

## Use of Technology in Sports and Athletic Training

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**Abstract:** There is a continuous change in the field of athletics due to technology. This study explores the use of various types of technology in sports and athletic training. The researchers adopted a documentary research approach to gather relevant literatures. Results of literature reviewed show that technology steadily changes the way athletics are played, what kinds of sports are played how injuries are treated and improves performance results. Technologies in athletics are man-made means engineered to reach human goals or interests in a particular sport. The use of technology in athletic training provides a technical means through which athletes tries to enhance their competitive and training environments so as to improve their overall athletic performance. The use of technology in athletic training involves the application of specialized equipment and technologies to execute athletic tasks more efficiently. To trhis end, athletes and coaches must be aware of evidence-based sport technologies and make careful choices about how it affects their performances.

**Key words:** Technology, exercise science, athletics training, sports, man-made, evidence-based

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### INTRODUCTION

Athletics encompasses the whole forms of competitive physical activity or games which organized or through casual participation, aim to use, maintain or improve physical ability and skills while providing enjoyment to participants and in some cases, entertainment for spectators. One unique thing about athletics is that it not only contributes to fulfilling personal needs such as fun, well-being and individual fitness but also produces external effects such as socialization, democracy social integration and public health (Heinemann, 2005).

Technology application in sports is growing at an alarming rate as new technologies are being discovered. Because computer technologies are highly becoming available and affordable, their use is increasing in athletic training. The area of exercise and sports science has become highly technical, compelling applied scientists and coaches to conform their practices to steady development of new technologies. The much dependence on technology may be traced to the natural urge to gain advantage over the opposition in competitive sports, so as to make available more information as feedback to coaches or athletes. Soltanzadeh (2015) defined technology as any physical instrument(s) that can be used for problem solving. Technology in sports also deal

with a range of cost-effective and easy to use measurement tools such as hand held camera and goniometer to sophisticated and expensive systems like three dimensional motion systems or isokinetic dynamometers. Due to the vast array of tools at the disposal of applied sport scientists and coaches, this choice, matched with the heightened appetite to gather and process information rapidly and at low cost to the user, may create more room for selecting the fad option, instead of an appropriate tool. Several researchers have drawn attention to the need for increased use and understanding of technologies in sports science (Barris and Button, 2008; Cummins *et al.*, 2013; Dellaserra *et al.*, 2014; Wilson, 2008). Thus, this study explores the use of various types of technology in athletic training.

**Significance statement:** Athletic training students benefit from the use technology such as cloud computing by keeping track of their completed clinical hours, proficiencies, evaluations as well as other relevant data like advising records the athletic training educator has allowed the students to track. This data that is stored in the cloud may also serve as a portfolio for students who need show a record of professional development while enrolled in an athletic training education program (Perkey, 2012). A previous study using a virtual reality

intervention found that 3D virtual environment resulted in a significant difference in somatic cognitive anxiety and anxiety between experimental and control groups, the main effect of group was significant in the test of anxiety in the post-test after controlling the effect of pre-test (Hamid *et al.*, 2015). Another study showed that the use of physical and mental anxiety reduction techniques brought about significant difference between control and experimental groups in terms of body and mental methods, body methods, mental methods between pre-post-tests in some methods between single and team sports (Zourmand and Changzhu, 2017). There is also technology for establishing and operating online manpower system targeting athletes and instructors with the aim of improving the efficiency in the athlete registration task and reinforcing the systematic instructor's history management and utilization of instructor manpower pool (Kim and Kim, 2018). It is in the light of this background that the researchers aimed to examine the use of technology in sports and athletic training.

## **MATERIALS AND METHODS**

The researchers adopted a documentary research approach to gather relevant literatures. This approach enabled the researchers to source for and extract related information from previous research works to convey their viewpoints regarding the use of technology in sports and athletic training. Further information about the use of documentary research approach can be found in several academic texts (Ahmed, 2010; Mogalakwe, 2009).

