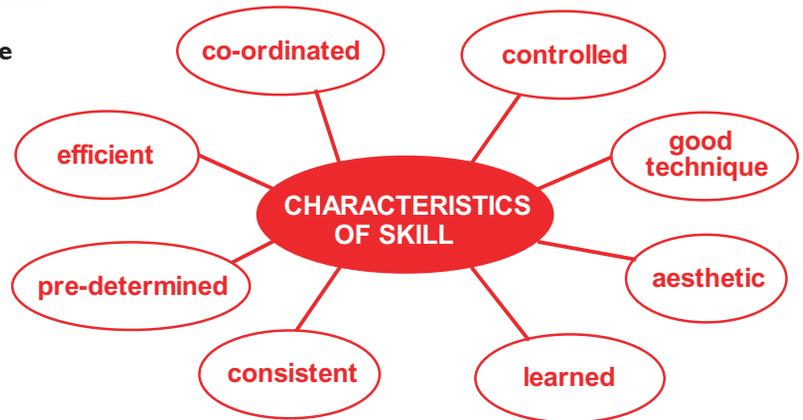


CHAPTER 5: Skill, skill continuums, transfer & types of practice

Characteristics and definitions of skill

figure 5.1 – skill

The term **motor skill** is used to describe a **technique** within a game or sport (for example, passing, hitting, catching, controlling a ball), or in reference to **the sport itself** (diving, tennis, hammer throwing), or a **quality** possessed by a sportsperson. The characteristics of skill (figure 5.1) are that it should be coordinated, controlled, with good technique, efficient, or predetermined by practice or the observation of others performing the skill perfectly. As such the skill will be well-learned, efficient and consistent. The beauty or pleasing nature of a skill is its aesthetic quality (figure 5.2).



Types of skill

A **psychomotor skill** is a voluntary body movement with a predetermined end result, for example, hitting a ball with a bat.

**Fundamental psychomotor skills** are basic skills that are learned when young. They form the basis of more complex movements, for example, jumping.

A **perceptual skill** is about being able to interpret information quickly at a given time and to make an appropriate decision. For example, a goalkeeper in football assessing the movement of an opponent approaching.

A **cognitive skill** is about being able to make sense of a problem and to solve it. These skills affect perception.

figure 5.2 – badminton, aesthetic?



Classification of skill

All skills are on a classification continuum. There are several types of continuum:

Environmental influence continuum

The environmental influence continuum deals with a range of skills labelled open to closed.

**Open skills** are predominantly perceptual, with no clear beginning

or end, are affected by environment, are externally-paced, in response to many actions of others. For example, receiving a pass at soccer or hockey. On the other hand, **closed skills** are predominantly habitual, with a clear beginning and end, and are not affected much by environment. For example, an athlete performing a shot putt. See further examples in figure 5.3.

figure 5.3 – the environmental influence continuum

OPEN			CLOSED		
soccer	soccer	tennis	tennis	soccer	shot
goal save	pass	stroke	serve	penalty	putt

Continuity continuum

The continuity continuum deals with **discrete**, **serial** and **continuous skills**. Discrete skills are those that have a clear beginning and end, for example, taking a penalty kick at soccer. **Serial skills** are those that have a number of discrete elements linked together. For example, the triple jump in which the hop, step and jump are linked into one movement. **Continuous skills** are those that cannot be split up very easily into subroutines, for example, a hockey player dribbling a ball. See further examples in figure 5.4.

figure 5.4 – continuity continuum

DISCRETE		SERIAL		CONTINUOUS	
weight	javelin	high		basketball	running
lifting	throw	jump		dribble	

## Muscular involvement continuum

The muscular involvement continuum deals with **gross** and **fine skills**.

**Gross skills** are those that use large muscle movements, for example, weight lifting. **Fine skills** are those that use small muscle movements, for example, darts. See further examples in figure 5.5.

figure 5.5 – muscular involvement continuum

GROSS							FINE	
weight lifting	javelin throw	netball pass		cricket stroke	golf shot	ten pin bowling	darts/snooker	

## Pacing continuum

The pacing continuum deals with self-paced and externally-paced skills. **Self-paced skills** are those in which the performer has control over movement, for example, serving in volleyball. **Externally-paced skills** are those in which the environment has more control, for example, blocking in volleyball. See figure 5.6 for further examples.

figure 5.6 – pacing continuum

EXTERNALLY-PACED				SELF-PACED		
yachting	tennis receiving serve	soccer game	diving	tennis serve	weight lifting	

