
ORIGINAL

COMPARISON OF TRADITIONAL AND UNDERSTANDING METHODOLOGY IN THE PRACTICE OF BASKETBALL

COMPARACIÓN METODOLOGÍA TRADICIONAL Y COMPRENSIVA EN LA PRÁCTICA DEL BALONCESTO

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ABSTRACT

The aim of this study was to compare the teaching of basketball by means of an understanding methodology and a traditional one with regard to ball control, decision-making and execution in a real game situation in the field of shooting, dribbling and passing. The sample consisted of 24 subjects aged between 8 and 11 years with one year’s experience in basketball, across a control group and an experimental group. To assess performance in a real game situation, we used the protocol developed by French and Thomas (1987). A MANOVA was conducted to check if there were differences between groups and an ANOVA of repeated measures to see if there were changes in the dependent variables after intervention. The understanding education group performed better than the traditional teaching group in the three analysed variables.

KEY WORDS: basketball, teaching, cognitive process, decision-making.
RESUMEN

El objetivo de este estudio ha sido comparar la enseñanza del baloncesto según una metodología comprensiva y otra tradicional, sobre control del balón, toma de decisiones y la ejecución en situación real de juego, de las acciones de lanzamiento, bote y pase. La muestra era de 24 sujetos entre 8 y 11 años, con un año de experiencia en baloncesto y distribuidos en grupo control y experimental. Para valorar el rendimiento en situación real de juego se utilizó el protocolo desarrollado por French y Thomas (1987). Se realizó un MANOVA para comprobar si existían diferencias entre los grupos y una ANOVA de medidas repetidas para conocer si había cambios en las variables dependientes tras la intervención. El grupo de enseñanza comprensiva obtuvo mejores resultados que el de enseñanza tradicional en las tres variables analizadas.

 PALABRAS CLAVE: baloncesto, enseñanza, procesos cognitivos, toma decisiones.
INTRODUCTION

The sport has great complexity since the motor response can be varied widely and depends on factors such as time, speed of processing and external perception for execution, these being fully significant in this process. There are two very important factors to explain this (Thomas and Thomas, 1994). First, the cognitive processing required by sports activities that have a high time pressure in team sports where players have to make quick decisions on their performance. Secondly, knowing how to solve a particular game situation does not necessarily imply knowing how to carry it out in a real game situation; it is what we call the "knowing when" and "how" sporting tasks. A player can have high levels of specific knowledge to solve a situation, but not a correct grasp of the skills needed to implement it. (McPherson & French, 1991; McPherson and Kernodle, 2003). Therefore, the quality of decision-making in a game situation is as important as the execution of motor skills, both being crucial to the output of the game (Blomqvist, Luhtanen, and Laakso, 2001; Thomas, 1994).

In the last two decades, lines of research have been developed that have led to educational programmes for analysing and trying to understand the cognitive processes used in games and sports. The origin of this line of research is found in the work of Bunker and Thorpe (1982) and the Teaching Games for Understanding (TGFU), which has continued in the work of Alison and Thorpe (1997), Light and Fawns (2003) and Webb and Pearson (2008). Other variations of this research are "Game Sense" (ASC, 1999), "Play Practice" (Launder, 2001), "Games concept approach" (Wright, Fry, McNeill, Tan, Tan & Schemp, 2001, cited in Light, 2003) and most recently "Playing for Life" (ASC, 2005). The TGFU indicates that the key is to put the player in a situation where tactics, decision-making and problem solving are the most important. The understanding of the game is the determining factor in this approach (Bailey and Almond, 1983), and being a good performer is not the only condition required in order to be effective in the game, but it is essential to understand how, when and where to use the technique. Understanding the game should lead the player to consider the "why" do something before the "how" (Hopper and Krusselbrink, 2001).