## **RESULTS AND DISCUSSION**

**Technology in sports:** The term technology has been defined in various ways by past literatures. Lending from Kumar *et al.* (1999), technology is made up of two main components: a physical component which consisting of items such as tooling, products, blueprints, equipments, processes and techniques and the informational component which comprises of know-how in management, production, marketing, reliability, quality control, functional areas and skilled labor. Sahal (1981) views technology as 'configuration', maintaining that the transfer object (the technology) depends on a subjectively determined but specifiable set of products and processes. Studies on the technology transfer had linked technology directly with knowledge and more energy is focused on the process of research and development (Dunning, 1994). By analyzing the definitions of technology, there are two fundamental

components identified: 'doing things and 'knowledge or technique'. Technology has always been linked with obtaining result, solving problems, completing tasks using particular skills, exploiting assets and employing knowledge (Lan and Young, 1996). The idea of technology does not relate only to the technology that embodies in the product but also associated with the information or knowledge of it use, application and the process in developing the product (Lovell, 1998; Bozeman, 2000). Technology is seen as means made by humans to meet human needs. This view of technology is the understanding that covers most discussions in sports.

According some researchers, sport is or should be similar to play: voluntary, set off from daily or 'real' life, taking place at particular arenas, both with respect to time and space. If one dimension of play seems important here it should be that 'Nevertheless it is precisely this fun-element that characterizes the essence of play' (Huizinga, 2016). In the general understanding, sports can be seen as activities transcending from jogging and non competitive aerobics to conventional competitions of sports. In the more restricted sense, sports refer to activities of competitions in which the outcomes are determined based on factors as bio-motors and movement skills of participants.

Technology has done a lot and is hoped to do more in the field of sports and athletics. Sports gear such as clothing and foot wear are to be user friendly and embody valuable properties such as flexibility, strength, density, thickness, resistance to moisture, toughness and more importantly cost. Foot wear is conventionally considered more for injury avoidance and comfort than performance aid. Clothing such as full body suits used in swimming is mostly considered to rationalize the competitors performance time where loosing the race or swimming is hundredths of second. In the field of tennis, racket has been developed, so as to provide increased ball speed and minimize the potential vibration that can result in a condition known as tennis elbow. In other sorting equipment such as golf club, the total mass of the club has reduced which results in a greater distance coverage and a more precise shot. The bicycle has also been through modern day improvements with the development of pneumatic tires, specialist wheel, pedals and break levers which are all targeted at increasing rigidity and stability of the bicycle. The high speed camera is one of the most efficient technologies used in sports today. There are high speed cameras such as high speed >100FPS (frames per second), still cameras, motion cameras.

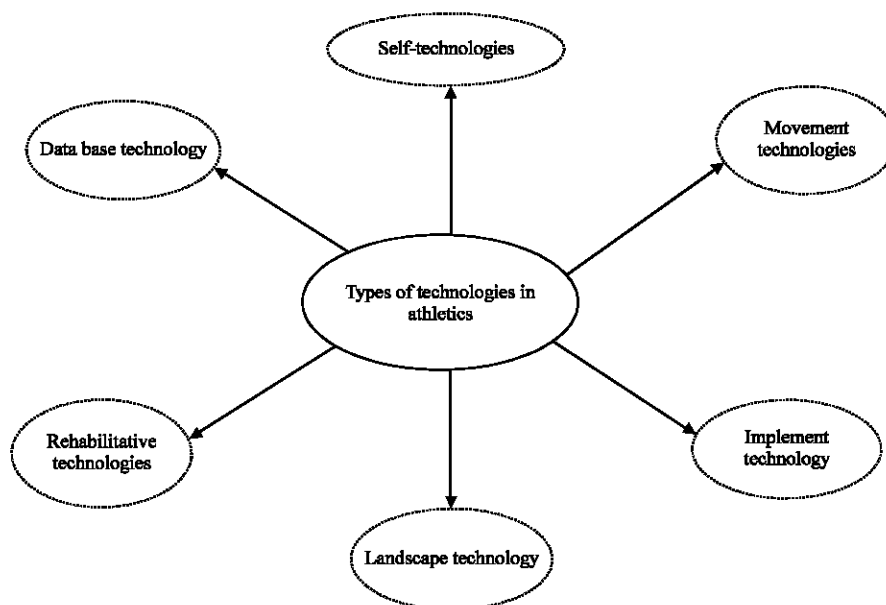


Fig. 1: Different types of technology obtainable in athletics training

**Types of technologies in athletics:** Figure 1 is a chart showing the different types of technology obtainable in athletics training.

