted.

#### **2.4.3 Research Strategy**

A single case study was used at the Spar National Netball Championships in 2012. This case was to investigate the Information Technology usage during the preparations of teams participating in the tournament.

The overall approach of the research was exploratory, as there are few or simply no previous studies aimed at establishing the status of technological use at a provincial level in netball in South Africa.

#### **2.4.4 Case Study Data Collection**

Data for case studies can be from many sources of evidence such as interviews, surveys, document analyses, direct observation, focus groups, and questionnaires among others (Yin, 2003).

Questionnaires and interviews combined with evidence from literature were chosen for the purpose of this study.

#### **2.4.5 Time Horizons**

The cross-sectional time horizon was used as the investigation took place over a particular period of time. This was to be the Spar National Netball Championships in 2012 which is a sporting event that ran for a week. The information that was observed and recorded, described characteristics that currently existed within netball in South Africa at a provincial level.

#### **2.4.6 Techniques and Procedures**

The techniques and procedures to be used in this dissertation are a combination of:

- Literature Reviews;
- Questionnaires;



- Interviews;
- Focus Group.

#### **2.4.6.1 Literature Review**

This was conducted to gather existing literature on the topic of technology usage in sport. It was used to both identify some of the technologies that currently exist for the use of netball as well as technologies more specific to other sporting codes.

#### **2.4.6.2 Questionnaires**

The aim of the questionnaire was to probe an investigation into the technologies used during training by various teams that participated in Spar National Netball Championships. The investigation was not limited to computerised technologies as shortfalls in technology usage were also identified. One such shortfall could be the lack of using technology or the inability to correctly manipulate the data obtained and to use the information that is provided by the technology.

There are two types of sampling, namely, probability sampling and non-probability sampling:

- **Probability sampling** – Probability sampling is based on randomisation (Babbie, 2005);
- **Non-probability sampling** – Non-probability sampling refers to the case where the probability of including each element of the population in a sample is unknown (Bless & Higson-Smith, 2006).

For the purpose of this study non-probability sampling techniques were used. There are various types of non-probability sampling namely purposive, quota and target (Cooper & Schindler, 2006).

#### **2.4.6.3 Interviews**

An interview is a technique which involves direct personal contact with the participant who is asked to answer questions relating to the research problem (Bless & Higson-Smith, 2000). According to Yin (2003), for in-depth interviews, the researcher initiates a dialog with a real person and engages the interviewee as a human being and not as a study subject. Therefore, the interviewer does not utilise a structured interview, but rather constructs a guide of open-ended questions. The principal advantage of open interview schedule format is that it does not suggest the terms by which respondents should answer a question (Babbie, 2005). Interviews were used to determine the use of social media as a coaching aid.

In this study, interviews were conducted via Facebook with both coaches and players. This was done to ascertain a stance on social media both as a research and a coaching tool for players and coaches.

#### **2.4.6.4 Focus group**

Experts in the field of Human Movement Sciences from the Nelson Mandela Metropolitan University were consulted in order to validate the applicability of the factors. Any suggestions or refinements of the factors put forward to the focus group were also included in this study.

## **2.5 Reliability and Validity**

According to Yin (2009), research design should represent a logical set of statements, and the quality of any given design can be judged according to four commonly used logical tests:

- Construct validity – which identifies correct operational measures for the concepts being studied;
- Internal validity – which seeks to establish a causal relationship, whereby certain conditions are believed to lead to other conditions;
- External validity – which defines the domain to which a study's findings may be generalised;
- Reliability - which demonstrates that the operations of a study, such as the data collection procedures, can be repeated and yield the same results.

The construct validity process was used in this study through the use of multiple sources of evidence, such as questionnaires, interviews, literature and a focus group. The use of these multiple sources of evidence provided for a process of data triangulation.

In this case the results of the Spar National Netball Championships were used and compared to the results of the questionnaires and interviews conducted with the participating coaches.

Reliability is linked to the consistency, dependability, accuracy and predictability. Case study notes were used so as to achieve reliability.

### **2.5.1 Data Triangulation**

Recognising the imperfections of the data collection methods, a triangulation approach was used to cross-check the gathered data. Data collected from the literature and questionnaires were triangulated against the results that teams obtained in the tournament. Figure 2.6 illustrates the triangulation process used in this study.

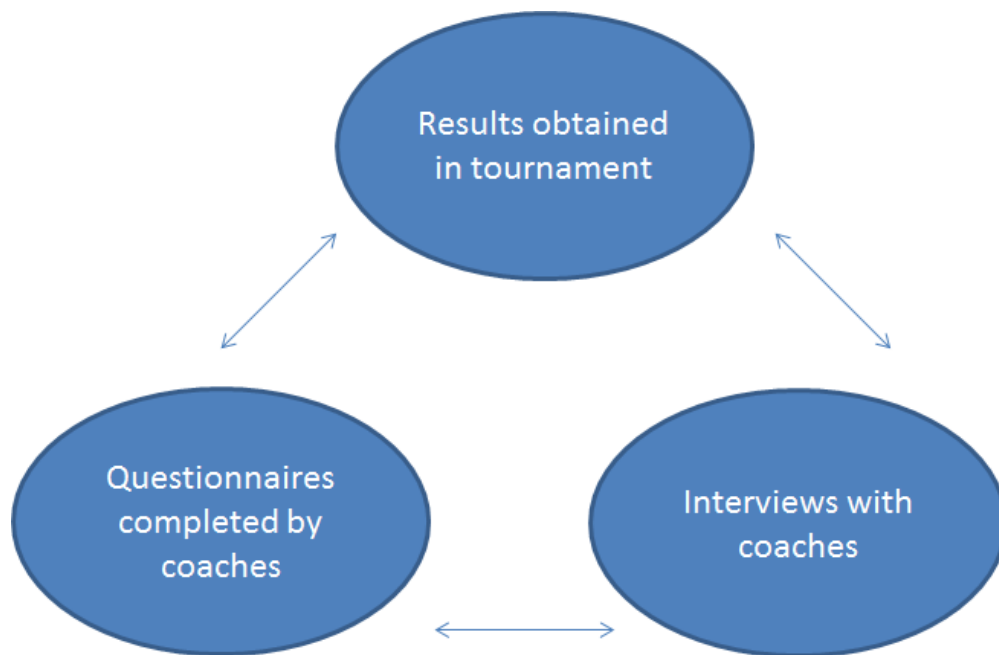


Figure 2.6 Data Triangulation

## 2.6 Data Analysis

Data analysis consists of examining, categorising, tabulating and testing of qualitative evidence to address the initial propositions of the study. Creswell (2009) and Yin (2003) both comprehensively described analytic manipulations in the analysis and interpretation of qualitative research data and this includes:

- Putting information into different arrays;
- Making a matrix of categories and placing the evidence within such categories;
- Creating data displays such as flowcharts and other graphics for examining the data;
- Tabulating the frequency of different events;
- Examining the complexity of such tabulations and their relationships by calculating second order such as means and variance.

Data displays, such as graphs and tabulating were used to comparatively highlight the differences found in the teams' coaching, preparation and technology usage. These were mainly used in order to present a qualitative analysis of the collected information.

After the data was gathered and analysed, a set of factors were produced. The guidelines aimed to provide ideas and guides for coaches who would like to incorporate information technology as a tool to assist coaching. Factors were identified through the analysis of existing systems as well as the systems used by other teams. Factors also arose from the procedures already in place by teams using technology in support of coaching. Either these

existing procedures could be seen as a guideline, or parts of the existing procedures could be improved and had the ability to serve as guidelines to new coaches.

## **2.7 Summary**

The research methodology used in this study followed a qualitative research approach using a single case study research design. Data collection for the case study was obtained by using a questionnaire and literature reviews.

The questionnaire used non-probability, judgement sampling and was mainly aimed at determining the technology used as a tool to assist coaches in the coaching of netball.

Chapter 2 highlighted the approach to be taken and the methods to be used in the study to ascertain to what extent technology is currently being used as a tool to assist coaching of netball in South Africa. A single embedded case study design was preferred, with four teams being investigated within a single holistic case. Data collection methods such as questionnaires and interviews were used. The use of questionnaires gathered information on how coaches prepared for a netball tournament and if technology was being used in preparation. Additionally, interviews were conducted with coaches and players with regard to the usage of social media. Interviews were also used as a means to follow-up with coaches if any additional questions arose from the results of the questionnaires. A focus group was used to validate factors that would be put forward, as well as the use of data triangulation for validity of data obtained.

Chapter 3 looks at the technologies that are currently available to netball. Not all technologies are explored, but attention is given to those that are relatively easy to obtain and have been found to be used by teams currently participating in competitions in South Africa.

## Chapter 3 Technology in Sport

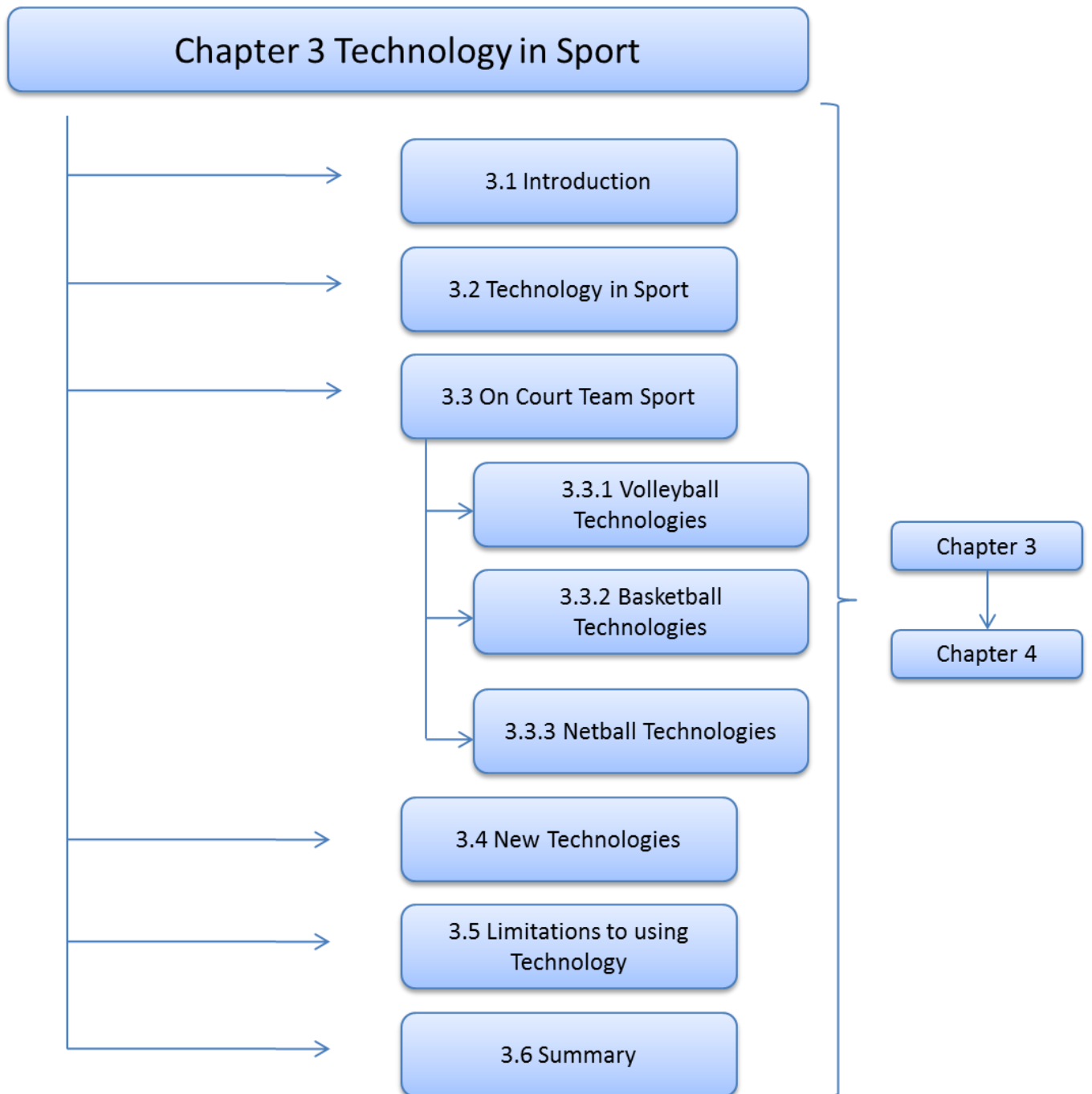


Figure 3.1 Chapter 3 outline

### 3.1 Introduction

This chapter investigates the technologies and then more specifically, the information technologies that are available to sport. This aims to answer the research question:

**“What information technologies are available to support sports coaching in general?”**

The chapter also investigates what netball specific information technologies are available. This would aid the answering of the question: **“What information technologies are available to support netball coaching?”**

### 3.2 Technology in sport

The dictionary defines technology as follows: *“The application of scientific knowledge for practical purposes”* (The Little Oxford Dictionary, 1996).

There is a considerable range of discussions when talking about how technology affects sporting performance. With technology being such a broad spectrum the concept of using technology in sport is not a new one. Some examples of technological use in sport are the following (Heyward, 2014):

- Pedometers;
- Heart Rate Monitors;
- Interactive Video Games;
- GPS and Geographic Information Systems;
- Persuasive Technology.

The question, however, is what role can computer technology play in sport?

The uses for computers in sports go beyond computer or video games (Glencoe & McGraw-Hill, 2010).

#### 3.2.1 Advantages of using technology in sport

There are definite advantages when using computerised technology to assist with performance in sport. The Ulster science society believes *“Sporting technologies are man-made means developed to reach human interests or goals in or relating to a particular sport.”* Examples of sporting technologies include golf clubs, tennis rackets, pole vault poles, athletic sports gear (clothing and footwear), advanced computer stimulations and motion capture (The Role of Technology in Sport, 2009).

Computerised technology in sports is a means by which athletes attempt improvement in their training and competitions in order to enhance their athletic performance. Performance improvement is achieved through using specialised equipment and the latest modern technologies to perform tasks more efficiently (The Role of Technology in Sport, 2009).

The benefits of using information technologies in sports would be that a greater knowledge of the human body has been recognised, allowing athletes to train and compete in sports until a much older age than before (The Role of Technology in Sport, 2009)

Smart Equipment Technology includes sensors and computers and can be used by athletes or coaches as part of their training regime. Examples of 'smart' equipment technologies include devices used for exercise stress testing and cardiovascular assessment, human reaction time and frequency of movement metres, and jump and run characteristics devices. More modern technologies such as motion analysis systems are also used to analyse athletic performance. This involves recording the movements of athletes during sporting activities which can then be used for personal performance evaluation by the sports person, for enhanced spectator entertainment, and in some cases for medical treatment (The Role of Technology in Sport, 2009).

### **3.2.2 History of Technology in Sport**

Over the past two decades, technology has completely reshaped the sports industry. Equipment companies are spending millions of dollars to improve athletic performance and safety while leagues try to maintain an even playing field. In addition, the fan experience has been transformed through huge leaps in media (Sloann.d.).

### **3.2.3 Uses of technologies**

There are various possible uses for technologies in sport. These uses include technologies that are aimed at:

- **Umpiring** –Technologies such as Hawk-Eye are considered to be decision-making aids. Aid is given to umpires and/or players when there is a dispute regarding the on-field/court call made by an umpire. Disputes may arise due to an umpire making a bad judgement call as a result of a fast occurring action (Collins & Evans, 2008);

**Coaching** – Coaching technologies, such as Shot Coach, aim to play the role of the coach by analysing player movements and providing feedback to players (Kamanetzky, 2013). These technologies are typically used by players without requiring the presence of a coach or manager;

- **Performance Enhancement** like the Coach Enhancement Platform is designed for coaches to self-reflect on their coaching and invite others to provide feedback and mentoring. Its aim is to enhance the performance of the coach (Coach Enhancement Platform);
- **Performance analysis** software, are systems that aim to analyse the performance of players in a particular motion. Motion analysis tools are common for these types of technologies. Often with the aid of computer animations, one can simulate the movements that a player has just completed, such as a cricketer's bowling action. These movements are typically captured and converted to animations through the use of sensors that relay images to a computer (Ferdinands *et al.*, 2008).

The focus of this research is on coaching and the use of Information Technology (IT) in coaching.

### **3.3 On-Court team sports**

An on-court team sport is typically a sport that is played on a court. The court not only provides restrictions on the movement of players, but also gives an indication of the surface that the players are playing on. Volleyball, netball and basketball are all examples of on-court, team sports. There are restrictions on the size of the playing court as well as similarities in the surface on which play takes place.

The fast paced nature of the above mentioned team sports as well as the lack of individuality of the concept of a team provide challenges for coaches to be able to give feedback to all players. This is due to the coach's attention having to be divided among all of the players on court. Information Technologies aimed at these sports vary. The variations include tracking systems to track player movement, technologies to optimise players' scoring abilities or even technologies to assist the coach in finding training drills.

The section that follows will look at some of the technologies that are available to each of these three on-court team sports.

#### **3.3.1 Volleyball Technologies**

##### **3.3.1.1 Interactive Volleyball CD-ROM**

The program includes an education section, a multiple access database of 400 drills, and a coaching/teaching practice/lesson planner.

The education section is designed to provide a coach with comments on designing and working out practice/lesson plans. These comments provide sub-topics that will enable



coaches to learn how to plan, run, and evaluate practices and lessons more efficiently. Each section is introduced with a descriptive video of information on the screen and printouts can be produced if desired (Kilb, Raz-Liebermann & Katz, 2001).

One of the sub-sections is the **education section** and it answers the following types of questions: (Kilb, Raz-Liebermann & Katz, 2001)

- What are the steps in planning a volleyball practice or lesson?
- What are the components of a well-planned practice or lesson?
- What are the various categories of drills?
- What are the principles related to selecting appropriate drills?
- How do blocked and random practices differ?
- Why is it important to evaluate both the practice plan and the practice management?

Another section is the drill database, which contains over 400 volleyball drills. Coaches can search the database by ability level, skill, degree of complexity, stage of development, or drill type. In some categories, there are sub-categories. Upon selecting a drill, additional information about that drill will appear (Kilb, Raz-Liebermann & Katz, 2001). The information includes text, a diagram and a full-motion video clip. If appropriate, selected drills can be added to the lesson/practice plan. Coaches can use some of the 400 drills on the CD-ROM or create their own drills.

The practice/lesson planner, is another section and has been created so that coaches and teachers can quickly plan their practices and lessons incorporating the drills contained in the database. The planner is connected to the drills database, so each drill that was selected previously can be stored in the specific plan. Coaches can print any number of the following elements of the drill: duration, objective, description, equipment, space for key points, space for evaluation and diagram.

### **3.3.1.2 StatEasy**

StatEasy is a comprehensive, integrated statistics and video solution for high school and college sports teams. It allows teams to record and publish statistically coded video to the Internet to share with a trusted community of coaches, families and peers.

StatEasy's solution allows teams of all types to create content, automatically attach statistics, and share that content with team members, fans and families. It is easy to start using this system by following these simple steps:

- Take statistics live during the game with StatEasy on a laptop;

- Continuously film the game from the desired vantage point (continuous video means no stopping and starting, except for half-time);
- Upload digital video into StatEasy;
- Synchronise the first statistic that was taken during the match with the corresponding video (do the same for the start of the second half);
- Use statistic reports to guide oneself to the most relevant video content.

The information should be shared with the team and community to build unity (Volleyball, integrated stats and video for volleyball teams of all sizes and at all levels, 2013)

### **3.3.2 Basketball Technologies**

#### **3.3.2.1 94Fifty**

94Fifty is an information technology solution to assist the sport of basketball. Basketball is a ball sport similar to netball in that it has a ball, a court to play on and points are scored by an action called shooting. Shooting is the action of getting the ball through the ring and net. Although the rules are different between basketball and netball, the basic principles of shooting to score goals and trying to prevent the opposing team from shooting goals remain the same.

The 94Fifty technology is applied to one of the most important pieces of equipment used in basketball, namely, the ball. Six sensors are built into the ball. The ball is, however, still able to maintain the same standard size and weight. Bluetooth technology is used to monitor just about anything a player would want to see: Shot arc, release times, backspin, speed and power of a dribble, and so on. If a force of any sort is put onto the ball, the measurements thereof are captured.

Used in conjunction with the four included training applications (including one which allows head-to-head competition against anyone, anywhere, also using the technology), 94Fifty provides players with instant feedback and hard data, allowing information to be processed in real time, and facilitating faster improvement (iKamanetzky, 2013).

The basic philosophy is simple: That which is measured can be improved, and too many aspects of training in basketball are not measured. A coach can call a jump shot “too flat,” lacking the proper arc to go in consistently, but that language is imprecise. Instead, the ball will communicate the exact angle of a shot to a smart phone and tablet. If 45% is what a player needs, he will quickly learn what that looks and feels like coming out of his hand.

The system works with both Android and IOS, uses Qi wireless charging with up to eight hours of battery life, and has a range of 90 feet from whatever device is used to gather the information (Kamanetzky, 2013).

### **3.3.2.2 Shot Coach**

Shot Coach is a technology that is lightweight and does not interfere with the players' normal court movements, and its aim is to assist in the coaching of shooting. The equipment required for this technology includes a wrist band that contains a chip, a box attached to the lower rim of the shooting hoop and a smart phone (Kamanetzky, 2013).

The technology works in the following way: first, the player puts on the wrist band over his shooting hand. The chip that is embedded in the wrist band tracks everything such as from where the shot was hoisted, the wrist movement, and the velocity.

The box is then magnetically attached to the underside of the shooting rim. This tracks shots that go down and measures the rim/backboard vibrations from the bricks (Kamanetzky, 2013).

All of this information is then relayed to a free mobile application which catalogues the data into digestible form. Armed with such specific knowledge, a scorer can truly understand the strengths and problem areas of his or her game. Most shooters would be aware, for example, of a tendency to hit more 3's from the corner rather than from the top of the arc. That discrepancy in marksmanship could be easily corrected. The data could reveal when shots are consistently fired too strongly or too far to the left. Knowledge is power, and Shot Coach supplies it.

Figure 3.2 shows the components that are required in order to run this technology (Kamanetzky, 2013).



Figure 3.2 Shot Coach Equipment

### 3.3.3 Netball Technologies

Using computerised technology in netball helps coaches objectively analyse the performance of their teams and individual players. Based on this analysis, the coach can make improvements to individuals or to the team as a whole (Sports Technology and Analysis, 2007).

As with sport in general, information technology usage in netball plays an integral role in identifying factors which can influence results on the netball court (Sport Science, Croft a Technology Avocate, 2013).

Using information technologies can give teams an edge. If a technology is said to assist in giving the edge, the technology will be implemented and used in compactions even when the technology that is being used is still in a testing phase (Ian, 2013).

Computerised technologies that have been identified for netball are the following:

- High-Tech Shooting sleeve;
- Dartfish;
- RTF Tracking;
- Vision Coach.

These will be discussed in more detail below.

### **3.3.3.1 High-Tech Sleeve for Shooting**

The High-Tech shooting sleeve employs biomechanical analysis during the shooting motion of a goal shooter in netball. The sleeve was originally designed for basketball players.

Basketball is probably the sport which has the closest resemblance to netball. The goals of the game are the same as well. Points are scored by shooting the ball through a hoop. Therefore using principles and movements based on basketball for netball is possible.

The High-Tech shooting sleeve could therefore be adapted for the use of netball, as shooting is a common action in both sports.

In an online article on [technologyreview.com](http://technologyreview.com), Brittany Sauser writes about a High-Tech arm band similar to a compression sleeve that is used by basketball players. The arm band finds the natural shooting rhythm of the shooter with the aid of two sensors. One sensor is placed at the wrist and another at the elbow. As shots are taken by the athlete, the position, velocity and acceleration of the arm is measured and wirelessly transmitted to a laptop. All monitoring is done in real time (Sauser, 2008).