Teaching players to make correct decisions when playing is a complex task (Turner & Martinek, 1995). There is empirical evidence that shows that knowledge is an indicator of skill directly connected to tactical behaviour (Iglesias, Moreno, Santos-Rosa, Cervelló, & del Villar, 2005; McPherson & Thomas, 1989; Ruiz & Arruza, 2005). Recently, there have also been studies that demonstrate that it is possible to intervene in this factor in situations unconnected to the game and achieve improvement in the actual competition situation (Brooker, Kirk, Braiuka y Brangrove, 2000; Iglesias, 2006; de la Vega, del Valle, Maldonado, & Moreno, 2008). However, mastery of technique is necessary to implement strategies in the game (Rink, 1996, 2001), but Thorpe, Bunker and Almond (1986) and Webb and Pearson (2008) suggest that
evaluation and understanding of the game and tactical knowledge development must precede the development of motor skills of the game. This approach to teaching for understanding, according to the TGFU research, emphasizes the role of knowledge and understanding (Bunker and Thorpe, 1982; Light and Fawns, 2003).

With this model, the teaching focuses on the practice of modified games that contain the basic features of the game. General strategies are introduced with the aim of developing tactical knowledge of the game and decision-making ability concerning "why", "how" and "what to do". Skill execution is only started once the player shows that he is ready and knows a specific strategy.

Therefore, emphasis is laid on practical learning in real game situations (Hastie, 1998; Webb y Pearson, 2008). With this methodology, the subject performs a more important role in determining what is processed, how it is processed, and, therefore, how he learns, leading to more adaptive results (Morgan, Kingston, & Sproule, 2005). Studies under TGFU do not confront methodology focused on technique as opposed to studies focused on understanding. The key according to Hopper and Kruisselbrink (2001) is knowing how to separate learning the techniques from learning the tactics, because in many cases to solve a tactical situation takes a few technical resources (Rink, French, and Graham, 1996). According to these authors there are some vital aspects to be considered in all investigations on this subject: the skills and strategies are linked, tactical ideas are acquired through play, the initial level of the game has to be cooperative and the sport has its own strategies and is very contextual.

Consequently, the coach’s purpose in this context is to design learning activities and experiences that encourage players to discover principles and concepts by themselves, so that these concepts can be transferred to other situations where they can be applied (Iglesias, Cárdenas, & Alarcón, 2007; Méndez, 1999, 2005). However, Chandler and Mitchell (1991), and McMorris (1998) observed that there was not enough empirical evidence to support the idea that a focus on games for understanding was more effective than other methods.

Longitudinal studies have been performed in this research area in which different methodological teaching models have been compared with the aim of solving one of the major enigmas in sport coaching: what is the best way of teaching sport? Different types of sports have been studied in this paradigm: net and wall sports (French, Werner, Rink, Taylor, & Hussey, 1996; Gabriele & Maxwell, 1995; Griffin, Oslin, & Mitchell, 1995; Harrison, Blakemore, Richards, Oliver, Wilkinson, & Fellingham, 1998) and invasion sports (García y Ruiz, 2003; Tallir, Musch, Lenoir, y Valcke, 2003; Brooker, Kirk, Braiuka, y Bransgrove, 2000), field sports and batting sports (Butler, Griffin, Lombardo and Nastasi, 2003) and finally white or target sports (Webb, Pearson and Forrest, 2006). These sports have different operating structures, and formal relationships that make it very difficult to make comparisons on transfers and comprehensive learning.
However, the results of this research have been inconsistent. Turner and Martinek (1992), in their study of field hockey, did not discover any significant differences in either declarative and procedural knowledge or in the development of technical skills when applying and comparing the traditional teaching model with the understanding model. By contrast, Griffin et al. (1995) in volleyball, Turner (1996) in field hockey and García and Ruiz (2003) in handball found that declarative knowledge was significantly higher in the understanding group when they compared it with the control and the traditional teaching groups. None of these studies (García & Ruiz, 2003; Griffin et al., 1995; Turner, 1996; Turner & Martinek, 1999) found significant differences between the technical and understanding groups in terms of performance in specific skill tests and in game execution. On the other hand, McPherson and French (1991) showed that technical improvement was much influenced by direct instruction. In their study, tennis players improved their execution technique only after receiving direct instruction on the technique. Other research found advantages in favour of the tactical group for the decision-making component (Allison & Thorpe, 1997; Gabriele & Maxwell, 1995; Griffin et al., 1995; Mitchell et al., 1995). In every piece of research the difference in relation to the enjoyment of the participants in the understanding-orientated group is very significant (Brooker et al., 2000, Webb et al., 2006).

