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**Preparing Athletes with Consideration to  
the “Stages of Learning” and the  
“Transfer of Learning”**

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## Preparing Athletes with Consideration to the “Stages of Learning” and the “Transfer of Learning”

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### ABSTRACT

Coaches strive to push athletes toward their full technical and physical potential while surpassing the previous generation of athletes. In doing so, comprehending how to integrate and organize various learning experiences is essential. This article seeks to describe the stages of learning (Fitts & Posner, 1967) and the transfer of learning (Perkins & Salomon, 1992) in relationship to planning and executing a practice schedule. In situations where coaches understand these phenomena, more effective instruction may result, and coaches thereby produce athletes with better personal awareness of their skills and areas of deficiency. Thus, the purpose of this research brief is to demonstrate how coaches can analyze their training of athletes to synthesize more efficient and prolific methods as a means to initiate the transfer of learning from other activities to their sport.

**Keywords:** sport pedagogy, athlete development, coaching instruction

### Introduction:

Coaches strive to push athletes toward their full technical and physical potential while surpassing the previous generation of athletes. To meet this goal, comprehending how to integrate and organize various learning experiences is essential. Knowledge of athletes' experience, transfer of related sporting skills, and stages of learning may provide an avenue to improve coaching instruction. Particular focus on the “stages of learning” (Fitts & Posner, 1967) which includes the *cognitive* stage, *associative* stage, and the *autonomous* stage (Magill & Anderson, 2017) has shown to improve understanding of sport-related instruction. Moreover, attention to the three types of transfer of learning, *positive*, *negative*, and *neutral* transfer, is paramount in coaches' analyses of athlete improvement (Perkins & Salomon, 1992). In situations where coaches understand these phenomena, more effective instruction may result, and coaches thereby produce athletes with better personal awareness of their skills and areas of deficiency

### Purpose of the Study

Thus, the purpose of this research brief is to demonstrate how coaches can analyze their training of athletes to synthesize more efficient and prolific methods as a means to initiate the transfer of learning from other activities to their sport.

## Significance of the Study

While this brief will provide an outline for a soccer practice schedule, it is possible to relate these stages and transfer of learning to any sport. One of the main goals of a coach is to help their athletes improve. Thus, it is hypothesized that applying these fundamental principles will help coaches be more efficacious. Additionally, a coach may gain knowledge of prior athletic experiences to teach new skills or refine previously learned skills.

## The Stages of Learning

**The Cognitive Stage.** In 1967 Paul Fitts and Michael Posner proposed the classic “learning stages model”. The first stage of learning is the *cognitive* stage. In this stage, the athlete or ‘skill-learner’ focuses on the cognitively related problems to the situation, on “what to do and how to do it” (Magill & Anderson, 2017, p. 274). The performer listens to instructions provided by the coach and then attempts to execute. However, in these initial learning stages many errors will be made, but it is critical to recognize the learner does not possess the knowledge or skills required to correct such errors. Thus, the coach is tasked with providing corrective feedback in an effort to aid the athletes’ attempts. Important to note, during these attempts it is unlikely the athlete will perform consistently as the variation in performances is high. For this reason, corrective feedback plays a vital role in guiding the learner toward greater consistency and superior performance. Furthermore, to bolster learning, the coach should cultivate a comfortable, positive, yet individualistic learning environment (Correia et al, 2019). According to Hall (2002), cognitive functions mature alongside motor skills. Due to this relation, it is vital for coaches to present accurate and precise material for athletes to learn in the cognitive stage. If instruction is substandard and athlete learning is rendered insufficient, the long-term progression of athlete development could be hindered. In other words, poor instruction by the coach and subsequently learning from the athlete, could severely impede the athlete’s future.

**The Associative Stage.** After an unspecified amount of practice and performance improvement in the skill, the learner graduates to the *associative* stage. In this stage, the learner begins to associate environmental cues with the movements required to achieve the skill goal. As a coach, it is imperative to allow the learner to make mistakes and use the environments’ feedback to fix faults. After honing these skills, athletes demonstrate fewer and less egregious errors because of their matured knowledge.

According to Fitts and Posner’s model (1964), this is also called the *refining* stage because there is room for improvement. At this point, the learner focuses on consistently and successfully performing the skill. Imagery may also be a source of skill refinement. According to Hall, mental images may be helpful in transferring the techniques from one well-learned skill to a similar skill (2002). As a coach, encouraging the players to set goals and use imagery to realize these goals can improve confidence and technique.

**The Autonomous Stage.** The final stage of the Fitts and Posner model is the *autonomous* stage. In this stage, motor skill proficiency is demonstrated with very little conscious awareness because it has become automated. This *implicit learning* is demonstrated when the learner performs a skill with minimal amount of attention, whereas the first stage – the cognitive stage- is *explicit* in that a considerable amount of conscious effort is applied to skill learning (Hall, 2002). In the autonomous stage, a learner becomes proficient in the designated skill and displays few errors. In the event of an error, the learner senses the fault and knows precisely what to adjust. However, contrary to popular belief, this does not mean the coach’s presence is unneeded. Even though the learner is able to give themselves feedback, the trained and astute eye of a coach may still be warranted, as convoluted elements may not be easily ‘felt’ by learners. Lastly, while achieving autonomous skill execution is desirable, not everyone reaches this stage. Many components underpin the attainment of this level including a) the quality of instruction and practice, b) the amount of practice put in, and c) learners’ motivation. If a coach employs meaningful drills and practices and the learner’s practice with intentionality, the probability of achieving the autonomous stage increases.