Figure 3.3 High-Tech Shooting Sleeve

Figure 3.3 shows Sharalle McMohan, an Australian Netballer, wearing the sleeve (Sauser, 2008). Damian Farrow who is a senior skill acquisition specialist at the Australian Institute of Sport (AIS) is working with other researchers to adapt the sleeve for usage in netball.

Music is used in synchronisation with the arm band when a successful shot is completed. When the athlete performs the correct motions he/she will hear a tone. Athletes can now adjust the shooting action based on whether or not they hear a tone.

Due to the fact that all athletes have their own unique shooting action, the first goal of the sleeve is to establish the athlete's shooting action and assign tones to the angles of the joint. This is where the biomechanical base comes in. When the shooting action has been established the sensors are used to pick up any changes in resistance and transmit the information wirelessly to a computer. The computer then calculates the distance between the joints and the kinematics for the arm. Feedback is given to the athlete and coach through graphs and charts of the action (Sauser, 2008).

### **3.3.3.2 Dartfish**

Dartfish is a software system that *integrates software and online tools to deliver a flexible, competent and comprehensive match analysis system*. This match analysis system is used to analyse more than just match play. It has the ability to track and analyse a variety of movements. For netball, more specifically, it has the ability to track the movements of the shooter's shooting style and applies analysis accordingly. When Dartfish is used for goal shooting analysis it can probably be seen as the predecessor to the High-Tech shooting sleeve.

The Dartfish tagging solution makes it easy to find, review and analyse key sequences/moments in a game. These are marked using descriptive 'tags' which can be integrated from any number of contributing coaches/analysts using the most appropriate tool for their role: Dartfish software can be used for in-depth description, or EasyTag for simple hand-held tagging. Tags can even be imported from other software or added from dartfish.tv. This solution is flexible and can be used for any sport, allowing one to decide what to tag and how it can best be described. Figure 3.4 shows how the tagging system can be set up.

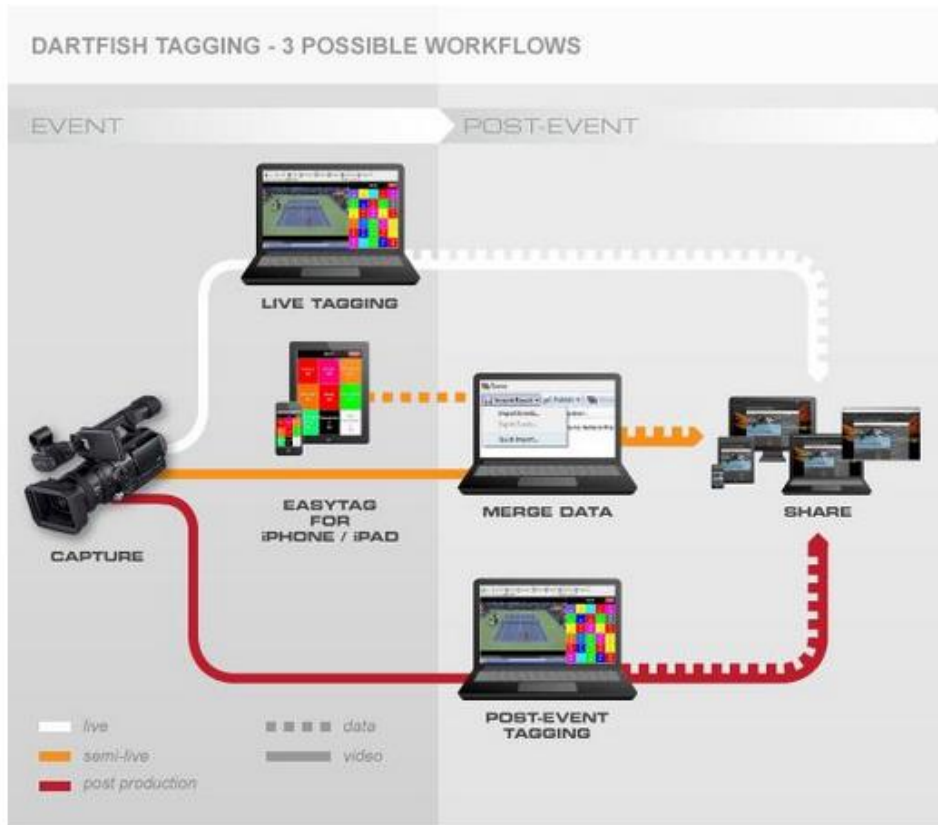


Figure 3.4 Dartfish Tagging (<http://www.dartfish.com/en/sports/team-sports/index.htm>, 2012)

As can be seen in Figure 3.4, the equipment required to run the Dartfish program is relatively easy to use, with technologies that most coaches might have been exposed to already. This adds to the ease of use of the product.

Some of the main stream uses for Dartfish include:

- **Dartfish EasyTag** works either stand-alone or can be integrated. One can use Dartfish software to record and timestamp information during a match or exercise drill. It distributes statistics, eradicating the need to manually do post-match analysis. After a game, players and coaches will be able to watch the game and the analysis of the game on a computer, smart phone or tablet.
- **Skill Development** improves athletes' performance through visual support. Execution of certain skills are recorded and analysed and can visually be played back to the players. This allows for a greater understanding of the corrections or adjustments that the athlete is required to make to certain movements. The recorded movements can also be compared against those of other players or other clips already in the system.
- **Player Development** can assist in managing and sharing quantities of clips among staff creating athletes' libraries. It captures video footage of athletes during training or

competitions. One can create athletes' libraries and make video available to every specific coach for various video processes used (e.g. technical, tactical, physical and mental) thanks to powerful and interactive sharing tools (CD, DVD, email or web platforms).

Dartfish's focus is on recording and analysing movements either in match play or during training drills. This recorded information is aimed to be distributed to the athletes or even other coaches. Distributions via CD, DVD, email, or web platform are amongst the examples provided. Can social media form part of the web platform for distribution of analysed game play?

### **3.3.3.3 RFT Tracking**

Recently on Netball Scoop there was a discussion on the Australian under 21 teams using a system called the RFT Tracking system (Ian, 2013).

Victoria University PhD student Alice Sweeting is using the technology as part of a cross sectional group. The technology provides real time information such as distance, velocity and positioning, with the Australian National Netball squads, including the Australian Diamonds.

The system is based on the concept of using GPS for tracking, but because netball is played indoors, it uses radio frequency for tracking (Ian, 2013).

The study of this technology is still in progress, but promising results have already been found.

### **Vision Coach**

The eyes are responsible for gathering over two thirds of all information fed to the muscular skeletal system. The visual system determines where a player would throw a ball to or catch a ball from, where he/she would land after jumping and also when to jump (Vision Coach, 2012).

Vision Coach is a large interactive light board measuring 50" x 34". To use the Vision Coach the individual gets into position by facing the light board display at eye level, and reacts to the lights as they appear in a random series by depressing each light as quickly as it is seen, or by responding to the light with verbal recognition.

All programming is done on the face of the display on the lower right corner. An alphanumeric LED window is positioned in the upper right corner to show program options,



times, scores, and late scores. These are visible only during the programming of, and at the end of each trial to ensure that there are no visual distractions during use. Individual program options are endless with the ability to incorporate a Fixator Light, 11 Distinctive Visual Fields, 12 Speed Settings, seven Different Light Settings with 120 Lights, Letters and Numbers, Red, Green, or Red and Green Lights, and Red/Blue Goggles used for Binocularity Assessment and Enhancement. At the completion of the trial, and after five minutes of non-use, the Vision Coach powers down into sleep mode until it is ready to be used again.

VisionCoach is self-contained. Microprocessors and Software are within. No external connections are required to run the unit other than a small power supply. It is Wi-Fi compatible with PC's, Tablets and Printers for detailed data collection. However, one does not require a computer in order to run the unit (Vision Coach, 2012).

Some of the critical sports skills developed by Vision Coach are (Vision Coach, 2012):

- Visual Concentration;
- Speed of Recognition;
- Reaction Time;
- Peripheral Vision;
- Depth Perception;
- Visual Memory;
- Visualisation.

Being able to recognise visual cues and react to them faster could provide a great edge over opponents on the netball court.

Now that some of the existing netball systems have been explored, are there existing computerised tools available, which could be used to aid the coaching of netball as well?

### **3.4 New Technologies**

Social media, YouTube, Smartphone applications and Websites are not considered new technologies. However, the concept of using these technologies as a tool to assist coaches in the coaching of netball might not have been explored in its full capacity. The potential uses of these tools are discussed in the sections below.

### 3.4.1 Social Media

When social media is mentioned, sites like Facebook, Twitter, YouTube and even Skype come to mind. These sites are created to share information which can range from photographs to videos to personal details.

There are many sporting heroes, some not even from the same country as their fans. Social media has enabled us to gather insightful information on our favourite sports stars. Figures 3.5 (De Villiers, 2003) and 3.6 (Dagg, 2013) show how social media can be used to find out what one's favourite sports stars are doing. One can follow one's favourite cricketer on Twitter.



Figure 3.5 Cricketer on twitter

One can be part of the fan page of one's favourite rugby player on Facebook.



Figure 3.6 Rugby Player on Facebook

While Figures 3.5 and 3.6 show how social media can be used for personal fascination, there are also ways of sharing more valuable information for educational purposes using social media.

The use of social media has drawn substantial attention from educators. An increasing number of consultants have started using social media in their teaching (Wang, n.d.). The Journal of Medical Internet Research (JMIR) covers the concept of not only using the Internet to share health and medical information, but also the role that social networking can play in the sharing of this information.

Sharing medical information may be best suited for medical forums. Teaching, however, need not be limited to specific forums. Perhaps for teaching, a more open and accessible forum could be used, including an existing forum such as YouTube.

### **3.4.2 YouTube**

YouTube has become the third most visited website in the world (Alexa, 2013). Only Google and Facebook are visited more than YouTube. Since its creation in February 2005, YouTube saw rapid growth. In the sixteen months after its creation, 100 million clips were being viewed per day (comScore, 2006). In October 2008, the site attracted 100 million users in America only in one day. This was estimated to be over two thirds of the Internet users in the United States (comScore, 2008).

YouTube is the site that houses various videos on various topics. These videos can range from uploaded episodes of cartoons, to compilations of athlete injuries, actor interviews and even "How To" videos. A study was done on the use of YouTube as a tool to teach music.

Negroponete (1995) suggested that combining media would be the new trend of technology as society entered the new millennium. These new multimedia forms would allow users to have more control over their consumption of information and media. (Negroponete, 1995) Jenkins (2006) furthered this claim by explaining how media companies were encouraging consumers to interact more by joining multiple media forms together and sharing them. These interactions created on the Internet had made a social link among people who had never met one another. These new technologies have enabled the Internet to become an interactive media technology (Jenkins, 2006).

Negroponete (1995) also discussed how media had changed from a passive form into a more interactive form. One educator looked for ways to add informality to the teaching of music in order to change the declining number of amateurs making music (Negroponete, 1995). Green (2002) presented observations and data collected from a pilot study that allowed students to bring in music of their choice to a music class, form friendship groups, and create

their own rendition of a song. These informal learning techniques were also developed into a curriculum and used experimentally in a number of English schools (Green, 2008). The projects that Green (2002 & 2008) described focussed on putting the learner at the centre of the education and discussed the benefits of the inclusion of informal learning in the traditional classroom. Students appreciated freedom in their education, and their choices resulted in confidence in their musical abilities. Green (2002) suggested that there is a natural continuum of informally learning music. This continuum includes memorising, copying, jamming, embellishing, improvising, arranging and composing. Green's continuum can be experienced through consumption and creation on YouTube. YouTube contains a myriad of videos that allow a viewer to learn informally through watching songs or lessons.

If the concept of using social media as a teaching tool exists in the medical fraternity with the sharing of medical information and the YouTube is identified for assisting in the teaching of music, then what is stopping social media from playing a role in coaching?

Figure 3.7 shows search results of what is currently available on YouTube for Netball Agility training.

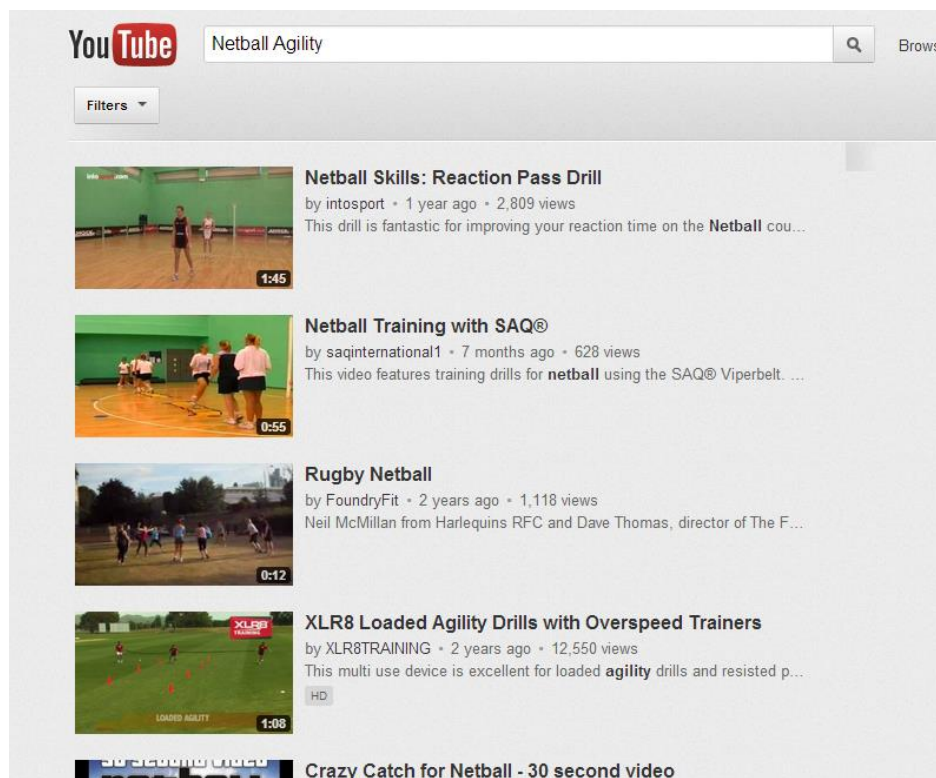


Figure 3.7 Results of agility drill YouTube Search (2012)

As can be seen in Figure 3.7, there currently are videos available to assist a coach in identifying a practice drill in order to improve a player's agility. This can be very helpful for a

new coach. Using YouTube to see which activities currently exist for netball specific training, can help a new coach put together a training session. The session can be focused on specific characteristics that are required by netballers, such as an agility building session.

It is even possible for players themselves to consult YouTube to identify exercises that the player can do to improve certain skills that they currently lack. Here YouTube is used to assist not only a coach, but also a player directly. This opens up a whole new avenue to coaching in itself. The coach of a team could upload an entire training session onto YouTube, which the players could then view and follow in a training session that the coach is perhaps not able to attend. A similar scenario where the coach uploads a training session onto YouTube could be used by players who missed a practice due to illness. In this way each player stays in touch with new drills and tactics that might have been learned at a practice. YouTube thus act as a database for existing drills that players or coaches can use for training. YouTube provides fans with the chance to see not only videos of their favourite sports stars in a match situation, but also grants fans the opportunity to watch interviews. Often interviews are conducted with players prior to big tournaments, when these videos are uploaded to the internet fans across the world have the opportunity to watch these interviews with their favourite players.

Figure 3.8 depicts an interview with a New Zealand Netballer (Jvay, 2011). This shows how social media can be used to gain information on one's favourite sports star.

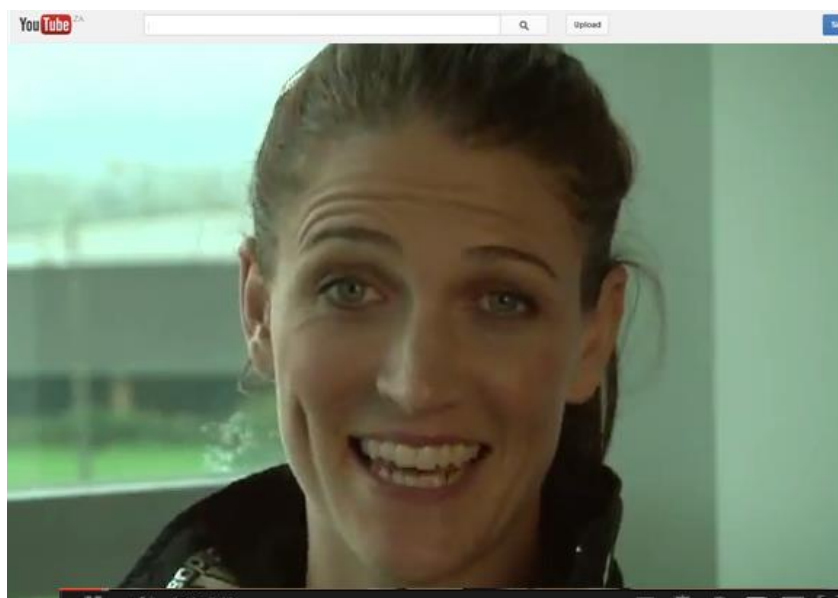


Figure 3.8 YouTube Interview

While Figure 3.8 shows how YouTube can share interviews of one's favourite sporting stars, Figure 3.9 gives insight as to how YouTube can be used as a match play analysis system

(outofyourtime, 2010). Matches played in different countries that are not necessarily broadcasted in South Africa can now be viewed from YouTube. These top class matches can be used in analysis. Centre passes, trick plays or even defensive or offensive structures can be scrutinised and used by coaches to teach the players in their team. The figure shows results of a search for “Netball New Zealand vs Australia”.



Figure 3.9 Australia vs New Zealand match

New Zealand and Australia have been the top two ranked teams in netball for over a decade.

### 3.4.3 Apps and Websites

With the introduction of smartphones came the introduction to applications. Applications (Apps) on phones go beyond playing games or surfing the Internet. New applications relating to fitness are popular among sportsmen and women. Some examples of applications on smartphones are Strava and Run Keeper. Both applications possess the ability to track activities via GPS. This allows the application to follow the athlete on a specific route, also tracking the distance the athlete has covered, as can be seen in Figure 3.10.

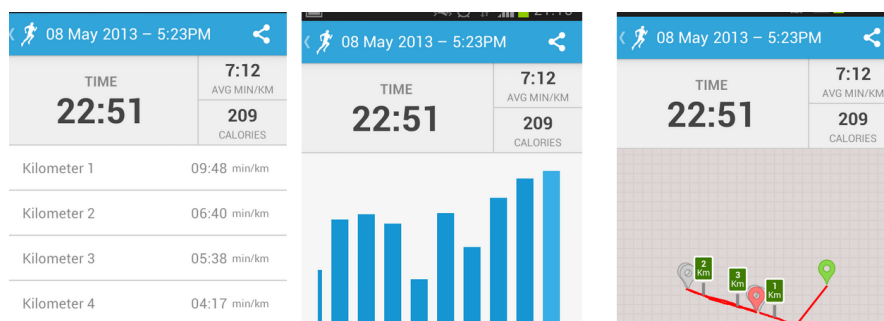


Figure 3.10 Run Keeper App

Figure 3.10 shows a recorded run using the Run Keeper App. As can be seen, there is a per kilometre breakdown of the run, as well as the total time and distance covered. Applications such as these can be used to monitor the fitness activities that netballers do in their own time. Since it has the capability to have the results uploaded to the Internet and shared with friends, it allows coaches to remotely monitor performance and fitness levels of the netballers.

Another option to consider as a coach could be to consult websites. Websites or online forums have a community atmosphere, where coaches from across the globe can communicate, share, compare drills or findings or even ask questions. Websites have a powerful ability to grow one's views as a coach and introduce new ideas and different forms of thinking. The possibility exists to collaborate or have discussions with coaches from different countries that employ different coaching techniques.

### **3.5 Limitations to Technology usage**

Although Information Technology has significantly advanced over the past decade, there are several limitations derived from the literature that pose difficulties for collecting reliable and/or valid data.

Limitations include the following:

- Inconvenience for athletes to wear multiple devices, and the effect of environmental conditions. Devices can be bothersome or uncomfortable, which can become distracting to athletes trying to focus on a game or practice while having to remember to comply with all the directions for using the devices (Maddison & Mhurchu, 2009);
- Scalability issues often arise when using two or more time-motion analysis devices (e.g., the GPS network and an accelerometer). Because of cost and participant inconvenience, using multiple devices may decrease the validity and reliability of the resulting data. All devices must be calibrated and timed precisely otherwise large discrepancies in data can occur (Hartwig, Naughton & Searl, 2011);
- IT is primarily used for studying velocity and distance measurements, but in order to assess muscle damage, energy cost, and other physiological and biophysical adaptations that occur during match play, other devices are required. IT alone is incapable of full assessments;

- GPS is unable to measure vertical jumps, as movement can only be monitored horizontally without satellite degradation;
- The average cost of IT alone varies between \$500 and \$2,000 US, which could range between R5,000.00 and R20,000.00 if converted directly;
- Another limitation of IT technology is the potential effect the environment has on the desired measurement capacities. Environmental conditions that can affect the signal accuracy of the IT include: (a) being indoors, (b) atmospheric conditions such as clouds, (c) local obstructions such as tall buildings, or (d) being in a highly populated area (Larsson, 2003; Michael *et al.*, 2008). Prior to reaching the IT, the satellite signals can become influenced by such conditions, leading to an error in the calculated distance from the satellite and consequently producing errors and/or missing data in speed and position measurements (Maddison & Mhurchu, 2009).

The above list highlights some of the obstacles encountered when using information technology for the enhancement of sport. This shows that there are benefits as well as limitations to using technology to improve athlete performance in sport.

### **3.6 Summary**

Chapter 3 looked at the technologies more specific to netball as well as some social media technologies that can be used in netball. When one thinks of the incorporation of social media as a coaching tool, it starts opening doors for other technologies. If YouTube and Facebook can be used then why not cell phone applications? Smart phones are small and most likely travel along with players wherever they go. Applications to assist training can be specialised for netball. Players can have the opportunity to train remotely using a smart phone application, and the results can be uploaded to a shared location for the coach to review. In the next chapter an investigation into the role of a coach will be conducted and technologies to support coaching will be discussed.