In accordance with Rink, French, and Tjeerdsma (1996), inconsistencies in the results found in the specific bibliography can be explained, in part, by the difference in the research designs. The various sports in which the studies took place, the participants' different ages, the differences in the length and nature of intervention and the selection of different variables for the research are the reasons that make direct and valid comparison among the studies difficult.

Therefore, research performed on methodological sport coaching models indicates that the current status of the issue is clearly controversial (Dooods, Griffin, & Placek, 2001; Griffin & Butler, 2005), making it necessary to carry out further studies to help clarify this data. The purpose of this study was to compare the technical or traditional model with the understanding model in teaching basketball, with regard to the effect caused in game performance, categorised on the basis of ball control, decision-making and execution variables for the actions of shooting, passing and dribbling according to the French and Thomas instrument (1987).

METHOD

Participants

The sample consisted of a total of 24 basketball players aged between 8 and 11 years, when the process of psychological maturation begins (M = 9.1 years, SD = 1.2), divided into two groups: understanding (n = 13) and traditional (n = 11). All players started with one year’s experience in federated official competition,
all observed matches were federated and training took place three days per week.

The different ages of the participants in the research is an important variable to relate results. Tests by Rink et al., (1996) indicate that 12 is the most suitable age to handle abstract concepts of tactics in sports. At this point in our research we used youth aged between 8 and 11 years with the limitations which that entails.

**Instruments**

*Observation protocol of the player’s individual performance in possession of the ball in an actual game situation.* Given that the sample used was in the initial stages of basketball, the instrument by French and Thomas (1987) was used to measure the basketball player’s performance in possession of the ball in a real competition situation. The authors propose three categories for the assessment of individual performance: total, correct and incorrect ball control, decision-making and execution with regard to passing, dribbling and shooting. The observation took place during basketball matches in federate competition, thirty-five sessions lasting an hour, in normal conditions with individual defence from midcourt. The first ten minutes of each player’s game were analysed according to the instrument protocol used (García & Ruiz, 2003; Turner & Martinek, 1999). The analysis was performed using a video recording of the match to facilitate identification of the different aspects to be recorded.

The collaborators chosen for the programme had prior experience of over five years coaching with training groups in official competitions with groups of similar age and characteristics (Graham, French, & Woods, 1993) and were national coaches, trained to level III. They were coached prior to the intervention to identify the most relevant categories and their assessment in the coaching sessions. A sample of 10 minutes of footage was used during five coaching sessions that did not form part of the intervention for that purpose. During the observations, model situations were identified for every category and the items they consisted of. Next, segments of this practice were observed and coded independently, until they attained an interobserver concordance level of 90% in each segment. The recordings were made in every one of the groups at both the beginning and the end. Some good results were obtained in the intracoder \((r = .89, p > .05)\) and intercoder \((r = .92, p > .05)\) reliability and validity tests.

*Coach’s Behaviour.* In order to examine the coach’s verbal interaction with the players in the understanding and traditional teaching groups, an applied programme session was filmed and the coach’s verbal behaviour was transcribed. The observations were filmed during the session before applying the second take match (post-test). The coach’s verbal behaviour was coded using an adaptation of the Coaching Behavior Assessment System (CBAS) by Smith, Smoll, and Hunt (1977). The instrument was adapted to measure 12 categories of the coach’s behaviour organised into two large dimensions: (a) the
coach’s initial general behaviour and (b) the coach’s behaviour when he responded to the player’s performance. The first dimension included teaching technique, organisation, general communication and encouragement. The second dimension involved the responses of consolidation and non-consolidation when performances were correct, and reaction to mistakes, including reinforcements, instruction technique, penalties and lack of response. Previous research (Goudas, Biddle, Fox, & Underwood, 1995; Wallhead & Ntoumanis, 2004) on teaching styles, selection of tasks and students’ motivation had already used the CBAS to measure the consistency of the coach’s behaviour in different intervention programmes.