**Developing Skill Efficiency.** When learning new skills, learners oftentimes recruit more musculature than needed to complete the skill. However, as learners progress, muscle recruitment is refined and decreases while coordination of muscle contraction increases. Similarly, when observing energy cost associated with the execution of the skill: more practice leads to less energy cost. Often times, while learning the skills, athletes have poor visual selective attention. This hinders their ability to assess motor performance and error detection/correction. With practice, athletes progress from considering a wide range of cues, to focusing on specific cues that assist in the success of the skill performance. The Fitts and Posner model suggests that coaches should strive for the learner to reach the fullest potential of their skill: the autonomous stage. Reaching this stage ensures the performer can execute the motor skill effortlessly and with no conscious attention. When all the stages

have been achieved, the learner then moves on to the *transfer of learning* to apply the same skills to different but similar motor skills.

## The Transfer of Learning

The transfer of learning occurs when learning in one context transfers to learning in a different context (Perkins & Salomon, 1992; Seidler, 2010). The primary focus of learning transfer is connecting the similarities between different motor abilities. Transfer only occurs when the learner has been fully educated and is able to apply what they have learned in a different context (Perkins & Salomon, 1992). For example, the motor patterns of kicking a field goal in football *transfer* to a free kick in soccer. There are three types of learning transfer: *positive*, *negative*, and *neutral* (Edwards, 2011; Magill & Anderson, 2017).

**Positive Transfer.** Coaches should aim to achieve *positive transfer* at the conclusion of teaching a new skill, which would demonstrate progress within the athlete (Magill & Anderson, 2017; Perkins & Salomon, 1992; Steinberg, Pixa, & Doppelmayer, 2016). One desirable consequence of achieving positive transfer is ‘embedding’ the skill within the long-term memory of the athlete. Coaches that guide athletes through the steps of learning increase the likelihood of positive transfer, and thus decrease the chance of the athlete performing the skill incorrectly in game-like scenarios (Steinberg, Pixa, & Doppelmayer, 2016; Seidler, 2010).

**Negative Transfer.** In some cases, athletes inaccurately perceive how a skill should be performed. For example, they believe the ‘proper’ way to kick a soccer ball is with the toes. In these instances, it is critical that the coach correct this perception. If left uncorrected, there is a possibility that a *negative transfer* can occur. While less common, negative transfer is when the athletes existing perception of a skill hinders their ability to learn new skills in different contexts (Magill & Anderson, 2017). For example, a soccer athlete who performs a basketball style overhead throw in a soccer game has demonstrated negative transfer. In this case, the previously learned skill became a hard-to-break- habit resulting in a performance error. When skill- or task-specific coordination movements are shared between performances, this can make skills more difficult to learn. In an effort to decrease negative transfer, the coach should clearly differentiate similar movements from one another. Using a corner kick as an example -- depending on which side of the field the corner kick is situated, the manner in which the athlete strikes the ball determines the balls’ trajectory. This will result in ball movement toward or away from the goal. If confusion arises as to how one should execute a corner kick, it demonstrates the shortcomings of the coaches’ instruction. In turn, this may result in a negative transfer.

**Neutral Transfer.** The last category of transfer is called *neutral transfer*. This occurs when previous experience has no influence on learning a new skill (Magill & Anderson, 2017). For example, if a student on the soccer team knows how to play the piano, it is unlikely this skill will transfer, in any meaningful way, to their ability to play soccer. In neutral transfer, there is simply no meaningful relationship between the two activities.

## Discussion

**Facilitating Positive Transfer.** Evidence suggests specific conditions of involvement may facilitate a positive transfer of learning. First, the learner must understand how to pinpoint the critical elements of a situation, and then apply them to different situations (Perkins & Salomon, 1992). Conceptually, this aptitude requires a foundation of learned skills before they can be applied in different contexts or with other skills (Steinberg, Pixa, & Doppelmayer, 2016). In the soccer specific context, fundamental skills such as running, dodging, kicking, catching, throwing, punting, and jumping must be developed before moving onward. Additionally, the wise coach teaches learners not simply how to apply the strategy but to monitor their own thinking processes in uncomplicated ways (Perkins & Salomon, 1992). Learners must be free to reflect on their thinking processes and self-monitor their progress. For example, in soccer, athletes can observe a filmed session of open and closed-circuit drills to observe the quality of their movement and skill execution in various environments. Understanding how the environment affects skill performance is beneficial because it informs the athlete, helps facilitate positive transfer of learning, and propels learners toward autonomous performance. Lastly, learners must be able to focus and practice mindfulness. Simply put, coaching is less effective when athletes are cognitively preoccupied. Players may not be able to recognize their distraction during drills, but coaches may become aware of a lack of focus and attention when the athletes continuously demonstrate errors and are unable to recognize and correct mistakes. Coaches can assist athletes by discussing the importance of focus and intentionality in practice.

## Conclusions

While this brief provided an outline for a soccer practice schedule, it is possible to relate these stages and transfer of learning to any sport. One of the main goals of a coach is to help their athletes improve. Thus, it is hypothesized that applying these fundamental principles will help coaches be more efficacious. Additionally, a coach may gain knowledge of prior athletic experiences to teach new skills or refine previously learned skills. Coaches may then monitor the transfer of learning by observing if practice activities are demonstrated in game-like scenarios (Steinberg, Pixa, & Doppelmayr, 2016). Furthermore, it may take hours of practice to achieve this and make it work successfully, but as movement becomes more adaptable through learning experiences, it becomes less resistant to external perturbation (Seidler, 2010). In other words, if the athlete does not learn the skill in the same environment that they will be using it in, the skill is less likely to be performed successfully in game scenarios. Therefore, athlete development specialists are urged to use the stages of learning and knowledge of skill transfer when planning their practices.

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