# Chapter 4 Role of a coach

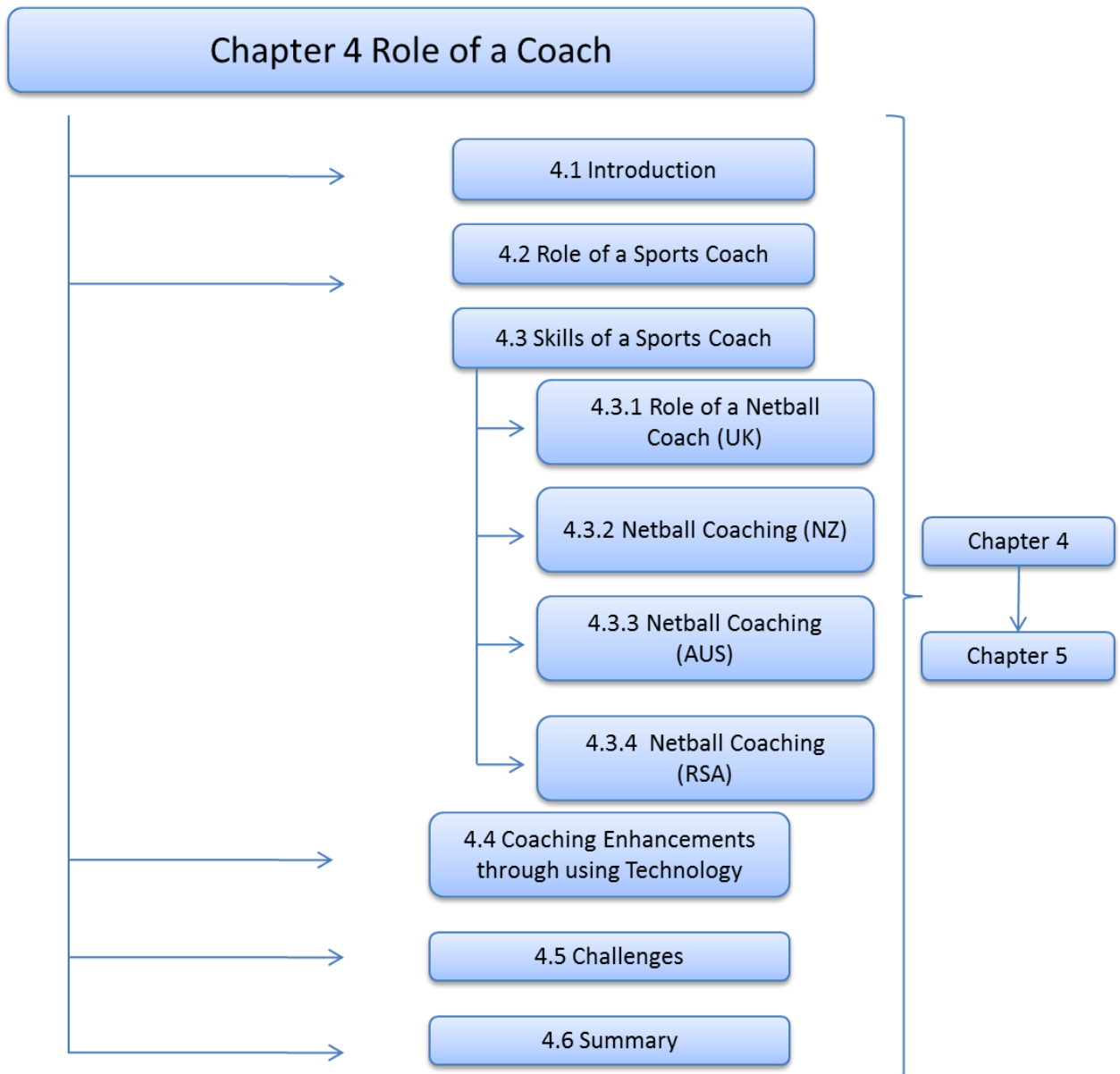


Figure 4.1 Chapter 4 Outline

## 4.1 Introduction

There are many different sports, with many different rules, but there is also one constant across all sports. That constant is that every sport and sports team requires a coach. Regardless of the type of sport played, the role of the coach could stay the same. This chapter aims to introduce the role of a sports coach in general and then looks in particular at the role of a netball coach. This will shed light on the secondary research question: “**What is the role of the coach in netball?**”

## 4.2 Role of a Sports Coach

A coach is expected to know the athletes and apply years of tried and tested knowledge and experience of the sport to assist them to achieve their goals in sport (Fricker, 2013).

While this is an essential element of modern coaching, there are now many more services and resources available to support the coach. At the elite level, there is physiological testing, biomechanical analysis, performance analysis and a whole range of technologies that can be strapped on, attached to, or integrated into the athlete or their equipment (Fricker, 2013).

Much of this technology is now becoming available to all coaches. Some examples of this are heart rate monitors, GPS tracking devices, power and other physical output recorders, video cameras, technical and game-analysis software (Fricker, 2013).

The online Merriam-Webster dictionary defines a coach as “a person who teaches and trains the members of a sports team and makes decisions about how the team plays during games” ([Merriam Webster Dictionary](#), 2013). With the coach being defined as a teacher and a decision maker what are the responsibilities of a coach?

The role of the sports coach is to create the right conditions for learning to happen and to find ways to motivate the athletes. Most athletes are highly motivated and therefore the task is to maintain that motivation and to generate excitement and enthusiasm. Looking at coaching as a job, the list below would be the requirements:

- When an athlete first starts in a sport/event, the coach's role is to direct the athlete in all aspects of training by telling or showing coaching style;
- As the athlete develops and demonstrates a sound technical understanding of the sport/event then gradually the coach's role changes to one where the coach and athlete discuss and agree on appropriate training requirements;

- As the athlete matures and demonstrates a sound understanding of training principles then the athlete will determine the training requirements. The coach's role becomes one of a mentor providing advice and support as and when required (coach job description, 2014).

In addition to the list above the typical responsibilities of a coach include the following (Sports Coach: Job Description, 2014):

- Teaching relevant skills, tactics and techniques;
- Monitoring and enhancing performance by providing tuition, encouragement and constructive feedback;
- Identifying strengths and weaknesses;
- Advising about health and lifestyle issues;
- Developing training programmes;
- Undertaking administrative tasks;
- Assisting with sports promotion/development;
- Promoting fair play;
- Taking care of sports equipment;
- Completing administrative duties;
- Planning coaching sessions.

### **4.3 Skills of a coach**

According to job.com the coach should possess skills in teamwork and team building or management. The coach should also show an understanding of nutrition, anatomy and physiology. The coach should possess skills in organisation and management, and is also responsible for planning, mentoring and motivating (Sports Coach: Job Description, 2014).

It is important to note the planning was a requirement in both the role of the coach and also in the skills that a coach should possess.

The importance in planning is due to the fact that with poorly constructed coaching sessions, players can become bored. This makes the planning phases to any practice very important. Coaches need to identify each player's needs and goals and then use these as a basis to prepare a practice session. Such systematic planning is important for tracking the progress of players as the season continues (Top Tips, 2014).

If planning is important to track progress, then there is a need for analysis to be done in order to assist in the identification and monitoring of progress. Coaches should have the skill to analyse technical and tactical aspects of performance. In conjunction to this, coaches should be able to identify the physical conditions that players are in or the conditions that players should be in as well as the mental skills of players. This should be compared to the goals that were set. The skills, knowledge and experience of the coach are often necessary in order to continue monitoring of the progress of the team members and revise practices to meet the changing demands (Top Tips, 2014).

Coaching at different levels, like school, university, senior or national level, could require the coach to have obtained certain skills for a particular level. This probed an investigation into what the requirements are for a netball coach at a different level and how a coach would go about achieving different level accreditations.

#### **4.3.1 Role of a netball coach (United Kingdom)**

Netball coaching is generally divided into levels. As the levels increase so does the expectations of the coach's ability. A level one coach would be considered an entry level or grass roots level coach. As the coaching levels increase, so the team level increases. For example a level one coach could be considered as a coach for school teams, while a level four coach could be eligible to coach a national team.

The United Kingdom created a UKCC for level one coaching. The levels in the UKCC are set out as shown in Table 4.1 (Netball UK CC, 2007).

Table 4.1 UKCC coaching levels

<b>Level</b>	<b>What the qualified coach will be able to do:</b>
Level 1	Design, implement and evaluate the process and outcome of long-term/specialist coaching programmes.
Level 2	Plan, implement, analyse and revise annual coaching programmes.
Level 3	Prepare for, deliver and review coaching sessions. This will normally be as a series of 6-10 coaching sessions in any one sequence.
Level 4	Assist more qualified coaches, delivering aspects of coaching, normally under direct supervision.

As can be seen in Table 4.1 each level of coaching contains different roles. As the level increases the role carries more responsibility. This table can be translated to what is depicted in Figure 4.2 (Netball UK CC, 2007).

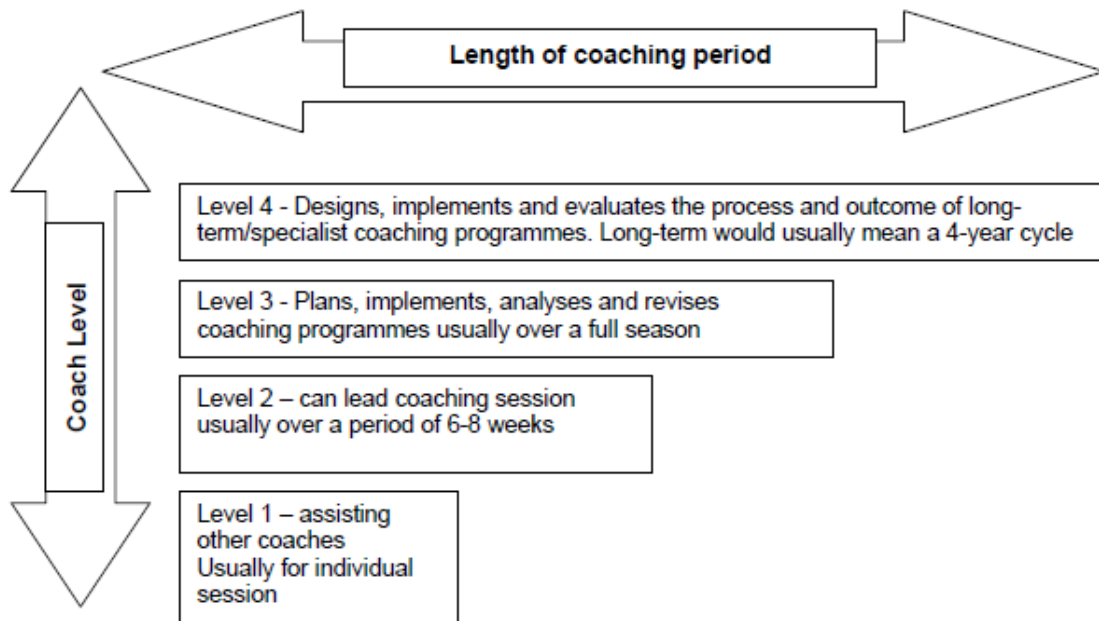


Figure 4.2 Diagrammatic representation of UK coaching levels

Figure 4.2 shows that for the United Kingdom or England, a coach generally achieves a higher netball coaching level the longer he/she coaches. Coaches seem to start off as assistants to other coaches and are gradually introduced to a leading coach role. Coaches tend to learn from other coaches while in level one and as their experience increases, so more responsibility is given and a coach can then move to the next level.

The UKCC explains the role of a level one coach as follows (Netball UK CC, 2007):

- **Prepare for the delivery of coaching activities**
  - The level one coach should be able to establish a safe working environment, which means that the training area should be safe and clear of obstructions and the surface should be good underfoot;
  - The coach should be able to prepare training activities.
- **Deliver prepared activity of coaching sessions**
  - The coach should be able to establish working relationships with players and other management;
  - The coach should prepare the players for the activities that will follow.
- **Evaluate the effectiveness of coaching activities**
  - The coach should be able to review the activities;
  - Constant development of personal practice should be exercised.

This has been the coaching approach for level one for England and the United Kingdom. The next sub-section takes a look at the process employed by one of the other netball countries.

### 4.3.2 Netball Coaching (New Zealand)

The New Zealand coaching process moves away from the levels approach, using more of a modular approach in their accreditation of netball coaching. Figure 4.3 shows the Netball New Zealand (NNZ) coaching accreditation approach.

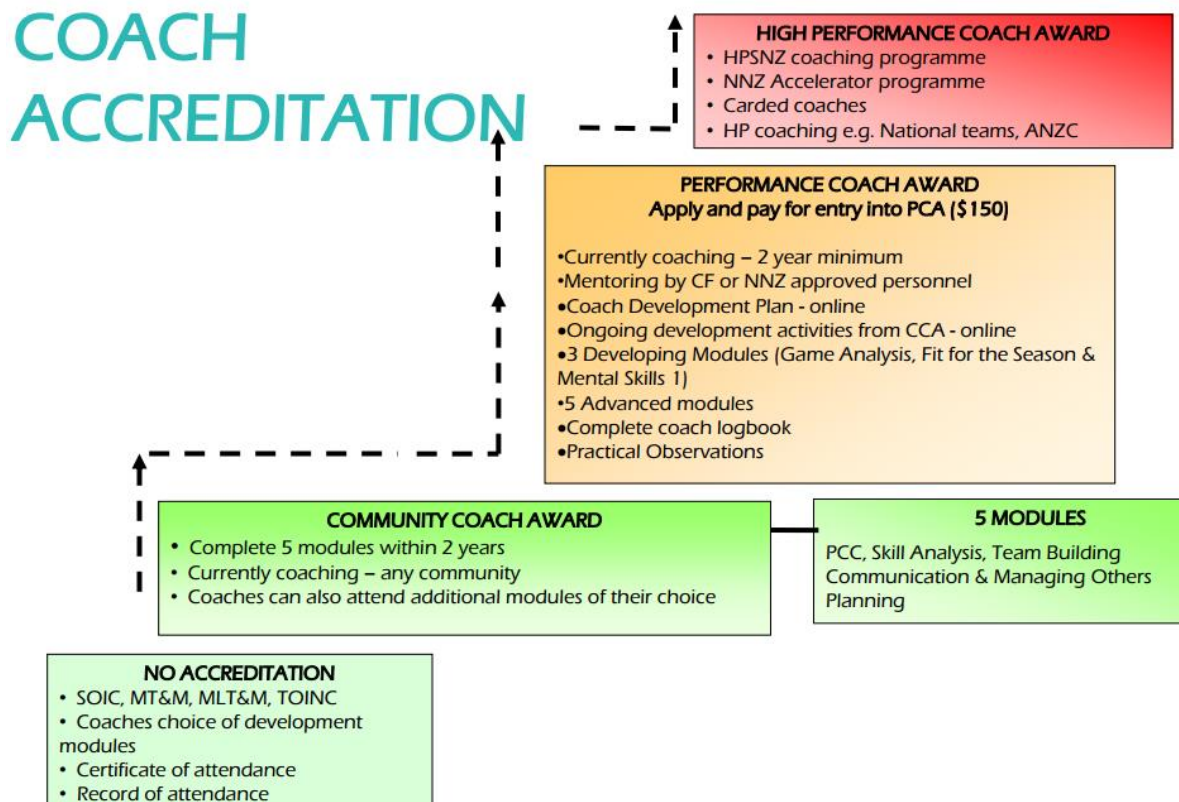


Figure 4.3 NNZ Coaching Accreditation (Coach Accreditation, 2013)

In Figure 4.3 it is shown that NNZ seems to use a modular or awards system to accredit coaches up to different rankings or levels (Netball Wellington Centre, 2013). It looks like a three tier approach employed by NNZ, where England seem to use levels up to level four.

Table 4.2 New Zealand Coaching accreditations

<b>Coaching Level</b>	<b>What the level entails</b>
<b>BEGINNER TIER: No accreditation attached</b>	This is for the starter coach, and is aimed at coaches who want to start a career in coaching.
<b>FIRST AWARD: NETBALL NEW ZEALAND COMMUNITY COACH AWARD</b>	Netball New Zealand Coach Accreditation Trail and consists of five compulsory modules – Player Centred Coaching, Communicating and Managing Others, Planning, Skill Analysis and Team Building. Once coaches achieve this award they gain additional support and personal development opportunities.
<b>SECOND AWARD: NETBALL NEW ZEALAND PERFORMANCE COACH AWARD</b>	Coaches have a 3 year period in which to complete this award, 5 years in total. The award requires coaches to complete the following: <ul style="list-style-type: none"> <li>• Currently coaching - 2 years minimum;</li> <li>• Source one's own mentor (assistance to find one can be provided by the CoachForce Officer);</li> <li>• Receive group mentoring by CoachForce or NNZ approved personnel;</li> <li>• Gain access code for Silicon Coach for CDP and on-going development activities.</li> </ul>
<b>THIRD AWARD: NETBALL NEW ZEALAND HIGH PERFORMANCE COACH AWARD</b>	Coaching at this level entails: <ul style="list-style-type: none"> <li>• HPSNZ coaching programme;</li> <li>• NNZ Accelerator programme;</li> <li>• Carded coaches;</li> <li>• HP coaching e.g. National teams, ANZC.</li> </ul>

As with the England approach, the roles and responsibilities of the coach would be adapted at each level or tier that the coach obtains accreditation for. Netball New Zealand guides the coach in each module. If one looks at the developing module, the coach will receive guidance on how to coach the following activities or skills (Community Netball, 2013):

- Attack 1;
- Planning 1;
- Team Building;
- Game Analysis 1;
- Defence 1;
- Fit for the Season;
- Selecting 1;
- Skill Analysis 1;
- Communicating and Managing Others;
- Mental Skills;
- Tournament Planning;

- Circle Work;
- Shooting;
- Ball Skills;
- Centre Pass;
- Through Court.

It is clear that in the developing module, coaches are assisted with the starting phases of game play. This is highlighted by Attack 1, Planning 1, Defense 1 and Selecting 1. This indicates that in further modules the coach will be guided into Attack 2 or Defence 2. As the coaching modules progress so too does the level coaching being taught and in conjunction with this, the skill level of the players are improved along with the advancement of the level at which the player plays.

The level of the accreditation of the coach directly impacts the level of coaching that a player can receive.

Comparing New Zealand and England there are some noticeable differences. An investigation into Australia could reveal if there is some consistency across the expectations and accreditations of netball coaching.

#### **4.3.3 Netball Coaching (Australia)**

The Muswellbrook Netball Association came up with various duties and responsibilities of a netball coach for Netball Australia. It was established that the coach should act as a role model for the players he or she is coaching. The coach should also be a dictator in dictating skill requirements and drills to be executed in practices. The coach must display leadership abilities and be encouraging and respectful to the players he or she is coaching. The coach should also have an open door policy and be a shoulder to cry on for the players being coached (muswellbrook, n.d.).

If some of the roles of the coach have been established for Netball Australia, what structure do they have in place to become a coach? It has been shown that England use levels and New Zealand lean more toward a modular approach.

Netball Australia use a framework which is a six tier progression strategy, each tier being accredited (Coaching Accreditation, n.d.). Figure 4.4 shows the different tiers within the Netball Australia accreditation process (Coaching Accreditation, n.d.).



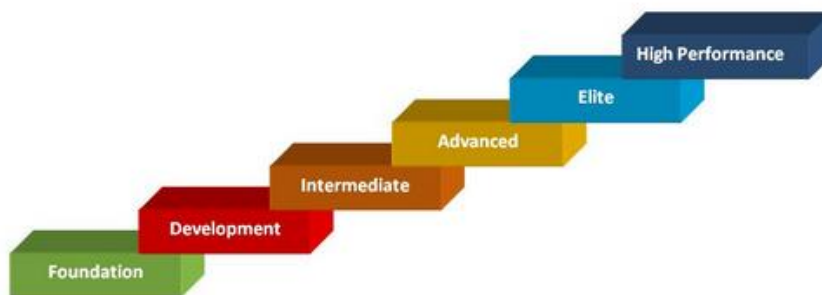


Figure 4.4 Australia coaching accreditation

A similarity with the other nations that stands out already is the foundation tier. Both New Zealand with their community coach award and England with their level one have a section aimed at the foundations of coaching. Table 4.3 reveals what the course details are available for Netball Australia and who each tier is aimed at (Netball Australia Accreditation Framework, 2013).

Table 4.3 Coaching Course Details

Course Name	Duration	Target Audience
Foundation Coaching Course	7 hours in-course work or 4 hours in course work and ASC Online Beginning Coaching General Principles course	Club coaches
Development Coaching Course	7 hours in-course work	Club, Association, & Regional Coaches
Intermediate Coaching Course	7 hours in-course work	Representative, Talent Identification and State League level.
Advanced Coaching Course	29 hours in-course and assignment work	Representative, Talent Identification and State League level.
Elite Coaching Course	As required	ANZ Championship assistant, underage state, state league (top level) and potential high performance coaches
High Performance Coaching Course	As required	Top level State League, State/Territory, ANL or ANZ Championship coaches

As with New Zealand each tier within the Australian setup has a predefined set of course work that needs to be covered. The detail of what is covered in each tier differs. New Zealand has shown progression in their course work, with intermediate coaches being exposed to Attack 1 or Defence 1 and at a later more advanced stage Attack 2. Australia's breakdown of course material can be seen in Table 4.4 (Netball Australia, 2013).

Table 4.4 Course Breakdown

Course Name	General Principles
Foundation	<p>The ASC Beginning Coaching General Principles course has been integrated into this training program. The units include:</p> <ul style="list-style-type: none"> <li>• Role of the Coach</li> <li>• Planning and Reviewing</li> <li>• Risk Management</li> <li>• Athlete Development</li> </ul> <p>The ASC Beginning Coaching General Principles course can also be completed online and the condensed netball specific course delivered.</p>
Development	<p>The ASC Beginning Coaching General Principles course has been integrated into this training program. The units include:</p> <ul style="list-style-type: none"> <li>• The Coach in Action</li> </ul>
Intermediate	<p>The ASC Intermediate Coaching General Principles course component must be completed separately through a State Coaching Centre, Registered Training Organisation or other approved Coaching Principles Agency.</p>
Advanced	<p>The ASC Advanced Coaching General Principles course has been integrated into this training program.</p>
Elite	Not applicable
High	Not applicable

In Table 4.4 the foundation course's first item on the list is the role of the coach. This directs back to the list put forward by the Muswellbrook Netball Association that deals with the coach being a role model, a shoulder to cry on and a leader.

Through this approach every accredited coach, regardless of what level they are coaching at, is made aware of the role they play not only in a netball perspective, but in the lives of players. Due to the incremental approach the roles put out at the foundation level are carried through each tier. It would be fair to say that the role of a coach at a foundation level is the same as the role of a coach at the high tier. It is the skill level of the coach that changes through each tier and not the role that the coach plays.

#### 4.3.4 Netball Coaching (South Africa)

The coaching accreditation structures of England, New Zealand and Australia have been investigated.

Although there was little evidence available on the coaching accreditation structures of South African Netball, it could be derived that Netball South Africa uses a similar approach to what England uses.

Upon investigation it was found that the highest level a coach can achieve in South Africa was a level four (SA Schools Netball, 2010).

With England also using a level approach and the top level being level four, Netball South Africa uses an accreditation system closer to what England uses. This level system consists of four levels. When comparing this approach with the Australian approach one finds the layout as shown in Figure 4.5 (Coaching Accreditation, 2013).

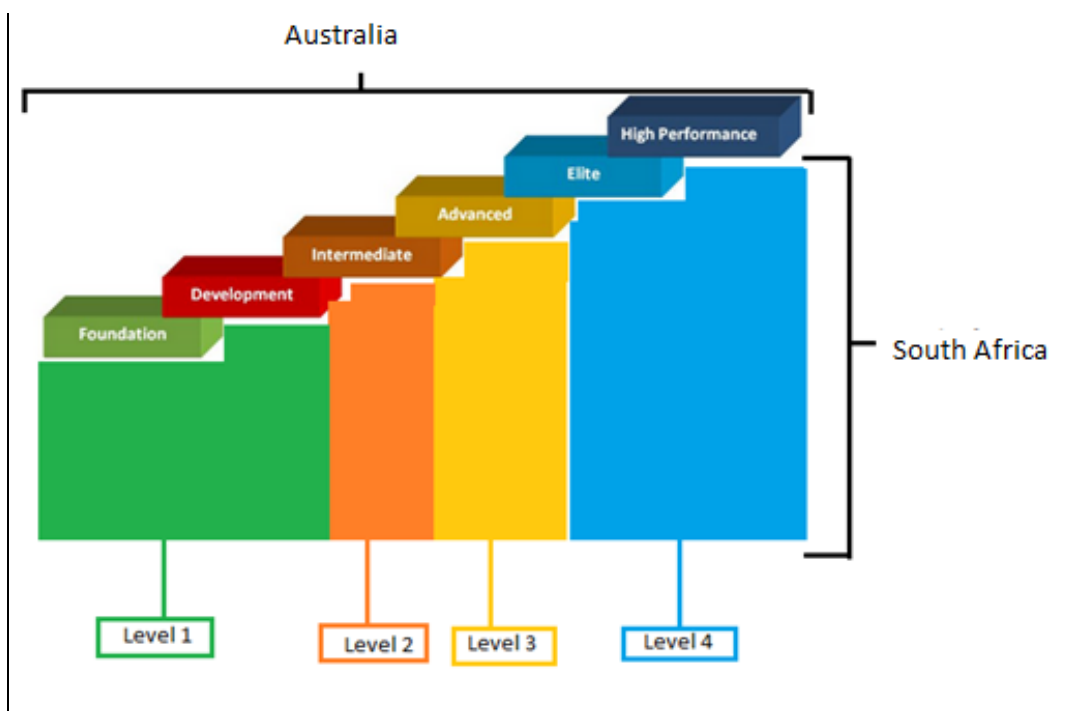


Figure 4.5 Australia and South Africa Comparatively

When looking at this comparatively, many of the tiers used in Australia would have to be combined in South Africa in order to achieve the same accreditation. This could raise a question as to whether a level four coach in South Africa really carries the same accreditation as a High Performance coach in Australia. More information on netball coaching in South Africa and what each level contains is, however, required.