**Self-technologies:** Prohibited performance-enhancing substances are the most visible of these technologies. Self-technologies accommodate these kinds of athletic innovations. Prosthetic/bionic limbs, surgical procedures and genetic engineering and sport psychological interventions are all considered as self-technologies. Equipment such as a prosthesis or a wheelchair are basic for some disabled persons to carry out their everyday life (Haisma *et al.*, 2006; Pasquina *et al.*, 2006). Advances in this technology, like energy storing prosthetic foot helps a lower foot amputee's gait faster more efficient (Brodtkorb *et al.*, 2008).

**Landscape technology:** Here, the sporting environment as well as the way spectators watches sport events are considered. Prominent landscape technology involves increase of modern multipurpose sport complexes, complete with Jumbo Tron screens retractable domes, mondo tracks, soaring cameras and artificial grass. Bates opines that modern athletes have an intimate relationship with the technological sporting landscapes. Track and field athletes employ better tactics since they can monitor their oppositions on the Jumbo Trons. The high-tech stadium remains interesting in trying to replicate the atmosphere of other traditional style stadiums. Indeed, the influx of technologies in the world of athletics has greatly

changed the landscape of exercise science and sports and more importantly, technology has in different ways, begun to differ the athletic body.

**Implement technology:** Implement technology deals with equipment that athletes use, hurl, propel or kick. Examples include football/soccer helmets equipped with radios and warning devices, shark suits that let swimmers move efficiently, slicing through water and high-tech shoes for running, tennis rackets and golf clubs. The interesting controversy about these kinds of technologies is the use of fish finding computers in sport fishing. This technology uses equipments (balance board or pedometer), media (audio, video or both) and social interaction to persuade individuals to adopt the behavior without their actually being aware of it.

**Rehabilitative technologies:** These are procedures and substances used in treating moderate to severe injuries. They also include medicine used by healthy athletes who only wants to counter the otherwise strenuous effects of their training sessions. Typically, these technologies are sourced in sports clinics and training facilities and specialists administer them in athletic training or sports medicine.

**Movement technologies:** The use of high-speed video technology (goal-line technology) which have change the response to cameras, wireless transmission, body worn sensors and mobile computers have revolutionised the

way sport psychologists and coaches interact with teams and individual players. Individual body-worn sensor scan yield real-time biometric player data that may inform decisions by the coach during a game or maybe used to access player progress overtime. Warburton *et al.* confirmed that interactive video game cycling highly increased energy expenditure and steady-heart rate when compared to traditional cycling at constant, sub maximal workloads; the two forms of cycling (interactive videogame and traditional cycling) resulted in similar ratings of perceived exertion.

**Data base technology:** This deals with computer innovations that allow coaches and athletes to know everything they needed to know about themselves and their opponents. Database programmers have in no small way affected the way that many and most professional players and coaches do their jobs. Informational feedback technologies like Nike GPS sports watch, a Polar heart rate monitor allow individual athletes to continuously keep record of their progress on important performance and physiological parameters.

### CONCLUSION

Just like every other area of life, sport and exercise science have been affected highly by advancements in technology. It is difficult imagining modern sports and many other sub-disciplines of exercise science outside technologies. Indeed, sport technologies have greatly changed the view of sport and exercise science. Importantly, technology has in more than one way changed what we think of as the athletic body. To this end, we have examined the contributions of technology on athletic sport performance, types of sport technologies and the advantages of technologies in today's athletics training. Even when not training for an Olympic gold medal, technology can be of positive and supporting role, assisting people to get motivated in keeping up with to a healthy exercise routine, or in rehabilitating after injury.

### RECOMMENDATIONS

It is recommended therefore, that, experts handling, managing and using athletic training must be equipped to make good choices on the type and use of sport technologies that would help athletes achieve optimum performance.

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