## Organisation continuum

### Skills with low organisation

are uncomplicated and have little organisational structure and whose subroutines tend to be discrete and may be practised separately. For example, swimming. **Skills with high organisation** have a complex organisational structure with subroutines which are closely linked and cannot be practised separately (the skill must be practised as a whole). They require far more attention and concentration to be performed successfully, for example, the pole vault. See figure 5.7 for further examples.

figure 5.7 – organisation continuum

LOW ORGANISATION		HIGH ORGANISATION	
swimming stroke	cycling	gymnastic move pole vault	

## Difficulty continuum

**Simple skills** are straightforward skills with few subroutines requiring little concentration and cognitive activity on the part of the performer, for example, walking or running.

**Complex skills** are complicated skills requiring a lot of attention or practice, the complexity of which can be perceived differently by different individuals. Complex skills require a large number of (interlinked) subroutines, some of which may be habitual and learned, which affects the ease with which the performer performs the skill, for example, a gymnastic floor exercise. See figure 5.8 for further examples.

figure 5.8 – difficulty continuum

SIMPLE				COMPLEX	
sprinting	throwing	gymnastic tumble	snooker	gymnastic floor exercise	

## The skill continuum

All skills have elements of **all** the classifications. For example, a golf swing may be predominantly a closed skill but it can be affected by strong weather conditions which would be an open skill characteristic. The swim start in figure 5.9 could be said to have gross and closed characteristics, but is it also self-paced and discrete?

Most skills have characteristics which make them near one end of a classification continuum. For example, a batsman in cricket as he plays a shot can be seen to be performing more of an open skill than a closed skill (he has to adapt to the speed and direction of the ball). But the cricket shot does have elements of closed characteristics too. The player has learned particular shots and almost automatically puts them into operation when the ball approaches at different speeds, with different spin, and in different directions.

figure 5.9 – swim start, gross and closed skill?



### The uses of transfer of skills

The term **transfer** (figure 5.10) describes the influence of one skill on the performance of another.

#### Positive transfer

This type of transfer occurs when **learning** in one task is enhanced by learning in **another task**. For example, learning a golf stroke may be enhanced by virtue of the fact that the player is a good cricketer.

Another example is the transfer of skills for very young children learning to pedal a bike without support of stabilisers. Here, the youngster will learn to travel on a balance bike until safe and accomplished. Then transfer directly to a pedal bike is possible without any further mechanical guidance (figure 5.11).

#### Negative transfer

This occurs when the learning of a new task is **interfered** with by the knowledge of a similar activity. For example, the flexible use of the wrist needed for badminton may interfere with the firm wrist needed for tennis.

#### Zero transfer

This describes the situation where **no transfer at all** may occur even between skills which appear to be similar. For example, learning at squash may have zero transfer from weight training.

#### Bilateral transfer (limb to limb)

This is the transfer which takes place from **one limb to another**, sometimes called **lateralisation**. For example, a soccer player learns to kick a ball with the non-preferred foot, the actions are learnt through reference by the brain to the preferred foot.

figure 5.10 – transfer

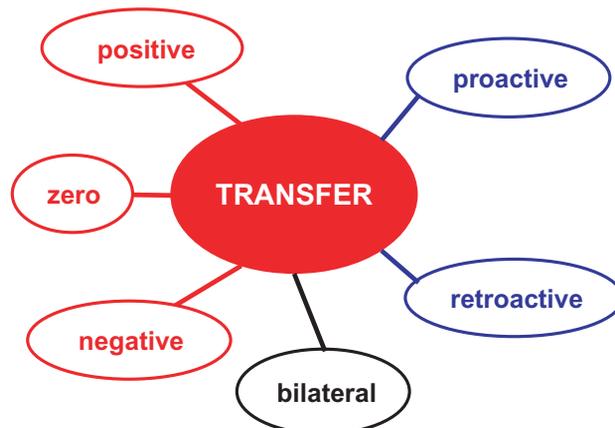


figure 5.11 – positive transfer from balance bike to pedal bike in a two year old



### The impact of practice on improving learning

This reflects the ways in which a skill **can be taught** to facilitate learning and maximise performance.

**Factors affecting choice of method** are: the **type** of skills to be taught, the **complexity** of the skill, the **classification** of the skill, the **environment**, the **ability** level of the **performer**, and the **motivational** level of the performer.

