PHYSICAL EDUCATION

Heckmondwike Grammar School – OCR A level Physical Education

Bridging work.

Dear PE student,

We look forward on welcoming you to Heckmondwike Grammar School in September.

Please see the attached bridging work to support your learning in A level PE.

The learning grid booklets for each module will be issued to you in September and you will compete them in the first weeks of term.

Please read the attached PE focus articles and complete the Article review sheet for each one. You may use the attached template sheet or write the headings on file paper. Please ensure you complete all sections fully.

If you have any questions about any aspect of the course or other issues, please email me - dwalker@heckgrammar.co.uk

Best wishes,

Mr Walker

Subject Leader Physical Education.

PHYSIOLOGY

Task 1 Levers, Planes and Axes – *read the following article and answer questions below*

Exam links

Levers, planes and axes is a key topic across all A-level specifications.

The topic of levers, planes and axes provides hands-on, to the point, right-or-wrong content. It is fairly easy to learn the facts for assessment objective (AO) 1, and then apply them for AO2. There isn't a great deal of AO3 analysis either. If you studied PE at GCSE, you may not have seen this topic within your specification, but this year your GCSE PE peers will be studying it, so you may be able to find yourself a younger study buddy.

If you are aspiring to a career as a physiotherapist, osteopath, chiropractor or similar profession, levers, planes and axes will become part of your daily language, given that this is how we describe the direction of movement. For example, if you have an injury that means you cannot bend your elbow, you will be described as having limited or no movement in the sagittal plane.

The three components can be summarised as:

- **Levers**: all movement is as a result of one of three lever systems.
- **Planes**: movement occurs within one of three planes (directions).
- **Axes**: all rotation is around one of three axes.

The lever systems

The three lever systems indicate that movement can occur as a result of muscular contraction (**effort/force**) around a **fulcrum** point (joint) in order to move a **resistance** (this could be body weight, or a mass such as a ball). All three lever systems have three common features:

- fulcrum (pivot point)
- resistance (load)
- effort (force)

Key terms

Effort/force Applied by muscles to create movement at a joint.

Fulcrum/pivot The pivot point around which movement occurs or mass is supported, e.g. the skeletal joint.

Resistance/load Mass of resistance to effort or force.

You will be required to draw each lever system (Figure 1), ensuring that you correctly identify the feature in the middle:

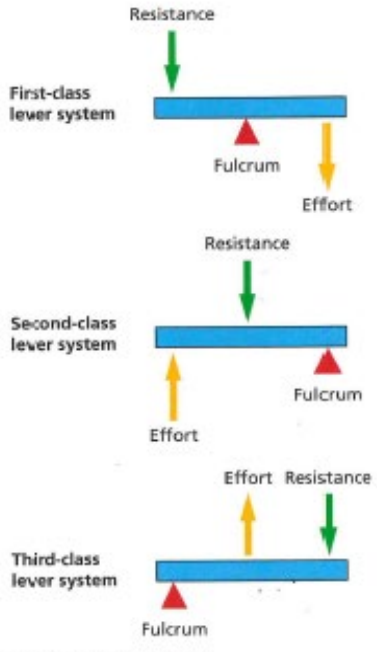

Figure 1 Lever systems

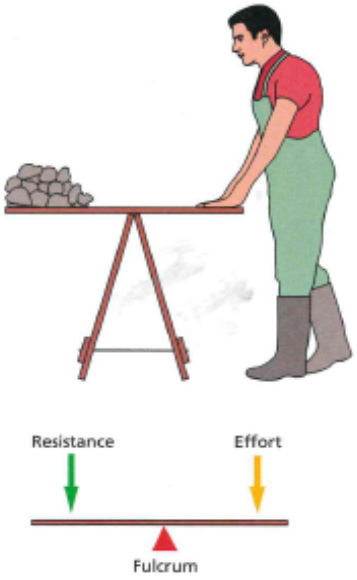

Figure 2 First-class lever system

- In a first-class lever system, this is the *fulcrum*.
- In a second-class lever system, this is the *resistance*.
- In a third-class lever system, this is the *effort*.

