

CHAPTER 13: The role of technology in physical activity and sport

Practice questions - text book pages 182 - 183

- 1) A successful training programme may be used for injury prevention. Which one of the following is not considered to be a preventative method?
- fitness training.
 - the training cycles within a periodised year.
 - ice baths.
 - a balanced diet.

Answer: d.

- 2) What is meant by the term talent identification?
- the process of identifying promising young talent and accelerating its progress.
 - providing a learning environment that develops potential.
 - using a variety of testing methods that profiles an individual.
 - a monitor of progress and performance.

Answer: a.

- 3) Which one of the following has a negative impact on sport technology?
- hypobaric chambers provide faster rehabilitation following injury.
 - smart clothing creates an 'uneven playing field'.
 - sports equipment can be designed for individual needs.
 - video analysis of matches highlight strengths and weaknesses of a player's performance.

Answer: b.

- 4) Which one of the following is not an example of negative impacts derived from hosting a global sports event?
- overcrowding.
 - generation of civic pride.
 - litter.
 - noise pollution.

Answer: b.

- 5) Which one of the following is not a desirable legacy from the Olympic Games?
- residential displacement.
 - new branding opportunities.
 - new stadia and infrastructure.
 - civic pride.

Answer: a.

- 6) How can sports analytics assist in the development skill and technique?

4 marks

Answer:

- Sports analytics' major role is providing **accurate** and precise **feedback** using both **quantitative** and **qualitative** data analysis.
- **Visual feedback** can be used to make immediate technical adjustments that can help fine tune technique.
- Computer simulation can predict techniques that can be used when **planning future** changes in technique.
- Over time, the coach and performer can assess if technical improvements have been made.

7) How can adaptive and assistive technology increase access to sport for the disabled and elderly? 4 marks

Answer:

4 marks for four of:

- **Assistive technology** refers to any item, piece of equipment that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.
- For example, Hiking poles offer increased support and stability on unfamiliar ground and uneven surfaces, help improve posture and increase confidence for the individual. Walking is the most popular activity within the retirement population.
- Assistive devices can help to improve the quality of life for both the disabled and elderly and maintain their sense of independence.
- **Adaptive technology** covers items that are specifically designed for persons with disabilities and would seldom be used by non-disabled persons.
- For example, wheelchairs used for wheelchair rugby and wheelchair basketball, are designed to withstand heavy impacts and be easily manoeuvrable.
- Throwing frames assist in weight bearing, thus enabling a seated disabled athlete to throw.
- Adaptive devices enable disabled sports performers to participate in sports that previously have been inaccessible.

8) Identify and describe a modern technology that aids analysis and feedback for improvements in sporting performance. 4 marks

Answer:

Note that there are many possible answers available.

4 marks for four of:

- **GPS positional software:** for example, Prozone uses cameras and sensors around the playing area to collect quantitative data.
- Analysing the position and speed of players such as average player recovery time, average total distance run by players, marking on and off the ball play of individual players.
- Giving fitness, strategy and tactics KPIs.
- Another example is the use of Smart replay technology such as **HawkEye** used in tennis, cricket and snooker.
- HawkEye is an electronic line calling service that delivers instant video replays.
- To assist officials with close decisions on foot faults or line calls, for example in a game of tennis.
- Offering players the opportunity to contest close umpiring decisions.
- Providing entertainment for live and armchair viewers.
- Post-match data for **quantitative** and **qualitative** analysis.
- HawkEye is also used to verify lbw decisions in cricket.
- And positional accuracy in snooker.

- 9) The London 2012 Olympic legacy is described as the longer term benefits and effects of the planning, funding, building and staging of the Olympic and Paralympic Games in the summer of 2012. Evaluate the success of this legacy.

