

The Weighted Expert System for the Evaluation of Actual Quality of Top-level Soccer Players

¹ 3rd Comprehensive Grammar Secondary School, Zagreb, Croatia

² Faculty of Kinesiology, University of Zagreb, Croatia

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Abstract

Due to the high complexity of the game of soccer match, official match statistics as well as physiological and performance parameters are insufficient to provide information for a comprehensive evaluation of the actual quality of soccer players. In the present study, a new criterion system is proposed for the expert evaluation of actual quality of soccer players in both phases of the game. The proposed criterion system consists of 19 criteria for the evaluation of player's actual quality - 7 for play in the phase of defense and 12 for play in the phase of possession (attack). Six soccer experts assessed relative importance of each criterion for particular outfield playing positions (i.e., central defenders, full-backs, midfielders, and attackers) with a high degree of objectivity (objectivity coefficients ranging from 0.89 to 0.97). The proposed criterion system, aimed at the subjective evaluation of actual quality of top-level soccer players, could be a useful tool for coaches and sport managers in selection and profiling of young soccer players, as well as in management of elite soccer teams.

Key words: **performance, subjective evaluation, expert system**

Introduction

Successful performance in top-level soccer depends on a myriad of factors, including physical, physiological, psycho-social, and technical-tactical factors (Bangsbo, 1994). Most previous studies on soccer were focused on physical and physiological characteristics of players (for a review, see Stollen, Chamari, Castagna, & Wisloff, 2005). In contrast, studies that evaluate soccer performance from the perspective of technical-tactical skills and knowledge are lacking. This is surprising, given that technical-tactical skills represent key elements of player's actual quality and his/her competitive performance (Reilly, Bangsbo, & Franks, 2000). As a consequence, knowledge about evidence-based selection and profiling in soccer is mainly related to the players' physical fitness and their game statistics (Mujika, Santisteban, Impellizzeri, & Castagna 2009; Reilly, et al., 2000; Stroyer, Hansen, & Klausen, 2004; Vaeyens, Malina, Janssens, Van Renterghem, Vrijens, & Phillippaerts, 2006). Hence, there is an evident need for creating an unbiased, as much as possible objective, scientifically-based system for the evaluation of actual quality of soccer players that integrates technical-tactical and psychosocial factors.

In a series of studies completed, some of the present authors have participated in the process of developing and evaluating the criteria systems for the evaluation of actual

quality of athletes in team sports games (Trninić, Perica, & Dizdar, 1999; Trninić & Dizdar, 2000; Hraste, Dizdar, & Trninić, 2008). However, to our best knowledge, no such attempts have been made in soccer. Hence, the aim of this study was to develop a criterion system for the expert evaluation of actual quality of soccer players, and to determine importance coefficients of every particular criterion for each playing position in top-level soccer.

Methods

Set of criteria for the evaluation of actual quality of top-level soccer players

The most pronounced characteristic of association football or soccer is a constant quick ball possession interchange, consequently, a quick switch of play in either defense or attack. For many reasons it is indispensable to discern clearly between quality of play in the phase of defense and in the phase of attack. Thus, 7 criteria for the evaluation of actual quality of play in defense and 12 criteria for the evaluation of actual quality of play in attack have been designed (Table 1). It should be noted here that these criteria are generalized to make them valid as regards particular playing positions' specific requirements (e.g., playing full-back or side midfielder position requires position specialization, that is, it is not the same whether a player is playing side-

lane position in the rear, defensive third or in the mid third of the field of play) and tactical variations (to be adequate to both systems with either two or three backs in the mid-lane of the back defensive line). Apart from the abovementioned differences, many others can also occur in the playing position arrangements of midfielders and in the number of attackers, but they are considered just nuances that do not attenuate the value of the entire criterion system.

Table 1. Set of criteria for the evaluation of actual quality of top-level soccer players.

CRITERIA FOR THE EVALUATION OF ACTUAL QUALITY OF SOCCER PLAYERS	
ACTUAL QUALITY OF PLAY IN DEFENSE	ACTUAL QUALITY OF PLAY IN ATTACK
Applying pressure on-ball	Ball control
Tackling	Dribbling
Clearance and interception	Play with the fewest touches possible
Duels in the air	Long passing
Positioning in a zone	Crossing the ball
Taking over and help	Heading
Positioning after the possession lost	Visual control over playfield and creativity
	Shots on target
	Play with the inferior leg
	Finishing effectiveness
	Cooperativeness
	Play off-ball

Set of the criteria for the evaluation of actual player's quality in the phase of defense

1. Applying pressure on-ball — ability to aggressively hinder any action of the opposing player with the ball. It consists of a correct positioning of the defending player on an imaginary straight-line connecting the centre of his/her goal and the position of the ball, and of constant attacking the possession, thus forcing the direct attacker with the ball to move towards less dangerous field zones (towards the side lines), or to encourage a backward pass, unprepared shot, crossing, or forced inaccurate long pass.