A useful rhyme to use to remember this is '1 2 3, F R E'.

Key exam points for lever systems

- It is important to get the feature in the middle correct (hence 1 2 3, F R E).
- The lever image can be reversed, meaning that the features on each end can be swapped over. However, the layouts shown in Figure 1 are the most frequently used.
- The fulcrum is always under the line, as is the pivot point
- Resistance is always above the line, and is now commonly drawn as a downwards arrow, as this indicates the effect of gravity on a mass.

First-class lever systems

This lever system is most like a see-saw in action, with the fulcrum in the middle (Figure 2). It is exclusive to the action of the triceps brachii, i.e. elbow extension. It is also relevant to the nod of the head,

Figure 3 Second-class lever system

but this is not a good example of a sporting action, so is rarely used.

When the triceps contract concentrically, they cause elbow extension (sagittal plane, transverse axis). This is common in shooting in netball or basketball, or in a line out throw in rugby. Imagine the triceps contracting (effort/force) when holding a ball ready to shoot (resistance/load). This contraction opens the angle of the elbow joint (the fulcrum) to release (shoot) the ball.

Exam tip

Remember that elbow flexion is a third-class lever system — only elbow extension is a first-class lever system.

Second-class lever systems

This lever system is most like a wheelbarrow, with the fulcrum at one end, the resistance in the form of load 'in the wheelbarrow', and the effort applied upwards at one end (Figure 3). Remember that you don't need to draw the body parts, just the line and three component parts.

This lever system solely applies to the ankle joint, i.e. plantarflexion and dorsiflexion movements.

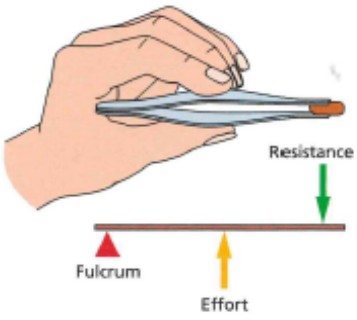

Figure 4 Third-class lever system

Third-class lever systems

In this lever system, the fulcrum is again at one end, but this time the effort is in the middle. Think of tweezers or tongs — the load is whatever you are moving/pulling (Figure 3).

For a sporting example, think of a hockey stick with the fulcrum at the end of the handle, held by the left hand. The effort is the right hand in the middle, and the load is the ball on the end of the stick. Most joints and joint actions in the body use the third-class lever system.

Mechanical advantage

Mechanical advantage describes what a lever system can do best. Each lever system has a mechanical advantage and disadvantage. For AQA, you need to know these for all three lever systems. For OCR you only need to know the mechanical advantages for the second-class lever system.

Mechanical advantage depends on distance between fulcrum and effort (known as *effort arm* or *force arm*) in comparison to the distance between the fulcrum and resistance (known as *resistance arm*) (Figure 5).

Remember the equation:

$$\text{Mechanical advantage} = \frac{\text{Effort arm}}{\text{Resistance arm}}$$

Second-class advantages and disadvantages

In second-class lever systems, the force arm is longer than the resistance arm. Therefore the mechanical advantage is that you can generate large amounts of force to overcome a resistance/heavy

Exam-style questions

1 Describe the mechanical advantage of the second-class lever system (1 mark)

2 A netballer is about to execute a netball shot. Their elbows are bent in preparation. Identify the lever system operating at the elbow. (1 mark)

3 Identify the plane, axis and lever system operating at the ankle joint when a performer is in the downward phase of a squat. (3 marks)

4 Sketch and label a third-class lever system. (2 marks)

5 Draw the force arm (FA) and resistance arm (RA) onto each of the lever systems in Figure 1. Note the mechanical advantage of each being the longest arm.

6 Differentiate between the lever systems operating at the elbow joint in flexion and extension. (4 marks)

7 Analyse the movements possible at ball-and-socket joints such as the shoulder. (6 marks)

PEReviewExtras

Check your answers at www.hoddereducation.co.uk/pereviewextras

Therefore, axes are relevant to angular motion (AO1, biomechanics).

