

International Journal of Computer Science and Mobile Computing



A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X

IMPACT FACTOR: 6.017

IJCSMC, Vol. 7, Issue. 12, December 2018, pg.304 – 312

The Impact of Technology Interaction with Multiple Sports Fields and Players in Raising Efficiency and Increasing Abilities and Skills

¹Asst.Prof. Jamal Abdul Kareem Hameed; ²Turki Hilal Kadhim;
³Salman Hekmat Salman; ⁴Abbas Fadhil Hammad; ⁵Waseem Saad Nsaif

¹ jamal.abdulkareem@sport.uodiyala.edu.iq ² Turki@sport.uodiyala.edu.iq ⁵ waseem@sport.uodiyala.edu.iq

¹⁻²⁻⁵ College of Physical Education and Sport Science – Diyala University - Iraq

³⁻⁴ College of Education for Human Science - Diyala University- Iraq

Abstract: Technology is an applied formulation of concepts in the light of the relationship between the teacher and the learner and everyone who is interested in the educational process and participate in the educational process and materials and is in the language of educational communication verbal and non-verbal and educational tools that contribute to the transfer of educational material to the learner transfer facilitator reduces the mistakes of traditional teaching. The innovations have shaped the way data is collected and processed, how information is relayed between coaches and staff or to athletes, and has had a big impact on the way in which athletes are monitored in the daily training and competition environments. This review highlights and provides examples of some of the latest technologies for data collection and processing, feedback methods and training tools. We finish by discussing some considerations for sports scientists and coaches before implementing new technologies. Education technology plays an important role in the field of education and facing the problems that hinder the achievement of its goals in its various fields. Hence, it has made many contributions to the rapid social and scientific changes and to help the educational process to cope with them and interact with them.

Keywords: Technology, sport, performance, feedback

Introduction

here are those who believe that the word technological Greek origin and means in the modern concept of the application of knowledge of scientific purposes in an orderly manner, and when the word is divided into two parts, the first of which means skill and the second art of teaching and thus be in all skill in the art of teaching. Charles Beard defines education technology as the sum of available laboratories, machines and systems developed and tested. They are originally linked to pure science, especially mathematics, but this definition has not been exposed to the extent to which educational goals can be achieved. While Henry B. Du technology defines itself as more of a scientific development and more of a geometrical achievement and a greater mechanical force, it is the sum of instruments and means that can add to human life. It is the power that can lead to inventions, skills. Some may think that the means of technology for education are modern methods only of the educational process or the use of educational machines only, or educational devices to the extent that there are some teachers who boast of the existence of a number of educational devices in his school, or that it enters the classroom and with many educational devices, but the technology of education More comprehensive, it may consist of blackboard, labs, laboratories, educational devices, closed television circuits, educational machines, computers and satellites - educational materials within them - and the objective teaching strategy of how to use them in any type of Teaching styles. And that the use of the modern method of education on the basis of studied and validated research experiments is the so-called education technology in the sense of the comprehensive methods, tools, materials, devices and organizations used in a particular educational system for the purpose of achieving specific educational goals before. It is clear that the technology of education is not just the use of modern machines and devices, but in the first place is the introduction of systems approach, which is a method, method and method of work that goes in organized steps and uses all the possibilities offered by technology according to the theories of teaching and learning. This method emphasizes the integrated view of the role of educational means and their association with other components of these systems in a reciprocal relationship. The field of sport and exercise science has become highly technical, challenging applied scientists and coaches to match his or her practical application of knowledge with the constant arrival of new technologies. The heavy reliance on technology may be attributed to the inherent desire to gain an advantage over the opposition in elite and competitive sports, in order to provide additional information that can be fed back to coaches and/or athletes. Technology has been philosophically defined as any physical instrument(s) that can be used for problem solving (Soltanzadeh, 2015). Based on this definition, the use of technology is not new to sport, nor does it purely suggest the use of expensive gold standard measurement tools. Rather, it suggests technology involves a moving scale from low cost and easy to use measurement tools (e.g. goniometer, hand held camera) up to expensive and sophisticated systems (e.g. isokinetic dynamometers or three dimensional motion systems). Because of the large array of tools available to coaches and applied sport scientists, this choice, paired with the increased desire to collect and process information rapidly and at minimum cost to the user, may increase the chances of selecting the fad option, rather than an appropriate tool. A number of technology in sport reviews have previously been published (e.g. a systematic review of global positioning systems (GPS) and micro-technology sensors in team sports, Cummins, Orr, O'Connor & West, 2013; a review of

vision-based motion analysis in sport, Barris & Button, 2008; video use in coaching, Wilson, 2008; integrated technologies such as GPS, accelerometer and heart rate monitors in team sport, Dellaserra, Gao, & Ransdell, 2014). In differentiating from previous reviews, our aim with this manuscript is to provide an overview of some of the new sport technologies available, and open up the debate of how the use of technology can improve or impair performance.

