Learning Football Skills Effectively: Challenging Tradition

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Skilled players spend many hours practicing and refining their skills with the aim of improving performance and achieving excellence. Practice history profiles indicate that the average Academy player will have devoted at least 10 years to the sport and accumulated more than 7,000 hours of practice. Those players taken on by an Academy on a full-time basis at 16 years of age are typically exposed to the sport at a very early age and are subsequently motivated to spend an average of 12-15 hours per week, 700 hours per year, in football-related practice activities. At least 10,000 hours of practice are required before players reach international levels of performance, a surprisingly robust finding regardless of the sport or domain of expertise in question. Academy players acknowledge the importance of practice and consider that dedication and commitment to practice are more important than ability, talent or skill in achieving excellence. Practice is the single most important factor underlying the development of elite players.

In contrast to its perceived importance, relatively little effort has been devoted to the process of identifying those factors underpinning effective practice or how the acquisition of skills can be facilitated through the instruction process. This is particularly disappointing when one considers the amount of time devoted to physical conditioning or mental skills training by scientists and coaches alike. Questions relating to practice and instruction have historically been viewed as the preserve of the coach, with current practice being driven by intuition and subjectivity rather than empirical evidence. Moreover, there has been no census of the typical training activities or instructional approaches employed by coaches at various levels of the game. In this article an attempt is made to challenge traditional beliefs about instruction and practice by drawing upon research evidence from the motor learning literature.

A model of instruction

Figure 1 highlights some of the important factors underlying practice and instruction. The coaching process necessitates that information is conveyed to the learner as to the behaviour desired, the session is then structured to provide an opportunity for practice, and feedback is provided to guide the learner's attempts to acquire the skill. The specific nature of the process is determined by the mode of instruction and coaching philosophy adopted by the instructor. In the sections that follow research evidence relating to each of these factors is reviewed in order to highlight some potential misconceptions.

Are demonstrations always helpful in conveying information to the learner?

A commonly held belief is that demonstrations are essential in order to inform the learner as to how best to perform the skill in question. Although demonstrations are likely to be effective in the majority of instances, as the old adage 'a picture paints a thousand words' suggests, occasionally they are no more effective than verbal instruction and may, in certain instances, actually be detrimental to skill acquisition. A demonstration is most effective when it clearly highlights the strategy required for successful performance and the learner has the necessary movement skill and motivation to apply the strategy conveyed in an effective manner. Demonstrations are no more effective than verbal instruction or practice alone when the information conveyed is low and/or when the task requires that the learner develop a feel for the movement or to 'scale' an existing movement pattern. An implication is that demonstrations are likely to be most effective early rather than later in learning as the individual is trying to develop a new pattern of coordination. However, a potential disadvantage when demonstrating a skill early in learning is that the coach can impose on the learner a movement pattern that may not be ideal for that individual. It may be appropriate to allow learners an opportunity to try out the skill prior to viewing a demonstration. Verbal instruction as to the goal of the task may be sufficient to enable learners to engage in trial-and-error or discovery learning and may in the long-term produce more flexible and adaptable skills. Demonstrations may then be introduced selectively as an additional source of guidance.

Another potential myth is that the demonstration must provide a 'perfect' representation of the skill. Although the accuracy of the demonstration may be an important factor, several authors have voiced the opinion that observing a learning model is at least as beneficial as viewing a skilled model since the former actively engages the learner in a problem-solving process. The benefits of using a learning model may be heightened if the observer is able to hear the prescriptive feedback provided to the model by the coach.

How important is variety and adaptability within the learning process?