The three axes are:

- The **longitudinal axis**, running vertically through the length of the body, i.e. from top to bottom.
- The **transverse axis**, running from side to side (like the bar through a table footballer), i.e. opposite to the longitudinal axis.
- The **sagittal axis** (in OCR, this is known as the *frontal axis*), running from front to back through the middle of the body, e.g. through the belly button or through an isolated joint.

In terms of AO2, rotation can involve the whole body, e.g. a forward roll in gymnastics around the transverse axis.

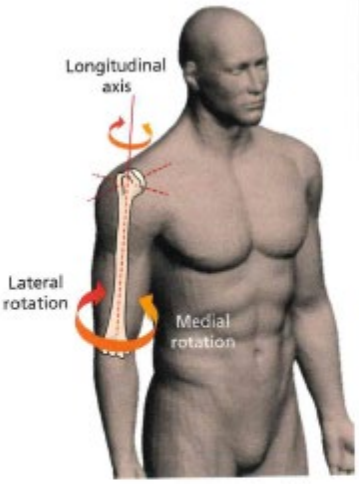

Figure 7 Rotation at the shoulder joint

Or it can be isolated to a joint, as in the example of median (internal) and lateral (external) rotation at the ball-and-socket shoulder joint shown in Figure 7. This occurs in bowling and in tennis racquet strokes.

Planes and axes

Each plane is paired with an axis (Table 1):

- The sagittal plane is paired with the transverse (side-to-side) axis.
- The frontal plane is paired with the sagittal/frontal axis.
- The transverse plane is paired with the longitudinal axis.

Movement occurs through a plane and around an axis, as in the case of movements in the frontal plane around the sagittal/frontal axis, such as abduction and adduction movements (Figure 8).

In this case, you can think of the sagittal/frontal axis as the pin in the middle of a Catherine wheel on Bonfire Night. The Catherine wheel spins around this central axis. Now imagine a performer cartwheeling — it's much the same.

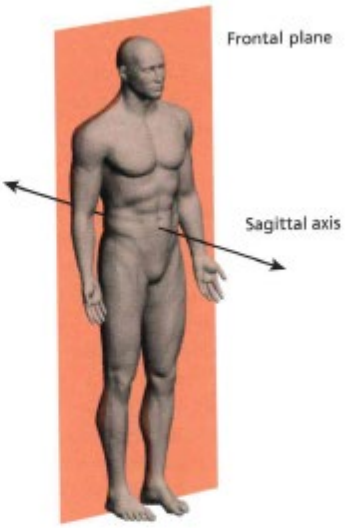

Figure 8 Movement through the frontal plane around the sagittal/frontal axis

With the sagittal plane and transverse axis, you can imagine a table footballer. You can rotate the player forward and backward, but not twist or turn or move forward or backward. This is the most common feature, applying to all flexion and extension movements.

This just leaves the transverse plane and longitudinal axis (like the Earth spinning round on its axis). You may see this axis described as the *vertical axis* due to its vertical position. Rotational movements occur in the transverse plane and around the longitudinal axis.

Table 1 Working together

Plane	Motion	Axis	Example
Sagittal	Flexion/extension	Transverse	Walking, running, squats, bicep curl, leg extensions, front somersault
Frontal	Abduction/adduction	Sagittal (AQA) Frontal (OCR)	Star jump, cartwheel, side-bending
Transverse	Rotation/circumduction/ horizontal abduction/ horizontal adduction	Longitudinal	Throwing, 360° twist, ice-skating spin, golf swing

Key points

- The triceps brachii (elbow extension) provide an example of a first-class lever system.
- Ankle joint movements provide an example of a second-class lever system.
- Other joints and joint actions are third-class lever systems.

Anna Snook teaches PE at Wycombe High School.