Developments in Data Feedback

Historically, coaches would observe and then relay information; he or she would provide feedback gathered from visual observation of an athlete's skill, relying solely on his or her ability to perceive changes in movement and interpret the results. Today, many coaches are challenged with a wealth of options relating to the selection of a feedback mode; he or she must decide which is the most appropriate per individual case (visual, auditory, haptic, multimodal), in order to ultimately improve performance. Consequently, the mode and schedule of feedback are crucial elements requiring consideration for improving sports performance. Augmented feedback, that is feedback provided by an external source, is generally believed to effectively enhance motor learning (Sigrist, Rauter, Riener, & Wolf, 2013). New technologies have made it possible for applied sports scientists and coaches to extract this information from performances and relay this information to athletes at a rapid rate. One leading example relating to the speed at which feedback could be returned to athletes involves the production of ClipCoach (Sheffield Hallam University, UK). ClipCoach was developed prior to the London Olympics in 2012 as part of an innovation project partnered with Olympic sports. The system uses a series of machine vision video cameras and force plates to record the motion of the diver. High-speed video feedback of the dive is available to the coach and athlete immediately post dive, allowing both slow motion review and dive comparisons to be made. The ClipCoach system drastically changed the way in which feedback was provided to Great Britain's divers. The timing of when feedback is provided is a key concept within motor learning. Feedback can be classified according to the time point of its provision, with concurrent feedback being provided during skill execution, while terminal feedback is provided after skill execution (Magill, 2007). One of the major trends in sports technology has been centred on real-time applications and devices that have the ability to provide athletes, coaches or scientists access to immediate data. The scheduling of augmented feedback is perhaps one of the most studied aspects of feedback, yet understanding the intricacies of scheduling feedback is a challenging task confounded by task complexity, skill level and salience of task intrinsic feedback (Magill & Anderson, 2012). Coaches are increasingly calling for sport scientists to deliver real-time feedback, however, given the relatively new nature of these concurrent methods, knowledge surrounding the effects of this mode and the optimum schedule of real-time feedback may still be required.

Technology and the Training Environment

The process of preparing students and training them on the use of computers and the development of modern technology on which they depend will contribute to the preparation of the future teacher and the educational curricula that help students to increase their experience and enable them to use technology in daily life in dealing with the problems they face in order to overcome the shortcomings of the old teaching method and the traditional lecture. Intelligent

system builds on knowledge and learning to achieve the goal of the educational process. With the advent of the educational process a new turn and the emergence of technological innovations to the field of education to change many of the concepts and methods that we were dealing with teaching, planning and curriculum design, and perhaps the greatest impact of these innovations emerged after the Internet has become a feature of daily life in many countries of the world, The influence of other means, such as educational radio, television, satellite, educational, computer-aided learning, and CD-Room educational discs, has also emerged. The Internet is one of the technologies that can be used in public education in general. Ellsworth (1994) points to the importance of the Internet, saying it is very gratifying for educators to use the Internet, which provides many opportunities for teachers and students alike in a fun way. Watson "(1994) that modern means of communication is one of the most important tools used in teaching. Another area that technology has influenced sports performance is training and strategy. There are many examples that stretch across a number of sub-disciplines of sports science (e.g. GPS technology informing strength and conditioning; kinematic analysis and biomechanical intervention; game analysis and data analytics informing tactical decision making programs). This section will focus on the simulated training environment. Changes to the standard training environment to include simulation of "game like" scenarios via augmented reality have become increasingly more Sensoria: A Journal of Mind, Brain & Culture 6 feasible through progressive technology. The purpose of simulation and virtual environments is to aid training. It allows a supplementary training environment, where those needing additional work or injured players who cannot fully train, are provided with the opportunity to improve perceptual cognitive and perceptual motor ability. Examples of these tools include video-based decision making tools, virtual reality environments and simulated batting environments. Video-based decision making tools can be cost effective for teams and allow the coaches to use any game vision they have and select the most desirable options (e.g. above real time training, Lorains, Ball, & MacMahon, 2013), providing a high degree of flexibility to suit any team. Tools such as the Elite Decisions and Elite Recall iPad applications (Decision Science, Shepparton, Australia), used by a number of Australian football and Rugby League teams provides the option for team athletes to undertake this form of training in any location. More advanced virtual reality environments allow athletes to be fully immersed in an interactive environment. This type of technology has been highly adopted by teams in the National Football League to supplement traditional practice methods, where the utilisation of virtual reality allows players to train without high physical impact loads, which may otherwise be faced if running through particular 'plays' during training. For example, the Minnesota Viking's used virtual reality to train their young quarterback. The process allowed the coach to be immersed in the same environment as the quarterback in order to point out correct reads and indicate mistakes. Other teams such as the Tampa Bay Buccaneers have used virtual reality to trial their offensive formations against the defensive formations of upcoming opponents (Bennett, 2015). . ProBatter (ProBatter Sports, Connecticut, USA) provides yet another example of how technology has influenced training environment in sports such as baseball, softball and cricket. ProBatter provides athletes with the opportunity to work on perceptual motor ability, by pairing a projected high definition video of a pitch with a projected ball. The paired video of the pitcher with the ball projection provides more information than the ball flight of the pitching machine alone. This technology attempts to provide important spatial