2. Tackling — a skill, ability to break the opponent's attacking activities:

- By performing a basic standing tackle — it is an efficacious defensive action during which a defender runs in front of the attacker a fragment of a second prior to or in the moment of his/her opponent receiving

the ball, that is, before his/her first touch with the ball. Players who frequently use this defensive tactic create constant pressure on the attackers, thus slowing down or breaking up their continuous attempts to attack. This technique should be used only when a defender is sure in successful outcome of the action, that is, in gaining possession; otherwise, he/she will be outplayed and defensive formation will be overwhelmed (the technique is most often utilized by the players from the back defensive line), and the opponent will get an open scoring chance.

- By regaining ball possession — a defensive action usually undertaken when the ball-handler tries to employ any individual technique to free himself/herself from his/her guard. His/her defensive counterpart, by playing with controlled aggressiveness (fair charges), employs every defensive technical-tactical element to tackle the ball no matter in which position he/she is in relation to the attacker, that is, either if he/she is in front of the attacker, beside him/her, or behind the opposing player.

3. Clearance and interception — a skill, ability of a player to kick the ball far away from the danger area or to intercept the attackers' passes in order to slow down the attack of the offensive team, or to break it up. After the ball has been cleared, it may be directed to:

- outside the field boundaries — a defender powerfully kicks the ball away by which he/she manages to "steal" a few seconds, needed for a throw-in or corner performance, thus enabling his/her teammates to assume a proper defending formation;
- deep into the field — a defender powerfully kicks the ball away as far as possible in order to clear, break up a dangerous scoring opportunity in front of his/her goal after he/she has estimated there has been no time for a technically sophisticated performance;
- into the field to a teammate — the most efficacious way of clearing with which not only a defending player stops the rivals' attack, but he/she enables a quick transition into a fastbreak, that is, into a counterattack in the situation of numerical advantage over the defenders who have to struggle hard to fill in defensive lines.
- Interception of the opponent's passes is a special case of clearing the dangerous scoring situations. Effective performance of interceptions is a result of good ability to "read the game". A defender anticipates which communication channel the attacker with the ball will use in a precise moment and covers the lane immediately prior to or in the moment of a pass being performed.

4. Duels in the air — a skill, ability of a player to intervene on time on the air ball whether it is coming from either sides or from the central lanes of the playfield. These are usually long passes, meaning that the ball covers a certain distance while flying, therefore, this skill depends directly on

following abilities of a player: visual perception of the ball flight trajectory, accurate estimation of its velocity, ability to fight for space and to secure the area of the supposed ball landing, and on a good skill of heading or receiving the ball before it touches the ground. Quality of play in duels in the air is manifested in the following activities:

- taking space for the ball reception and play, as well as impeding the attacker in his/her attempts to receive and pass the oncoming ball;
- fair charge against the opponent (body, shoulders) presents an opportunity for successful interference with the opponents attacking actions;
- good clearance technique with the head or foot, meaning, the ball should be hit away to the least dangerous area of the playfield, that is, to the side lines, deep into the field, or out the playfield.

5. Positioning in a zone — a skill and ability of a player manifested as consistency in keeping the distance among teammates playing in the same line-up. When a team plays with three or four players in the back defensive line, it is of utmost importance that they maintain proper distance among themselves throughout the game to secure the strong side (area where the ball is), but such an arrangement of players allow also a quick transformation, switch of the defensive zone from one end or side of the playfield to the other, depending on the position of the ball and ball-handler, other attackers and other teammates. This skill is most pronounced in the offside trap setting, when the entire defensive line should move forward, thus reducing play space for the offensive team. The most important detail in this tactical shift is the inter-player distance maintenance, which requires high concentration of players, good teamwork, good communication, and commitment of players to respect style of play, assigned tasks and duties. In instances of unfavourable space interrelations (if one player lags behind), a scoring chance for the opposing team may occur. Positioning in the defensive formation of all the players in a lineup is manifested in the following activities:

- marking, covering certain part of the playfield with regard to the position of the ball;
- marking the direct ball-handler and quick returning to one's own position in the defensive formation;
- help to his/her teammates by closing space, slots behind their backs.