## 4.4 Coaching Enhancement through using Technology

Mark Upton has started to introduce the concept of “Performance Development” in recent times, which encapsulates both player and coach development and is highly relevant across a range of ages/levels.

As a guide for implementing initiatives that will contribute to developing players/coaches, coaches can use the “Performance Development Framework” as shown in Figure 4.6 (Upton, 2013).

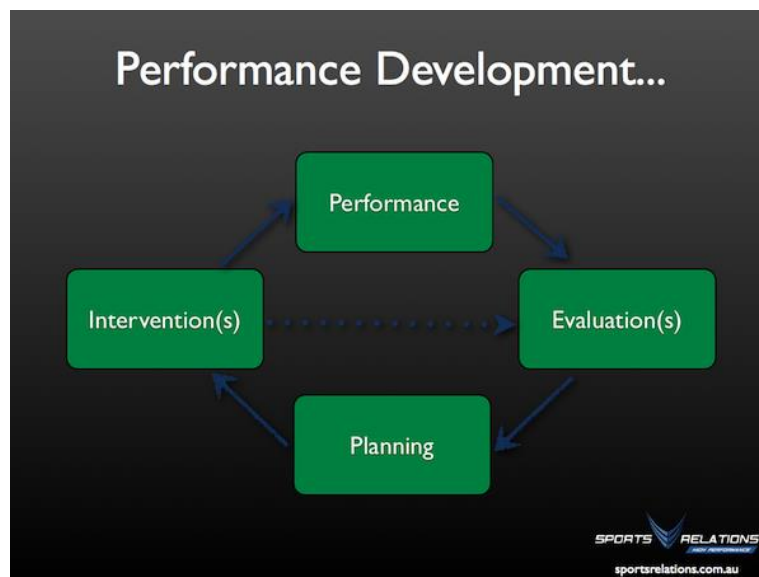


Figure 4.6 Performance developments

The details for using each of these four layers will depend on the context. This high-level view is enough to provide a basis for making decisions on how technology can provide value and “fit” within the process of Performance Development. As technology evolves rapidly, and often marketed as “the answer to all your problems”, it becomes so important to have a clear understanding of exactly how software/applications/hardware will enhance the development of players/coaches (Upton, 2013).

In addition to tools that assist coaches in using technology, there are software systems available to enhance the coach’s coaching performance. One such technology is the Coach Enhancement Platform. This is an online video platform designed for coaches to self-reflect on their coaching and invite others to provide feedback and mentoring. It records a video of the coach, in any coaching situation, easily uploaded to the platform. The video can be used later to reflect on one’s coaching (using time-coded comments), and one can give others viewing access so that they can provide their feedback (Coach Enhancement Platform, 2014).

Coaching development is just as important as the players' development. Research and practical applications have shown that video review is a powerful tool for self-reflection and receiving feedback on one's coaching. All this is now possible with the Coach Enhancement Platform (Coach Enhancement Platform, 2014).

## **4.5 Challenges**

Research shows that fear of change, lack of qualifications in ICT skills and obsolete equipment are some of the major challenges faced in trying to keep up with the latest trends of technology (Nhamo & Magonde, 2013).

A recent study into the applications and challenges of using technology in sport in Zimbabwe showed the following to be challenges experienced by coaches when incorporating information technology into coaching (Nhamo, Magonde, 2013):

- Lack of exposure to relevant software and hardware;
- Lack of suitable sporting facilities where the necessary hardware and software can be installed;
- Lack of support from government;
- Lack of technical support from international federations;
- Inadequate training for coaches, referees and administrators;
- Lack of resources to purchase the necessary hardware and software.

## **4.6 Summary**

Although there are differences between the coaching accreditation structure of England, New Zealand, Australia and South Africa, the aim seems to be the same. All of them put the coach in the light of mentor and leader but also as someone with an open door policy and strong two way communication.

The role of the coach seems to be not only to coach a team and teach them skills, but also to run practices and formulate practices, be it under supervision of a more qualified coach or by themselves. Coaches are also responsible for team selection. This is done by conducting trials. The coach has to devise the tactics that have to be incorporated in matches and equip players not only with skills to play netball, but also to learn skills that can be applied to life.

Chapter 5 will look into the case study where questionnaires were sent out to various coaches in order to determine the extent to which technology is used to assist them during the coaching of netball.

# Chapter 5

## Case Study of Netball In South Africa

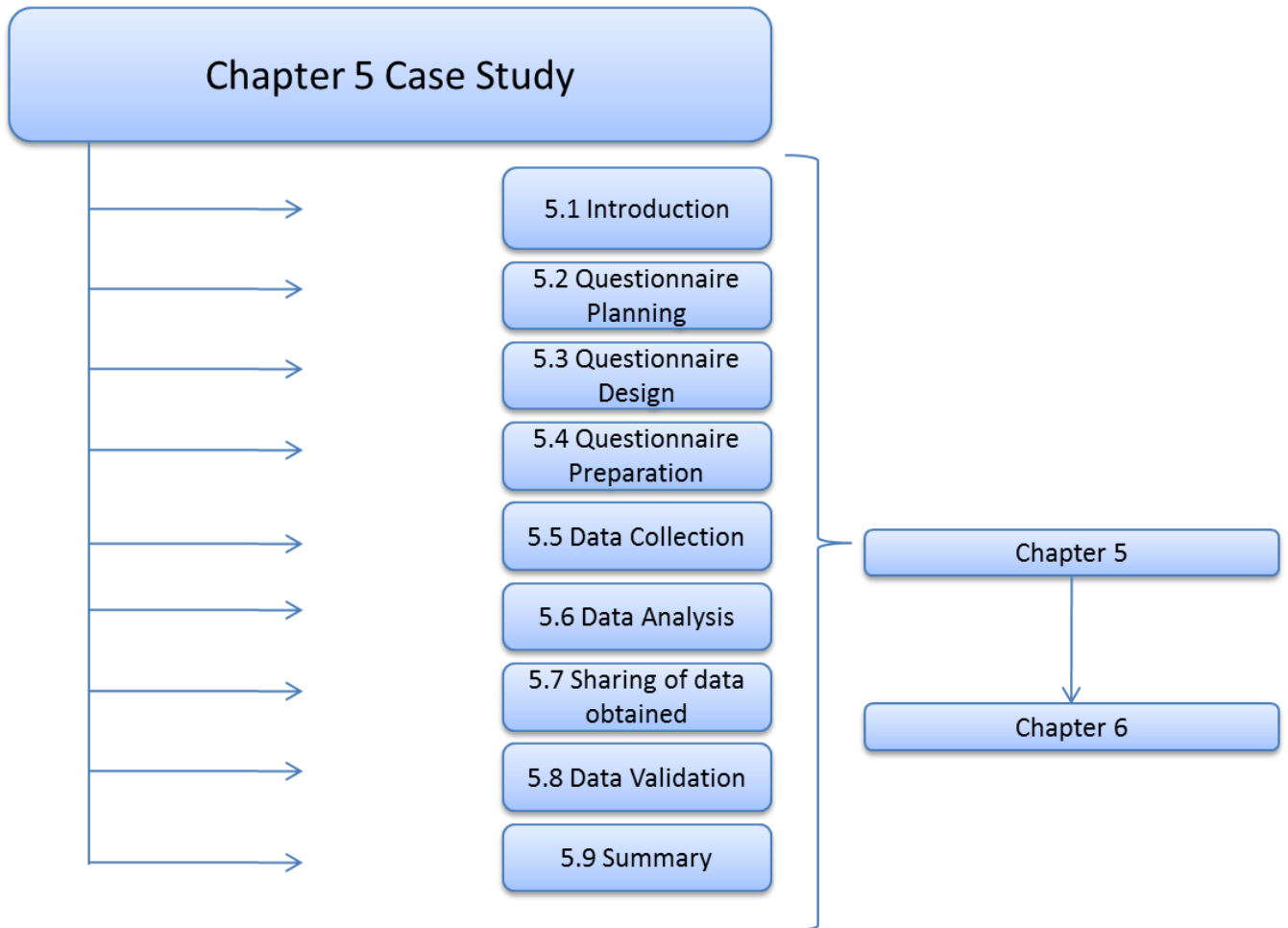


Figure 5.1 Chapter 5 Outline

## **5.1 Introduction**

The research methodology used to obtain information regarding the extent to which technology is used as a coaching tool in netball was explained in Chapter 2.

This chapter details the setup of the case study: where it was used, how the questions were formulated and what questions were asked. In this chapter, the research question of **“What is the status of technology usage in netball in South Africa?”** is being addressed.

This section in part also looks at **“What are the factors that impact on the introduction of information technology usage in netball coaching?”**

## **5.2 Questionnaire Planning**

Using the non-probability sampling technique in which the probability of including each element of the population in the sample was unknown, the case was set out at a tournament.

A questionnaire was submitted at the Spar National Netball Championships of 2012. Coaches of the teams participating in the A section of the tournament were asked to take part in the answering of the questionnaire. The coaches of the teams who completed the questionnaire were later contacted for interviews. After the interviews with coaches, it was decided that one player from each of the participating teams would also be approached and the results of the two sets of interviews were compared.

## **5.3 Questionnaire Design**

The questionnaire in Appendix A was used to gather information from coaches. The coaches from the Spar National Netball Tournament who were willing to participate in this study completed the questionnaire which contained three different sections.

The first section contained questions of a biographical nature. The questions in this section were aimed to gather information about the coach. This information included aspects of coaching history, coaching experiences and which team they were coaching in the competition.

The second section inquired about the training and preparation for the Spar National Netball Tournament. Here coaches were asked how long before the tournament had they started training, and how many training sessions they ran in a day. This was asked to ascertain if the frequency of training could have an impact on their results in the tournament.

The third section is twofold in that it firstly probed into the usage of technology as a whole during training. This was to determine which teams had technology available to them as well as which technologies were being used. Secondly, coaches, whether they used technology or not, were asked for their personal opinion about technology usage as a tool to assist coaching.

The layout of the questionnaire in Appendix A is discussed further in this chapter. After the questionnaires were received back from the coaches, more questions were identified. These additional questions were asked in an interview via Facebook. The focus of the interview questions was on social media and how coaches incorporated the use of social media as a tool to assist them in coaching. The interview questions are in Appendix C and Appendix D and are discussed in section 5.5 of this chapter.

## **5.4 Questionnaire Preparation**

With the one questionnaire being distributed at a single tournament, it was important to formulate questions in such a way that the maximum amount of data could be extracted from the participating coaches.

### **5.4.1 Question Formulation**

As stated in Section 5.3 the design of the questionnaire took on a 3-tier approach. The first tier looked at the biographical nature of the coaches. The questions that were asked in this tier related back to Chapter 4, Section 4.2. The role of a coach was discussed in Chapter 4 Sections 4.2 and 4.3 and it was highlighted that coaches could achieve different levels of accreditation. The higher the level of accreditation a coach received the better equipped or skilled coach they could be deemed. The biographical questions therefore investigated the accreditation level of the coach.

With different levels of accreditation comes coaching opportunities. A level two coach, for example, can coach provincially, whereas a level three coach could coach national age groups. This too was highlighted in Chapter 4 in Section 4.3.1 to 4.3.4 which highlighted the levels available for coaching. Therefore the coaches were asked what previous coaching experience they had in terms of teams that they had coached.

The second tier of the questionnaire was aimed at looking into the training regime applied by a team in preparation for the tournament. Since in Chapter 4 Sections 4.2 and 4.3 the roles of the coach were established and it was brought to light that the coach was responsible for preparing correct training sessions, questions were formulated to investigate how the teams prepared for the tournament. They were asked how often they had trained in the previous three months leading up to the tournament. Also in those last three months, how many



training sessions did they have? This was to set teams apart. If teams trained more often, would that influence the results that they obtained from the tournament?

In the third tier of the questionnaire was the technology based questions. Here it was investigated first to see if there were teams that utilised technologies during their training. Secondly it was important to discover what those technologies were, and thirdly what the coaches' feelings were towards technology. In Chapter 3 the different types of sporting technologies were brought to light in Sections 3.3.1 up to Sections 3.3.3. It was also highlighted what netball technologies were available in Section 3.3.3. Dartfish was seen as a prominent netball specific technology. This was the reason behind asking which technologies were used.

After the questionnaires were sent out and looking back at the findings of the available technologies in Chapter 3 for new technologies which was set out in Section 3.4, a follow-up interview was conducted with coaches who wished to participate. In Section 3.4 of Chapter 3 some focus was put on the use of social media in sport by looking at Facebook and YouTube as well as Twitter to see how these tools could be used for coaching. The interview focused on the coaches' feelings toward using such tools in their coaching.

Now that the origin of the questions was discussed broadly, attention will be paid to the questions in the questionnaire.

#### **5.4.2 Biographical questions in the Questionnaire**

The biographical questions were set out to gauge the competency level of the coaches as well as how the coaches compared. If the coaches shared a similar level of competency the coaching would not have had such a big impact on the results of the tournament. It can be assumed that coaches with similar qualifications will produce a similar quality of coaching. Since the data obtained was triangulated back to the results of the tournament, all factors towards a successful team performance had to be taken into consideration. If a team had a superior coach, it could be a reason for a good performance in the tournament.

The first questions (Question 1-1 and 1-2) of the biographical information section simply inquire about which team the coach represented. Coaches would remain anonymous; therefore the questions were answered for a particular team, which was then compared to the result obtained in the tournament for that team.

Other questions in the biographical section can be seen in Table 5.1.

Table 5.1 Questionnaire Section 1

<b>Section 5.1 Biographical questions</b>	
<b>Question</b>	<b>Reason</b>
<b>Q1-3 Which age groups have/do you coach?</b>	Identify the coach's ability to communicate with the age group of the tournament. If the coach was not able to communicate with the players on an appropriate level the efficacy of the coaching techniques employed could be questioned and could influence a team's overall result.
<b>Q1-4 What is your coaching level achieved?</b>	This involves inquiries about a coaching level. Different levels or qualifications are required in order to coach different teams. School coaches (Primary or Secondary) need not obtain a certification in order to coach. If, however, one wishes to coach at a provincial school level, the coach will have to complete a level 1 coaching course that is certified by that country's netball body. For South Africa, that body will be Netball South Africa (NSA). The higher the team that is being coached, the greater the level of certification that is required.
<b>Q1-5 Which sports codes have you coached before?</b>	This identifies if the coach has had previous coaching experience with sports other than netball. Exercises and drills are not always limited to one sport. Therefore skills, drills or techniques obtained during coaching of other sports could have an influence on what is coached by this individual for the sport of netball. For example, speed training for athletics will not differ from speed training for netball. Limited adaptations may be required, but the basic goal remains the same.

Table 5.1 lists the questions that were asked to gather information on the coach for a specific team. The questions ranged from their qualification obtained for coaching to their past coaching experiences. These questions would give a clear indication if there were differences in the coaching ability of the various participants.

#### **5.4.3 Training and preparations in the Questionnaire**

The nature of a team sport is that each individual member of the team contributes to the common goal of the team. For this common goal to be achieved these individuals must possess the ability to play together as a team and to do this, the team needs to train.

The questions in Section 2 of the questionnaire aimed to find out how the teams trained in preparation for the tournament. Table 5.2 shows which questions were set aside to investigate the teams' training regimes.

Table 5.2 Questionnaire Section 2

<b>Section 2 Training and preparations</b>	
<b>Question</b>	<b>Reason</b>
<b>Q2-1 How often (per year) does this team compete in netball matches or tournaments?</b>	This aimed to identify how often this particular team played together in a match situation. The more that the teams played together, the better for them. Teams that played together often were more likely to deliver a better performance than a team that had just formed and this would all influence a team's overall result.
<b>Q2-2 How long before the tournament did your team start training as a group?</b>	When teams played and trained together often, they might perform better because they were used to playing together.
<b>Q2-3 In the last three months leading up to the tournament, how often did you train?</b>	Realising that gathering a team together on a regular basis to train can be costly and that not all teams had the same funds available, Question 3 was limited to the training covered within the last three months.
<b>Q2-4 How many training sessions did your team have in the above selected schedule?</b>	This probed into the intensity and frequency of training and included awareness that one day may have contained multiple sessions.

As can be seen in Table 5.2 the questions for this section gave a comprehensive view of the training and preparations that the teams underwent for the tournament. Preparation for a tournament had a direct impact on the results of the tournament. Differences in preparation strategies could show why certain teams obtained better results. These questions were therefore asked to comparatively determine how preparation time could impact the results that a team achieved. As data triangulation was done to compare the technology usage of teams with the results achieved in the tournament, additional factors like the preparation time had to be determined as it also contributed to the results that a team achieved.

#### **5.4.4 Technology Usage Questions in the Questionnaire**

The third section of the questionnaire was technology based. This section inquired about the technologies used during training. Technology assisted training, when used correctly, could give teams an edge. This edge could mean the difference between a Gold award and a Silver award.

The third section of the questionnaire about the technology used in training was divided into two parts. The first part investigated if technology was used as well as which technologies were being used. The second part gathered information on the coaches' opinions on using technology in coaching.

#### 5.4.4.1 Technologies used in Training

Having realised that not all of the teams had access to technology for training purposes, the researcher had an option in the questionnaire to allow those who did not utilise technology to skip ahead to the opinion questions discussed in section 5.4.4.2. This meant that even if coaches did not use technology, their options could still be captured.

Table 5.3 shows the questions that the participants were asked with regard to the technologies being utilised during training.

Table 5.3 Questionnaire Section 3a

<b>Section 3.1 Technology used in Training</b>	
<b>Question</b>	<b>Reason</b>
<b>Q3-1 Do you make use of any Technologies during training? If your answer to this question is No, please move on to question Q3-7</b>	This question was to enquire whether or not a team utilised technology. If not, they could move ahead in the questionnaire.
<b>Q3-2 If your answer to the previous question was Yes, How many sessions in a week do you make use of Technology?</b>	This asked about the frequency of technology usage in training. While Question 3 identified which technologies were used and listed a few that were available, if the technologies used by this coach were not in the list, they were asked to specify which technologies they did use in Question 4. As found in Chapters 3 and 4, using technology as a once off option does not necessarily improve a player's skills. It is the repetitive usage of technology that shows improvement.
<b>Q3-3 Which Technologies do you use during coaching?</b>	This provided a list of technologies that were being utilised during training. The technologies identified in Chapter 3, such as Dartfish, were listed as selectable options. There was also an option for coaches to add any technologies that they used which were not on the list.
<b>Q3-4 If your answer to the previous question included Other, Please specify the other Technologies that you use?</b>	If a technology not defined in the list of Question 3.1 was being used, the coaches were asked to specify which additional technologies were being used.
<b>Q3-5 How do you manage the data gathered from the technologies used during coaching?</b>	The data obtained from the technology utilisation is used in a particular way. This question was intended to investigate what was being done with the results obtained from the technologies used.

In Table 5.3 some of the technologies that are being used in training were identified. This section also probed into how the data that was gathered from the use of technology was used or stored. Technologies were identified in Chapter 3. These technologies included Dartfish and the High-Tech shooting sleeve. Coaches were asked if these technologies were used in the preparations for the tournament. Technologies not listed were identified by

asking coaches to specify any other technologies that were used, and which were not among the options available.

#### **5.4.4.2 Coaches Feel toward Technology Usage**

In this section of the questionnaire, the opinions on the usage of technology when combining it with coaching netball were obtained. Here the coaches gave views on the efficacy of available technologies as well as suggestions for additional technologies.

Table 5.4 highlights the questions that were asked in this section.

Table 5.4 Questionnaire Section 3b

<b>Section 3.2 Opinion on Technology Usage</b>	
<b>Question</b>	<b>Reason</b>
<b>Q3-7 To what extent do you think technology should be used in coaching?</b>	With the Internet being a major information technology tool and access to the Internet being readily available in most countries, Question 3.7 inquired about the extent to which technology should be used as a tool in coaching.
<b>Q3-8 What according to you are the advantages or disadvantages of using computer technology in conjunction with coaching?</b>	Not all people agree with the usage of technologies in sport and in coaching. These two questions probed into the coaches' feelings toward the pros and/or cons of using technologies in coaching.
<b>Q3-9 Does the use of Technology deter from the originality of the game?</b>	
<b>Q3-10 To what extent would you like to see technology being used in netball?</b>	This looked into the depth at which technology should be used in netball specifically and not sport in general.
<b>Q3-12 Do the Technologies currently available, have sufficient coverage to assist all playing positions in netball?</b>	This enquired about areas that could improve in the existing technologies or even suggestions for a new technology. Many of the technologies found in the literature currently seemed to focus on the shooting side of netball. Coaches were therefore asked if there was sufficient coverage for all positions that could be played in netball. This was to see if coaches desired additional technologies to perhaps assist in defence.
<b>Q3-13 Any other comments you wish to add regarding technological usage in netball?</b>	This question was included to allow the coaches to comment on any other areas of coaching, and or technology or just leave a general comment.

Table 5.4 is the last section of questions that were asked in the questionnaire. The only question that has been omitted from the table is a question that probes into the willingness of the participants to be available for follow-up questions.

#### 5.4.5 Interview questions

Following the results of the questionnaires it was found that additional questions were required. The additional questions were asked from both the coaches who stated that technology was being used, as well as from some of the players. This was done via interviews over Facebook. Facebook was chosen not only for convenience, but also to highlight the role that social media could play in communication. If interviews could be conducted using social media, it could be used to pass on vital information to players.

Figure 5.2 shows the interview format and how the questions were constructed.

**Follow-up Interview for technology usage in sport.**  
**By : Janine Daniell**

At the Spar National Netball Championships, it was indicated that you were willing to be contacted after completion of the questionnaire, if any further information was required. After reviewing the questionnaire submitted by you, a few additional questions arose regarding the technology usage in preparation for the tournament. The following questions have been identified. If you are willing to further participate in the study, please complete the questions below.

**Question 1**  
In your questionnaire you answered, you stated that you utilize technology. How do you store the data that is obtained from the Technology?

**Question 2**  
Do you use social media such as Facebook or YouTube as part of your coaching?  
E.g. Facebook to for communicating practice time changes  
E.g. YouTube for obtaining ideas for training drills

**Question 3**  
If you do use social media, how do you use it?

**Question 4**  
If you do not use social media, Why not, and would you like to use it?

Figure 5.2 Interview

The focus of the follow up questions in Figure 5.2 were on social media and the role it played in assisting coaches. It was shown in Chapter 3, in the literature, that social media such as Facebook and YouTube possessed the ability to assist coaches with communication and finding drills for netball. The open ended questions allowed for answers that gave insight into which media was used as well as how it was used. Additionally, derivatives could be drawn from the coaches' preferences with regard to the use of social media. Figure 5.2 can also be seen in Appendix C.

Table 5.5 depicts the questions that were asked in the interview to the coaches who stated in the questionnaires that they used technology to assist in training.