See figure 5.12 for the different methods of organisation of skill practice, and figure 5.13 on page 71 for the details of how the different methods are organised.

figure 5.12 – organisation of practice



## The whole method

figure 5.13 – practice methods

In this method, the skill is **practised in total**. The method should be preferred **where the skill or task:**

- Is of low complexity or is a simple task.
- Has high organisation.
- Consists of interrelated subroutines.
- Has discrete skills of short duration (the movement is rapid or ballistic).

**WHOLE METHOD**  
whole practice only

**PART METHOD**  
part A - part B - part C - part D practiced separately

**PROGRESSIVE PART METHOD**  
part A - B - parts AB - part A - B - C - parts ABC - part A - B - C - D - whole ABCD

**WHOLE - PART - WHOLE METHOD**  
whole (ABCD) practiced - then parts A - B - C - D practiced separately - then whole (ABCD)

This method should be preferred **where the skill or task:**

- Cannot be broken down into parts.
- Or requires temporal or spatial coordination.

Examples of skills or activities where the whole method would be appropriate are:

- Somersault or tumble in gymnastics.
- Dart throw.
- Snooker or pool shot.
- Tennis serve figure 5.14.
- Soccer penalty kick.

The **performer:**

- Would be experienced.
- Has high levels of attention.
- Is in the later stages of learning.
- Is older and highly motivated.
- Uses distributed practice (page 74).

figure 5.14 – Andy Murray - tennis serve - whole method



## Advantages of the whole method

- **Wastes no time** in assembling parts.
- Useful for quick **discrete skills** where a single complete action is required.
- The movement retains feeling of flow/kinaesthetic sense.
- Movement can be more easily understood/relationship between subroutines and so helps to create a more consistent, **habitual skill**.
- Learner can develop their own **schema/motor programmes** through trial and error learning.
- **Transfer** to real situations from practice is more likely to be positive.

## Disadvantages of the whole method

- Ineffective with complex tasks.
- Not appropriate with an element of danger.
- Not always appropriate if group/performer has basic experience.

### The part method

In this method, the skill as a whole is **broken down into parts** for practice. The part method should be preferred **where the skill or task:**

- Has high complexity.
- Is of low organisation.
- Has independent subroutines.
- Has slow or serial tasks, where the skill as a whole is of long duration.
- Or for dangerous skills.

Examples of skills or activities where the part method would be appropriate are:

- Triple jump in athletics (figure 5.15).
- Full trampoline routine with ten different moves.
- Clean and jerk in weight-lifting.

The part method should be preferred **where the performer:**

- Is a beginner.
- Has limited attention span.
- Is in the early stages of learning.
- Is having problems with a particular aspect of a skill.
- Has limited motivation.
- Uses massed practice (page 74).

### Advantages of the part method

- Allows **serial tasks** to be broken down and learned in subroutines. For example, the complex elements of a gymnastics floor routine.
- Reduces the demand on the learner when attempting complex skills.
- Allows **confidence** and **understanding** to grow when building up more complex skills.
- Helps to provide **motivation** to continue if progress can be seen to be made.
- Helps to reduce potential **injury** and **fatigue** in more complex skills.
- Allows the coach/learner to correct on **faults** and **weaknesses**.
- Recommended for low organisational tasks which can easily be broken down.

### Disadvantages of the part method

- Transfer from part to whole may be ineffective.
- Highly organised skills are very difficult to break down.
- Difficult to create kinaesthetic feel/sense of skill.
- Can be **demotivating** for performer.
- Can be **time consuming**.

### The progressive part method

In this method, parts are practised separately, then combined into slightly bigger elements for practice, which in turn can be combined into the whole movement or bigger parts for further practice and so on. This method is suitable for:

- Complex tasks or skills.
- Chaining of complex skills learned independently.
- Skills which have limited attentional demands.
- Skills which require coordination of spatial/temporal components.
- Skills which have a good **transfer** to the whole movement.

figure 5.15 – triple jump - best by parts



## Advantages of the progressive part method

- Learner has **time** to build up whole skill.
- Helps learner to develop **understanding** and schema/motor programmes as chaining of subroutines are linked together.
- Helps to reduce potential **injury** and **fatigue** in more complex skills.
- Helps build up learner's **confidence**.
- Allows the coach/learner to correct faults and weaknesses.

## Disadvantages of the progressive part method

- **Time** consuming.
- Learner could experience difficulty in developing links between subroutines/**negative** transfer.
- Could **demotivate** learner.