PHYSICAL EDUCATION

PHYSIOLOGY

HGS - A LEVEL Physical Education - Bridging Work 2025 - Article reviews 2025

Student Name -

Article title - Levers, planes and axes

PE focus Volume 15 2020

TASK 1 - Answer the following questions. *Using the templates provided at the end of the document*

AO1: Knowledge and Recall Questions

- What are the three key features common to all lever systems?
- In a first-class lever, which component is in the middle?
- What type of movement occurs in the sagittal plane?
- Which axis is paired with the transverse plane?
- Define the term “mechanical advantage.”

AO2: Application Questions

- A gymnast is performing a cartwheel. Identify the plane and axis of movement involved.
- Describe a sporting example where a third-class lever is used.
- Explain why a second-class lever is beneficial when lifting a heavy weight.

AO3: Analysis and Evaluation Questions

Analyse how a hurdler benefits from the use of a second-class lever system during take-off.

Explain how knowing about lever systems can help improve the performance of a basketball player during a jump shot.

SOCIOLOGY

Task 2 The Relationship Between Sport and Society – *Read the following article and answer questions*

A exam focus

Eric Reid (35) and Colin Kaepernick (7) kneel in protest during the singing of the American national anthem

The relationship between sport and society

Edexcel

Drawing on historical and contemporary events, **Adam Morton** discusses the dynamic relationship between sport and society

Like many other cultural activities, sport is said to reflect society. One example that commonly features in A-level PE specifications is the emergence of modern versions of sport, familiar to us today, from pre-industrial, feudal, popular recreations and mob games. Extending this idea of a dynamic relationship between sport and society, this column considers sport in the context of five contemporary sociological issues:

- race
- gender
- sexuality
- social class
- religion

Illustrating the links between sport and social change highlights the importance of contextualising sporting events within the historical and contemporary settings in which they occur. An understanding of the social impact and importance of sport is necessarily based on an understanding of the broader social context in which the sport is played (Malcolm 2012). Here we will examine how sport reflects and reproduces patterns evident in society, and consider examples of how sport can act as a point of resistance against wider social issues.

Sport and race

Nowhere is the relationship between sport and racial politics more evident today than in the National Football League (NFL). When Colin Kaepernick (then the San Francisco 49ers quarterback) knelt, instead of standing, during the traditional pre-game American national anthem, he was making a silent but globally publicised protest in support of the Black Lives Matter campaign. While some, including Donald Trump, saw this as unpatriotic, Kaepernick explained his actions in an interview at the time:

> I am not going to stand up to show pride in a flag for a country that oppresses black people and people of colour. To me, this is bigger than football and it would be selfish on my part to look the other way.
>
> Colin Kaepernick

American football has also been the subject of controversy for racial stacking. This term describes a phenomenon in which race not only influences an individual's involvement in certain sports but also the role or position that they play in a sport. In the case of the NFL, black American footballers have historically been statistically less likely to play in central positions involving decision making (e.g. at quarterback) than those where physical attributes are deemed more important (e.g. running backs). Implicit in this is a prejudiced perception that there is a correlation between race and intelligence. Sometimes referred to as 'positional segregation', studies have found similar trends in rugby union (South Africa), ice hockey (Canada) and football (England).

More generally, research has shown that black athletes are more likely to be described in physical terms than white athletes, who are more frequently described in terms of mental attributes. Such prejudice reaches beyond players, and English football is often criticised for a lack of black and ethnic minority managers in the professional leagues. As a reflection of society, these sporting examples ought to be seen in the context of wider prejudice (e.g. the Black Lives Matter campaign). In a recent *Guardian* newspaper article, former education minister David Lammy claimed that, at the University of Oxford, 13 colleges did not offer a single place to black A-level applicants between 2010 and 2015.

Sport and gender

The profile of women's sport has risen significantly in recent years, with a notable increase in awareness and coverage of major sporting events. In terms of Olympic participation, for example, there is a long-term trend in which the opportunities for women to compete have increased throughout the course of modern Olympic history (Figure 1). However, there are still more Olympic events for male competitors than for female ones.