A common assumption is that repetitive practice of a skill under constant practice conditions is essential for effective skill acquisition. Although such practice is successful in producing effective performance within a particular practice session, variable practice conditions are essential for the long-term retention of football skills. It is therefore crucial that coaches introduce variety into their practice sessions early in learning. Coaches should try and progress from using structured drill-type practices to more realistic games where players have the opportunity, for example, to vary the height, weight and direction of pass. There is also considerable evidence to suggest that it is much better to practice a variety of skills (eg passing, shooting, dribbling) in a random manner (referred to in the motor learning literature as high contextual

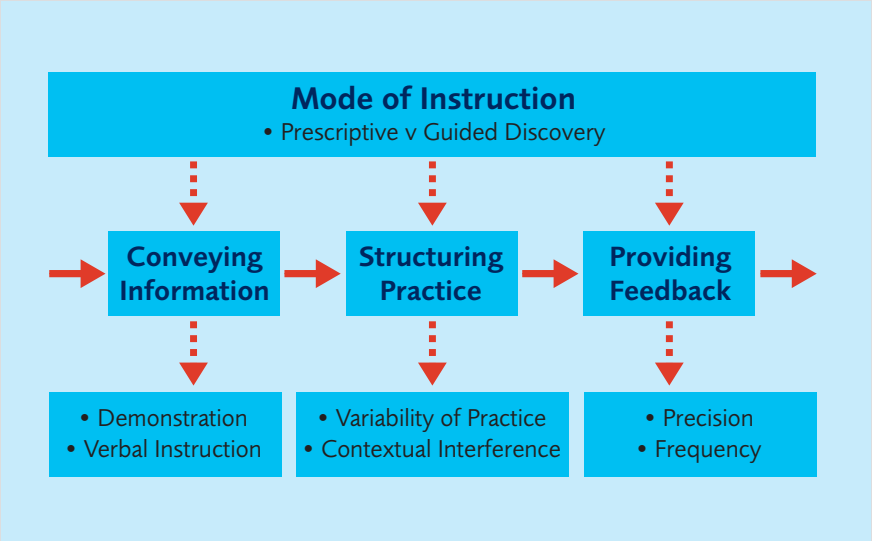

Figure 1 Some of the important factors underlying effective instruction

interference practice conditions) rather than to practice one skill per training session in a blocked manner (low contextual interference practice conditions). There is an important balance here between fostering positive performance effects on the one hand, so that the learner continues to be motivated to practice, and encouraging effective learning on the other. Specific repetition of a single skill (eg repetitive drills) results in positive performance during the practice session, whereas variable practice of a variety of skills (eg small-sided games) results in poorer performance during the session but better learning in the long-term.

The question of when to introduce variety and random practice conditions into the learning process presents a challenging dilemma for the coach. Whilst coaches have the natural inclination towards introducing variable and random practice conditions as learning progresses, this progression should typically occur earlier in learning than is currently the case. Most coaches wait for performance to improve before progressing on to more difficult practices. To optimise skill learning, coaches should consider making this progression much earlier in the learning process. A radical view, for which there is some empirical support, would be to dispense with repetitive drill type practices altogether and introduce variable and random practice conditions at the outset through small-sided practices (ie 3 v 3, 4 v 4) and conditioned games. Perhaps this shift from drill practices to small-sided games may illustrate why 'street football' was perceived to be effective in developing football skills.

It is also commonly believed that practice when fatigued is detrimental to skill learning. However, whilst practice under such conditions may have a negative effect on performance during the session, it is likely that learning is not affected. Players have to perform skills under a variety of circumstances when anxious and fatigued and consequently, it is important to mimic such conditions during practice.

Can coaches provide too much information?

An important part of the coaching process is to provide learners with corrective feedback so that they can improve on subsequent practice attempts. The tendency is for coaches to provide detailed feedback on a frequent basis. Although feedback is essential for skill acquisition, particularly early in learning, research suggests that learners should be encouraged to rely on their own intrinsic feedback processes rather than on augmented feedback from a coach or significant others. Coaches should therefore resist the temptation to provide too much feedback and progressively encourage learners to develop their own error detection and correction processes through learning by trial and error. This process requires another 'leap of faith' for coaches! It is likely that when coaches reduce the frequency and precision of feedback, performance during practice sessions may not be as efficient as was previously the case when feedback was provided in abundance. In contrast, the process of 'fading out' feedback over time is likely to facilitate learning and long-term performance. Table 1 highlights some techniques that coaches can use to reduce the learner's reliance on extrinsic feedback.

