

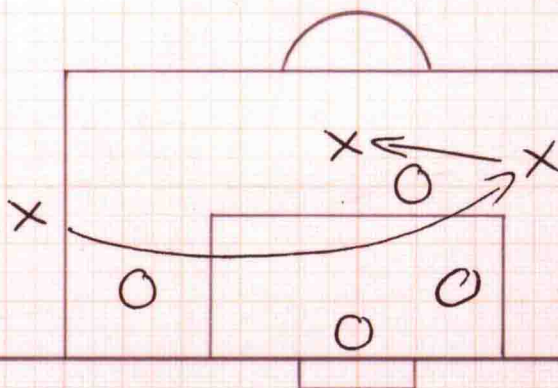
IAN FRANKS & MIKE HUGHES



SOCCER

ANALYTICS

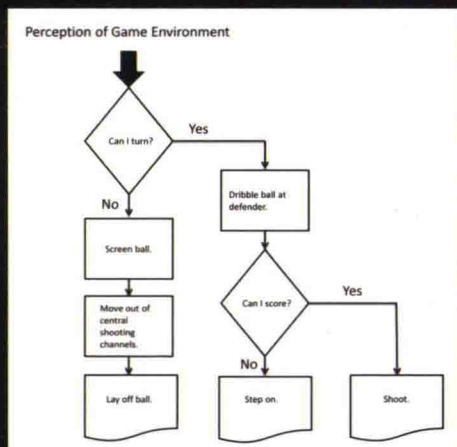
SUCCESSFUL COACHING
THROUGH MATCH ANALYSIS



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Match analysis in soccer has become more and more important in recent years. Nowadays, no professional soccer club plays a single match without having analyzed their own and their opponents' matches to find the best possible match plan and maximize their success.

In this book, Ian M. Franks and Mike Hughes explore soccer analyses and use the results to develop realistic, progressive practices to improve the performance of the individual players and the team.

Research from human decision making and motor skill acquisition is directly applied to the coaching process and technical and tactical practices are designed to accommodate these findings.

Not only is the players' behavior during practice and matches analyzed but the coaches' as well. This helps evaluate different coaching practices to find your ideal coaching style. Any coach reading this book will find help in developing and improving their coaching.

Anyone who wishes to delve more into the science of soccer analysis will find ample material as well as a comprehensive bibliography to better understand the science of soccer!

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Soccer Analytics

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DEDICATION

This book is dedicated to Emilly, Brynn, Hayden, Kieran, Siena and Sebastian who are all well on their way to completing 10,000 hours of active yet enjoyable deliberate play and practice.

ABOUT THE BOOK

This book explores the analysis of soccer and uses the results of this analysis to develop realistic and progressive practices that will improve the performance of both the player and the team. An historical perspective of past research is maintained when describing the logical and systematic methods used to notate the game. Analysis of the coaching practice itself is also considered whereby the behaviours of the coach are scrutinized and evaluated. Research from human decision making and motor skill acquisition is directly applied to the coaching process and therefore technical and tactical practices are designed to accommodate these findings. It is expected that this book will provide the reader with an understanding of how to develop their own coaching practice and improve their coaching style with the aid of match analysis. A comprehensive bibliography is provided for students of the game who wish to delve further into the science of soccer analysis and soccer skill acquisition.

This book is intended to be informative for all levels of coaches, from the recreational novice who has the responsibility to develop young players to the experienced coach of senior players. Part 1 provides a window into the notional analysis of soccer. It logically explains how one might develop a system of analysis and then gives a brief summary of the results from analysis. Special attention is paid to the studies that have provided information on set pieces and crosses. Part 2 illustrates how decision making is a critical process in soccer and provides a unique method of using this to advantage when coaching. For example, defending is broken down into a series of decisions all players on the team should be involved in no matter what their position. In part 3 we emphasize the need to have progressive realistic practices that maximize transfer of training from the practice field to the match. Several examples of functional training are given along with progressive practices that move from an isolated technique in a specific area of the pitch to a full phase of match play. In addition, combined attacking techniques are coached in realistic situation-specific practices and then they are progressed back into small-sided games. Part 4 provides the coach of developing young players with a brief summary of research findings and recommendations into the acquisition of motor skills as

they pertain to teaching and coaching soccer skills. Then practices that adhere to these recommendations are described for several techniques. In part 5 we briefly introduce some guidelines for warming up players before training and games. Several practices are then described that could be used to begin the coaching session with an emphasis on game-related activity. This section also describes several fun conditioning games that can be used to end the coaching session. Part 6 defines the entire coaching process and illustrates how match analysis fits into the overall scheme of this process. Furthermore this section gives the coach some guidelines as to the preparation, organization and execution of a successful practice session. Within this framework of the coaching practice we emphasize the need for coaches to engage in self-reflective practice. Coaches must gather feedback on their own coaching behaviours in order to improve the delivery of information they provide players. In order to maintain an easy reading experience for the coach we have chosen not to follow the regular convention of citing references within the body of the text. However, in part 7, we do provide an extended bibliography of classic studies and recent research that directly relate to research used in writing this text. This section will aid the student of soccer to begin a more rigorous and detailed investigation into various aspects of soccer analysis and soccer skill acquisition.