Table 5.5 Follow Up Interview Questions

<b>Follow up Questions Asked During Interview</b>	
<b>Question</b>	<b>Reason</b>
<b>In your questionnaire you answered, you stated that you utilise technology. How do you store the data that is obtained from the Technology?</b>	Data storage is as important as gathering the data. When data is stored correctly it can be used as information for comparative purposes to either weigh up to players vying for the same position or to track progress for a particular athlete. This question was asked because it was identified in the questionnaires that data analysis was a tedious and time consuming task. If data was stored in Excel for example, graphs could be formulated to assist in the analysis process.
<b>Do you use social media such as Facebook or YouTube as part of coaching?</b> <ul style="list-style-type: none"> <li>• E.g. Facebook for communicating practice time changes</li> <li>• E.g. YouTube for obtaining ideas for training drills.</li> </ul>	Social Media can be used to share information, be it information about what is happening in the team or the sharing of information about a new exercise drill. Chapter 3 covered the possible uses of social media in the review of technologies available in netball. This question was asked to see if coaches considered the usage of social media as a coaching tool.
<b>If you do use social media, how do you use it?</b>	Was social media only being used for communication purposes, or were training aspects also shared via social media?
<b>If you do not use social media, why not? And would you like to use it?</b>	This question was included to find out about a coach's personal opinions regarding the use of social media as a coaching tool. If a coach was opposed to the idea, the likelihood of utilising it was less.

The follow-up questions asked during the interviews in Table 5.5 extracted information about a technology such as social media that could be overlooked as a coaching tool due to its perceived personal nature.

Questions 2, 3 and 4 of the interview were also asked of one player from each of the teams. This was done to determine if players on their own utilised social media for netball training.

## **5.5 Data Collection**

The combination of a questionnaire that was set up based on the findings of the literature chapters and the interview conducted with the coaches and players were the primary data collection methods used for this case study,

Coaches were physically handed the questionnaires at the Spar National Netball Tournament of 2012, if they agreed to partake in the study. The questionnaires were then retrieved from the coaches before the conclusion of the tournament.

Coaches and players were contacted via Facebook for the interviews. The interview questions and answers were replayed via Facebook.

## **5.6 Data Analysis**

Data analysis will consist of examining, categorising and tabulating for the questionnaire, interviews and literature obtained. The analysis will be conducted and laid out in Chapter 6. This chapter discusses the results of the questionnaire, interviews and literature that was obtained during the study.

After the data was gathered and analysed, a set of factors were produced. The factors aimed to provide ideas and guides for coaches who would like to incorporate technology as a tool to assist coaching.

## **5.7 Sharing of Data Obtained**

There are no obligations to share the data that was obtained. Results from this study will, however, be freely available if required.

## **5.8 Data Validation**

Due to the sample size of this study it was decided that a focus group should be consulted for the validation of the factors that were found as output from this study. Participants of the focus group were deemed experts in the field of Human Movement Sciences at the Nelson Mandela Metropolitan University.

A meeting was set up and the factors that emerged from the study were put forward to the experts. The experts' intention was to validate the applicability of the factors. There was also an opportunity for the focus group to raise concerns about existing factors or to add considerations to existing factors. The minutes of the meeting can be seen in Appendix E.

## **5.9 Summary**

Chapter 5 focused on the case study. It introduced the criteria to become a coach in South Africa. It highlighted the questions which were asked in the questionnaire of the case which pertained to the preparation for the Spar National Netball Championships. It also showed which questions were posed to the coaches and the players in the follow-up interviews that were conducted.

Chapter 6 will describe the analysis of the results that were obtained from the questionnaires.



## Chapter 6 Analysis of Results

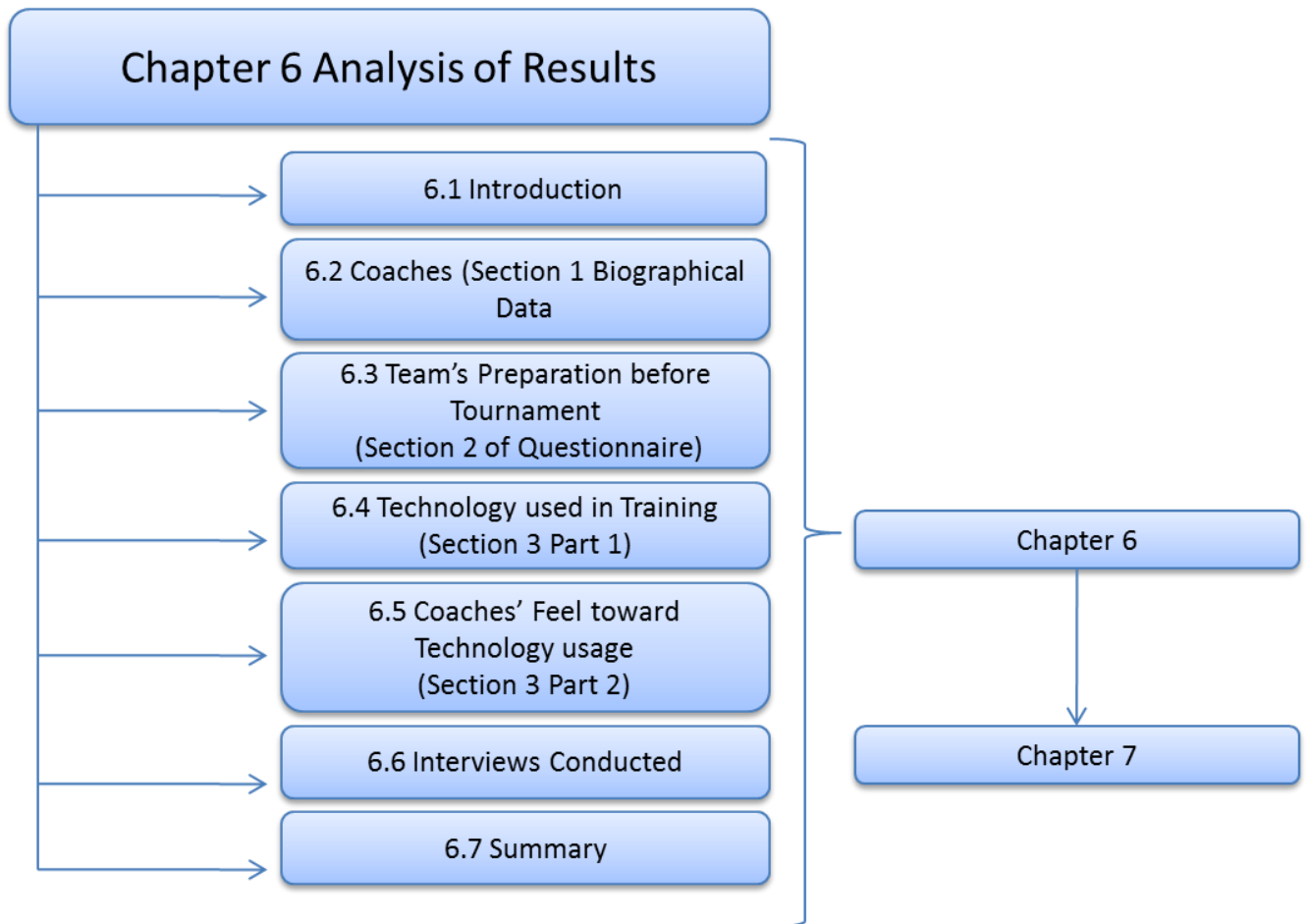


Figure 6.1 Chapter 6 outline

## 6.1 Introduction

In this chapter the results of the questionnaires and interviews conducted with the coaches are analysed. The analysed results are discussed and then compared to one another. Analysis is performed in a discussion format, after the reviews of the results are presented.

## 6.2 Coaches (Section 1 Biographical Data)

The questionnaire given to the coaches was divided into three sections. The first section was the biographical data. The results will now be discussed and analysed for Section 1 of the questionnaire.

Four coaches participated in the questionnaire. The first section of the questionnaire covers biographical information about the coaches. This is done to compare the experience and ability of the coaches to one another. The results can be seen in a graph depicted in Figure 6.2.



Figure 6.2 Coaching Levels

Figure 6.2 depicts the coaching level that the coach obtained. The coaching level refers to the accredited level that the coach obtained from Netball South Africa (NSA). The higher the level obtained, the better qualified the coach was. Here it can be seen that there was little difference in the levels of coaching between the participating coaches. All of the coaches had received a level of accreditation from NSA.

Other information captured in the biographical fragment of the questionnaire relates to which age groups the coach has worked with in the past. This is captured in Table 6.1.

Table 6.1 Age Groups Coached

Province/Level Coached	Senior	Tertiary	U/21	Secondary	Primary
EP (NMBAY)	√		√	√	√
Border (Amatole)	√		√	√	
Gauteng Central	√	√		√	√
Gauteng North	√	√	√	√	√

Table 6.1 shows that all four of the coaches had experience in coaching different age groups. Gauteng North's coach had experience in all the possible age groups while the other three coaches missed out on one or two age groups. Being able to coach different age groups gave the coaches experience with working in different environments with different kinds of people. Coaches that have experience in a multitude of age groups may be better equipped to coach different types of players. Different levels of coaching accreditation allow coaches to coach at different levels. Since there was little difference between the levels of accreditation of the coaches, it is normal to find little difference between the age groups that the coaches have worked with.

Although there were minor deviations, for the most part the four coaches were evenly qualified. The Northern Gauteng coach has coached all possible age groups in Netball in South Africa. This could occur when students, in their off time, assist in the coaching of schools and then make a decision to continue with coaching, exposing those to the higher age groups as well. The age groups coached is also relative to what kind of day job a coach has. Typically in South Africa coaching happens on a part time basis. People with day jobs tend to only coach Tertiary, Senior or u/21 level, as these practise times can occur what is considered after hours. Schools tend to practise after school, thus coaches at school level tends to be teachers or students who can assist in after school hours.

It is recognised that coaching styles may differ and that players can benefit more from one coaching style than another. Coaching style is, however, not a characteristic that can be captured biographically and can therefore, even though a factor, not be included into measuring the success of a team.

### **6.3 Team's preparation before tournament (Section 2 of the Questionnaire)**

The second section in the questionnaire related to the training regime followed by the teams leading up to the tournament.

The approaches taken by the various coaches in preparing for the tournament differed extensively. There were differences in how often the team competed, how long before the start of tournament preparations began as well as the regularity of training sessions. Preparation is an important component leading into any tournament. It is often the better prepared teams that delivered the better performances. Table 6.2 shows the training regimes followed by the various teams.

Table 6.2 Training Schedules

<b>Teams</b>	<b>How long before start of tournament did your team start training?</b>	<b>How often did you train (past 3 months leading up to tournament)?</b>	<b>How many training sessions did you have in the 3 months?</b>
<b>EP(NMBAY)</b>	Weeks	Weekly	2 (per week)
<b>Border (Amatole)</b>	Months	Weekly	8 (per Week)
<b>Gauteng North</b>	Months	Daily	5 (per day)
<b>Gauteng Central</b>	Year	Daily	2 (per day)

It is clear in Table 6.2 that EP and Border seemed to both lack competition time and played together for only a maximum of 10 times per year. It can be assumed that not much time was spent together other than for the Spar National Championships. Gauteng Central and Gauteng North had a greater number of competitive encounters. It is said that the more a team plays together the better cohesion exists within that team. The amount of time spent together in a match situation can give an advantage to the Gauteng teams.

As highlighted in Chapter 4 with the role of the coach, practice is an important part of preparation for a tournament or a match. Typically practices are used to identify team combinations. In addition to team combinations the starting line-up is also identified as well as players' strengths and weaknesses. Practices can also be used to develop and improve player fitness. Set and/or Trick moves or plays are also worked out at practices. Practices work on the principles of repetition. The more often the players repeat a certain task the more experienced they become in that task.

Training sessions per day or week indicates the regularity of training. Assuming that these training sessions are not limited to court play, a fair bit of conditioning can be done. Players who are in a better condition can perform at a higher level for a longer period of time. Since the structure of the tournament is in such a way that completion is over a one week period, teams find themselves in a situation where they are expected to play multiple matches on the same day. As the tournament drags on, the players that have a lesser conditioning tend

to fade. Most of the important matches such as semi-finals and finals happen at the end of the tournament. Conditioning training therefore can have a direct effect on the placing of a team.

#### **6.4 Technology used in training (Section 3, Part 1)**

The third section of the questionnaire was set out in two parts. The first part identified whether or not technology was used by any of the teams. The actual technologies being used were also identified.

The technology usage across the four teams was split evenly. Two of the teams utilised technology in their training regime while the other two did not.

Looking at the technologies that were used, both Gauteng North and Gauteng Central made use of the Dartfish program. Dartfish is a software application that records the shooting action/motion of the shooters. The footage is then used to analyse the action and suggest improvements where necessary. This software has the ability to improve the accuracy of the shooters. When shooters are more accurate in goal scoring the converting of opportunities that are on offer into points are more frequent. Often teams with higher goal shooting averages win games. In tournament format, when two teams are equal on log points, the tournament rules turn to goal averages to see which team gets the higher placing. This can impact team placement or the team's ability to reach a play off.

In addition to the Dartfish program, Gauteng North makes use of Visual Coach. This program assists the players into adjusting the vision that the player has on court. Much of the player's decision making is determined by what the player can see. If the player can enhance his/her vision, he/she indirectly advances his/her decision making ability. Visual Coach is often used in a defensive structure where players require the ability to be able to mark one player, while keeping an eye out for the ball moving down court. If a player can keep track of who they are marking as well as the movement of the ball on court then he/she can cover a wider area.

Both of the teams that made use of technology during training stored the data that was collected. By storing the data the coaches could monitor the improvement of players. Data was collected on a regular basis and compared to the data collected on prior occasions. In this way the improvement or regression of player skills was tracked.

Gauteng North took the data collected one step further and used it for comparative purposes. Players were not only compared to other players in the same team, but also to

other players in the same playing position. This methodology could be used to see how players weighed up against one another. If enough data was collected for comparative purposes, coaches could start to see a trend develop in certain positions. It could highlight the common skills that players playing in the same positions might possess.

## **6.5 Coaches' feelings towards technology usage (Section 3, Part 2)**

Although not all of the teams made use of technology it does not mean that they did not wish to make use of technology. The second part of Section 3 of the questionnaire looked into what coaches felt about using technology. The general feeling of technology usage was to the coach's convenience. The notion that it should replace the coach was not well received. The advantages of using technology in sport were its ability for storage. One example was that the data could be stored and referred back to on multiple occasions. Player analysis was another advantage highlighted by the coaches. Some of the coaches also felt that it could improve skills and understanding of skills.

It was evident that technology was seen as an aid to the players and the skills of the players. Coaches seemed to approve of using technology as a tool to assist in coaching.

The one major disadvantage of the utilisation of technology in training is that the analysis of the data captured is usually time consuming. This opens up two possibilities. The first would be to train additional staff or assistant coaches in data analysis. This data analysis would pertain to the data that was collected from the technologies that were used during training. The assistant coaches could then perform the analysis and give the feedback to the coaches, who in turn would discuss the findings with the players.

The other option would be to programmatically add analysis components into the technologies that were being used. The data that was captured could be analysed by the software system that captured the data. A similar concept is found in using Hawk-Eye in tennis, where the rules of tennis are programmatically added and the feedback given from the Hawk-Eye system has the rules calculated in the projected ruling.

If this concept is applied to something like Dartfish and the shooting action can be analysed programmatically, the coaches can receive feedback more rapidly.

Coaches were asked how technology could be used in netball from their point of view. The graph depicted in Figure 6.3 shows the results.

### To what extent would you like to see technology be used in netball?

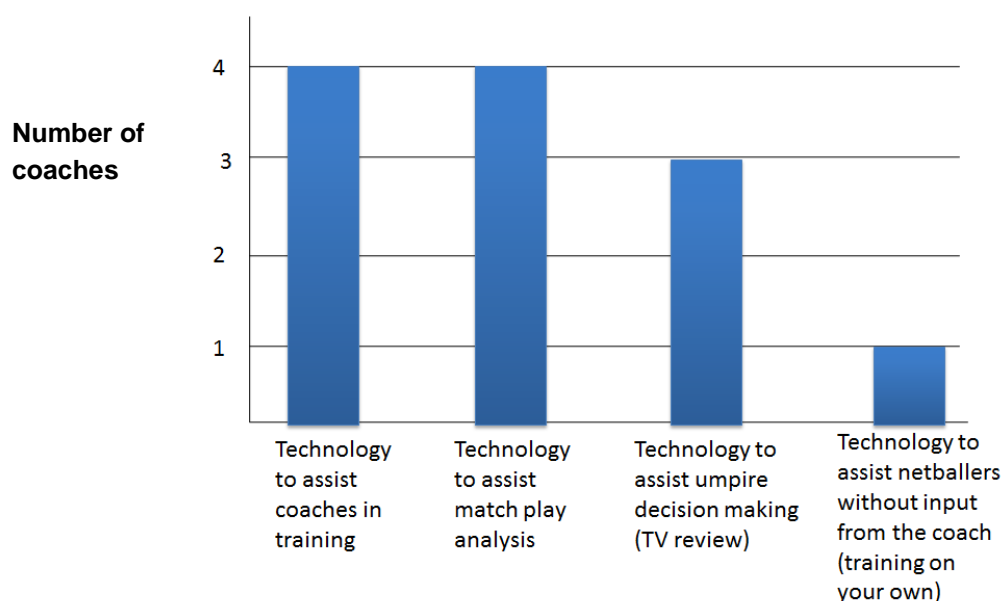


Figure 6.3 Technology use in Netball

Figure 6.3 shows what coaches believe that there are areas where technology could be used to the benefit of the game. One of the most common choices was a technology to assist umpire decision making. The best way to do this would be with a TV review system, similar to what currently exists in rugby. Using TV review systems have proven to be time consuming, and based on the fast paced nature of netball, decision making aids might take away from the speed of the game. TV review would require stoppages for a third umpire to review a decision or rule on a challenged decision. This adds breaks into the game and might disrupt the flow of the game. More investigation would need to be done in order to find the best way to incorporate a decision making tool without grinding the match to a halt. If the current review systems such as Hawk-Eye in tennis are studied, while the challenge is being reviewed, match play is suspended. Similarly in rugby when TV review is used to verify if a try has been scored, time is stopped until a decision has been made.

There also seemed to be a need for a technology that can be used by players. Often players like to train in their own time. This is mainly due to the unprofessionalism in netball in South Africa. The coaches seemed to think that there should be technologies available to assist players when they trained on their own. For this to happen, cost would be very important as players would likely be required to carry all the costs of such a technology.

In addition to this, a need was identified for technologies to support match play analysis. Aspects of match play analysis could include decision making as well as player movements on court. Some teams probably already perform match play analysis in its simplest form.

This is done by videotaping matches and then analysing it at a later stage. This is in some way utilising technology for the purpose of match play analysis. The analysis is just done manually.

Many of the current netball technologies utilised have a strong focus on shooting, like Dartfish which has a very detailed shooting component and the High-Tech shooting sleeve that is being adapted from basketball which were discussed in Chapter 3. This leaves a gap for a technology to be used more specifically for defence. This factor was highlighted by one of the teams who suggested a technology to be developed that was aimed more at defenders than shooters.

The general feel on the usage of technology in the sport of netball seems to be that it should be available to the coach, but only when the coach wishes to use it.

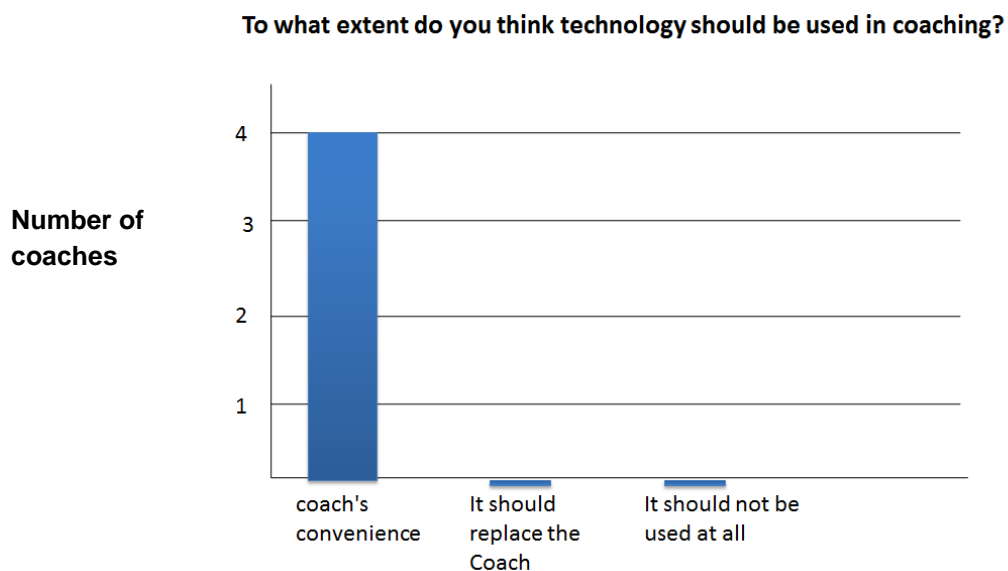


Figure 6.4 How Technology should be used

The graph shown in Figure 6.4 reveals that coaches wanted technology to be used when it was convenient for them. The notion of convenience is broad as it might refer to the type of technology or the choice as to when they wished to incorporate it into a practice.



## 6.6 Interviews conducted

After the initial questionnaires were answered and analysed a few additional questions arose. These questions focussed on social media. Social media is something most South Africans are aware of. Sites like Facebook and YouTube are used almost daily. The questions probed into the feeling of the usages of social media as a tool to assist coaching. The transcripts of these interviews can be found in Appendix D.

Table 6.3 shows the results of the two teams who indicated that they utilised technology during training.

Table 6.3 Comparison of Interviews conducted

<b>How do you store the data that is obtained from the Technology?</b>		
Gauteng North		NMBay
Store it on external hard drives, dartfish TV, DVDs and on notebook		Don't use technologies
<b>Do you use social media such as Facebook or YouTube as part of coaching?</b>		
<ul style="list-style-type: none"> <li>• E.g. Facebook for communicating practice time changes</li> <li>○ E.g. YouTube for obtaining ideas for training drills</li> </ul>		
As part of marketing definitely, as part of coaching nope.... Dartfish TV or personal		No, most players have Facebook, but no coaching abilities there.
<b>If you do use social media, how do you use it?</b>		
Rarely Upload videos for players to watch.		Don't use it
<b>If you do not use social media, why not? And would you like to use it?</b>		
We see our players enough to show them when we see them. Personal approach works much better.		Social media is not available to all players so to keep with equality and not excluding players we steer clear.

Table 6.3 shows the results of the coaches. Here it can be seen that data storage was done on notebooks, or online (Dartfish TV). With regard to social media, the coaches were aware of its uses for marketing purposes, but chose to not use it as a coaching tool. This can be out of fear that players would rely more on information obtained on YouTube than the instructions passed by the coach. It is possible that coaches saw the use of social media as a rival to their coaching instead of as a tool to assist their coaching.

As a result of the possible reluctance of the coaches to utilise social media to assist in coaching, by either gathering ideas for drills from YouTube, or by using facebook as a tool for communication, it was decided that one player from the teams that participated in the

questionnaire be asked similar questions. These transcripts of the interviews can also be found in Appendix D. Table 6.4 shows the results from these questions posed to the players.

Table 6.4 Comparative interviews conducted with players

<b>Do you use social media such as Facebook or YouTube as part of Training?</b>		
<ul style="list-style-type: none"> <li>• E.g. Facebook for communicating practice time changes</li> <li>• E.g. YouTube for obtaining ideas for training drills</li> </ul>		
Gauteng North	Gauteng Central	Nelson Mandela Bay (EP)
Yes	Not really	Yes
<b>If you do use social media, how do you use it?</b>		
As inspiration, motivation, tips and examples for training, coaching and class.	I have facebook account so tell my friends when I have matches for support	YouTube - For extra Training. To view examples of drills to do in own time. Facebook - As communication tool to alert all players that belong to the team group set up about upcoming events. Matches and training sessions. Share photos taken at tournaments etc.
<b>If you do not use social media, why not? And would you like to use it?</b>		
-	Don't have access to Internet other than on phone. Yes would like to use it	-

Table 6.4 shows the players' views on social media and how they used it to assist them in training when they trained on their own. Not all players seemed to have access to the Internet, so their ability to utilise social media was impaired. It should be noted that this was the view of one player per team, and that the case of players training on their own, or the case where Internet access was a problem could be in the minority.

