

Performance Science

SKILL ACQUISITION FOR

ATHLETICS RESEARCH REVIEW

NOTES

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These notes accompany the audio presentation 'Skill Acquisition for Athletics Research Review'

What is skill acquisition?

Learning process – from conscious efforts to master a task to the point when decision making required to complete that task becomes automatic.

- Unconscious Incompetence: The individual neither understands nor knows how to do something, nor recognizes the deficit
- Conscious Incompetence: Though the individual does not understand or know how to do something, he or she does recognize the deficit
- Conscious Competence: The individual understands or knows how to do something. However, demonstrating the skill or knowledge requires a great deal of consciousness or concentration.
- Unconscious Competence: The individual has had so much practice with a skill that it becomes "second nature". He or she may or may not be able to teach it to others, depending upon how and when it was learned.

What is the best way to teach a new skill?

Demonstrations are likely to be most effective when the task requires the specific replication of a particular novel movement form. They may be less effective when used to refine or scale an already acquired movement.

A demonstration may constrain the learner to adopt a movement pattern that may be less than ideal and not best suited to that individual.

Skills learnt using instructional techniques that promote implicit learning are more resistant to forgetting, less likely to break down under pressure, and are more flexible and adaptable than those acquired via traditional explicit methods.

Blocked practice:

- Individuals repeatedly rehearse the same task: *eg Long jumper: 5*jumps, then 5* approach, then 5*sprints*
- results in better performance during a practice session
- may produce better immediate performance because you can remember the previous performance and copy/repeat it again

Random practice:

- Individuals perform a number of different tasks in no particular order: *eg the same long jumper going jump, sprint, approach, sprint, approach, jump etc.*
- Produces better learning and retention because you have to come up with the solution again – known as the spacing hypothesis
- Enhances learning because generalized motor programs are acquired more effectively during practice.
- Individuals begin to appreciate the distinctiveness of the different tasks when they practice them under random conditions, making each task more meaningful in their long term memory – known as the elaboration hypothesis.
- As immediate performance may not improve the coach may need to find other ways of maintaining positive performance during practice, so as to promote interest and enjoyment.

For the first few attempts at a new skill, individuals in the verbal-cognitive stage of learning may benefit more from blocked practice conditions as they may need a number of repetitions in order to produce the action successfully just once. However as soon as they acquire a rough approximation of the skill they should move to random practice.

Constant practice:

- Individuals rehearse only one variation of a given class of tasks during a session: *eg female SP using 4kg shot only*

Varied practice:

- Individuals rehearse a number of variations of a given class of tasks during a session
- Enhances learning by facilitating the development of more effective schemas, which individuals use to govern the production of movement variations of a particular class of actions: *eg SP using 3,4 and 5kg shots.*
- Varied practice enhances the flexibility or adaptability of movement production, allowing individuals to apply what they have learned during varied practice to the performance of similar actions they have not specifically attempted before.

What type of feedback can an athlete receive?

Intrinsic feedback

- sensory information that normally occurs when individuals produce movements.
 - proprioception – from inside the body, signals body and limb position and movement. *Eg where take off leg felt in comparison to the body in high jump take off*
 - exteroception – comes from outside the body. *Eg how far away from the bar the athlete was on take off.*

Extrinsic feedback

- sensory information provided by an outside source and in addition to that which normally occurs when individual produce movements.

Knowledge of results:

- Provided after the action is completed that indicates something about the degree to which the performer achieved the desired movement outcome.
- KR that duplicates intrinsic feedback can be irritating for learners. *Eg if athlete fouls, they are likely to have seen/felt it, so just to be told they are over can be frustrating!* It becomes more important when the available intrinsic feedback is insufficient.

Knowledge of performance:

- Provides information about the quality of the movement a performer has produced. *E.g. low point of the hammer was in the correct place and moving round on each swing.*

How much feedback should you give, and when should it be provided?

Instructional feedback can serve as:

- **Motivation** – energises individuals to increase their efforts. Motivation is strongly linked to goal achievement.
 - **Reinforcement** – increases the likelihood the performance will be repeated. Can be positive or negative.
 - **Information** – indicates how individuals can refine their movement patterns
 - **Dependency producing** – performance may suffer when feedback is removed
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- Frequent, immediate, detailed and prescriptive feedback appears best for performance during practice, whereas less frequent, delayed less detailed and more descriptive feedback is better for learning.
 - Instructors should not allow too much time to pass before providing individuals with feedback. However where it is given too often, feedback loses its reinforcing power.
 - The more complex the task, the more feedback may need to be given.
 - Feedback containing error correction information can have a dependency producing function.
 - Beginners can only attend to a limited amount of information at a time.

Attentional cueing is prescriptive feedback that directs learners' attention to the most pertinent information for correcting a particular performance error. *Eg: focus on hips during the throw*

Summary and bandwidth feedback may be more effective

- athletes should be able to self-regulate the frequency of feedback they receive and that a question-and-answer style should be adopted.
- The intention is to develop athletes that are independent and active problem solvers.

What is the optimal learning environment?

- most important contributor to motor learning is the act of proper physical rehearsal itself.
- quality of practice sessions is crucial.
- Practice should replicate competition as closely as possible with regard to both movement components and environmental conditions

E.g. length of time between jumps to simulate competition environment, particularly important for event like pole vault where there can be a long period of time between vaults, or between warm up and your first jump.

References

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