and temporal information components of the pitch, allowing the coupling of perception-action. The simulator can throw the majority of pitching combinations, making the training tool diverse, and allowing players to train up skills without placing additional load on other players. While such technologies have been widely adopted in training scenarios, understanding the limitations regarding their effective use is paramount. The ProBatter system for instance is limited in the fact that release always occurs in the same position, which is not true of real world pitching movement. In addition, Mann, Farrow, Shuttleworth, and Hopwood (2009) showed that viewing perspective is an important consideration when examining perceptual-cognitive decision making skill, with decision making superior when viewing an aerial perspective compared to a “player” perspective, raising questions about appropriate viewing perspectives. Further, considerations include ‘action fidelity’, that is, ensuring that the task adequately captures the dynamic nature of sport (Mann, Williams, Ward, & Janelle, 2007). Research has shown that baseball players may rely on different perception-action coupling when facing a pitcher and swinging a bat compared to watching a video and pressing a button – a task used in laboratory settings (Mann et al., 2007). Additional research in baseball has shown players to use visual, tactile and auditory feedback when adjusting their swing. Some of the aforementioned technologies may remove available feedback, and again limit the effectiveness of training with such devices (Gray, 2009). Such research highlights the need to critically evaluate how such technologies are used in applied settings to ensure the task being trained is representative of the actual task.

Considerations for the Use of Technology in Sport

The importance of education technology, the education sector has witnessed a great leap in the present century. The education scientists mechanisms have developed very rapidly, exploiting the development of technology. The productivity of education has increased. It has become more enjoyable, the student has become more interactive and more creative. And your goal is to find and provide effective means to help students learn more easily. Modern teaching methods include computers, CD-ROMs, the Internet as the sea of information and a great educational tool, and audio-visual media. The impact of technology in education, even if the importance of technology in the field of education is mentioned, is that this importance is increasing year after year because of the speed of change and development in various fields. The importance of technology in education is as follows: Technology plays the role of mentor, and change from the old method of explanation and traditional teaching methods. modern educational tool such as computers and other technology means many programs and functions in the field of education stimulates the discovery of new talent and Developing mental abilities in various subjects. For example, the Internet has opened a new window to help students participate in school activities and share information. Technology provides a rich source of information that both the teacher and the student need. The Internet has become a vast sea of information, such as encyclopaedias, dictionaries, maps and other sources of information that are difficult to obtain by traditional methods of research. In his search for information on a particular topic, the Internet takes only hours (or minutes) to get that information easily without strain. Technology intervention in the processing of scientific material received The students have become imperative, as well as their professional training, which they use and try to make them a means to the student after graduating from school as a mentor. The public or private labor market has become a foregone