The transcription of the footage was coded by the researcher and another person, a second researcher who did not know the purpose of the study. The second researcher was trained prior to the intervention to identify the most relevant categories of the coach’s behaviour in the adaptation of the CBAS. A sample of 10 minutes of footage was used during five coaching episodes that did not form part of the intervention. During the observations of the first two coaching episodes, model situations were also identified for every category in the coach’s behaviour. Next, coaching segments were observed and coded independently, up to an interobserver concordance level of 90% in each segment. After this criterion was obtained, every intervention example was coded independently. The coach had to use positive reinforcements, encouragement, feedback, control maintenance, general instructions and organisation for the intervention to be teaching for understanding. While in the traditional teaching model the coach gave feedback by means of negative comments, inappropriate exclamations and lost control at times. The reliability was .79 for the intervention programme in teaching for understanding, and .82 for traditional teaching.

**Design**

A quasi-experimental pre-post design was implemented with two experimental groups in thirty-five sessions lasting an hour each (three months of intervention). Similar basic learning contents were implemented in these groups using the two models proposed. Pre-treatment and post-treatment assessment was performed. The independent variable was formed by the different intervention programmes that were administered, whilst basic sport competence in basketball (ball control, decision-making and technical execution in passing, dribbling and shooting) was measured for the dependent variable.

*Traditional teaching model.* This model was based on the use of exercises and game play, which began with the simple execution of a technical move in decontextualized game situations until a complex move was attained (analytical strategy). The coach was responsible for offering correct execution models (through demonstrations) and answers to any problems that arose (corrections).
Teaching for understanding model. It was based on a proposal focused on understanding the tactics of basketball actions through similar games, according to the methodology Teaching Games for Understanding (TGFU) developed by Bunker and Thorpe (1982) and active learning through indirect strategies of tactical and technical aspects of basketball by means of investigation. Several questions were raised in the sessions about the contents of basketball and requirements connected to the techniques needed to solve the game’s problems, with the players themselves having to find answers and solutions. A mixed programme was used (guided discovery and problem solving). Sometimes, there was a more appropriate response and other times there could be different responses for the same problem. In guided discovery, the coach’s aim was for the players to find the most effective response to the different questions (e.g. the most suitable pass in a play situation or the most correct decision by a player in possession of the ball). In the problem solving programme there were different responses that could solve the problem raised (e.g. different types of passes or shots).

Data Analysis

The independent operational variable was the conveyance of basketball coaching using a teaching for understanding model and another based on a traditional model. The dependent variables were ball control, decision-making and shooting, passing and dribbling execution. A MANOVA was performed with Take 1 to check the homogenisation of the groups. After the intervention, a MANOVA was performed with the data from Take 2, to check whether there were any differences between the groups. A repeated measures ANOVA was also performed to see if there had been any changes in the dependent variables after the intervention.

RESULTS

Preliminary Analysis

A one-way between-groups MANOVA was performed with Take 1 (Table 1), considering ball control, decision-making and passing, dribbling and shooting execution as the dependent variables. No significant differences were found (Wilks’ Lambda = .61, $F(22, 50) = .70, p > .05$).

| Table 1. Mean, Standard Deviation and P-value of the Variables of Ball control, Execution and Decision-making, Dribbling and Shooting in Initial Observation. |
|---------------------------------|-------|-------|-------|-------|-------|
| Ball control                   |       |       |       |       |       |
| Total                          | 12.69 | 7.22  | 14.72 | 13.34 | .875  |
| On target shots                | 11.07 | 7.94  | 13.45 | 12.69 | .823  |
| Incorrect control              | 1.61  | 1.66  | 1.27  | 1.00  | .836  |
Effects of the Intervention