For women's sport more generally, 2017 was a significant watershed, with the Women's Cricket World Cup, the UEFA

Source: Olympic.org

Figure 1 Female participation at the Olympics

The Netherlands played England in the semi-final of the Euro 2017 tournament

Women's Euro 2017 finals and the Women's Rugby World Cup all taking place and garnering much warranted and overdue attention. That year also saw further evidence of the growth in women's sport as the Kia Women's Super League cricket entered its second year and plans were announced for the creation of women's teams for two of rugby union's traditional sides, the Barbarians and the British and Irish Lions.

The scale of these changes was reflected in the inclusion, for the first time in 2016, of international women's football teams in the hugely popular *FIFA* computer game series. However, while the profile of women's sport continues to rise, that it makes up just 7% of all UK sports media coverage is reflective of wider, ongoing gender inequality, as exemplified by the BBC gender pay dispute, which revealed significant disparities between the pay of men and women in similar roles.

Sport and sexuality

Changing social views on sexuality have also been reflected in sport. Using the slogan 'Make Sport Everyone's Game', the Rainbow Laces campaign, orchestrated by LGBT charity Stonewall, has used the high profile of sport to draw attention to homophobia in sport and society, with many athletes choosing to wear rainbow-coloured laces in support of LGBT inclusion.

The 2013 World Athletics Championships in Moscow saw another example of sport acting as a point of resistance. Tatyana Firova and Kseniya Ryzhova, two female athletes in the gold medal-winning Russian 4 × 400m relay team, shared a globally publicised kiss on the medal podium. While there was some dispute at the time about whether this was simply a celebratory kiss, many saw it as a protest against a Russian 'anti-gay' law prohibiting the promotion of homosexuality, and against wider concerns around homophobia in the country.

Sport and social class

Regarded as one of the founding fathers of sociology, Karl Marx argued that capitalist society is divided and governed by economic determinism. That is to say, an individual's life opportunities are determined by how much money (economic capital) they have. In this sense, there is a significant body of evidence which supports the view that sport reflects society, with success at the elite level and sporting participation more generally both correlating with higher social class.

The British Olympic team exemplifies this, in what has been described as 'one of the worst statistics in British sport'. British athletes educated in independent (private) schools were not only statistically overrepresented at both London 2012 and Rio 2016, but also more likely to win medals. The influence of social class is particularly strong in certain sports. The proportion of privately educated medal winners in Team GB was equestrianism (62%), rowing (52%), tennis (50%) and hockey (44%).

There is clearly a correlation between schooling and success in what are sometimes referred to as 'posh' or 'middle-class' sports. While this extends to some other elite sports (e.g. professional cricket and rugby in the UK) it is not the case in football and rugby league. Here the percentage of pupils

Russian athletes celebrate winning gold in the women's 4 x 400m relay at the 2013 IAAF World Championships in Moscow


The Irish rugby team represents both Northern Ireland and the Republic of Ireland

educated in the state sector mirrors those playing the sport at an elite level.

As well as influencing the sports people play, social class also influences the way in which people partake in sport. In much the same way that the food an individual consumes (e.g. caviar, or fish and chips) is seen as reflective of their social class, so too are the sports they are involved in and the way in which they are involved in them (e.g. a local council-owned golf course, or an exclusive, members-only club). Sociologist Pierre Bourdieu describes this pattern in sporting participation as:

> The opposition between the most expensive and smartest sports (golf, sailing, riding, tennis) or the most expensive and smartest ways of doing them (private clubs) and the cheapest sports (rambling, hiking, jogging, cycling, mountaineering) or the cheapest ways of doing the smart sports (e.g. tennis on municipal courts or in holiday camps).

Sport and sporting events have also been the site of protest about inequalities in society. The build-up to the 2016 Olympics in Rio de Janeiro was marred by civil unrest as the local population protested against a national economic crisis, with rising unemployment and falling public sector wages threatening security, health, education and transport services.