## The whole-part-whole method

This method is a **combination** of whole and part methods having the advantage of flexible application to almost any task and situation depending on the stage of learning of the performer and the task difficulty. A learner would first practise the whole movement and identify difficult components, which would then be practised separately. When practising a header pass, an error could be corrected by whole-part whole-practice (figure 5.16).

These difficult components might be different for different people. When sufficiently fluent, the parts can then be re-combined into the whole for further practice.

## Advantages of the whole-part-whole method

- The learner first practices the whole method to acquire a kinaesthetic feel/ understanding of the skill.
- The breaking down and practising subroutines, followed by the integration of **subroutines** into the whole skill develops greater **positive transfer** and **fluency** of movement patterns.
- The whole skill can be developed more quickly.
- Learner may experience increased **motivation** and drive to learn by this practice method.

## Disadvantages of the whole-part-whole method

- Possibility of **negative transfer** unless the coach builds up the subroutines within the same coaching session.
- May be too **complex** for early learners to digest in one session.
- Breaking down and building up skill is **time consuming**, as opposed to leaning the whole skill.

## Practice conditions - variable practice

Variable practice (see figure 5.17) is a method in which practice **conditions are varied** to encourage the formation of the patterns in the brain which enable a sportsperson to perform skills with fluency and competence.

Practice activities would include a number of different activities which could be performed in different ways. Conditions should be as **realistic** as possible in **as many situations** as possible, as near to the **competitive** or match situation as possible. This method is relevant to **open skills**.

figure 5.16 – heading required



figure 5.17 – practice conditions



### Distributed practice

Distributed practice is a method in which training sessions include **rest intervals** which could involve mental practice. Sessions would be short and spread over time with recovery periods between. Good for the **beginner** and most **skill learning**, gives **time to recover** physically and mentally and is good for potentially **dangerous** situations.

### Massed practice

Massed practice is a method in which practice is done with **no rest intervals** with sessions **long in duration**. In this method, a single training session will last a relatively long time, and all the activities are performed one after the other. This method is good for '**grooving**' of skills and to encourage an **habitual** response, is good for **discrete skills** of short duration, but can lead to **fatigue** and boredom and there may be elements of **negative transfer**.

### Overlearning

Overlearning involves a learned skill that is **habitual** because of many **repetitions**. **Such skills** are performed '**automatically**' in response to a game or sporting situation (stimulus). Hence **attention** can be directed **peripherally** to **other elements** of a game (for example, tactics or strategy).

### Mental practice

Mental practice (figure 5.18) works by producing **small muscle contractions** in the same sequence as an actual practice, and since the gross movement of the skill does not actually happen, it **prevents** wear and tear.

### Mental practice or rehearsal

Mental practice is defined as the cognitive (thinking) rehearsal of a physical skill without movement (figure 5.19).

- It creates a **mental picture** of a skill.
- Can be used to **simulate** a whole movement sequence or just part of it.
- Can be used to **imagine** and envisage success and avoid failure in a competitive situation.
- Can provide a mental warm-up in order to promote a state of **readiness** for action.
- And must be as **realistic** as possible to be effective.
- Can be used during **rest** and **recovery** periods **during** a performance or in between performances.
- Can be used to focus **attention** on important aspects of a skill.
- Builds **self-confidence** for an upcoming performance.
- **Controls arousal** and induce calmness before a performance.
- Can be used to enable the learner to **memorise** a skill or movement more effectively.