6. Taking over and help — a skill, ability of a defender to take over the opposing attacker on time. Namely, in the zone defense the defenders guard certain playfield area and mark players who enter that space. On the attackers' penetration through the defensive zone, these space interrelations among defenders change indispensably to adjust to the moves of the attackers. This defensive adaptation requires maximally coordinated reaction of the entire defensive line. Their aim is to minimize time during which attackers are not closely marked, especially the ball-handler, by any of the defenders. The success in taking over

and helping depends not only on abilities, skills and commitment of individual players, but also to a great deal on teamwork and team cohesion, and even also on qualities of attackers, especially the ball-handlers:

- taking over the responsibility for the ball-handler – aggressive but fair charge against the attacker who has managed to pass by his/her primary guard by employing dribbling or using his/her teammates (the second or the third attacker). That is the way of averting the direct scoring danger from one's goal. The defender who is taking over the responsibility for the ball-handler must perform it on time by positioning himself/herself precisely between the attacker and own goal;
- taking over an attacker without the ball – the defender should approach to the attacker and follow his/her moving in the area of the defender's responsibility. This manoeuvre, like the previously described one, must also be performed precisely to maintain distance among the teammates. Taking over an attacker without the ball is connected with the task of the defender to return to his/her position in the defensive formation (after helping on ball). Namely, attackers frequently charge against the set defensive lines (from one side of the playfield to the other), especially using slots between defenders, with the aim to break up the defensive zone and open space for a pass (through ball) or cut-in behind the defense. Therefore, the attackers on weak side must also be watched and any attempt to penetrate defense must be impeded in the beginning.

7. Positioning after the possession lost — ability of a player to assume defensive role and his/her quick positioning in the defensive formation upon the very moment of the ball possession conversion. The team that has lost possession is in the distinctive unfavourable situation, mainly due to the position, arrangement of its players on the playfield who were building their attack just a tenth of a second ago. This particularly regards the back defensive line players who may be far away from their usual playing positions in the defensive formation, especially if they have gone forward to join their team's attacking actions in the attacking third. The players who are in the moment of possession conversion in front of the ball must promptly make a decision how to react and move quickly to assume a new position with regard to the ball, their rivals and teammates. That means a player positions himself/herself on the nearest defending position, no matter whether it is an area he/she usually covers in the defensive formation or not, and performs every defensive action needed, that is, any action he/she considers to be most effective at the moment. A special case describing this quality feature is when the goalkeeper has left his/her usual position in front of his/her goal posts, outside 5-meter box, or even outside penalty box. Then the nearest teammate, usually one of the defensive players, should substitute his/her goalie and cover his/her playing position within the goal posts (however, he or she would not be allowed to play with his/her hands).

Set of the criteria for the evaluation of player's actual quality in the offensive game phase

1. Ball control — a skill of a player to control the ball and direct it to the communication channels optimal to the attack development. It is manifested in efficacious covering of various distances while simultaneously advancing the ball and controlling it in the possession in duels with the opponents (positioning between the ball and the opponent – protective positioning), the skills extremely important in the transition from defense to attack and in the ball possession regaining and clearing the own defensive third. The skill is manifested in good performance of short and medium (up to 20 m) balls receiving and passing. Receiving technique regards stopping the ball with any part of the foot, knee, chest or head. Quality reception of the ball implies a receiver takes only one touch to assume control over it; it would be ideally if that one touch is also the first touch of advancing or passing the ball. Passing technique over short (up to 10 m) and medium (10-20 m) distances implies ball passes performed with all foot parts and headers. Good pass performance is characterized by high accuracy, optimal ball rotation and its optimal speed, all of which should facilitate the ball reception.

2. Dribbling — a skill of an offensive player to outplay his/her direct defender in one-on-one play as to create time and space advantage over him/her. There are two basic types of dribbling:

- dribbling with the face to the goal — a player receives the ball facing the opponent's goal, or he/she has enough time to turn around prior or upon the ball reception, which enables him/her success against his/her direct defender. This dribbling is performed in most zones of the playfield since such match situations do not usually occur in the scoring critical zone, that is, outside the core of the defensive third;
- dribbling with the back to the goal — a player receives the ball with his/her back to the opponent's goal, most often in the finishing or scoring critical zone (in vicinity or inside the penalty area). Successful dribbling performance creates open finishing opportunity. Such a dribbling is typically performed within tight area and very quickly because of a high concentration of defenders in the heart of defense.

3. Play with the fewest touches possible — a skill, ability characterized by a quick reaction of a player when receiving and passing the ball. It is manifested as the minimum touches with the ball — the ideal would be one touch play. Two touch passes (receiving and then passing the ball) and first touch passes enable quick switch of strong sides, that is, a quick transition of the centre of play (the ball) from one end or side of the field to the other, which creates preconditions for quality and, probably, successful attack since the defensive counterparts have not managed to adapt to the new match situation. This presents an opportunity to penetrate the closest scoring zone by a quality pass

to an open teammate or by an individual skill (dribbling, ball advancing and shooting). The skill to control the ball with minimum touches is very important in vertical movements of the ball (through balls passed up and down the playfield). Skillful ball-handlers are able to transfer the ball in a very short time from their penalty area to the opponent's scoring critical zone and create a scoring opportunity.