Sport and religion

Closer to home, sport in Ireland provides an illustration of the dynamic relationship between sport and society. Here the sports traditionally played reflect the religious division in society. In general terms, they have been categorised into British (e.g. rugby, hockey and cricket) and Gaelic (e.g. hurling and Gaelic football) games. Historically these have been predominantly played by Protestant and Catholic people respectively. Association football, given its universal popularity, is seen as being less culturally specific.

Unlike football however, where the Republic of Ireland and Northern Ireland compete as separate teams, the Irish national rugby team represents both parts of the island, with the best players from across the island competing together, as one team. In an effort to further encourage a sense of unity, the song 'Ireland's Call' — which includes the verse: 'Ireland, Ireland, together standing tall, shoulder to shoulder, we'll answer Ireland's call' — was adopted in 1995 and is now sung by the Irish team before international matches.

Conclusion

Sport is often described as reflecting society. Wider social issues such as racial tension, gender equality, sexuality, the privilege and disadvantage inherent in social class, and religious differences have all influenced sport. However, as well as reflecting social trends and prevalent beliefs, we have also seen, through a series of contemporary events, how sport can act to reproduce and perpetuate social inequality. While many would argue that for too long sport has reflected prejudice and only served to reproduce this through exclusion, discrimination and racist, sexist or homophobic 'banter', sport ought also to be viewed as providing a form of resistance against social injustice, affording athletes such as Colin Kaepernick the opportunity to kneel for what they believe in.

Adam Morton teaches physical education at Mill Hill School, London.

PHYSICAL EDUCATION

SOCIOLOGY

HGS - A LEVEL Physical Education - Bridging Work 2025 - Article reviews 2025

Student Name -

Article title - The relationship between sport and society

PE focus Volume 13 2018

TASK 2 - Answer the following questions. *Using the templates provided at the end of the document*

AO1/2 Questions

- What was Colin Kaepernick protesting when he knelt during the national anthem?
- What is racial stacking in sport?
- Despite increased visibility, what inequality still exists in UK sports media?
- How did Russian athletes Tatyana Firova and Kseniya Ryzhova make a political statement in 2013?
- How does social class affect participation and success in sport?
- Which sports in the UK showed high representation of privately educated Olympic medal winners?

Higher-Level Analysis and Evaluation (AO3)

- In what ways does sport reproduce social inequality?
- Discuss the significance of sport media coverage in shaping public attitudes toward gender equality.

PHYSICAL EDUCATION

PSYCHOLOGY

TASK 3

1. Gymnastic Routine

Classify a gymnastic floor routine against the following skill continua and justify a reason for each.

- Open – Closed
- Simple – Complex
- Gross – Fine (6 marks)

2. Explain how the use of the following types of guidance would be beneficial to the gymnast when practicing their floor routine.

- Verbal
- Manual/Mechanical (4 marks)

2. Feedback Knowledge Check

Read the article below on feedback and then answer each question as fully as possible, using relevant examples where appropriate.

Section A: Short Answer Questions

1. Define intrinsic feedback and explain when it becomes most useful in the learning process.

2. Outline the difference between intrinsic and extrinsic feedback.

3. At which stage of learning is extrinsic feedback most beneficial, and why?

4. Explain why positive feedback should be precise and specific to the skill.

5. Describe one-way negative feedback could help an elite athlete improve.

6. What risks are associated with overusing negative feedback?

7. What is the difference between knowledge of results (KR) and knowledge of performance (KP)?

8. Why is knowledge of performance particularly useful in closed skills?

Section B: Applied Questions

9. A novice swimmer is learning the front crawl. What types of feedback would be most beneficial for them and why?

10. A footballer notices their pass reaches the intended player. What type of feedback is this, and how could it help their performance?

11. A gymnast is performing on the pommel horse. Describe how intrinsic feedback and KP might support their performance.

12. Explain how an elite cricket batter uses intrinsic and extrinsic feedback to play a successful shot.

The six feedback and learning phases

Vol 17 – Sept 2021

1 Intrinsic feedback

Intrinsic information is associated with the feel of the movement as it is being performed. It is also called *kinaesthetic feedback* and is detected by proprioceptors, which are present in muscles, tendons and joints.