ABOUT THE AUTHORS

Ian Franks, PhD, gained his full English Football Association Coaching Award in 1975. He was intricately involved in developing the Canadian Soccer Association's Coaching Program in the early 1980s and was head coach at the Olympic Soccer Training Centre at the University of British Columbia from 1980 until 1983. Professor Franks then took a position as director of the Centre for Sport Analysis at the University of British Columbia and conducted research into the computer analysis of international soccer matches. Since joining the faculty of the School of Kinesiology at UBC, he has published over 150 research articles, 22 book chapters and 5 books in the areas of sport analysis, skill acquisition and movement control. Professor Franks is also a Fellow of Canadian Society for Psychomotor Learning and Sport Psychology as well as the National Academy of Kinesiology.

Mike Hughes, PhD, is an emeritus professor of sport and exercise science at the Cardiff Metropolitan University and has conducted research into match analysis for over 30 years. He has worked with National Sports Great Britain teams as a notational analyst in squash, hockey, soccer and badminton. He has published over 160 research articles, written and contributed to 24 books and organized 18 international conferences on sport analysis. His areas of expertise include modeling, sport system perturbations, tactical and technical game analyses as well as individual movement analysis. Recent research includes work on performance indicators in soccer, racket sports, basketball, cricket, women's squash and statistical techniques in the analysis of soccer. Professor Hughes is the founder and current president of the International Society of Analysis of Sport (ISPAS) as well as being the founding editor of the International Journal of Performance Analysis of Sport. Professor Hughes is a BASES (British Association of Sport and Exercise Sciences) accredited sport and exercise scientist and a Fellow of the Royal Statistical Society.



PART 1

MATCH ANALYSIS

CHAPTER 1

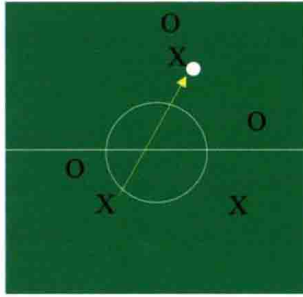
INTRODUCTION

Spectators of a soccer game want to be entertained while observers search for critical information. Needless to say, we all would like to be entertained, but for the coach, watching a soccer game is hard work. Observing playing behaviour is one of the most important tasks a coach has to accomplish, and early research into the process of behavioural observation revealed some interesting findings in the field of social psychology that are relevant when examining the observational skills of soccer coaches. Darren Newtonson found that adult observers used breakpoints in action sequences to organize behavioural units of ongoing events for later recall. These units then became units of comprehension and memory. For example, breakpoints in soccer game action for the observer coach could be something as simple as a change in ball possession and each component of memory could be one possession. Unfortunately, due to the length of the game and the myriad of other factors that affect memory recall, most of what the soccer coach observes and remembers about the game is not accurate. This is not surprising since a lot of events (e.g. breakpoints, changes in possession and critical incidents) take place in a 90-minute game. Research findings from our own lab at UBC have shown that at most levels of coaching, from novice to international, observations by coaches are in

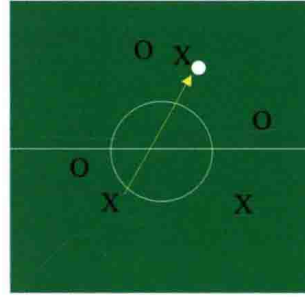
error by more than 50% when trying to recall such things as how goals were scored and how shooting opportunities were created.

How then can coaches improve their ability to remember key events during a game? We know that skilled observers develop a specialized set of predictive features and adopt certain monitoring priorities. Therefore the soccer coach must understand key factors in expected performance and have a clear vision of what that expected performance should look like. In order to provide an accurate recall of all game events it would obviously require a considerable amount of practice in observing playing behaviours. However an alternate method of maintaining an accurate account of a 90-minute soccer match is to use a memory aid. This could be as simple as a pencil and paper checklist or as complex as an interactive computer-video analysis system. The level of sophistication of the system is not important; the key elements of any system of analysis are accuracy, relevance and usefulness of information that is collected by the system. For instance, a video recorder can collect and store most of the information from a game, but the game still needs to be analyzed in a manner that can assist the coach in making decisions. The statistical accumulation of such things as number of possessions and number of passes is not informative if the coach requires the information to assess team or individual performance and make preparation for the next game. By way of example let us examine a simple forward pass. Diagram 1 illustrates a pass that is identical in all aspects except the position of one defending player (diagram 1a) or in its location on the field (diagram 1b). In diagram 1a the pass in case 2 is more penetrative and offers more of an attacking threat than does the pass in case 1. Also if we move the position of the pass from the middle of the field to the top of the penalty area as shown in diagram 1b, it is obvious that the pass in case 2 would be considered much more difficult to execute than the pass in case 1 and should eventually lead to a shot on goal.

