

Interdisciplinary and multidisciplinary approaches to sport and exercise



Critically discuss interdisciplinary and multidisciplinary approaches to sport and exercise science within the professional experience undertaken in term 1. Support your answers with relevant literature and theory'

The advance in sports professionalism and the increasing intensity of competition has made a scientific approach to sport vital to monitoring and improving performance (Campbel. 2007). British expertise in sport and exercise science is reflected in the growing number of postgraduate qualifications that offer the chance to study new and exciting developments.

The applications of scientific principles are studied by examining three branches of science - biomechanics, physiology and psychology - although this knowledge is applied differently to each of the sport and exercise disciplines. Sport science largely offers expert scientific backup for top sport training and performance, while exercise science has a central role in physical programmes aimed at improving general health (Campbel. 2007).

The qualified sport and exercise scientist can expect to have a broad technical, physiological and psychological knowledge, and stands to benefit from current developments within the field offering a professional status.

Although research within sport and exercise science is done in many different disciplines, the majority of published research is mono-disciplinary. Burwitz et al (1994) defined mono-disciplinary as a singular discipline in nature. A professional experience was undertaken to assess the approaches to inter and multi-disciplinary within sport and exercise science research.

The experience was of a sport science nature which involved the participation of a newly created test, designed to monitor endurance performance. The test focused on heart rate response, ground contact times

and oxygen uptake whilst running on a treadmill at sub maximal speeds. The data collected from this test will, as a result, be used to better the understanding of factors that contribute to endurance performance and importantly to easily be able to measure these factors. A similar study created by Blackadar et al (2001) found that the measurements of ground contact times and heart rate response during level running at chosen speed can provide accurate estimates of maximal aerobic power. Carpenter and Ledger (2004) suggests that an understanding of physiological factors is essential for anyone involved in sport (coach or performer), appreciation of this is vital in developing effective training programmes and optimising performance.

This essay will outline what multi and interdisciplinary approaches to sport and exercise science are. It will then delineate how the two approaches can be applied to the professional experience undertaken.

An Interdisciplinary approach within sport and exercise science involves a partnership of coaches with sport and exercise scientists such as physiologists or psychologists. Miles et al (1997) defines an interdisciplinary approach as more than one area of sport and exercise science working together in an integrated and co-ordinated manner to solve a problem. Interdisciplinary research needs to involve a strong integration of information from more than one sub-discipline of sport and exercise science from the outset of a particular research programme (Burwitz et al. 1994). Williams and James (2001) developed a model to demonstrate interdisciplinary approaches, where the goal of the sport or exercise is affected by each area involved.

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Multidisciplinary research involves less integration of the sub-disciplines of sport and exercise science. Each discipline tends to work in parallel on a common topic (Burwitz et al. 1994). Just like interdisciplinary, it involves more than one sport working together but the difference being they work together in an isolated, unitary and co-ordinated manner (Miles et al 1997). In a multidisciplinary approach each discipline will look for problems to a solution from within only that discipline, for example, a physiologist will look at how the body responds to exercise; each discipline will then assemble their findings. Alternatively in an interdisciplinary approach, the physiologist may work together with a biomechanist to look at if rate of fatigue changes with different technique (Burwitz et al. 1994). The deficient in the integration of sub-disciplines from the outset of sport and exercise science may be resultant to the multidisciplinary research, thus, making it harder to integrate them together whilst trying to bring about an interdisciplinary approach to problem solving.

The majority of sport and exercise science research is mono-disciplinary (Burwitz et al 1994) but introducing the involvement of multi and interdisciplinary research will help to improve the overall standard of research. It will bond together more than one discipline of sport and exercise science such as physiology and biomechanics, consequently, improving the ability to solve problems such as injury, fatigue and poor technique. More than one approach working together as a team will combine their knowledge and methods from their different areas to be able to solve a problem.