6 marks

Answer:

6 marks for six of:

- **Economic** – supporting new jobs and skills, encouraging trade, inward investment and tourism, for example, apprenticeships in broadcasting companies.
- Long-term benefits on London's and Britain's tourism industry.
- **Regeneration** – of a whole London district with new homes, improved transportation and reuse of Olympic venues.
- The re-opening of the Olympic Park as the Queen Elizabeth Olympic Park in July 2013.
- Sport **funding** and investment – funding for elite sport until has continued, supported by the National lottery.
- Continued high investment over the next five years in the Youth Sport Strategy, linking schools with sports clubs and encouraging sporting habits for life.
- Development of more sports **facilities** and encouraging participation in schools sports and wider.
- **Education** - Introduction of the School Games programme to boost schools sport and county sport festivals.
- Introduction of Sport England **initiatives**, such as Activate.
- Reports that school sports participation has not been boosted.
- **Social and volunteering** – has continued to be successful as highlighted by the over-subscribed number of volunteers for events such as for the Commonwealth Games Glasgow 2014 and World Athletics Championships in 2017.
- **Learning** – shared knowledge and lessons learned from the construction of the Olympic Park and preparing and staging the Games are used by organisers of forthcoming Global sporting events.

- 10) Identify the disadvantages of using technology in assisting officials in their decision making.

3 marks

Answer:

3 marks for three of:

- Officials may become too **reliant** on technology systems and so could lose skills such as time-keeping, the ability to make quick, decisive marginal decisions.
- Technology **can't be used for everything**/officials are an integral part of the sporting contest
- **More officials** are required, for example, the 4th referee in rugby.
- It can **slow down** the speed of the game whilst replays are viewed.
- **Breaks in play** can be disruptive for spectators if too long.
- It is **not always reliable**. Systems break down.
- **Cost** limits use of technology.

- 11) Discuss how increased technology has helped officials in their decision making and its impact on the sporting event.

3 marks

Answer:

3 marks for three of:

- Ensures **correct decisions** are made/fair competition/less controversy/players more confident in decisions.
- Helps **officials communicate** with each other.
- **Less pressure** on officials to make the final judgement/less post-match criticism.
- **Timing/measurement accurate**.
- Creates **excitement** in crowd waiting for decision/allows players to officially challenge decisions.

12) Discuss how technology that can be used to improve performance.

6 marks

Answer:

6 marks for six of:

- **Equipment:** tennis rackets/cricket helmets, hypobaric chambers.
- **Injury rehabilitation:** for example, hyperbaric chambers.
- **Smart Clothing:** that is flexible, strong, breathable, absorbent, insulates and wicks away sweat. Resistance to moisture and keeps athlete dry and compression clothing that aids recovery.
- **Footwear:** bespoke footwear.
- **Playing surfaces:** for example, all-weather/multi-use games areas such as 3G technology.
- **Facilities:** for example, sport-specific venues/climate control.
- **Cameras:** for example, photo-finish/action replay.
- **Computers:** for example, storage of information/match/games/individual sport analysis.
- **Software programmes:** for example, technique analysis/dartfish, nutritional software.

- 13) Discuss the notion that sports performers are only as good as the technology that supports them. Use examples from global sports to support your answer.

15 marks

Answer:

2 marks for two of:

- Sports performers want to **improve**.
- And so are willing to take on **different methods** to do so.
- Otherwise they are left behind in the race to be the best.

2 marks for two of:

- Some **Governing Bodies** have striven to keep technology's influence to a minimum.
- For example, the only change in **basketball** in the last 35 years, has been the replacement of the official leather ball with a composite material that gives greater consistency and grip.
- **Table tennis** has maintained the traditional celluloid ball and wooden bats.
- **Cricket** has retained its traditional ball.

4 marks for four of:

- **Other sports** have benefited from **major changes in equipment technology**.
- For example, **skis** have changed shape to give greater efficiency.
- **Pole-vault poles** have changed from wood to bendy bamboo to aluminium (and landing in sand pits) to highly flexible fibreglass poles.
- That catapult an athlete over a bar 5 and 6 metres for females and males respectively.
- And deep foam cushioning for landing.
- **Athletic tracks** were surfaced with crushed cinders as recently as the 1964 Tokyo Olympic Games.
- The 1968 Olympic Games was the first time a polyurethane surface (known as Tartan) was used.
- Records tumbled at these Games.