Based on the results it can be said that players and coaches had a different outlook on social media and how it could be used to assist during training. If players used YouTube to view examples of drills, coaches might want to look at uploading drills and pointing players to those drills. This way even when the player trained on his/her own, he/she would be using the coach's instructions.

Coaches perhaps see the use of Facebook and YouTube as social media on a personal level, causing a feeling that using social media infringes on the coaches' personal lives. There are clear boundaries that are set between coach and player. The likelihood that the coach will have a player befriend them on Facebook is slim. For that reason coaches might

shy away from using Facebook as a tool to assist coaching. Facebook, however, allows the use of groups. Groups can be created for a common goal and many people can join the group. In such a group not all group members need to be set up as friends.

The NMMU netball club is a good example of the group setup as can be seen in Figure 6.5.

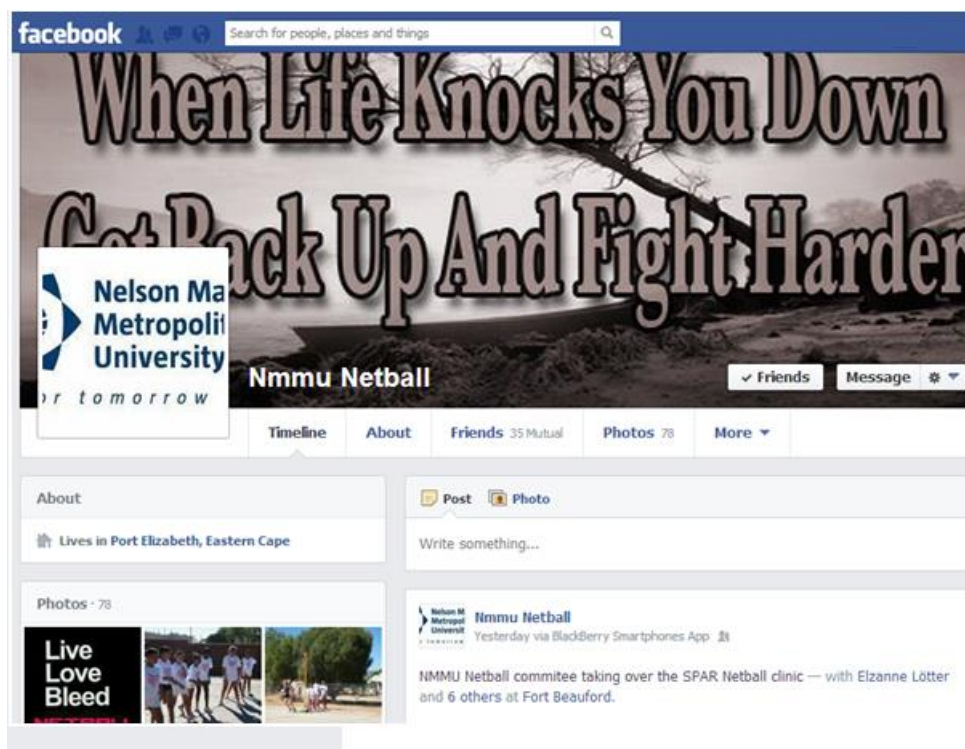


Figure 6.5 NMMU Netball Group ([www.facebook.com/nmmu.netball](http://www.facebook.com/nmmu.netball), 2013)

Figure 6.5 shows the NMMU Netball Group. It can be seen that information is shared about a clinic as well as photos. This works in a club system so various members of the club can post information about various teams. This can be narrowed down further and groups can be created at a team level instead of at a club level and information can be communicated via Facebook.

## 6.7 Summary

Chapter 6 analysed the results that were obtained from the questionnaires. The analysis was done comparatively and identified possible patterns of norm or deviation from the perceived norms. The outcome of the interview questions were also compared for both the players as well as the coaches.

Chapter 7 takes the findings of the analysis as well as the literature reviewed in Chapter 2 and proposes guidelines to incorporating the use of technology as a tool to assist in the coaching of netball in South Africa.

## Chapter 7 Factors Toward Using Technology in Netball

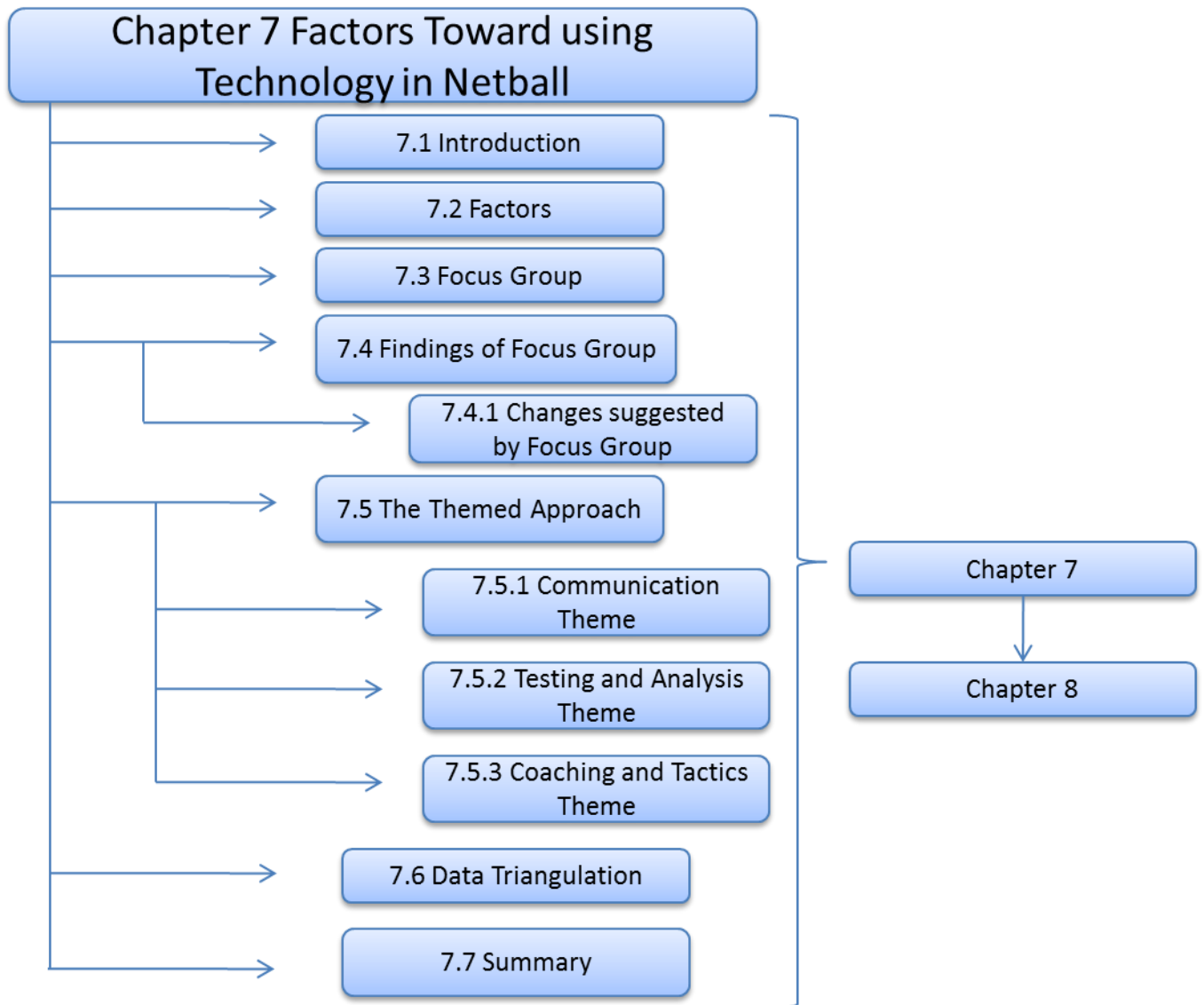


Figure 7.1 Chapter 7 Outline

## 7.1 Introduction

This chapter will outline some factors that impact on how technology can be used to assist the coaches in the coaching of netball. It is important to remember that these factors are set out based on information gathered from one case study. This chapter also aims to solve the question of “What are the factors that impact on the introduction of information technology usage in netball coaching?”

## 7.2 Factors

1. Do not look too far away from what one has
  - Everyone has a cell phone and lately almost everyone has a smart phone (Joss, 2012). Set up a Facebook group for the team and relay information about practice or match times, venues or even changes to information already provided. This will assist the coach by providing the information to the players on time and at the right place for practices and matches. See Figure 7.2 as an example ([www.facebook.com/nmmu.netball](http://www.facebook.com/nmmu.netball), 2013). Facebook was found in the literature chapters to be a helpful tool for communication. On investigation there were already teams using it to communicate.

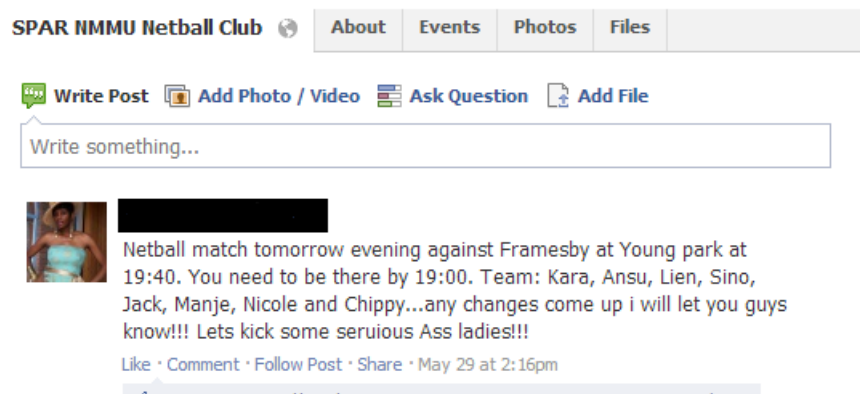


Figure 7.2 NMMU Netball Group Announcement Example

- One may not have a video camera, but that does not stop one from doing video analysis. Use YouTube and analyse match play of teams such as New Zealand and Australia that can be found on YouTube. It may not give much insight as to how the opponent plays, but can give one tips on how to set up structures for the team to follow or for a discussion on match play. Ask the club, tertiary institution or federation about using a computer to access YouTube for the video session. Figure 7.3 shows part of the first quarter between New Zealand (NZL) and Australia (AUS) (outofyourtime, 2010).



Figure 7.3 Match between AUS and NZL

- In the questionnaire, coaches spoke about the need for a technology that allowed players to train on their own. If players are expected to carry the costs of these technologies, YouTube could be a viable, cheap option.
- Use the computer to keep statistics about matches. Ask the assistant coach to keep shooting statistics or intercept statistics during match play. Use a personal computer and programs, for example, Microsoft Excel to store these match statistics. It is an easy way to track progress of the shooters during the

course of the season. Keep count of how many interceptions or turnovers the defenders are creating.

## 2. Look for cheaper solutions

- Speak to the association about purchasing a video camera. This can be used to record one's own matches for video analysis. Use the video camera to record the matches of possible opponents in a tournament. One can watch this and analyse their match play to devise a strategy for when the team meets them.
- Try using technology aimed at other sports. Rugby tends to have the biggest budgets and the best equipment. Speak to the rugby coaches and see what technologies they utilise that can also be used for netball. Much vision training is done in rugby to train players to have better vision across the field. This is a skill that defenders can develop as well to see the court and read where possible interceptions can come from. It is not ideal to use a sport specific technology that is not aimed at netball, but similarities between sports exist. Identify those similarities and see if the technology available for one sport can assist one in another.

## 3. Store Data in easily accessible places

- Storing data electronically is possibly one of the easiest places. It is easier to draw up comparison charts to see the progress of a particular player or compare two players to one another. It is also easier to give the feedback of analysis performed to players when the data is already electronically available.
- Figure 7.4 shows how Microsoft Excel can be used to store data regarding shooting statistics in a match. In Figure 7.4 it is shown how easy it can be to use Excel to draw up a detailed spread sheet with shooting information. Figure 7.4 has two shooters, Dumi and Elzanne. The shooting statistics per shooter is broken down into the four quarters of match play. Each quarter has its own individual average for each of the shooters as well as a match average for each of the shooters. Here coaches will be able to see if shooting averages deteriorate as the match proceeds. Coaches can identify during the match if a shooter is shooting poorly, and make subsequent substitutions. If shooting averages go down as the match continues, it could point out a lack

in fitness of a shooter. As the shooter fatigues, he/she might be missing more shots.

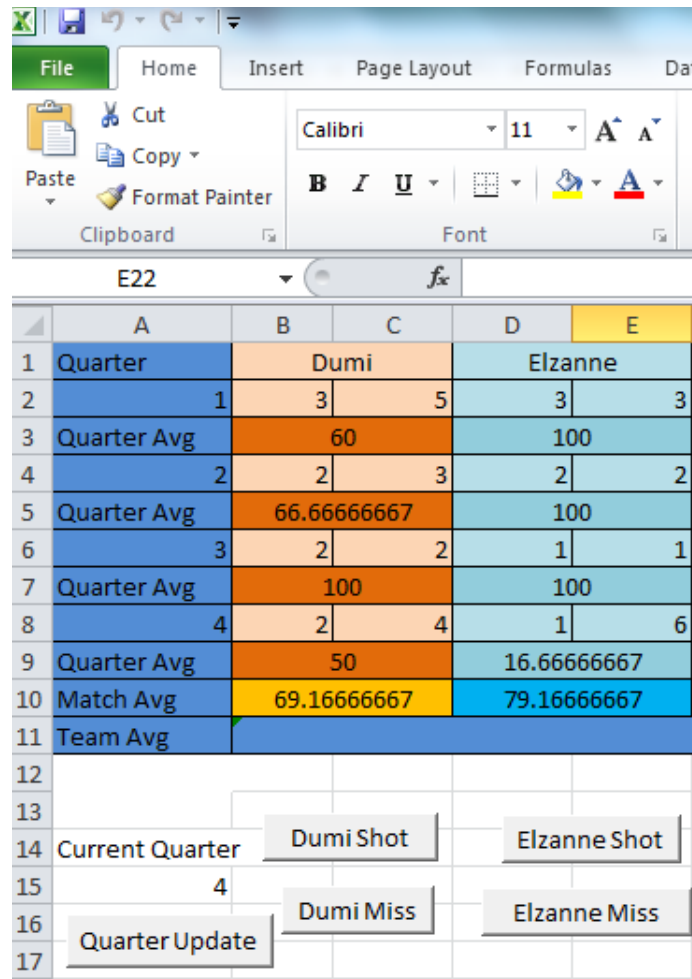


Figure 7.4 Shooting Stats

- Allow players to track their own progress as well. Give feedback obtained from analysis to the players so that they too can see where they need to improve, or to see how they have improved.
  - Send the players' feedback via email regarding results obtained from performing analysis. Email is a good option as most smartphones allow access to email. It is also more personal than posting it on a Facebook group.
4. Find an assistant for data analysis
- The most painful process about using a technology for coaching is analysing the data. Data obtained from software systems needs to be analysed in order



to determine results. Some software systems have built in analysis functions, but others do not. Find an assistant to help with the analysis of the results to obtain quicker feedback.

5. Gather Technologies that are common
  - When funds are available to acquire technologies, look at what are the most popular systems available. This will ensure that one has assistance from other users to help one fully utilise the technology to its full potential.
  
6. Gather statistical data
  - Most teams already do this in some form, i.e. keeping count of the goal averages of shooters or seeing how many shots succeeded from a certain amount of attempts.
  
  - This can also be done for defenders, to count how many interceptions they took, or how many turnovers they caused.
  
  - Statistical information can easily be captured and stored in a simple Excel spreadsheet. This can be done court side by the assistant coach or manager during the game if the team has access to a laptop or tablet.
  
7. Collaborate to obtain funds
  - One of the most common problems with the use of technology for netball is the funds required to purchase a specific technology. Most tertiary institutions have a biokinetics department. Collaborate with the department to purchase technologies that can be mutually beneficial. A technology can be purchased by the institution and testing can take place on one's netball players creating a practical learning environment as well as providing benefits to the coach in the data received.
  
8. Use Social Media for coaches
  - Find out from the players who would be interested in using social media to assist in training and who has access to social media sites.
  
  - Facebook is one of the most used social networking sites. Make use of it to share information about training, matches, and other information that needs to get out to players.

- Players are training on their own, outside of scheduled practices and they are looking to sites such as YouTube to get drills to perform. If coaches do not want their players to be coached in a different style, try uploading additional drills onto YouTube and point the players to those links.
- Some players miss practice due to illness, and it is also possible that the coach can miss a practice due to illness. With social media this is not necessary. One can upload drills to YouTube and allow the captain to take the practice using the exercises that the coach has uploaded to YouTube.

#### 9. Use of Social Media for Players

- Encourage all players to visit YouTube. Here one can direct them to videos that are pre-screened by the coach. These videos can range from drills to interviews to inspirational videos.
- Let players join team groups on Facebook. This can boost camaraderie within the team as it gets the players communicating outside of the netball court.
- Similarly to the above mentioned joining of groups on Facebook, one should look at which phone applications are popular among players, such as WhatsApp. These applications also have grouping abilities and can include the players that do not necessarily have constant access to Facebook. Since these applications send messages straight to the phone without requiring time consuming logins, any communications sent are received with an immediate notification to the player.
- Use applications such as Run Keeper. Here one can set up a profile and invite friends to join. The friends can be the players. When players are given a training program that requires them to run a particular distance, this application can be used to track the distance covered in the time in which the distance was run. The coach can see that the players are following the program and can track the performance of the run. Run Keeper also sends the user (player) an email to give feedback about runs. Figure 7.5 shows the feedback that the application gives to the runner on the phone. This

information is also available on the Run Keeper website to be viewed by all the user's friends such as team mates and coach.

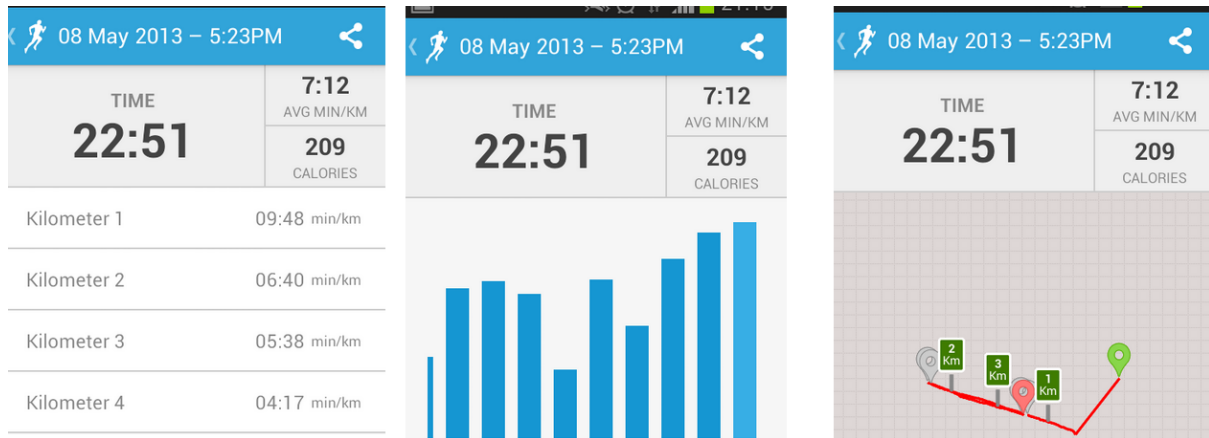


Figure 7.5 Run Keeper application feedback

## 10. Use of YouTube

- YouTube was introduced under the factor of not looking too far away from what one has. Its purpose in that factor was related to video analysis and how simply having a computer and access to the Internet allowed some form of video analysis to take place. Here are some other factors which have been highlighted where YouTube can be used:
  - Record players' matches and upload the recorded match on YouTube. Let the players watch and analyse the match in their own time. Have a team meeting and discuss the different analyses that were found by the players.
  - Sticking with match play analysis, YouTube houses matches played in the Australia New Zealand (ANZ) Championship, World Cup Matches, Commonwealth Games and even some test series played between other countries. Have video sessions of some of these matches for additional analysis. Here coaches and players can pick up patterns of

play, centre passes or special moves which can be incorporated into their play.

- YouTube can also be used to find drills. Agility and speed are important components of netball and YouTube is rife with drills to improve agility and speed.
- From a psychological point, YouTube can be a great source of motivational videos and speeches that can be viewed before a match or after a loss in a tournament.

#### 11. Know the technology

- When a new technology has been acquired e.g. Vision Coach, ensure that the coach is fully aware of the features and limitations that it possesses.

#### 12. Use Internet websites to gather more information

- Visit sites such as Sportplan. It houses training drills for a variety of sports including netball <http://www.sportplan.net/drills/Netball/index.jsp>.

Here one can ask questions about certain aspects of coaching such as defence, and also see what training drills other coaches are using, or propose to use. Figure 7.6 shows an example of a netball training drill. (Getting Free Netball, 2013).



The screenshot shows the Sportplan website interface. At the top, there is a navigation bar with the Sportplan logo and links for Home, Netball Drills, Chalk Board, Sessions, Features, and Answers. A left-hand menu lists various categories such as Ball skills, Basic attack, Basic defence, Decision making, Footwork, Getting free, Group practices, Interception, Movement, Passing, and Player Roles. The main content area features a drill titled "Getting free, Getting free Netball". To the left of the drill is a diagram of a netball court with three players: a blue player (B2) at the top, and two red players (B1) at the bottom. Arrows indicate the movement of the ball and the players. To the right of the diagram is a "Description" section explaining the drill: "In this practice players work with one ball in groups of three - two attackers and one defender. Blue player 2 (B2) starts with the ball and the other two players set up a few meters away, with the defender marking B1. When everyone is ready B1 should make a forward run and then perform an outside roll, spinning 360 degrees the run into space and receive the pass. Repeat 5 times and then players rotate roles in a clockwise direction." Below the description is a "Coaching Points" section: "Players should be running at a high intensity and the focus should be on the change of direction and pace from B1."

Figure 7.6 Netball Drill

- Sports Fitness Advisor is another example (<http://www.sport-fitness-advisor.com/>). This site is less specific to netball. However, it gives drills to improve strength, speed and agility. It also has a section on nutrition. Coaches can use this site to gather ideas about the conditioning of the players.

### **7.3 Focus Group**

The factors that were found were put forward to a group of experts. This group was derived from various people specialising in the fields of biomechanics and/or sport science. The aim of the focus group was to verify the validity of the factors that were found.

A meeting was set up at the Nelson Mandela Metropolitan University with five experts from the department of Human Movement Sciences. A brief overview of the study was given via a PowerPoint presentation, followed by the introduction of the factors. The floor was then opened for feedback from the group of experts. A discussion was held on the factors to investigate the validity of those factors. The minutes of the conducted meeting can be found in Appendix E. The feedback obtained and how it can be used in netball will be discussed in the next section.

### **7.4 Findings of Focus Group**

The experts validated the factors that were highlighted in this chapter, but questioned whether or not a coach has the ability to handle all of the streams involved in powering computerised technologies along with management of players and coaching the team. This brought forward a new opportunity of team management for netball.

It was brought up by one of the experts that the English Premier League soccer works on a principle of management more than that of coaching. There is a network of people all having different levels of involvement in managing the team and the players, and the coach/manager fulfils an overseeing role.

#### **7.4.1 Changes Suggested by Focus Group**

There were no changes suggested towards the factors that were put forward. The factors were found to be valid in the context of the study. When looking at how technology can impact the coaching of netball these factors were found, by the focus group, to be reasonable and if considered could result in the successful integration of technologies for netball coaching.