4. Long passing — a skill to perform good passes to a teammate over the distances greater than 20 metres. Depending on the arrangement of the players on the playfield, long passes may be ground or air passes (pass to space, through ball). Quality of a long pass is manifested in the following: accuracy, softness (right speed and ball rotation to facilitate the teammate's reception), part of the foot with which a pass is performed (trajectory and rotation of the ball depends on it), and perception of the gross movements of teammates and rivals when passing through ball on space. This criterion does not embrace the skill of crossing (a separate criterion).

5. Crossing — a skill to perform, most often long and diagonal or square (meaning, crosses are usually performed from the side lane positions) passes into the box in order to create scoring opportunity for teammates from the first touch. A cross is a special type of long passes which is, as a rule, performed with the inside of the foot thus providing the ball with the powerful rotation and desirable trajectory. Only exceptionally this kick is performed with the other part of the foot. A quality cross is characterized by the aforementioned parameters of quality long passes. Generally, there are two types of crosses:

- a cross bent round away from the goal — is performed from a side lane position with the inside of the foot. The kick is powerful and the ball has a fast rotation which kinetic energy a teammate can utilize to enhance his/her shot force. The ball trajectory is bent away from the goal, so the possibility for goalkeeper's interception is thus reduced;
- a cross bent round to the goal — is performed with the inside of the foot from various positions in the final third. The ball has a fast rotation, but this time it is bent toward the goal. This is a very scoring promising, that is, dangerous cross because the slightest touch or flick, or attempt of these, from any player will be enough to direct the ball onto the target.

6. Heading — a skill, ability of control play, that is, ball handling with the head, either if it regards powerful and accurate hits (shots on target), or just accuracy of passing (passes to teammates). Quality heading is characterized by the following:

- shot accuracy — a skill to perform a shot on target, either from the ground or air, from a duel or without a contact with the rival player;
- pass accuracy — a skill to perform a pass to a teammate from a duel or with no contact with the opposing player; these passes are usually backward passes (back passes) in the penalty area of the final third;

- flick — a skill to switch the ball behind one's back or sideways, most often after a long cross or pass.

All the listed characteristics can be most easily recognized in a move of grounding the ball on the pass or shot on target performance. Namely, the most usable header is the one played low on the teammate's foot, as is a header on target most efficient if it is low.

7. Visual control over the playfield and creativity — ability manifested in good perception of the positioning of players of both teams on the playfield and in capitalizing on the observed momentary arrangement of players by the performance of the most efficient action. The players with the pronounced combination of these abilities are capable, at any moment of a match, to perform an unexpected pass or individual skill (shot or dribbling) with which they usually manage to outplay the counterparts and create favourable scoring opportunity, either for themselves or their teammates. Quality perception and visual control over the playfield allows a player to see which teammate of his/her is in the best scoring position or which defender is poorly positioned so he/she would be able to switch the play quickly to the spotted area. Under the term "creativity" the ability of a player is understood to cover a great distance of the playfield or to open space to himself/herself or to his/her teammate for a finish by an unexpected move (passing, shooting, dribbling).

8. Shots on target — a skill to perform effectively when taking a shot at the goal. In this actual quality component one should differentiate between two basic types of foot shots:

- Drive / Powerful kick — a shot hit performed with the centre of the instep; it is characterized by a straight or swaying flight trajectory and a high speed of the ball. Most often it is used for goal kicks taken from the positions outside the penalty box. The kick performance technique depends on the zone of the playfield from where the shot is taken and on the match situation. It can be utilized under various tactical conditions: from the individual ball advancing, by kicking the backward ball, a kick upon the forward pass received, volley kick and when kicking the stationary ball (free kick).
- Placed shot — is most frequently used for free kicks' performance from the distance of about 25 metres, but it may also be used as a shot hit out of ball advancing. The technique is characterized by a high rotation, a somewhat lower speed and accurate placement of the ball at any of the four goal corners' squares with 1m long sides. Inside of the foot is the most frequent kicking part of the body; only exceptionally it may be executed with the outside of the foot also. The basic difference between the powerful and placed shot on target is in the ball trajectory shape — shape of the trajectory of the placed ball, kicked either by the inside or outside of the foot, is arch-like. Such a shape ensures avoiding obstacles, like wall on free kick performance.