Regardless of these resemblances, fundamental disparities between the two stated approaches are still apparent. Interdisciplinary approaches look to be <https://assignbuster.com/interdisciplinary-and-multidisciplinary-approaches-to-sport-and-exercise/>

the best in terms of bringing about improvements as it incorporates the disciplines which take the form of 'bridge-building' (Squires et al 1975). This requires an amalgamation of expert knowledge from diverse disciplines concentrating on a precise problem. Contrastingly, multidisciplinary approaches gather rather than combine knowledge; consequently the sub-disciplines work independently during the research processes before coming together to reach a conclusion about a stated problem (Burwitz et al 1994). Burwitz et al (1994) believes that an interdisciplinary approach will disclose possible conflicts between the disciplines. As there are direct dealings among sub-disciplines, a view given by one area could be disputed by another. This is less likely to occur in multi-disciplinary approaches as the disciplines do not work in direct contact with one another.

Despite the above examples, no clear definition is given of the distinctions between the two approaches because many sport and exercise scientists have regarded multi and inter-disciplinary as synonymous terms (Burwitz et al 1994).

The professional experience undertaken was involved with sport science; Smith (2001) describes sport science as being characterised by collaborations with coaches and performance directors. The experience undertaken was first and foremost a physiological approach.

Researchers have amassed so much knowledge about physical activity that it is now a separate academic field of study within the biological sciences (Katch et al 2000). Physiology of exercise can be defined as the study of how the body responds and adapts to exercise and importantly identifies

physiological characteristics that explain rather than simply describe performance and also focus on ways to improve performance (Bromley et al 2007). Middle distance running is a sport that utilises this definition very well. In this event, oxidative phosphorylation represents the principal energy-producing metabolic pathway and, therefore, it is not surprising that the parameters of fitness which correlate most closely with performance are those related to oxygen uptake (VO_{2max}), the various oxygen uptake required to run at different speeds (running economy), and the oxygen uptake that can be sustained without appreciable accumulation of lactate in the blood (Jones. 1998). Understanding the principles of these factors will contribute to improving endurance performance, and as a result enable an athlete to overcome these issues and improve them. During the professional experience questions were put to the researcher regarding the involvement of other disciplines to determine the dimension of the research. These questions were: 'are there any other areas of sport and exercise science e. g. biomechanist, psychologist, etc, other than yourself (a physiologist) present to help assess the data gathered from the research?' 'Will the results of the research be collated with other disciplines and fed back to the performer?' The response from the questions asked clearly demonstrated that the research being carried out was of a mono-disciplinary nature as there was no interaction with other disciplines of sport science. As discussed, an increase in the need from multi or interdisciplinary in sport and exercise science, would have much improved this study as more than one area of sport and exercise science being involved would have given feedback to an athlete, therefore increasing the value. The research itself was looking at the reliability and validity of a heart rate by looking at its response to ground

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contact times whilst running on a treadmill to see if it can be used to predict endurance performance. As well as being assessed physiologically, the researcher may have advised the athlete to be assessed by a biomechanist, this may show results that running technique could affect fatigue, for example, the biomechanist could get the athlete to run over a force plate, and the force generated on the plate could show that too much force is being exerted and as a result making you fatigue more quickly. This could then be fed back to the physiologist whereby a solution could be put together to rectify this and therefore the enabling the athlete to have a better running efficiency. This would create an interdisciplinary approach as more than one discipline is working together in an integrated fashion thus improving feedback to the athlete and as a result give the athlete a much better chance of improving performance.

The professional experience undertaken was shown to be mono-disciplinary as it was a test focusing solely on the physiological changes of an athlete whilst performing a treadmill run. As discussed above, introducing further dimensions may have been more beneficial to the athlete as they receive more feedback of ways to improve. However the test was a funded study by a recognised middle distance running corporation (The British Milers Club) to specifically look at the monitoring of endurance performance and the introduction of other disciplines may have confused the findings and taken away the aims of the study.