figure 5.18– mental practice

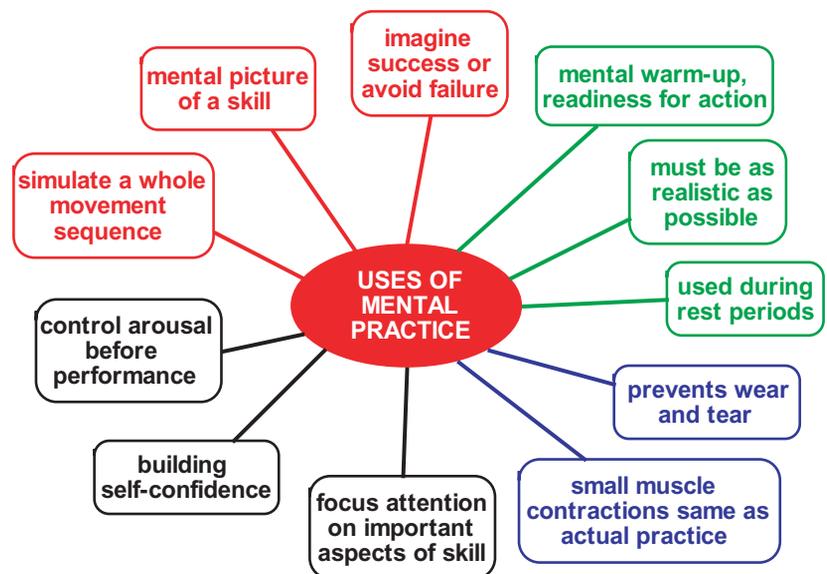


figure 5.19– mental practice



Helen Roscoe Photography

## Practice questions

- 1) Tackling in football would be best classified as which type of motor skill?
  - a. closed skill.
  - b. fine skill.
  - c. continuous skill.
  - d. open skill.
  
- 2) Skills involving large muscle group and less precise movements are best classified as which type of skill?
  - a. gross skills.
  - b. open skills.
  - c. fine skills.
  - d. continuous skills.
  
- 3) When should teachers introduce whole method of learning for students?
  - a. when the skill is high in complexity and low in organisation.
  - b. when the skill is low in complexity and high in organisation.
  - c. when the skill is low in complexity and low in organisation.
  - d. never.
  
- 4) Massed practice is the most appropriate practice method to use when:
  - a. the learner needs to practice the same task in a number of different ways.
  - b. the learner practices a set task without any change.
  - c. the learner's motivation is low.
  - d. the task is simple and can be fully learned in one session.
  
- 5) Which of these schedules of practice sessions represents the most distributed practice session?
  - a. 2 x 4-hour a week for 2 weeks.
  - b. 4 x 2-hour a week for 2 weeks.
  - c. 2 x 2-hour a week for 4 weeks.
  - d. 2 x 1-hour a week for 8 weeks.
  
- 6) Due to the different wrist action involved in tennis and badminton, a person who has learned the forehand in tennis before learning the forehand in badminton often experiences what kind of transfer?
  - a. positive transfer.
  - b. negative transfer.
  - c. zero transfer.
  - d. bilateral transfer.
  
- 7) If you were watching a number of performers in sport, what characteristics would you expect the movements of a skilled performer to have? 4 marks
  
- 8) a) Why is the shot put often regarded as a closed skill? 2 marks  
 b) Using passing skills in a team game, explain what is meant by an open skill. 4 marks  
 c) Give one example from sport of each of the following and state why you have chosen your example: continuous skills, serial skills, discrete skills. 3 marks
  
- 9) a) Choose two specific skills from an individual and a game activity and explain why you might use whole or part practice. 4 marks  
 b) Identify an advantage and disadvantage for whole and part methods of learning. 4 marks

**Practice questions**

**figure 5.20 – the racing swim start**



10) The diagram in figure 5.20 shows a profile for the racing start in swimming scaled across four different continuums representing the skill characteristics of the movement.

- a) Referring to the profile, describe the swim racing start in terms of each of the four characteristics shown. 4 marks
  - b) Using this same profile chart, sketch a profile which would describe the characteristics of a table tennis serve. 3 marks
  - c) Explain why you have chosen your particular characteristic for muscular involvement and environmental conditions. 4 marks
  - d) Explain how your profile for the table tennis serve might assist a coach in planning practices for players learning this skill. 5 marks
- 11) a) What is mental practice? 1 mark
- b) Mental practice is often used by sport’s performers when preparing for competitions. Suggest reasons why this is the case. 3 marks
- 12) a) Explain the difference between massed and distributed practice. 2 marks
- b) Justify the choice of practice conditions for a training session of a sport of your choice. 6 marks
- c) Name two characteristics of the task, and two attributes of the learner which might lead you to decide which method (massed or distributed) of practice to use. 4 marks
- 13) Generally a skill should be taught as a whole as far as possible. Give reasons for this. Some skills need to be split up into parts to be taught effectively. What are the advantages and disadvantages of this type of skill presentation? 8 marks
- 14) Explain four different types of transfer of learning. 4 marks
- 15) a) Using a practical example, explain what is meant by the term ‘transfer’ in skill learning. How can transfer be detrimental to performance? Give a practical example. 5 marks
- b) How can a teacher or a coach ensure that as much positive transfer takes place as possible in a training session? 5 marks

Answers link: [http://www.jroscoe.co.uk/downloads/as\\_a1\\_revise\\_pe\\_aqa/AQAAS\\_A1\\_ch5\\_answers.pdf](http://www.jroscoe.co.uk/downloads/as_a1_revise_pe_aqa/AQAAS_A1_ch5_answers.pdf)