9. Play with the inferior leg — ability to perform technical elements efficiently with the non-preferred leg. Persons are born with side preference in motor performance, but that innate feature can limited quality enough development of soccer players. Trained ambidexterity, that is, quality enough performance of soccer technique with both legs enables a player to resolve match situations on both sides of his/her body, giving him/her a huge advantage over defenders.

10. Finishing effectiveness — a skill, ability to realize, capitalize on scoring opportunities. It can be described by a ratio between the number of scoring opportunities and the number of goals scored. Finishing effectiveness unifies all elements of technique and tactics as well as theoretical knowledge which can be useful in achieving the supreme aim of the game of soccer — scoring. This skill is most easily monitored since goals are counted in soccer; it is the most important item in the game statistics. Which kicking or hitting technique would be optimal? It depends on numerous factors, but immediate one is the way in which the attack has been prepared, that is, the selection of kicking technique depends on whether it should be performed after:

- a cross from either side lanes;
- a through ball received which has come through a slot into space between the back defensive line and the goalkeeper;
- individual penetration and dribbling past one or several opponents;
- short and quick passes through the middle of the defensive formation;
- the ball reception with one's back to the goal;
- low or ground back ball from the side lane positions;
- a distance shot opportunity created (outside the penalty area);
- set pieces (free kicks, corners, side throw-ins).

The high standard attackers, mostly centre forwards, should be quick in their reactions in the instances of one-on-one with the opposing goalkeeper. These match situations are the so called 100% scoring opportunities, but they occur rarely, therefore, no failure is acceptable.

11. Cooperativeness — ability and commitment to co-work with teammates. Cooperation is super-positioned to individual actions. It is a distinctly appreciated ability in the phases of the attack opening and transition (fastbreak and counter-attack) when the ball should be as soon as possible removed from the own goal danger zone and the own attack should be started. Ability to cooperate with teammates is manifested in unselfishness even in the penalty area actions like:

- a double pass or back ball;
- a pass to a teammate in a better scoring position.

Optimal cooperation among teammates is frequently a crucial deciding factor on winning and losing. The final outcome will not be decided by the mathematical sum of individual qualities or individual performance, but by their

synergy effect, that is, by common efforts that pump their power from their collectiveness. The difference in synergy power is the difference in winning and losing.

12. Play off-ball — a skill of using motion lanes in order to draw away the opposing players' attention (e.g. decoy running); the aim is to open or take space. It is manifested in the following:

- short, quick ambulatory movements the aim of which is area taking and opening for the ball reception;
- space opening for teammates by employing outrunning and drawing the defender away from the part of the playfield which is a target of attack penetration; it is emphasized in a fast break;
- slots perception for through balls or balls to space and timely stepping into the area behind the defenders.

A special case of this skill is letting the ball pass through to the trailer who is coming after the attacker. If timing on letting-through-ball is good, then the entire defensive formation is decoyed and it does not have enough time to respond by closing slots and approaches to its goal. Thus, a very good scoring chance is created. This skill is closely related to cooperativeness and good teamwork. Every purposeful letting the ball through occur when the actual receiver is quite prepared to receiving it properly and securely. At such a moment the first player changes quickly either the direction or speed of his/her movement, or both, and lets the ball through to his/her teammate, who is in a better scoring position. So, optimal cooperation of two teammates is a basic precondition for this instance of off-ball play to be efficacious. Initiative and commitment to participate in any action of his/her team is the main characteristic of a good off-ball player.

Playing positions in contemporary soccer

The basic difference between soccer and other team sports is that soccer players in different lines of a line-up do not have the same roles nor importance in play when in possession (in attack) of the ball and without it (in defense). Players from the back defensive line rarely participate in finishing, closing parts of their team's attacking actions - similarly as strikers or forwards do find themselves in front of their own goal hardly ever. As a result of position-specific demands, primarily due to the rather large dimensions of the playing field, the following player specializations have become common over the decades of soccer development:

- Central defenders
- Full backs
- Midfielders
- Attackers

Players specialized to play in a particular formation line differentiate among themselves by their aerobic characteristics (Santos & Soares, 1998) and intermittent endurance (Oliveira, et al., 1998). The differences have been docu-

mented also in players' anthropometric characteristics, anaerobic capacities and muscular force (Reilly, Bangsbo, & Franks, 2000). The aforementioned classification facilitates quality monitoring during the development of young soccer players as well as training programs for all age and quality categories of soccer players. The expert judges, who participated in the current research, were familiarized with the classification prior to their evaluation of how much was each criterion important to the delineation of actual quality of soccer players.