7 marks for seven of:

- What are available to all sports performers are technologies that **refine technique and fitness**.
- And hence make a difference to their performances.
- **Instant replay** can give **feedback** information to both athlete and coach during training and performance that could assist the technical performances that may follow.
- **Software systems** such as Dartfish for individual sports.
- Provides frame to **frame comparison** between the performer and a technical model.
- And Prozone analyses the **positions** of players on the pitch by using up to 12 fixed cameras and sensors.
- Enabling a coach or manager to assess fitness levels.
- And **analyses the strategy and tactics** within the game.
- A **heart rate monitor** accurately records and displays heart rate function during physical activity.
- Allowing athlete to predetermine and maintain the training intensity or training zone during the session.
- **Scanning** technology can be used to create personalised footwear.
- **Force plate technology** tells the coach the precise way in which the foot is active during the strike with the ground.
- And enables him or her to assess whether changes in foot posture are required.
- This technology has been used to support elite triple, high and long jumpers within the UK over the 15 years.
- And has assisted athletes such as Jonathon Edwards – current world record holder for triple jump.
- Data from **wind tunnel technology** has been used in refining the design of equipment such as cycles and helmets.
- This technology has supported the enormous success of the Great Britain cycling squad in the 2008 Olympic Games in Beijing.
- **GPSports** technology monitors a position, speed and cadence, useful to countryside sports such as mountain bike riding and walking.
- And can link to heart rate monitors and even video to gain a better picture of an athlete's performance
- All these technologies have created modern global sport that strives to achieve higher, further and faster performances.

14) Comment on how the future of sport may be affected by the developments in technology.

6 marks

Answer:

6 marks for six of:

- The biggest change in sport happens when a technology is introduced – for example, **carbon fibre** led to radical redesigns of bikes, boots and boats.
- For example, cutting edge development in racket design includes the incorporation of piezoelectric crystals which produce electricity under stress.
- The current generated by a ball hitting the strings is amplified and returned to the crystals in the frame.
- Causing them to stiffen to give greater power and 50% less vibration.
- For example, the sports shoes of the future will be even more sport-specific than they are now.
- The use of **intelligent fabrics**, such as sheer thickening material, will enable a player to self-adjust to the requirements of the pitch or conditions.
- Cushioning will improve so that the incident of hairline fractures reduces.
- And shoes will be **self-cleaning**.
- Experts at the University's Sports Technology Institute continue the development of lighter a football boot.
- **Global sports facilities** will be constructed to provide a central sporting complex that has a negative carbon footprint, for example, the Tokyo Olympic facilities being built for the 2020 games.
- **Mobile devices**, such as phones and tablets, are one of the fastest expanding markets.
- They are likely to enhance sport with their ability to measure an athlete's performance and analyse it.
- Such technology will enable manufacturers, coaches and elite athletes to quantify and understand the effect of a piece of kit in action on the pitch or court.
- The cost of sporting technology widens the chasm between rich and poor nations and elite and grass roots participation.

15) Sports are a form of entertainment. How have contemporary technologies enhanced the entertainment value for both live and armchair spectators?

5 marks

Answer:

5 marks for five of:

- **Miniaturized video cameras**, in places such as racing cars, provide TV footage in ways that previously was not possible.
- The analysis of sport performance provided by officiating technologies such as **HawkEye's** electronic line-judging system and **goal-line technology**, have greatly enhanced the spectator's knowledge and involvement.
- And help to diffuse audience aggression and frustration, when pressure points do not fall prey to with bad umpiring decisions.
- A **'mic'd up' referee** further facilitates the involvement of live and armchair fans to engage in real-time play.
- Spectator interest and excitement are enhanced by broadcasting and **in-stadium replay screens** and scoreboards that can very quickly communicate results to an audience.
- A **wider range of sports** are more accessible and visible through the development of technology, for example, glass walled squash courts.