CHAPTER 15: The role of technology in sport

Practice questions - text book pages 203 - 204

1) There are a wide range of methods that can be used in data collection.
What is meant by the mixed-method research approach?
   a. the collection of quantitative and valid data.
   b. the collection of quantitative and qualitative data.
   c. the collection of qualitative and valid data.
   d. the collection of quantitative and objective data.

Answer: b.
Explanation:
- *Mixed-method research approach provides quantitative data which can be explored further in a discussion-based context or through descriptive responses e.g. descriptive questioning on a questionnaire representing qualitative data.*

2) Which one of the following statements best describes subjective data in relation to a hockey player?
   a. the player's heart rate averaged 150 bpm during the match.
   b. the player covered 2000 metres during the match.
   c. the player made 6 successful tackles and 8 unsuccessful tackles during the match.
   d. the player's passing technique looked good throughout the match.

Answer: d.
Explanation:
- *Answer d. is an observation made without measurement and is therefore liable to be influenced by personal opinion and therefore is subjective in nature.*

3) Which one of the following is not a potential problem which a sports coach might have when he or she is relying on his or her own observation of a sporting performance?
   a. an important feature of a performance may be missed by the coach.
   b. the performer may not be convinced of faults suggested by the coach.
   c. the coaches' feedback enables the performer to make immediate adjustments.
   d. the coach may not be in a good position to observe the performance.

Answer: c.
Explanation:
- All choices apart from c. are potential problems.

4) A metabolic cart is a devise used to measure:
   a. heart rate.
   b. breathing rate.
   c. oxygen consumption.
   d. blood pressure.

Answer: c.
Explanation:
- *Metabolism is the result of all the processes in your body working together to create energy. A metabolic cart is used to assess energy expenditure by indirect calorimetry which measures oxygen consumption.*

5) Which one of the following does not support data integrity?
   a. regularly backing up data.
   b. controlling access to data.
   c. using error detection and correction software when transmitting data.
   d. leaving a computer unattended for anyone to access.

Answer: d

6) Discuss the relationship between sports analytics and experimental research design. 3 marks

Answer:

- *Sports analytics is the provision and understanding of feedback using a variety of analytical data collection techniques.*
- *Used in experimental research design.*
- *Namely quantitative, qualitative, objective, subjective and valid and reliable forms of data collection.*

7) Using examples from modern technologies, discuss the advantages and disadvantages of using quantitative and qualitative data analysis in sports analytics. 4 marks

Answer:

Note 1 mark for advantage with example and 1 mark for disadvantage with example.

Quantitative advantages:

- *Coach/performer is able to make effective decisions based on quantitative data.*
- *For example, IBM tracker predictor analytics technology identifies key performance indicators (KPIs) such as what players need to be successful in a match.*
- *For example, GPS heart rate monitors calculate KPIs such as training intensities, calorie burn, distance run and time splits.*
- *Stored data facilities are available to compare data and plot performance goals.*

Disadvantages:

- *Coach/performer may become too reliant on quantitative data that at times may be too time-consuming and overpowering.*
- *Modern technologies such as the Running Kinematic Motion Analysis System is very expensive and only accessible to elite sportspersons.*
- *Such equipment requires specialist sports technicians to interpret data.*
- *Coach/performer may have to travel time and cost to access such facilities, when this time could be better spent training.*
- *Accuracy of data may be questionable, particularly when using links to Google Earth.*

Qualitative advantages:

- *Can provide quality feedback to coach/performer.*
- *For example, the use of video playback and split screen motion analysis to assist in refinement of technique.*
- *Can be cheap and accessible to all.*
- *For example, the coach using a mobile phone or iPad for video recording during a performance.*

Disadvantages:

- *Implies that decision making (received from modern technologies such as video replay) is accurate.*
- *Decision making is open to human error.*
- *And could be influenced by personal opinions.*

8) How do the following modern technologies aid analysis and feedback for improvements in sporting performance? 4 marks

a) Video and computer software analysis.

Answer:

- *Used to quantitatively and qualitatively assess technique.*
- *For example, split screen comparisons can compare technique between the performer and an ideal model, or the same performer at different times of the year.*
- *Highlighting biomechanical technical aspects of technique, using a variety of drawing tools that can provide feedback that can be used to refine technique.*
- *Potentially reducing the risk of injury that can be the result of poor technique.*
- *Thereby increasing overall performance.*

b) Heart rate monitor.

Answer:

- *GPS trackable technology and associated apps that calculate training intensities in relation to perfromer's age, height, weight and gender, for example Garmin GPS watches.*
- *Providing quantitative data analysis such as calorie burn, distance run and time splits.*
- *Stored data facilities available to compare data and plot performance graphs.*

9) a) What is a metabolic cart? 1 mark

Answer:

- *A metabolic cart is a trolley or wearable kit containing technology that uses indirect calorimetry to measure oxygen uptake and carbon dioxide production.*

b) Evaluate the use of a metabolic cart within the athlete's training environment? 3 marks

Answer:

- *In sports science, portable metabolic carts use light miniature computer technology.*
- *That can be adapted to the athlete's training environment, for example strapped onto the shoulders of the sportsperson.*
- *Thus providing test reliability specific to the event requirements of the performer.*
- *And the evaluation of data such as a respiratory quotient from fuel food usage during the exercise period.*
- *That can be used to adjust the nutritional requirements of the performer if needed.*

10) Global Positioning Satellite (GPS) technology has made a significant impact on sport. Discuss. 4 marks

Answer:

4 marks for 4 of:

- *GPS tracking software systems assist coaches in monitoring players during matches such as when to use a substitution.*
- *Provides quantitative data that helps improve performance, such as measurement and monitoring of speed and distances covered during a game.*
- *Provides physiological data, such as heart rate recovery, that can be used when devising training programmes.*
- *Helps reduce injury by monitoring recovery during interval training sessions.*
- *Assists in rehabilitation, at a faster rate, following injury.*
- *GPS apps could act as a motivational tool due to feedback that the sports person is able to access.*

11) a) What is meant by the term data integrity? 2 marks

Answer:

- *Data integrity is the maintaining and assuring the accuracy.*
- *And consistency of data over its entire lifetime.*

b) What measures can be taken to maintain data integrity? 3 marks

Answer:

3 marks for 3 of:

- *Data encryption which locks data by cipher.*
- *Data backup, which stores a copy of the data in an alternative location.*
- *Access controls regulate who and what can use or view data.*
- *Input validation to prevent incorrect data entry.*
- *Data valuation to certify uncorrupted transmission.*