Data collection and data processing methods

A group of six Croatian top-level soccer coaches (or managers) participated in the research. Each of them met at least one of the following three preconditions:

- a first coach (manager) of the national championship winner club;
- a selector or a coach of the Croatian national team participating in the final tournament of the European Championships;
- a selector or a coach of the Croatian national team participating in the final tournament of the World Championships (FIFA World Cup).

Every soccer expert assessed relative importance of each criterion by using pairwise comparison for every type of soccer player (any particular criterion has been compared to every other one; for example, if the criterion "A" was thought to be twice as much important as the criterion "B", then the criterion "A" was attributed in the comparison matrix of pairwise comparisons, in the place AB with the value 2, and in the place BA with the value 1/2, etc.). In this way each soccer expert produced reciprocal square matrix of grades for every type of four soccer players, out of which one vector of importance coefficients was computed by the Geometric Mean Method (vectors of arithmetic means and standard deviations) also for each type of player. The result was 4 vectors for defense and 4 vectors for attack which were then rescaled to obtain the sum that equalled one. The Cronbach's coefficient (α) was used to assess the reliability (objectivity) level of the established importance coefficients.

Results

In Table 2, very high values of the objectivity coefficients can be seen for fullbacks (0.965), central defenders (0.964) and attackers (0.931), whereas values of the same coefficients for midfielders are somewhat lower but still high (0.890). Hence, the conclusion is viable that the criteria are applicable to all types of soccer players. A somewhat lower inter-judges agreement values were expected in relation to the actual quality criteria importance for the players who primarily play the midfield positions, due to the most complex nature of these playing positions.

Table 2. Means (Mean) and standard deviations (SD) of importance coefficients attributed to the criteria for the evaluation of actual quality of soccer players in defense, Cronbach's objectivity coefficient (α) and importance ratio of the defensive criteria to the attacking criteria (D/A)

Criterion	Central defenders		Full backs		Midfielders		Attackers	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Applying pressure on-ball	0.104	0.042	0.105	0.017	0.092	0.016	0.035	0.014
Tackling	0.137	0.063	0.111	0.027	0.075	0.016	0.023	0.008
Clearance and interception	0.140	0.013	0.104	0.026	0.059	0.015	0.027	0.011
Duels in the air	0.122	0.042	0.055	0.013	0.041	0.009	0.035	0.019
Positioning in a zone	0.115	0.040	0.087	0.019	0.077	0.022	0.027	0.004
Taking over and help	0.113	0.021	0.089	0.018	0.072	0.013	0.026	0.009
Positioning after the possession lost	0.119	0.043	0.098	0.023	0.076	0.012	0.027	0.006
α	0.964		0.965		0.890		0.931	
D/A	0.85/0.15		0.65/0.35		0.49/0.51		0.20/0.80	

19 In contemporary soccer, midfield players cover the greatest area of the field of play, constantly participating in play either in defense or in attack (Barros, et al., 2007; Di Salvo, et al., 2007). Besides, the experts suggested further differentiation of midfielders into: defensive midfielders, side midfielders, forward (offensive) midfielders and classical midfielders. Therefore, the level of inter-judges agreement was expectedly lower with these player types. The obtained results indicate the need for further research based on the proposed additional classification of midfield players.

Discussion and conclusions

Based on the determined importance coefficients attributed to the criteria for the evaluation of actual quality of soccer players in defense (Table 2) it is viable to describe particular types of soccer players as follows:

- **Central defenders.** The role of central defenders is almost entirely defensive, which is in accord with the obtained importance coefficients of the criteria for the evaluation of play in defense (0.85) as opposed to the ones evaluating play in attack (0.15). The most important actual quality evaluation criterion for central defenders is *clearance and interception*, followed by *tackling*. The experts evaluated the marked criteria as the most important probably due to the fact that the primary task of central defenders is to impede forward attackers, and the most efficient way to do so is in the moment of the ball reception, that is, until the receiver has not gained complete control over the ball and space (clearance and basic tackling), or even before the attacker even receives the ball (passes intercepted). A high level of tactical skills and theoretical knowledge is extremely important for the players playing in the back defensive line because the described tactical tools are very effective, but they are also very risky if

not performed properly, leaving no space for mistake in estimation and anticipation. Next in the importance ranking is the criterion *duels in the air*, because central defenders have the responsibility to clear crosses and all air balls from their penalty area due to their central position in the defensive formation.