A change that was suggested related to the magnitude of the workload expected from a coach. Being experts in the field of human movement sciences, the focus group suggested the incorporation of sports scientist, biokineticists and even nutritionists to assist the coach in managing the condition of the players in the team.

It was also stated that sport scientists and biokineticists have a better understanding of the available technologies, where a coach might still require training on how to use a technology.

The group also suggested taking the above mentioned factors and breaking them down into separate themes, which could change the dynamic of coaching in netball, by not leaving the coaching up to one person. Each theme could apply some of the above mentioned factors that address its specific role with respect to the team. Each theme will have its own role player and will oversee a certain aspect of the coaching.

Various themes were discussed, but the following were found to be best suited for netball at an entry level of the themed approach. A brief example of the themed approach is laid out in the following sections.

## **7.5 The Themed Approach**

If a theme was to be applied to various aspects of running a team, then at a very basic level a three themed approach could be incorporated. The three themes would work together as described below.

### **7.5.1 Communication Theme**

The communication theme would take charge of the management of players as well as the communication to players. This theme will include providing information to the players and coaching staff regarding game times, practices and even which players will participate in the match. The communication theme can also take charge of the feedback provided by players regarding training exercises that had to be executed in the player's own time. The role player in this theme could be the manager.

The manager could use the following supporting technologies to assist with handling communication:

- Facebook
  - Set up a Facebook group with all players and use that group to communicate information
- WhatsApp
  - Because not every person in the group will look at Facebook in a timely manner, one could set up a group on WhatsApp or a similar tool for instant

messaging. In this way a player would be notified instead of relying on the player to check to see if any new information was given.

- Run Keeper
  - Have the manager collect the data from an application like Run Keeper regarding extra sessions that were required to be put in by players.
- Email
  - Use email to collect session data if an application is not available. As coaches often give specific exercises to be completed in a player's own time e.g. a shooting program for shooters, have the players email results to the manager regarding their shots in, vs shots missed while doing the program.

Factors that are highlighted above which will fit into this theme are:

- Gather statistical data
  - This information can be captured during matches and communicated to the coach during or after the match.
- Store data in easily accessible places
  - Data can be emailed to players or coaches or just kept and provided as requested.

### **7.5.2 Testing and Analysis Theme**

The testing and analysis theme relates to the testing of athletes to determine their physical condition and analysing any information obtained. In Chapter 3 it was highlighted that the use of biomechanics can aid in injury prevention, but so does testing of the athletes. Testing athletes at the start of a season can highlight weaknesses that can be flagged for possible injury occurrence. Programs can be given to players that will work on their weaknesses and reduce the risk of injury.

The analysis portion of this theme relates to the analysis of results. These results can be the results of the tests conducted to determine player conditioning, or the analysis of the results of a computer system used such as Dartfish. Data analysis was an area of concern for the coaches who participated in the questionnaire. It was time consuming to look over all of the results.

The testing and analysis theme can have a single role player such as a biokineticist or a sport scientist, or the theme can have both, resulting in two role players.

The technologies that can be used for this theme are as follows:

- Dartfish
  - If a system like Dartfish is available, the role players in this theme can assist with the analysis of the captured data.
- Sports Plan website
  - The sports plan website can be consulted to find out what tests to run on a netball player to determine their conditioning at the start of a season.
- YouTube
  - Once conditioning has been determined, YouTube can be used to get drills to improve weaknesses found during testing.

In addition to the technologies to be used some of the factors highlighted can also be considered in this theme. These factors to consider are:

- Collaborate to obtain funds
  - If a sport scientist or biokineticist can be used for this theme, perhaps the candidate already has access to systems such as Dartfish, or to other systems that can be useful.
- Find an assistant for data analysis
  - The role player in this theme can serve as an assistant for data analysis.

### **7.5.3 Coaching and Tactics Theme**

The coaching and tactics theme is the physical coaching of the team. The role player in this theme would be the coach. This theme involves the coaching of the players, devising tactics for match play and the skill development of the netball players. The supporting technologies specific to this theme would be:

- Sports Plan
  - Use the website to find drills to improve skills
- YouTube
  - Use YouTube to find drills to improve skills;
  - Analyse matches played by top ranking countries and identify tactics from there;
  - Upload skills that the coach wishes the players to learn;
  - Upload a practice if the coach cannot attend a practice.

From the factors that were highlighted one can look at the following:

- Don't look too far from what one has



- Use a video camera when on tour or participating in a tournament and record matches of one's opponents when playing;
- Devise tactics from the footage gathered.

#### **7.5.4 Merging Themes**

All of the above mentioned themes have the ability to operate independently as each theme can potentially have its own role player. This poses a possible problem. If the coach is never informed of the test results of the players, the coach will not know what condition the player is in. If feedback is never given on the individual session done by players, the coach will never know if the players are putting in the extra work. If the analysis results are never distributed to the coach and the player involved, there will not be growth of that player.

The merging of the themes into one is critical. Each role player should have access to data that is handled by all the role players involved. For this a technology such as icloud can be proposed for the storing of data electronically and allowing it to be pushed wirelessly to any mobile device. This, however, requires each of the role players to be in possession of an Apple mobile product. A more cost effective solution could be to use Dropbox. Dropbox is available on most smart phones as well as on personal computers. The role player in the manager theme can set up a folder for each player in the team. Each role player in each theme can save data about that player in the appropriate folder. The player can also be given access to his/her folder to look over any information that was gathered.

Independent themes can work separately, but share information in such a way that it unifies the management of the team and players.

With the themed approach there are endless combinations of themes. The focus group also mentioned nutrition as an important component of the wellbeing of players. However, it was also argued that netball in South Africa is not yet professional, therefore when introducing the themed approach it might be better to start with the three themes mentioned above, and expand on that as time, or money allows.

### **7.6 Data Triangulation**

Triangulation, as shown in Figure 7.7 was the data interpretation method used to establish the status and impact of technological usage in the training of netball. Data was obtained primarily through the questionnaires that were given out at the Spar National Netball championships in 2012. Secondly interviews were conducted to further establish the usage of available technologies. Thirdly Netball South Africa was contacted to obtain the final results of the tournament that was obtained by each of the participating teams.

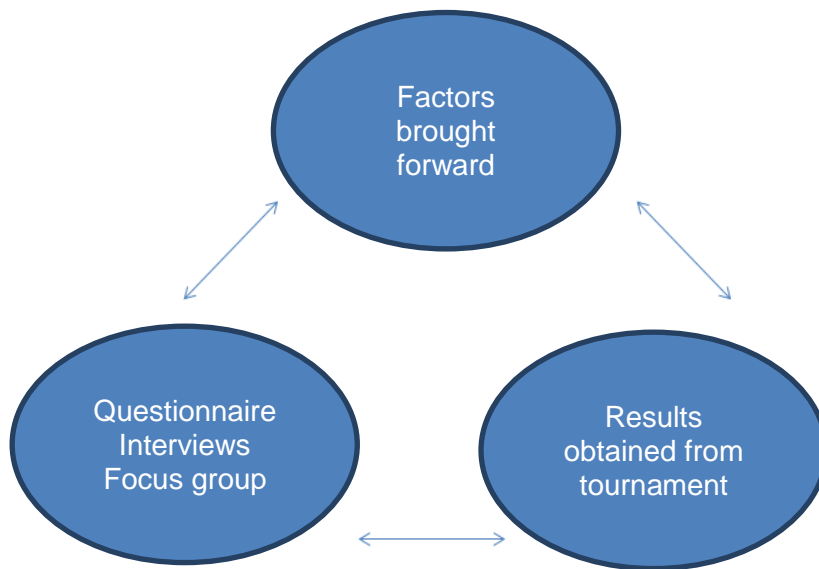


Figure 7.7 Data Triangulation

The questionnaires demonstrated that technology was being used by two of the teams that participated in the tournament. Out of these two teams Gauteng North utilised both Dartfish technology and a technology called Vision Coach. Alternatively Gauteng Central only utilised Dartfish in training. The other two teams did not make use of any technology.

The questionnaires also found that the coaches of these teams had similar coaching experience and had all obtained a similar level coaching certification. This rendered the coaches equal so it could not be said that there was one coach who was drastically better than another coach. This was done to determine if the results obtained by a team could have something to do with the quality of the coach. The training regimes followed by teams were also identified to eliminate the notion that teams which train more regularly could obtain better results. Other than Nelson Mandela Bay, who had minimal training, the other teams were fairly equal in their preparation time for the tournament.

The interviews that were conducted as a follow-up probed more into the social media aspect of training. This was to both gauge the coach's awareness of the power of social media tools as well as to identify if coaches were unknowingly using technologies in training. The results of the interviews were evenly matched with no coaches showing much support for social media as a coaching support tool.

After the data was obtained Netball South Africa were contacted for the official results of the Spar National Netball Championships of 2012. The results showed that Gauteng North (who indicated that they had made use of the most technology in the training and preparation

leading up to this tournament), had obtained the Gold medal position. The team in second position in the tournament was Gauteng Central. This team had also indicated that technology was used during the preparation for the tournament.

Alternatively the two teams who indicated that no technologies were used to assist the coach in the training for the tournament, namely Nelson Mandela Bay and Amatole finished fourth and eighth respectively. The official results, as received via email from NSA, can be seen in Figure 7.8 (De la Guerre, 2013).



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SPAR NSA Senior Championships in  
Johannesburg      11/8/ 2012

A Section:

1. Gauteng North A
2. Gauteng Central
3. Dr Kenneth Kaunda
4. Nelson Mandela Bay
5. Freestate Motheo
6. Ekurhuleni
7. Western Province A
8. Amathole
9. Boland Bizhub A
10. Frances Baard
11. Royal Bafokeng
12. Umgungundlovu

Figure 7.8 Spar National Netball Championship Results

This is an email I'm not sure how to put an email reference in the bibliography

The teams using technology in training obtained better results than those teams who did not. With the coaches' accreditation levels and the time training for the tournament being equal among most of the teams, the obvious difference between the teams who came first and

second and the team who finished eighth was the use of technology. Nelson Mandela Bay who ended fourth with minimum training begs the question of what the team is capable of if the opportunity to utilise technology in training arises.

As a whole it can be said that the utilisation of technology in Netball is average. Knowing how to use technology in conjunction with coaching is limited. It can be said that some federations use technology unknowingly. The simplest forms of technology are overlooked while more complex technologies are being sought after. There are also times when the simple technologies could be used differently to yield better results. The simplistic form of match play analysis where a match is videotaped and analysed at a later stage can be adapted. The adaptation could include the storing of analysis for future use. The stored data could be used when the two recorded teams meet again in the future. Match play analysis is a double edged sword. It allows one to not only analyse match play, but also that of one's opponent. When used correctly, the very primitive form of videotaping a match, analysing it, and storing that analysis on a computer system for future use can be a very useful tool in training situations. The team can now train to counter specific interchanges that are employed by the opposing team.

Factors were produced and put forward in this chapter after the results of the questionnaire, the interviews and the focus group were analysed.

## **7.7 Summary**

Chapter 7 took the findings of the analysis done in Chapter 5 as well as the literature reviewed in Chapter 2 and proposed factors to consider when incorporating the use of technology as a tool to assist in the coaching of netball in South Africa. Based on the advice of the group of experts (focus group), it took those factors and broke them down into themes, indicating that the responsibility need not fall solely on the shoulders of a coach.

Chapter 8, the final chapter, will summarise the findings of the study and thereby conclude the dissertation.

## Chapter 8 Summary

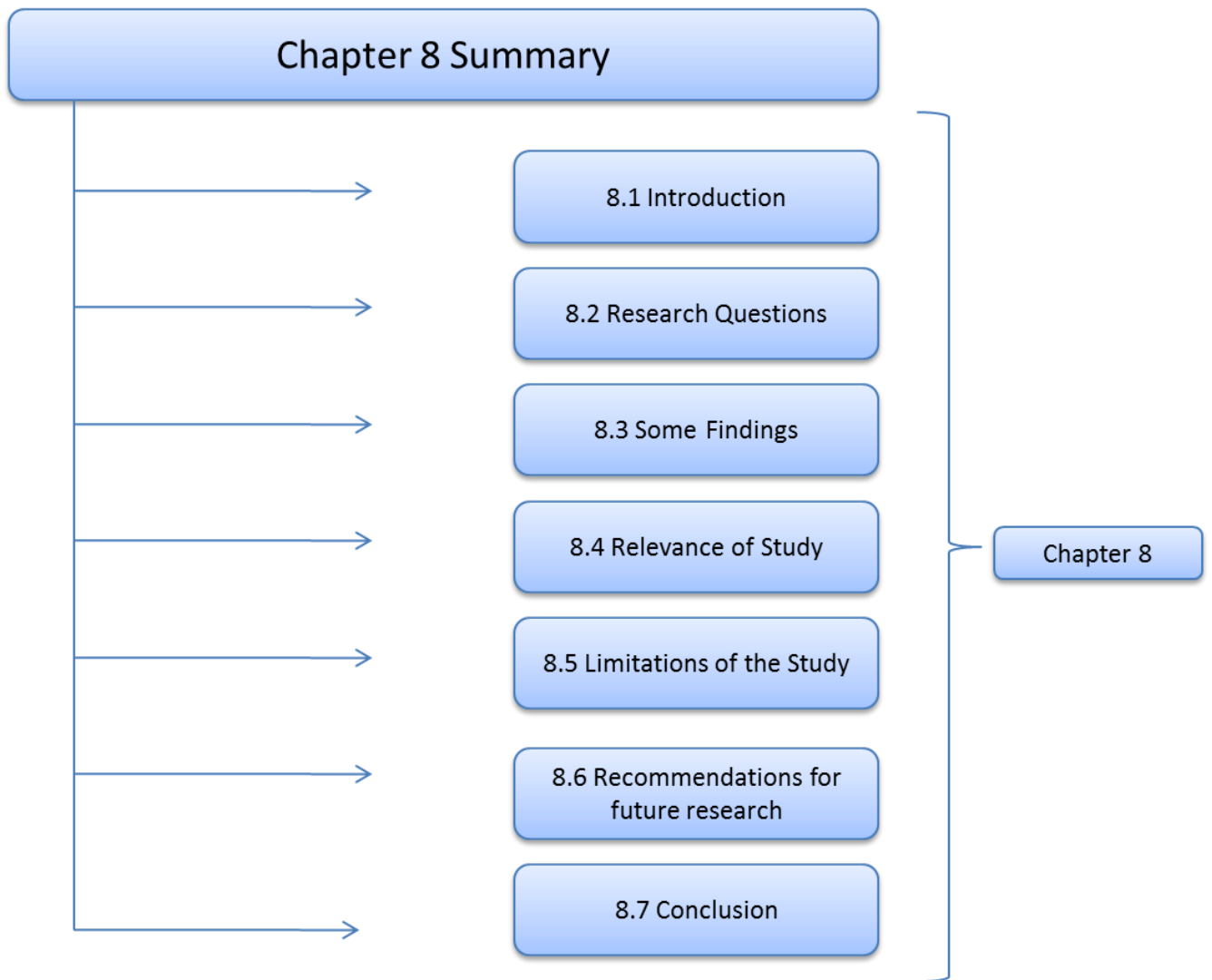


Figure 8.1 Chapter 8 Outline

## 8.1 Introduction

The technology usage in netball in South Africa is limited. Some provinces have managed to obtain technologies that have the ability to assist in the coaching of netball. However, not all provinces have had the ability to acquire technology, or know what different technologies are available for them to use.

The underlying reasons as to why technology usage for netball in South Africa is hard to acquire, may have to do with the fact that netball in South Africa is not a professional sport. Funds for supporting technologies are therefore difficult to obtain. Coaching is not necessarily the coach's only job. Therefore the coach might not have the time to search for technologies or to learn how a new technology works.

Based on the roles that computer technologies have played in other sports, a strong argument could be made that the use of technology to assist the coach in the coaching of netball could not only improve the results of the team using the technology but also the skills of the individual players. In turn, if each individual player in each province performs better it could be argued that the South African national team could achieve better results and a higher ranking than 6<sup>th</sup> in the world. A better world ranking could then be a driving force behind making the sport of netball professional in South Africa.

## 8.2 Research Questions and Objectives

Key research questions arose in response to the above. Looking at the research question:

**What are the factors that impact on the introduction of information technology usage in netball coaching?**

The corresponding research objective was to provide factors to consider in the use of technology as a supporting tool for coaches in South Africa. Technology usage in South Africa for netball was found to be a hit and miss situation. A questionnaire was sent out at the Spar National Netball championships in 2012 and from the teams that chose to participate in the questionnaire 50% used technology in preparation for the tournament.

When looking at which technologies were used it was found that many of the simple tools such as Microsoft Excel were being overlooked as a supporting technology. The power that Excel holds to keep statistical information and to make comparative graphs is immense. The shooting percentages of the shooters could be captured in Excel. This could be done per quarter, per match, or even for an entire tournament. Similar statistical data can be kept for

defenders to determine how many turnovers they caused, or how many interceptions they took.

The factors therefore serve as reference for coaches who are already using technology or coaches who want to begin using technology in coaching. The factors highlighted how simple technologies could be used or incorporated into coaching.

Social media was another factor found to be overlooked by coaches. Facebook and Youtube are social media tools that could be used for communication or simply finding drills to assist coaching and to improve players' speed or agility.

The factors that were found and discussed in Chapter 7 were validated by a group of experts, referred to as a focus group, from the Human Movement Sciences (HMS) department of the Nelson Mandela Metropolitan University.

The questionnaires did not only highlight how many teams use technology or the fact that simple usable technologies were seemingly not seen as a tool to assist coaching, but also identified which technologies were available and popular among those teams who did use technology in the preparation for the tournament.

This was covered in the secondary research questions:

**1. What information technologies are available to support sports coaching in general?**

Literature was reviewed in order to find out which technologies were available to sport in general. The technologies found were used in different sports. There was Stat Easy, to assist with keeping statistics, Shot Coach to analyse the shot take technique in basketball and there was the Volleyball CD-ROM that contained many drills and coaching ideas. Many of the systems were found to have a heavy base of biomechanics. These biomechanics are applied almost like rules to the system and feedback is given based on these rules.

**2. What information technologies are available to support netball coaching?**

Literature showed that there are a few netball specific technologies available to support the coaching of netball. Dartfish was not only found to be used in the literature, but also in the questionnaire, both teams that indicated that they use technology also indicated that Dartfish was one of the technologies used.

Australia seems to be leading the way when it comes to technology usage. They indicated in a blog that they use a tracking system that uses GPS to track the movement of players on court. It was also Australia that formed part of the High-Tech shooting sleeve that was adapted for the shooters of netball from a concept introduced by basketball.

The literature only touched on a few technologies that seemed to be popular or new to netball.

### **3. What is the role of the coach in netball?**

Literature chapters looked at what the roles were of a coach in general and how they are meant to be leaders and mentors and put the players first and be fair and true to the game.

Information was also sought on how to become a coach and what was being taught in the coaching courses of various netball playing countries. Through this it was established that the coach has to run practices, organise matches, conduct trials to pick the best players, manage the players throughout the season and teach them skills to perform at their best.

### **4. What is the status of technology usage in netball in South Africa?**

The objective here was to identify what technologies were being used by the provinces that have technologies available to them. This was also done with the questionnaire and was later followed up by interviews.

The questionnaire found that half of the teams that participated in the study were already using technology in preparation for the Spar National Netball Championships of 2012. These teams were also found to have achieved better results in the tournament.

The follow-up interviews probed into the usage of social media, and whether coaches were using it as a tool to assist in coaching.

Social media is often seen as information shared with friends and family about personal experiences or events. This perception has the ability to distort the view of using social media to share information amongst team players. The personalisation that is attached to something like Facebook might raise the concern from the coach as to where one separates one's personal life from one's coaching life? It might be for this reason that coaches were hesitant to use Facebook as a tool to assist coaching.



If it is found that the reasoning behind not using Facebook is that coaches fear the crossing of the line between personal life and coaching life, then it can be argued that coaches are not aware of the correct usage of a system like Facebook. An example of how a group on Facebook can be used to pass information about events and share photographs taken at events was shown in Chapter 6. NMMU Netball successfully set up and used the group feature of Facebook for information sharing at a club level. It is probable that coaches could also post information regarding matches and practices in the group.

After looking at the results of the interviews with the coaches and the idea of coaches preferring a personal approach to an approach involving the utilisation of social media, one wondered whether players shared that sentiment. The same interview that was conducted with the coaches regarding the use of social media was put forward to some of the players.

Where the coaches seemed a bit more reluctant to use social media to assist in coaching, the player interviews yielded dissimilar views. When comparing the results between the coaches and players of the interviews surrounding the usage of social media, there seems to be a difference in the outlook of the usage of social media as a tool to assist coaching. Players seemed to consult social media for additional training aspects where coaches tended to shy away from social media as a coaching tool.

A technology that was prominent was Dartfish. Dartfish is predominantly a video analysis based tool. Its expense, however, is something that makes it difficult to obtain. Here again the factors found cheaper implementations to be possible with the use of a plain video camera, where the coach can record the player movements and at a later stage review and apply his or her own analysis on the movement the player has made.

The manual analysis does have disadvantages as it is based on the coach's opinion, but it could be argued that the analysis done by Dartfish is also based on someone's opinion. The advantages of Dartfish are the side-by-side comparisons that could easily be missed by a coach doing manual analysis from a video obtained by a video camera. The video camera and manual approach is not of the same quality or standard than that of the Dartfish program, but it is a plausible alternative if funds are limited.

During the literature review other technologies such as the High-Tech Shooting Sleeve was found. This sleeve records the motion of the arm on a successful shot. It applies this motion to a sound tone and every time the arm repeats that motion the tone is given

indicating that the shot with those arm positions and movements will be successful. This technology was still in development phase, but showed promise to be successful.

Most technologies identified were motion based so a strong underlying of human movement sciences is applied to these technologies. The Focus group mentioned above are experts in the field of human movement sciences, making their contribution in the validation of the factors credible.

### **8.3 Some Findings**

Based on the results of the questionnaire and the interviews conducted, factors that could impact on the introduction of technology when wanting to incorporate technology into coaching were introduced. These factors were highlighted in Chapter 7.

It should be highlighted that it is not the type of technology that is very important when choosing a technology to assist in the coaching of netball, but rather what information a technology can provide for the coach. In turn, it is also important to ensure that the coach does something with the information obtained from the use of a technology. Technology or the information retrieved from the technology also has to be shared among the coaching staff for it to be beneficial to the team and the players. It is of no use if the coach has the information but is not willing to share it with the assistant coach or other relevant role players.

The assistance of technology as a coaching aid is lost if the information is not used. Information can be used in the following ways:

- Store information to track progress of players;
- Store information to compare two or more players playing in the same position;
- Gather information about players (conditioning information);
- Gather information about opponents (one might play against them later in a season);
- Review data received about players with the players and set goals together;
- Capture statistical data for shooters during match play;
- Capture statistical data for defenders during match play (such as how many interceptions they took).

These are just some examples of what to do with the information that a software system provides. If information is obtained from using technologies and software systems, but nothing is done with the information, the technology is practically useless in assisting the coaches in the coaching of netball. It is clear from the list above that there is a lot of information that can be drawn from the usage of technology. It was considered that a coach

alone might not be enough to manage a team at a national level. For this a themed approach was suggested by a group of experts from the Human Movement Sciences department of the Nelson Mandela Metropolitan University.

The themed approach involved taking different role players / stake holders and assigning them to different themes. Each of these themes comprised a set of factors to consider and some technologies to assist the responsible role player in completing the tasks required for his/her role in that theme. A role player would be responsible for each player in the team, but only within his/her theme. For example, the manager could be a role player or stake holder in the communication theme and would be in charge of the communication for each player in the team. Communication can be anything from the time of a match, to results of exercise programs assigned to players by the coach.