Table 1 SOME TECHNIQUES FOR 'FADING OUT' A LEARNER'S RELIANCE ON PRESCRIPTIVE FEEDBACK FROM THE COACH

Summary Feedback	Feedback provided as a summary of performance on the preceding block of practice attempts
Bandwidth Feedback	Provision of feedback only when performance falls outside some agreed upon criteria or bandwidth
Descriptive v Prescriptive Feedback	Provision of descriptive feedback rather than prescriptive guidance encouraging learners to find their own solutions
Question & Answer Style	Asking learners to come up with their own solution through a question and answer approach (ie what could you have done better on that attempt?

Should coaches adopt a 'hands-off' or 'hands-on' approach to instruction?

A common theme in the preceding sections is the suggestion that coaches are overly prescriptive in attempting to guide the learner through the skill acquisition process. The temptation for coaches is to demonstrate frequently, organise specific and blocked practice conditions, and provide detailed feedback. Although this 'hands-on' approach may produce better learning initially, it may in the long-term impose artificial constraints on learning, producing temporary and inefficient solutions to the movement problem. Skills learnt through explicit instruction are also likely to break down under pressure. In recent years there has been a resurgence of interest in discovery learning or more 'hands-off' approaches to instruction. The philosophy underlying these approaches is that players should merely be guided through the learning process by encouraging them to find their own solutions to movement problems. The presumption is that skills learnt through guided discovery are more adaptable and flexible, more resistant to forgetting, and less likely to break down under pressure than those developed through more prescriptive approaches.

In this 'constraints-led' approach to instruction, coaching is directed towards creating the optimal environment for changes in movement form to emerge through self-exploration. A constraints-based model of skill learning is presented in Figure 2. The model suggests that the movement behaviour adopted during practice is determined by the unique constraints provided by the task itself, the characteristics of the learner, and the environment. Coaches can manipulate these constraints so that the desired behaviour (eg passing, dribbling) emerges through the process of guided-discovery rather than via prescriptive coaching. The process of manipulating constraints for the purposes of effective learning challenges coaches to be highly creative in designing games and practices that enable skills to emerge in learners. Some examples of how constraints can be manipulated to encourage learning are provided in Table 2.

Can coaches enhance game reading skills through instruction and practice?

Although the main focus in this article is on the acquisition of movement skills, the ability to 'read the game' (ie perceptual/cognitive skills) is also crucial to performance in football. At the elite level, players are more likely to be differentiated on these 'game intelligence' skills than on their physical or physiological characteristics. The ability of the skilled footballer to anticipate an opponent's future actions effectively is well documented. When compared to their less skilled counterparts, skilled players are faster and more accurate in recognising and recalling patterns of play, are better at anticipating their opponents' actions based on advance visual cues (ie their postural orientation), employ more effective and appropriate visual search behaviours, and are more accurate in their expectation of what is likely to happen given a particular set of circumstances. The traditional view is that a player's ability to read the game is innate and that consequently, such skills are not amenable to practice and instruction.

There is considerable empirical evidence to suggest that these skills are developed through football-specific practice, rather than as a result of maturation, and while genetic factors may set the limits on performance, it is possible to improve a player's ability to 'read the game' through structured training programmes. The typical approach has been to employ video simulations of football situations, coupled with instruction as to the important sources of information underlying anticipation skill, and feedback. This type of approach has been used successfully to improve goalkeepers' anticipation skills at penalty kicks and outfield

Further Reading

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players' capabilities to recognise patterns of play and to anticipate future pass destination. Since most clubs have access to digital coding and editing systems there would appear to be considerable potential to develop appropriate video-based simulations to enhance game intelligence in football. Such training can also take place away from the training field, at a self-regulated pace, in and out of season, and when the player is injured or fatigued. Innovative and creative coaches are needed to embrace new knowledge and technology and to work with sports scientists to facilitate the acquisition of game intelligence.

In summary, the aim in this article was to highlight potential shortcomings with the traditional approach to practice and instruction. There is a shortage of research on the skill acquisition process in football, which is disappointing given its importance in developing elite players. Nonetheless, the empirical evidence that exists questions some traditional beliefs. Some of the key observations are listed below.