- **Full backs.** Importance coefficient for the criteria evaluating actual quality of their play in defense is considerably higher (0.65) than the one for the criteria evaluating actual quality of their play in attack (0.35), meaning that their primary role in soccer game is defensive actions performance. The most important criteria for these player types are, expectedly, *tackling*, *pressure on-ball* and *clearance and interception*. All three criteria describe defensive tactical tools in instances where the defensive player is facing his/her attacker, which is the most common space relation between full backs and their opponents. Full backs are most frequently in the back defensive line and their task is to prevent the attackers from penetration into the penalty area or from crossing the ball from the sideways position. Since their actions are usually performed outside the penalty area, that is on the positions from which crosses are executed, it is clear why *duels in the air* got the least important criterion grade.
- **Midfielders.** The participating soccer experts evaluated importance of quality of play in defense and in attack as being equal for midfielders (importance ratio of the defensive criteria to the attacking criteria is 0.492, whereas the reverse ratio quotes 0.508). The result was not surprising, due to the most complex playing role of midfielders emerging from them being the bridge between defensive and attacking formations. On defense, they are the first defensive formation. Positioning of midfielders in the defensive formation is not static; on the contrary, that line is extremely elastic on defense. It is each player's responsibility to

apply pressure on his/her direct attacker in the moment of ball possession conversion and when the attacker has the ball. After his/her direct attacker has passed the ball, the defender returns to the defensive formation where he/she assumes the assigned position from which he/she takes over and help on the player's off-ball and covers space under his/her responsibility. Therefore, it was obtained that the most important criterion was *applying pressure on-ball*. If the midfielders are successful on this task, the opponent's attack should slow down because the tunnel or through balls have not been allowed, and the entire attack has been forced to wide or side positions (less dangerous). Second and third by importance are the criteria *positioning in a zone* and *positioning after possession lost*. High values attributed to these criteria confirm importance of zone positioning in the defensive formation, in which every player covers a particular segment of the playfield. Zone defense is the only possible defense in soccer since the game is played on a vast playfield which has to be covered. Cooperation of players in the zone, that is, good timing of their actions and keeping the distance among the players are crucial because the wrong positioning of only one player may result in opening space, creating easy scoring opportunity for the rivals.

- **Attackers.** The basic role of attackers is scoring. It is also the rationale of the sports game of soccer. Therefore, the ratio of 0.8 for the importance of criteria

evaluating actual quality of play in attack to 0.2 for the criteria for play in defense is not surprising at all. However, no player is in contemporary soccer free from defensive tasks. Therefore, according to the evaluation of the expert group, attackers have more important role in defense than the central defenders in the phase of attack. Our experts set *applying pressure on-ball* and quality of play in *duels in the air* as the two most important criteria. Namely, upon possession lost, attackers should immediately transform into the first defensive players whose task is to apply pressure on the ball-handler, thus slowing him/her down, postponing forward passes and slowing down ball flow in general. In that way attackers can buy several seconds for their defenders to set the defensive formation and organize. The second criterion refers to play in the air. This skill is most often manifested after game stoppage when the opposing attackers perform throw-ins, corners or free kicks to the penalty area. Then our attackers serve as defenders who employ their height and skill to win control over a particular area, thus helping their defensive formation in clearing the penalty area.

The results displayed in Table 3 make the description of certain types of soccer players possible due to importance coefficients attributed to the criteria for the evaluation of actual quality of play in the phase of attack:

Table 3. Means (Mean) and standard deviations (SD) of importance coefficients attributed to the criteria for the evaluation of actual quality of soccer players in attack, Cronbach's objectivity coefficient (α) and importance ratio of the attacking criteria to the defensive criteria (D/A)

Criterion	Central defenders		Full backs		Midfielders		Attackers	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Ball control	0.016	0.003	0.033	0.012	0.045	0.012	0.064	0.019
Dribbling	0.006	0.001	0.026	0.006	0.041	0.009	0.074	0.012
Play with the fewest touches possible	0.014	0.004	0.026	0.010	0.038	0.015	0.047	0.013
Long passing	0.017	0.004	0.025	0.010	0.042	0.015	0.036	0.008
Crossing the ball	0.006	0.001	0.050	0.012	0.032	0.011	0.047	0.009
Heading	0.021	0.006	0.019	0.010	0.025	0.008	0.078	0.013
Visual control over playfield and creativity	0.013	0.003	0.029	0.006	0.067	0.017	0.064	0.020
Shots on target	0.014	0.007	0.026	0.011	0.049	0.024	0.088	0.030
Play with the inferior leg	0.009	0.003	0.018	0.009	0.024	0.007	0.046	0.018
Finishing effectiveness	0.009	0.002	0.035	0.016	0.055	0.024	0.115	0.012
Cooperativeness	0.014	0.002	0.035	0.004	0.055	0.012	0.079	0.027
Play off-ball	0.010	0.002	0.029	0.009	0.036	0.008	0.063	0.017
α	0.964		0.965		0.890		0.931	
A/D	0.15/0.85		0.35/0.65		0.51/0.49		0.80/0.20	