Intrinsic feedback cannot readily be deployed during the cognitive stage of learning, but develops during the associative stage. It is utilised best from the onset of the autonomous stage, helping to correct movement during performance. For example, a pole vaulter will make small adjustments to their action and body shape during flight. Kinaesthetic feedback replaces the need for conscious control. While this helps fluency of movement, it also allows the autonomous performer more attentional space, allowing supplementary tasks to be undertaken simultaneously.

2 Extrinsic feedback

Extrinsic information is detected by the learner from an outside source, e.g. the coach or teacher. It involves the learner hearing or seeing information, and can be positive or negative.

An extrinsic input can support intrinsic feedback but is best administered at the cognitive stage of learning when novice performers have yet to develop kinaesthesis.

3 Positive feedback

Positive feedback is given or received when a skilled movement is performed correctly. Input can be intrinsic or extrinsic but in either case it is used to reinforce the action. In order to be effective, delivery must be precise and specific to the skill.
Positive feedback is useful for motivating learners during earlier learning phases and most helpful as a teaching aid at the cognitive level. For example, a teacher might praise the correct pattern of movement after a successful volleyball spike.
It is less effective at the autonomous stage because mistakes require detailed analysis to facilitate progress at higher levels, e.g. if hands slip during the pulling phase in a butterfly stroke, the elite swimmer will be less efficient.
During all phases of learning, positive feedback loses impact if overused.

4 Negative feedback

Negative feedback is given or received when the skilled movement is incorrect. It can be intrinsic or extrinsic, and is used to eradicate bad habits.

Negative feedback can be facilitating at the autonomous stage, when the athlete is finely tuning a skill. With careful use it can motivate elite performers and help them remain at the autonomous level.

If overused, negative feedback can hinder progress at any learning stage.

5 Knowledge of results

Knowledge of results (KR) concerns information about the outcome of an action. It allows skills to be modified or upgraded. KR can be positive or negative, but is always extrinsic.

KR is useful during all phases of progress, but for different purposes. For example, during cognitive learning a dancer would need to focus on foot position to confirm correct placement. However, at the autonomous stage, a footballer, on seeing a pass was accurate, can decide on a subsequent supporting move.

In general, KR is most useful in open-skill execution, as the outcome and not the quality of movement is the criterion of success, e.g. the successful football pass. However, KR is not useful in some closed skills, e.g. a gymnastic vault, because performance is judged on quality of movement and not solely on outcome.

6 Knowledge of performance

Knowledge of performance (KP) tends to be detected intrinsically and is referred to as the ‘feeling tone’ of the skill. It concerns the quality involved in movement and informs the performer whether the skill movement is correct or not in terms of articulation.

KP operates at the autonomous stage, as it allows quick correction and is good for modifying overlearned skills. It is based on technique and helps to make a comparison between previous and current performance. Detection is made during skill execution.
KP is vital for elite performance but cannot be utilised during earlier learning phases.
In general, KP is most useful in some closed skills when performance is judged on quality of movement. For example, a gymnast will utilise KP to control movement quality during a pommel horse sequence.

However, kinaesthesis is also central in open-skill performance, e.g. KP allows the correct weight to be applied when passing the ball in hockey. Autonomous players will develop KP to enable delicate touches, e.g. batters in cricket apply ‘soft hands’ to steer the ball away from fielders and complex body movements like goalkeeping diving saves are only possible when kinaesthesis is fully developed.

KP is acquired through experience, therefore it takes a long time to develop. For some aspirants, long learning processes are demotivating, preventing progress towards expertise.

AO1 – ***Produce a glossary and definitions of content specific terms:***

A02 – Describe the application of theory to practical examples?

What sports / activities are referenced?

A03 – Analysis / Examination / Critical evaluation / Positive and negative effects / Comparisons / Conclusions.

AO1 – ***Produce a glossary and definitions of content specific terms:***

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