Another theme could be for the testing and analysis. This theme controls the fitness testing of the players. Based on the results of the fitness tests, areas of weakness or lower fitness levels of players can be identified. Training programs are then given to players and re-testing is conducted to monitor improvement. The testing and analysis theme would ideally be run by a sport scientist or biokineticist.

Additionally the coach would be in charge of the coaching and tactical theme. This theme would involve the actual coaching and the devising of tactics to support the coaching of the team.

There is the possibility for additional themes, such as the nutrition theme. This theme would lay out eating plans for players based on each player's training load. This is important for recovery and even preparation for matches and practices. A medical theme could also be introduced and work in collaboration with the testing and analysis theme, where injured players do rehabilitation instead of fitness and a physiotherapist or doctor oversees that aspect. These additional themes were not explored in detail, but could also form part of the themed structure proposed in Chapter 7.

The only drawback with the themed approach is the cost. Each role player will probably expect some sort of compensation for the part he/she would play. The argument about the cost effectiveness will definitely arise. The cost of employing three people (coaching theme, testing and analysis theme, communications theme) on seasonal basis vs the cost of purchasing a technology once-off, and training a person to use that technology will be a debate when discussing financing.

The advantage of having highlighted the themed approach is that coaches have an opportunity to nit-pick which parts of which themes they wish to include. If there is no support for all of the stakeholders suggested in each theme the structure of the theme can remain, and coaches can choose from that structure which elements are feasible to include in their coaching. This still broadens the current scope of coaching.

With the use of technology in the coaching of netball, be it in a theme or the sole responsibility of the coach, there are still no guarantees that results will improve for a team. While each technology has a list of advantages, there is also a list of disadvantages. If one looks at some of the technologies explored in this study, Table 8.1 shows that technologies are advantageous, but can also have draw backs.

Table 8.1 Advantages and Disadvantages of using Technologies

<b>Technology</b>	<b>Advantages of using this Technology</b>	<b>Disadvantages of using this technology</b>
<b>Vision Coach</b>	<ul style="list-style-type: none"> <li>• Improves eye, hand body coordination. Teaches one's body to react on what is seen by the eyes.</li> <li>• Technology is constantly being improved.</li> </ul>	<ul style="list-style-type: none"> <li>• It is very expensive.</li> <li>• It is a very specific technology, and cannot be used for a wide variety of exercises.</li> </ul>
<b>Dartfish</b>	<ul style="list-style-type: none"> <li>• Has ability to track different players' actions in situations.</li> <li>• Can easily retrieve specific actions from the index that is created and make tactical and statistical analyses.</li> <li>• Can be used for a variety of different purposes, such as injury rehabilitation, skill development, scouting and testing.</li> </ul>	<ul style="list-style-type: none"> <li>• Needs training to operate the system.</li> <li>• Expensive to set up the system.</li> </ul>
<b>TV review system</b>	<ul style="list-style-type: none"> <li>• Gives one the ability to view it repeatedly.</li> <li>• Can be combined with other technologies as well, e.g. cricket using it with "hot spot".</li> </ul>	<ul style="list-style-type: none"> <li>• It is very expensive.</li> <li>• Needs additional personnel to operate it.</li> <li>• Effectiveness is in line with the amount of cameras used.</li> </ul>
<b>Run Keeper</b>	<ul style="list-style-type: none"> <li>• Ability to accurately track exercise distance and speed.</li> <li>• No need to rely on the player to provide the data, as the application does it.</li> <li>• Easy to see if the player completed the exercise.</li> </ul>	<ul style="list-style-type: none"> <li>• Need access to a Smartphone with GPS.</li> <li>• Usage of Internet data for uploading each exercise session.</li> <li>• Not always comfortable to carry a Smartphone around while exercising.</li> <li>• Can cheat the system, go cycling instead of running.</li> </ul>

Technology	Advantages of using this Technology	Disadvantages of using this technology
<b>YouTube</b>	<ul style="list-style-type: none"> <li>• Available from almost anywhere, provided that there is an Internet connection.</li> <li>• Can be viewed in a time that is convenient for the player and coach.</li> <li>• Can be used for comparisons.</li> <li>• It is free to use.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses a large amount of data when viewing YouTube. This can become expensive.</li> <li>• Relies on other people to upload training sessions and games to view.</li> </ul>
<b>Facebook</b>	<ul style="list-style-type: none"> <li>• Very easy to access.</li> <li>• Very user friendly.</li> <li>• The application is constantly being improved. Application is free to use.</li> <li>• Communication possible with team.</li> </ul>	<ul style="list-style-type: none"> <li>• Some people might choose not to be part of facebook due to various reasons.</li> <li>• People might miss an announcement that was made on Facebook.</li> </ul>

Table 8.1 briefly looks over some of the technologies named in the study. For each of these technologies some factors that were advantageous to the use of the technology were listed. Factors that were found to be a disadvantage to the use of a particular technology were also listed. Many of the disadvantages could be traced back to the people using the technology. People do not have the availability, or do not have access, or do not always log into a system in a timely manner, and they may also lie or cheat. It would seem that the major drawback to using a technology to support the coaches in the coaching of netball is the users themselves.

## 8.4 Relevance of the study

The research is significant because there is a lack of published findings not only on all the technologies that are available for use in netball in South Africa, but also on which technologies are utilised by South African netball.

As was found in Chapter 6, the only technologies identified as having been used for preparation of the Spar National Netball tournament in 2012 were Dartfish and Vision Coach. Only two technologies were used among 50% of teams participating in the study. In the questionnaire it was indicated that all teams would like to use technology, and this shows that there is a level of acceptance to the benefits that using a technology would provide. This research thus reveals some of the available technologies and ways to implement them.

## **8.5 Limitations of the study**

Due to the fact that the participation in the questionnaires was voluntary, the case study group was limited to four teams that took part in the A section of the Spar National Netball Championships of 2012. As a result of the sample size there were limitations to the data collected. Due to the fact that there were few studies done on the technology usage in the coaching of netball in a South African context, there was minimal research on this topic.

The following section recommends future research in this area.

## **8.6 Recommendations for future research**

With 50% of the top netball playing provinces in a small sample size using technology perhaps a future study could focus on the reasons why there is not a greater use in technology. Suspected causes relate to lack of funds or perhaps there is a lack of knowledge not only as to which technologies are available, but also how to use them.

The themed approach mentioned earlier in this chapter is probably one to look to in the future. It might at this stage be a step too far for South African netball at a national level. Perhaps a further study can be done into the themed approach and what the cost vs. benefits would be. If the benefits outweigh the cost, the feasibility to incorporate this methodology could be justified.

Another area for research could be to take a group of netballers and utilise available technologies and track the progress of the netballers in relation to the technology used.

## **8.7 Conclusion**

Technology usage in sport is quite popular and broad, but technology uses in netball in South Africa is a hit and miss. Some teams have access to technology and they seem to excel, winning tournaments. It shows that technology, when used correctly, can assist the coaches in the coaching of netball and help a team achieve good results. In the study it was found that some coaches shy away from the technologies that are right in front of them such as Facebook and Youtube. This could be because the coaches fail to see the potential those technologies hold beyond the personal sharing of photos and watching videos.

None of the coaches who partook in the questionnaire stated that they had used any of the Microsoft Office programs in their coaching. This shows that coaches have probably not considered Excel as a tool for keeping statistics, be it statistics on shooting, or defensive intercepts or just for counting the win/loss ratio of a season.

A group of experts who approved the factors that were introduced in Chapter 7 agreed that the use of the simpler technologies that are already being used by most coaches and players on a day-to-day basis can be powerful tools in coaching. Facebook can be used for communicating information to a team, just by setting up a group and allowing each player in the team to join that group. YouTube holds numerous examples of drills on how to improve speed.

Considering Microsoft Excel, information that can be captured in a simple Excel sheet can be broken down into different levels. Shooting statistics, for example, can be looked at from a tournament level, and broken down into a match level, and even per quarter statistics can be captured. Another factor was taking something as simple as a video camera and recording matches for video analysis. One can also look at factors that are common across different sporting codes and share technologies that might be available. An example here could be that there is running in athletics and also running in netball. Perhaps the technologies used by an athletics team could be borrowed and used in netball as well.

When using the word technology in a sporting environment it would seem that coaches think big. They think Dartfish, or Vision Coach or something with maybe six cameras that constantly track the movement of players on court using devices built into the players' shoes. This is all possible, but as a sport that is not yet classified as professional in South Africa, the probability of incorporating such technologies at a provincial level is not plausible for all participating teams.

For coaches wanting to start using technology, they would have to consider the cost factors and begin with what they have right in front of them, share with other sporting codes, and look to the simple technologies.

# Appendix A Questionnaire



## Computer Technology Usage in Netball

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This questionnaire serves as an investigation into the current technologies that are being used in parallel to coaching in the sport of netball. The investigation aims to reveal which technologies, mainly computer based, are available for netball specifically and if their use assists coaches in the coaching of the sport. The questionnaire is split up into three sections and there are total of 23 questions in the questionnaire. All questions that are marked with an asterisk (\*) are compulsory and have to be answered before the questionnaire can be submitted.

### 1. Biographical Details

Background information about the coach and past coaching experience

1.1 \* Which sports codes have you coached before?

1.2 \* Which age groups have/do you coach?

- Primary Schools level
- Secondary Schools level
- Tertiary or College level
- Under 21 Age Group
- Player over the age of 21 (Senior)

1.3 \* What is your coaching level achieved?

- Level 1 coaching
- Level 2 coaching
- Level 3 coaching
- Level 4 coaching
- No specific coaching level obtained

1.4 \* Which sports codes have you coached before?

- Athletics (Track or Field)
- Tennis
- Hockey (field)
- Basketball
- Other



1.5 \* If your answer to question 1.4 included Other please specify

## 2. Team Preparations and Practices

This section inquires about how you as coach prefer to prepare for tournaments and matches

2.1 \* How often (per year) does this team compete in netball matches or tournaments?

- 0 > 10
- 11 > 21
- 22 > 31
- 32 or More

2.2 \* How long before the tournament did your team start training as a group?

- Week(s)
- Month(s)
- Year
- More than a year
- No training was done

2.3 \* In the last three months leading up to the tournament, How often did you train?

- Training Daily
- Training Weekly
- Training Monthly
- No training was done

2.4 \* How many training session did your team have in the above selected schedule? e.g. if you selected Training Daily for 2.3 how many times did you have a training session in that day

- 1 - 3
- 4 - 6
- 6 - 8
- 8 - 10
- More than 10
- None

## 3. Technology usage

Which Technologies are incorporated in your coaching session

3.1 \* Do you make use of any Technologies during training? If your answer to this question is No, please move on to question 3.7

- Yes
- No

3.2 If your answer to the previous question was Yes, How many sessions in a week do you make use of Technology?

- 1 - 3
- 4 - 6
- 6 - 8
- I use technology in all sessions I coach

3.3 Which Technologies do you use during coaching?

- Dartfish Program
- Photocells
- High Tech shooting sleeve
- other

3.4 If your answer to the previous question included Other, Please specify the other Technologies that you use?

3.5 How do you manage the data gathered from the technologies used during coaching?

- Data is stored and used to track progress
- Data is stored and used for comparative purposes
- Data is stored, but nothing is done with it
- Data is not stored
- Other

3.6 If your answer to 6.5 contained Other, please specify

3.7 To what extent do you think technology should be used in coaching?

- It should be used according to the coach's convenience
- It should replace the coach
- Not at all

3.8 What according to you are the advantages or disadvantages of using computer technology in conjunction with coaching?

3.9 Does the use of Technology deter from the originality of the game?

- Agree
- Disagree
- Neither Agree nor Disagree

- 3.10 To what extent would you like to see technology be used in netball?
- Technology to assist umpire decision making (TV review)
  - Technology to assist coaches in training
  - Technology to assist match play analysis
  - Technology to assist netballers without input from the coach (training on your own)
  - Other

3.11 If one of your options to the previous questions was other, please specify?

- 3.12 Do the Technologies you currently available have sufficient coverage to assist all playing positions in netball?
- Yes  No

3.13 Any other comments you wish to add regarding technological usage in netball?

3.14 If one of your options to the previous questions was other, please specify?

#### 4. Follow up

This section inquires about the participants willingness to be available for follow-up questions if so required

- 4.1 Will you be willing to assist with the answering of any further questions if required?
- Yes  No

Thank you for your time

Submit Questionnaire

## Appendix B Answers

### Section 1 of questionnaire, Biographical Data

Which Team do you coach	Q1-3 Which age groups have/do you coach?	Q1-4 What is your coaching level achieved	Q1-5 Which sports codes have you coached before?	Q1-6 If your answer to question 1.4 included Other please specify
EP (NMB)	Primary, Secondary,U21, Senior	3	other	NONE of the above
Border (Amatole)	Secondary, U21, Senior	2	other	none of above
Gauteng Central	Primary, Secondary, tertiary, Senior	2	other	NONE of above
Gauteng North	Primary, Secondary, tertiary, U21, Senior	1	Athletics, other	Softball

## Section 2 of questionnaire, Preparation for tournament

Team	Q2-1 How often (per year) does this team compete in netball matches or tournaments?	Q2-2 How long before the tournament did your team start training as a group?	Q2-3 In the last three months leading up to the tournament, How often did you train?	Q2-4 How many training session did your team have in the above selected schedule? e.g. if you selected Training Daily for 2.3 how many times did you have a training session in that day
EP (NMB)	0 > 10	Week(s)	Weekly	1-3
Border (Amatole)	0 > 10	Month(s)	Weekly	1-3
Gauteng Central	11 > 21	Month(s)	Daily	4-6
Gauteng North	22 > 31	Year	Daily	1-3

### Section 3, Technologies Used In Training

Team	Q3-1 Do you make use of any Technologies during training? If your answer to this question is No, please move on to question 3.7	Q3-2 If your answer to the previous question was Yes, How many sessions in a week do you make use of Technology?	Q3-3 Which Technologies do you use during coaching?	Q3-4 If your answer to the previous question included Other, Please specify the other Technologies that you use?	Q3-5 How do you manage the data gathered from the technologies used during coaching?	Q3-6 If your answer to 3.5 contained Other, please specify
EP (NMB)	N	-	-	-	-	-
Border (Amatole)	N	-	-	-	-	-
Gauteng Central	Y	1-3	Dartfish	-	Data is stored and used to track progress	-
Gauteng North	Y	1-3	Dartfish, other	Visual Coach	Data is stored and used to track progress, Data is stored and used for comparative purposes	-

**Section 3 (continued), Opinions on technology usage**

<b>Team</b>	<b>Q3-7 To what extent do you think technology should be used in coaching?</b>	<b>Q3-8 What according to you are the advantages or disadvantages of using computer technology in conjunction with coaching?</b>	<b>Q3-9 Does the use of Technology deter from the originality of the game?</b>	<b>Q3-10 To what extent would you like to see technology be used in netball?</b>	<b>Q3-11 If one of your options to the previous questions was other, please specify?</b>	<b>Q3-12 Do the Technologies currently available have sufficient coverage to assist all playing positions in netball?</b>	<b>Q3-13 Any other comments you wish to add regarding technological usage in netball?</b>	<b>Q4-1 Will you be willing to assist with the answering of any further questions if required?</b>
EP (NMB)	Coach's convenience	Using Computer Tech allows you to continually refer to particular situations and gauge improvement. It's like a permanent storage facility of what you did	Disagree	Technology to assist coaches in training, Technology to assist match play analysis	-	N	-	Y

Border (Amatole)	Coach's convenience	To assist with analyzing players and games	Disagree	Technology to assist umpire decision making (tv review), Technology to assist coaches in training, Technology to assist match play analysis, Technology to assist netballers without input from the coach (training on your own)	-	N	-	Y
<b>Team</b>	<b>Q3-7 To what extent do you think technology should be used in coaching?</b>	<b>Q3-8 What according to you are the advantages or disadvantages of using computer technology in conjunction with coaching?</b>	<b>Q3-9 Does the use of Technology deter from the originality of the game?</b>	<b>Q3-10 To what extent would you like to see technology be used in netball?</b>	<b>Q3-11 If one of your options to the previous questions was other, please specify?</b>	<b>Q3-12 Do the Technologies currently available have sufficient coverage to assist all playing positions in netball?</b>	<b>Q3-13 Any other comments you wish to add regarding technological usage in netball?</b>	<b>Q4-1 Will you be willing to assist with the answering of any further questions if required?</b>
Gauteng Central	Coach's convenience	Advantage - Enhance technique development Disadvantage - Time Consuming	-	Technology to assist umpire decision making (tv review), Technology to assist coaches in training, Technology to assist match play analysis	-	Y	-	Y



Gauteng North	Coach's convenience	& improves understanding of game and skill - Time consuming	Neither Agree nor Disagree	Technology to assist coaches in training, Technology to assist match play analysis, Technology to assist netballers without input from the coach (training on your own)	-	Y	it helps a lot when used correctly, but we need more analysts as it is very time consuming	Y
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## Appendix C

### Interview Questions

#### **Follow-up Interview for technology usage in sport.**

**By : Janine Daniell**

At the Spar National Netball Championships, it was indicated that you were willing to be contacted after completion of the questionnaire, if any further information was required. After reviewing the questionnaire submitted by you, a few additional questions arose regarding the technology usage in preparation for the tournament. The following questions have been identified. If you are willing to further participate in the study, please complete the questions below.

#### **Question 1**

In your questionnaire you answered, you stated that you utilize technology. How do you store the data that is obtained from the Technology?

#### **Question 2**

Do you use social media such as Facebook or YouTube as part of your coaching?

E.g. Facebook to for communicating practice time changes

E.g. YouTube for obtaining ideas for training drills

#### **Question 3**

If you do use social media, how do you use it?

#### **Question 4**

If you do not use social media, Why not, and would you like to use it?

## **Appendix D**

### **Interview Transcripts**

**Interviewer:** Student

**Interviewee:** Coach of Gauteng North

**Interview Setting:** Interview Conducted via Facebook Messaging

**Affiliation with interviewee:** Interviewee answered a questionnaire regarding technological use in netball training. This interview is a follow-up.

**(Start of Interview)**

**Interviewer:** In your questionnaire you answered, you stated that you utilize technology. How do you store data that is obtained from the Technology?

**Interviewee:** We store it in external Hard drives, dartfish TV and on notebooks

**Interviewer:** Do you use social media such as Facebook or YouTube as part of coaching?

- E.g. Facebook for communicating practise time changes
- E.g. YouTube for obtaining ideas for training drills.

**Interviewee:** As part of marketing definitely, as part of coaching, nope.... use Dartfish TV or Personal

**Interviewer:** If you do use social media, how do you use it?

**Interviewee:** We rarely upload videos for players to watch

**Interviewer:** If you do not use social media, why not?

**Interviewee:** We see our players enough to show them when we see them. Personal approach works much better.

**Interviewer:** Student

**Interviewee:** Coach of Nelson Mandela Bay (EP)

**Interview Setting:** Interview Conducted via Facebook Messaging

**Affiliation with interviewee:** Interviewee answered a questionnaire regarding technological use in netball training. This interview is a follow-up.

**(Start of Interview)**

**Interviewer:** In your questionnaire you answered, you stated that you utilize technology. How do you store data that is obtained from the Technology?

Interviewee: We indicated that technology was not used

**Interviewer:** Do you use social media such as Facebook or YouTube as part of coaching?

- E.g. Facebook for communicating practise time changes
- E.g. YouTube for obtaining ideas for training drills.

Interviewee: No, Most players have facebook, but you can't coach over facebook, it doesn't really provide tools for coaching as far as I understand it for sharing with friends.

**Interviewer:** If you do not use social media, how do you use it?

Interviewee: We do not use social media.

**Interviewer:** If you do not use social media, why not?

Interviewee: Although most players have facebook, not all players have constant access to social media, so to keep it equal for all we steer clear of things like YouTube.

**Interviewer:** Student

**Interviewee:** Player of Gauteng North

**Interview Setting:** Interview Conducted via Facebook Messaging

**Affiliation with interviewee:** Interviewee agreed to be interviewed for technology usage. Player participated in Spar National Netball Championships.

**(Start of Interview)**

**Interviewer:** Do you use social media such as Facebook or YouTube as part of coaching?

- E.g. Facebook for communicating practise time changes
- E.g. YouTube for obtaining ideas for training drills.

Interviewee: Yes

**Interviewer:** If you do not use social media, how do you use it?

Interviewee: I use it as inspiration, motivation, tips and examples for training. I teach, so I get ideas for class as I take a phys-ed class.

**Interviewer:** If you do not use social media, why not?

- (Technology is used, did not need to ask this question)

**Interviewer:** Student

**Interviewee:** Player of Gauteng Central

**Interview Setting:** Interview Conducted via Facebook Messaging

**Affiliation with interviewee:** Interviewee agreed to be interviewed for technology usage. Player participated in Spar National Netball Championships.

**(Start of Interview)**

**Interviewer:** Do you use social media such as Facebook or YouTube as part of coaching?

- E.g. Facebook for communicating practise time changes
- E.g. YouTube for obtaining ideas for training drills.

Interviewee: No not really for netball.

**Interviewer:** If you do not use social media, how do you use it?

Interviewee: I have a facebook account to tell my friends when I have matches for support. Hope that counts.

**Interviewer:** If you do not use social media, why not?

Interviewee: Would like to use it more, but mainly have access to internet on my phone only, so it costs me data.

**Interviewer:** Student

**Interviewee:** Player of Nelson Mandela Bay

**Interview Setting:** Interview Conducted via Facebook Messaging

**Affiliation with interviewee:** Interviewee agreed to be interviewed for technology usage. Player participated in Spar National Netball Championships.

**(Start of Interview)**

**Interviewer:** Do you use social media such as Facebook or YouTube as part of coaching?

- E.g. Facebook for communicating practise time changes
- E.g. YouTube for obtaining ideas for training drills.

Interviewee: Yes

**Interviewer:** If you do not use social media,how do you use it?

Interviewee: I use YouTube – for extra training. So I go look for videos to increase jumping height. I defend.

Our club uses facebook groups and players just join that group and get information on what is happening in the club.

**Interviewer:** If you do not use social media, why not?

- (Technology is used, did not need to ask this question)

## **Appendix E**

### **Minutes of Focus Group Meeting**

#### **Human Movement Science Department**

#### **Minutes for Masters Meeting**

**Janine Daniell**

**09102013**

#### **1. Welcome**

#### **2. Present**

- Prof du Rant
- Ms Raffan
- Mr Raffan
- Mr Kramer
- Ms Kahts
- Ms Daniell

#### **3. Presentation by Ms Daniell**

##### **3.1**

Title: Factors to consider towards introducing technology usage in the coaching of netball in South Africa.

#### **4. Primary comments on masters**

##### **4.1**

Factors found to be valid. Awareness from coaches in netball will be increased with social media phone apps which aren't necessarily the norm.

Possibly create themes when discussing the technology available for netball coaches.

Primary themes identified were the management (organising the team), coaching (tactical and technical aspects of the game) and performance of athletes.

In terms of performance the aspects to consider for high performance are:

- Nutrition (an example provided was myfitnesspal.com)
- Biomechanics / Sport science specific to the sport (dartfish often used and service providers are usually Sport Scientists)
- Recovery (many periodized programs provided and service providers are sport massage therapists)
- Management to handle communication between players, coach, and other general information



- Fitness levels and injury prevention status (Biokineticists are service providers and technology used would be the sharing information via e-mails or other means)
- The application of periodization training (Sport Scientist and the numerous software packages available for assessments and implementation thereof).
- Lastly, psychological training is an important aspect to consider.

Under these possible themes, place the technology and service providers that can be used to facilitate the optimisation of high performance in netball players. Perhaps use empirical research to support your findings.

#### 4.2

Ensure that you specify the scope of your study. That is: are you trying to find the most cost effective technologies for all coaches of netball or are you trying to identify the use of technology to optimise high performance in netball players?

#### 4.3

It is important to identify who the service providers are for optimising sports performance and how technology can be used to optimise the interaction between service providers.

### **5. Conclusion and thanks provided**

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