The one-way between-groups MANOVA with Take 2 (Table 2) revealed significant differences in ball control (Wilks’ Lambda = .79, F(4, 68) = 2.02, p < .05), decision-making (Wilks’ Lambda = .53, F(12, 60) = 1.81, p < .05) and execution (Wilks’ Lambda = .55, F(12, 60) = 1.69, p < .05). In the ball control variable, the groups offered significant differences in total ball control measures (F(2, 35) = 3.71, p < .05) and correct ball controls (F(2, 35) = 3.17, p < .05). The differences found between the groups were favourably inclined towards the teaching for understanding group rather than the traditional group. With respect to final decision-making, significant differences were found in the total passing decision-making variable (F(2, 35) = 3.53, p < .05), correct passing decision-making (F(2, 35) = 3.59, p < .05) and in the correct shooting decision-making variable (F(2, 35) = 3.92, p < .05). The values were always higher in the teaching for understanding group than in the traditional teaching group. Regarding technical execution, significant differences were found in the total passing execution variable (F(2, 35) = 3.53, p < .05) and correct passing executions (F(2, 35) = 3.36, p < .05). The differences found between the groups were always in favour of the teaching for understanding group.
Table 2. Mean, Standard Deviation and P-value of the Variables of Ball control, Execution and Decision-making, Dribbling and Shooting in Final Observation.

<table>
<thead>
<tr>
<th></th>
<th>Understand Traditional</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>DT</td>
<td>M</td>
<td>DT</td>
</tr>
<tr>
<td>Ball control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17.61</td>
<td>9.52</td>
<td>10.54</td>
<td>5.55</td>
<td>.034</td>
</tr>
<tr>
<td>On target shots</td>
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<td>9.96</td>
<td>9.72</td>
<td>5.69</td>
<td>.050</td>
</tr>
<tr>
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<td>1.31</td>
<td>.81</td>
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<td>.666</td>
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<tr>
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<td></td>
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<tr>
<td>Total passing</td>
<td>11.69</td>
<td>7.56</td>
<td>7.36</td>
<td>4.27</td>
<td>.040</td>
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<tr>
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<td>5.36</td>
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<tr>
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<tr>
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<tr>
<td>Total passing</td>
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<td>7.36</td>
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<tr>
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<td>.699</td>
</tr>
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</tr>
<tr>
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<td>2.00</td>
<td>1.78</td>
<td>.180</td>
</tr>
</tbody>
</table>

DISCUSSION

The purpose of this study was to establish a comparative analysis of the effects caused in coaching basketball using an understanding methodology and a traditional one, on ball control, decision-making and passing, dribbling and shooting execution. Some authors suggest that more ball control leads to better performance in later decision-making (French, Werner, Rink et al., 1996; French, Werner, Taylor et al., 1996; Turner & Martinek, 1992, 1999). Initially, in the first observation of the actual game played, there were no significant differences between the research groups in the ball control variables. After the intervention, significant differences were attained in favour of the group based on teaching for understanding in the total ball control and correct ball control
variables. Furthermore, this same group made more progress in its percentage of baskets, whilst the traditional group’s values were the same as its initial ones. Due to the results obtained in ball control in an actual game, our conclusions coincide with the idea put forward by other authors (French, Werner, Rink et al., 1996; French, Werner, Taylor et al., 1996; García & Ruiz, 2003; Turner & Martinek, 1992, 1999), where the tactic-orientated group has more and better ball control and has better performance in decision-making.