Context: position of opposing players



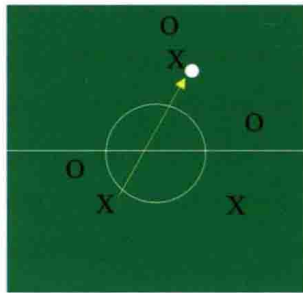
Case 1



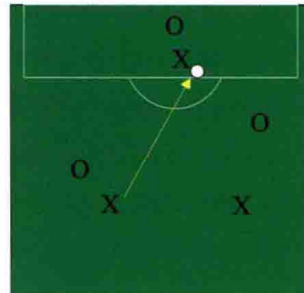
Case 2

Diagram 1a

Context: position on field



Case 1



Case 2

Diagram 1b

Collecting only the number of completed passes without taking into consideration the context in which they were made reduces the richness and informative nature of the data. Therefore, it is important to understand what opportunities these passes and possessions create. Hence the sequential nature (i.e. what leads to what) of data capture then

becomes a critical feature in any analysis system. However if this were to be achieved by simply video recording the game without any systematic analysis system to guide the viewing then many of the problems encountered on an initial live viewing of the event may still exist.

How then can a team's performance be analyzed in a systematic and progressive manner? During an average soccer game each team has possession of the ball approximately 200 times, and since the objective of the game is to score goals, these 200 possessions could possibly translate into 200 goals. Not a very likely occurrence given that league champions usually average only 2 or 3 goals per game. The remarkable fact is that about 99% of all team possessions end up being lost to the opposing team without a goal being scored. Analyzing a soccer game is therefore a process of recording how, where and why the team lost and regained possession. A detailed analysis of these lost possessions should provide the coach with an overall view of the key factors that were responsible for both good and bad team performance.

Let us take a brief look at these lost possessions. Each possession is lost in a particular area of the field and each loss can be attributed to a particular action. It is obvious that goals can only be scored from certain areas of the field, let's say within 40 meters of the goal (we realize that there have been exceptions but these account for a very small percentage of all shots). Therefore, the task for the attacking team is to move the ball into an area of the field from which shots on goal can be taken. Team possessions that are lost in these areas would satisfy a large part of the final objective, which is to produce a shot on target that results in a goal, whereas a sub-objective would be to create the shooting opportunity. If possession of the ball is continuously lost in these shooting areas and shooting opportunities do not arise, the problem for the coach is less formidable than if ball possession is lost in areas other than the shooting area. Using this simple logic we can now identify priorities for possession loss as: first, lose possession in scoring a goal (usually 1% per game for winning teams); second, lose possession in taking a shot at goal (10% per game for winning teams); third, lose possession after creating a shooting opportunity (20% per game); and fourth, lose possession in and around the shooting area (40% per game). As you can see, we are now developing a method for systematically observing the game.

Collecting and categorizing information about how the team lost and gained possession can cover all the attacking and defending events the game has to offer. If we just recorded numbers and totals of discrete events this would provide interesting statistics for spectators and TV viewers, but the observing coach wants to know more. For example, what events led to the shot that missed the target, the lost possession in the defending third of the field or the free kick outside the penalty area? This type of information can only be gathered if a sequential history or story of the game is recorded that allows us to ask "What led to what?" Over the past 30 years notational analysis researchers have developed computer analysis systems that record the sequence of game events; these are then time locked to the video recording. Some systems automate the process such that the camera recognizes the image of all players, the ball and the officials every second of the game. Because of these systems some coaches can now view the statistics (as either numbers or graphs) after the game (or at half time) and then recall video excerpts of key events in the game. This then becomes a very powerful and useful coaching tool and provides important visual feedback for players. In addition to being an excellent coaching tool these notation systems have allowed researchers to collect data from many major soccer competitions to form a large database of information that may provide answers to several questions such as:

- ⚽ How are goals scored, and what leads to the creation of shooting opportunities?
- ⚽ What type of defensive tactic yields most regained possessions?
- ⚽ What are the technical demands of performance?

Let us look in a little more detail at some of the tentative answers to these questions that have been gleaned from soccer match analysis research over more than 60 years.

HOW ARE GOALS SCORED?

It appears that after reviewing a considerable amount of data from past games, the approach play that led to goals was not significantly different than the approach play that led to shots that did not result in goals. Goals were thought to occur randomly from a population of all shots. These facts were uncovered in one of the earliest examples of