- A demonstration may not always be effective in conveying information to the learner, so use sparingly, only after some initial practice on the skill and 'fade out' over time.
- Variable and random practice conditions, as exemplified by small-sided games, should be introduced early in the learning process.
- Learners should be encouraged to develop their own error detection and correction skills by using various techniques to 'fade out' the importance of prescriptive feedback as early as possible.
- A more 'hands-off', less prescriptive approach to instruction may help develop more adaptable players. Various examples of how to manipulate constraints to encourage the desired behaviour to emerge through guided-discovery are illustrated.
- Game reading skills are amenable to practice and instruction and such training should be fundamental to the talent development process.

The information provided in this article is intended merely for guidance. Coaches need to employ 'craft knowledge' to adapt and modify these guidelines to suit the individual needs of the players under their care. Players learn skills at different rates and in varying ways and consequently, coaches also need to be flexible and adaptable to ensure that skills are learnt efficiently and effectively.

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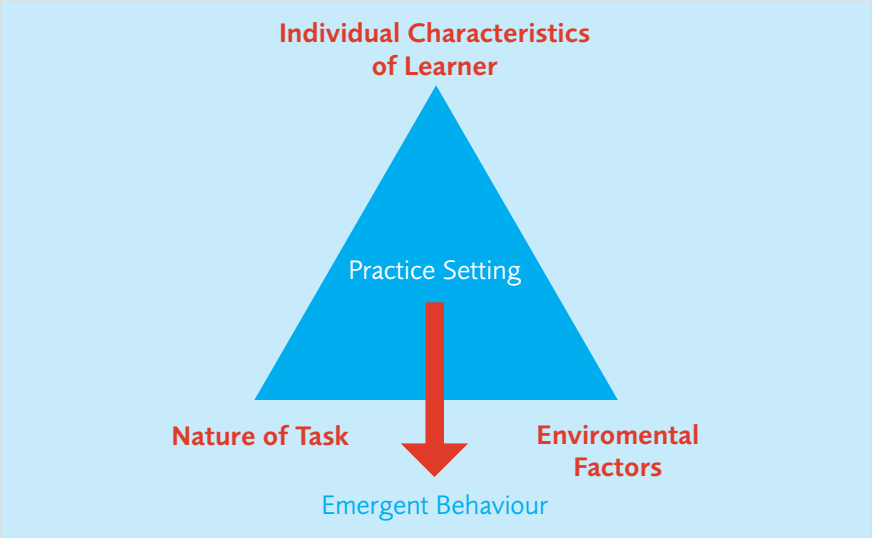

Figure 2 Factors that 'constrain' skill learning

Table 2 SOME EXAMPLES OF HOW CERTAIN BEHAVIOURS CAN BE ENCOURAGED DURING PRACTICE BY MANIPULATING VARIOUS CONSTRAINTS

	What can be manipulated?	Some examples	Emergent Behaviour
Task Constraints	Conditions or rules	1-and 2-touch	Pass and move, awareness of other players
		Score off a cross only	Heading and volleying
		1-touch finish	Positioning, sharp finishing, quick feet
	Pitch markings	Flank corridors	Crossing
		No tackle zones	Containment, staying on feet
		Shooting zones	Shooting and finishing
	Number of players	5 v 3 defence v attack	Playing out from back
		6 v 4 attack v defence	Width and penetration in attack
	Time	Restricting time in possession of ball	Fast counter attacking
	Equipment	Futebol de Salão (juggling practice and matches)	Encourages development of kinaesthetic touch/feel
Characteristics of Learner	Coupling between limbs	Using rubber bands around the ankles with goalkeepers	Goalkeepers move the feet together rather than cross the feet when moving across goal
		Tethering goalkeepers to the two goalposts using rope or elastic bands during 1 v 1 situations	Greater awareness of goal position and angles during 1 v 1 situations
Environmental Information	Access to sensory information	Using special glasses to occlude sight of the feet during a ball control or dribbling task	Players rely on articular proprioception (ie touch/feel) rather than vision when orienting the foot to control the ball