As with other studies, (Allison & Thorpe, 1997; Gabrielle & Maxwell, 1995; Mitchell et al., 1995; Stuart & Thorpe, 1997; Turner & Martinek, 1995), we found there are significant differences in (total and correct) passing decision-making and correct shooting decision-making in favour of the group focused on teaching for understanding. Previous research in which the same measurement instrument was used (García & Ruiz, 2003; Turner, 1996; Turner & Martinek, 1999) shows that the trend is always in favour of the group focused on teaching for understanding when making decisions in the various variables analysed, although, on the other hand, this trend does not usually indicate major differences between the groups (Mitchell et al., 1995), or they are only significant in an isolated aspect (Turner & Martinek, 1999). In other similar research, differences concerning decision-making were not sufficiently evidenced when such intervention programmes lasted less than three months (Méndez, 1999). In any event, some experiences did not find any significant differences between the decisions made by one or the other group (French, Werner, Rink et al., 1996; García & Ruiz, 2003; McPherson & French, 1991; Rink, French, & Werner, 1991; Turner & Martinek, 1992).

After the intervention period, significant differences were found in total pass execution and correct pass execution in favour of the group focused on teaching for understanding compared with the group focused on traditional teaching. Up to the age of eleven or twelve, our capacity for learning is global, and analytical learning experiences have an added difficulty, so, unlike other research in older players (French, Werner, Taylor et al., 1996; Turner, 1993, Turner & Martinek, 1992, 1995), this expected equality in technical execution in an actual game situation becomes more difficult. In this respect, the technical contents were never worked on directly in the teaching for understanding group, but it seems that they were developed as a need to respond to problems faced when playing. According to Devis and Sánchez (1996), although there is an emphasis on progress from tactics to technique, “from why to what”, this does not mean that technique is ignored. As some authors point out (Cárdenas, 2003; Castejón & López, 2003; Read, 1988), this is a model that integrates technique whilst modified games are being played, and momentarily pays particular attention to a fundamental aspect to continue with the game. Therefore, it is observed that the teaching for understanding group progresses more in variables related to the execution of technical contents in an actual game. This trend in favour of the teaching for understanding group in game execution can also be seen in other research in the passing execution variable (Gabrielle & Maxwell, 1995; Turner & Martinek, 1999).
Research of this kind, as we have pointed out before, is very complex and does not manage to explain all the processes that occur due to the great difficulty in controlling the variables and their interrelation (Rink, French & Graham, 1996). The participants in this study, players aged between 8 and 11, have some biological and psychological maturation processes typical of their age, and it may be difficult to extrapolate the results of similar studies with different age groups. Procedural knowledge can affect speed in decision-making and condition later actions, so it may be interesting to focus studies on other age levels and other team games, with more possibilities of conducting longitudinal studies and being able to verify procedural changes over a longer period of time. Therefore, the field of study needs to be extended to technique, tactics and attack and defence actions, with an analysis in actual game situations. The challenge for the future is to find a study model and an instrument of technical and tactical ability that can be applied to various populations and learning stages.

The main conclusions are that, after the intervention of 30 sessions, significant differences were perceived in favour of the teaching for understanding group in the variables of ball control and accurate ball controls. The understanding group made the most progress in its on target shooting percentage and experienced better performance in decision-making. There is a tendency in favour of the group oriented towards teaching for understanding when making decisions on the different variables analysed, although without significant differences between groups.
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Número de citas totales / Total references: 63 (100%)
Número de citas propias de la revista / Journal's own references: 1 (1,59%)
# APPENDIX

## Performance observation categories in a real play situation

<table>
<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ball control</strong></td>
<td>The player receives or catches the ball with one or two hands in order to subsequently play it (dribble, pass, shoot).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passing</strong></td>
<td>The player tries to pass to an unmarked team-mate.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dribbling</strong></td>
<td>Take the ball to the field of attack dodging opponents. Effect an appropriate penetration. Effect an appropriate change of direction (that is, out of reach of the defence) towards a free area or break through the defence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shooting</strong></td>
<td>Shoot at goal from inside or near to the restricted zone when unmarked or not under pressure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Execution</strong></td>
<td>The ball reaches the unmarked team-mate with suitable speed and height.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Progress</strong></td>
<td>Lose control of the ball. Lose control of the ball due to a legal action by an opponent. Make an infringement (steps, double or foul in attack).</td>
</tr>
</tbody>
</table>