- **Central defenders.** If they ever participate in the attacking actions, it is after the stoppage of the game, on free kicks and corners, when they join their teammates in the opponents' penalty area. Therefore, *heading* is expectedly the most important criterion for actual quality evaluation of central defenders' play in attack. The next criteria by importance are technical-tactical tools *ball control* and *long passing*. They frequently deliver balls to midfielders (short passes) or even to forward attackers (long passes, more than 30 m) when the opposing defense plays aggressively and marks the midfielders closely so they are not in a position to receive the ball; in that instance the phase of transition must be omitted to reduce the possibility of losing possession in the middle of the field of play.
- **Full backs.** According to the experts participating in the research, *crossing the ball* is the most important technical-tactical tool for this type of soccer players. In the phase of attack, full backs strive to get to the position most favourable to crossing the ball into the penalty area, thus creating scoring opportunities for teammates. Besides crossing the ball, the criteria *finishing effectiveness*, *cooperativeness* and *ball control* are also important for the evaluation of full backs' play in attack. The criterion of finishing effectiveness got a somewhat surprisingly high value of importance. Namely, full backs participate rarely in the closing parts of attacks or they are seldom in a position to score. The other two highly evaluated criteria are in accordance with the expectations since cooperation with teammates and ball control are important skills for assuming control over the area from which a good cross can be performed. The criteria *play with the inferior leg* and *heading* have been evaluated as the less important for full backs' actual quality of play in attack because they have few opportunities to head the ball on target and they decide seldom to dribble and penetrate to the middle third and middle lane.
- **Midfielders.** *Visual control over playfield and creativity* is the most important criterion according to the evaluation of the group of experts. Namely, the primary role of midfielders is to transfer the ball from their defensive third to the final, attacking third and to deliver it to their attackers. In this transition they must employ all their technical and tactical skills and knowledge in order to detect weak points in the opponents' defensive formation and capitalize on it by directing their attacking actions to the poorly guarded areas. Well trained and set defensive formation is hardly to be outplayed by schematic moves, so creative midfielders, with good visual perception, must perform unexpected moves to create good scoring opportunity. The criteria *finishing effectiveness*, *cooperativeness* and *shots on target* are also important in the evaluation of actual quality of play of midfielders in attack. They frequently enter the offensive third and finish. Therefore, high effectiveness in the closing phases of attack is also important to midfield players, because one

cannot expect too many scoring opportunities in the matches against high standard rivals. Further, these players usually attack from the background, as a second wave, and they frequently have an opportunity to take a shot at the goal from the distances of about 20 metres, which is a decent and promising scoring opportunity. Heading is less important for midfielders as well since they are seldom in a position to finish with a header. Besides, due to their primary roles, they are not very tall.

- **Attackers.** As expected, soccer experts regarded *finishing effectiveness* to be the most important criterion for the attackers' actual quality evaluation. Namely, the primary task of attackers is to score; so the eventual match outcome depends considerably upon their scoring efficiency. A quality attacker is expected to create scoring opportunities and finish. When playing against high standard teams, one cannot expect many scoring opportunities, therefore, each and every chance should be used; high shooting efficiency is then the only chance for favourable outcome. The following criteria on the importance scale for the attackers were *shots on target*, *heading* and *cooperativeness*. High level of technical skill and knowledge is indispensable, whereas accurate shots and headers from any position should be their specialty. In addition, if he/she is good in assisting as well, it makes him/her even more dangerous and enhances his/her effectiveness in the closing parts of attack.

The main aim of this study was to create an expert system for the reliable evaluation of actual quality of top-level soccer players. Altogether, 7 criteria for the defensive game phase and 12 criteria for the attacking game phase were proposed and described. With the high level of inter-observer agreement (0.89-0.97), six soccer experts defined the coefficients of importance of each particular criterion for the following four playing positions in soccer: central defenders, full backs, midfielders, and attackers. These coefficients of importance allowed us to define specific characteristics and skills necessary to play soccer at the highest competitive level for each playing position. The proposed weighted criterion system for the subjective evaluation of actual quality of top-level soccer players could be a useful tool for coaches and managers in selection and profiling of young soccer players, as well as in management of elite soccer teams. Future studies are needed to determine the validity of the proposed criterion system in top-level trained soccer players.

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Correspondence to:

Antonio Perić, MagEd

3rd Comprehensive Grammar Secondary School

Kuslanova 52, 10000 Zagreb, Croatia

Phone: 00385981673958

E-mail: antonio.peric@zg.htnet.hr