conclusion for practicing their work with very advanced technological means and the disappearance of traditional methods. Coming to the labor market experience and a great future. Technology in all its advanced means can radically change the educational level of the teacher and how to develop his personal abilities in the explanation and urge him to give a greater opportunity and easier to understand and receive the student of the scientific material, and this in turn will reflect on the development of intellectual capacity and intellectual student, in addition to refining his talents and enjoyment of the study materials. Applications in Educational Technology Educational technology has evolved in the past few years, until it has come to open schools without books or even papers, and schools and universities have been competing to minimize the use of paper and pencils. Distance learning, the student can learn from his home without having to go to the classroom, but receives his lesson via a computer connected to the Internet. The teacher begins the lesson by broadcasting audio and video to his students, and students can interact with their teacher in the same way. , The student can solve his homework and deliver it through the Internet, and the process of repair automatically without the need for the teacher to repair it manually, and this facilitates the process of solving the homework and make it more enjoyable. Books are redundant many schools and universities have replaced traditional books with laptops and tablet computers in the education process. This allows for the replacement of multiple books with one tablet (or notebook), reducing the burden of carrying books on the back. The technology has and will continue to have an impact on sport. What remains in contention is the extent at which scientists, coaches and athletes can appropriately use and understand new technologies. When working with elite athletes, small changes most often need to be made in a relatively short amount of time. Thus, three key factors may play a role in the effectiveness of a new technology, a) validity and reliability of the data, b) meaningful data, and c) processing speed. Typically, the outputs from technical systems such as forceplates, isokinetic dynamometers and three-dimensional motion capture systems, seen as the gold-standard equipment, can be data rich and very comprehensive. There is merit in using these methods in order to collect valid and reliable data, and extract in-depth, meaningful information. These systems, however, are often limited in their use because of requiring a great period of preparation, processing and analysis time. Nonetheless, systems that become used in standard practice (e.g. forceplate use in swimming and athletics at Australian Institute of Sport, Tor, Pease, & Ball, 2015) may become highly automated and close to real-time through the streamlining of data processing and standardised procedures. The limitations of gold-standard equipment (cost, environmental restrictions, specific training required, see Figure 1) are likely factors that drive new commercial devices and applications to be made available for purchase. Unfortunately, not all devices are found to provide valid and reliable data *Sensoria: A Journal of Mind, Brain & Culture* and thus, if the rate at which technology is adopted exceeds the rate of validation, then scientists, coaches and athletes are at risk of using technology that has not been appropriately tested. Feedback or training interventions based on invalid and unreliable data may then be detrimental to performance. Whether looking to implement changes toward short or long term goals, meaningful information is required in order for sports scientists and coaches to make informed decisions that affect the performance of his or her athletes. Thus, the ease at which information rich datasets can now be collected can be problematic if analysts are not focussed in their analysis. There is a risk that coaches, and more importantly athletes will become overloaded

with the amount of information presented, which could be detrimental to learning or performance. ‘Paralysis by analysis’ or ‘choking’ is common outcome that results from conscious control of a movement that is typically automated, which is quite possibly brought about by an overabundance of information and continual monitoring (Ehrlenspiel, 2001). Furthermore, technology has shown great potential for monitoring performance in sport, but it can only be effective if the individual athlete is aware of the performance goal and if he or she perceives the need to carry out corrections to technique or training (Liebermann et al., 2002). Finally, there is a trade-off between the usefulness of data to monitor and improve overall performance and duration of analysis when working with elite athletes. During competition, in order for athletes to implement any changes, there is a limited time to provide meaningful information. This necessitates the need for advanced tools with faster processing speeds such as the example of the ClipCoach system. With the myriad of technology available that can be used to affect sport performances in both competition and training setting, we believe it is paramount for the sport scientist and coach to determine the goals and practical outcomes of using new technology. With new gadgets, widgets and applications being made available to the consumer market at a rapid rate, it is easy to get caught up in the “latest craze” without considering the practicality of the systems used or output delivered. We encourage our applied colleagues to consider the potential benefits against any consequences or unknowns, prior to employing any new tool and before diving head first into purchasing unvalidated high-tech products.

Conclusions

Technological applications The dynamic analysis is a real translation of the scientific discoveries of the movement of technology, whether in devices, tools, methods of research and the use of theories, laws and sciences related to the activity of the human body to provide sufficient capacity to achieve the best educational and training opportunities for those involved in this process, Such as:

- A) Kinovea program, gait analysis program,
- B) The device of recording the electrical activity of the muscle (EMG)
- C) Force measurement platforms (FORCE PLATEFORM)
- D) Foot sensors (foot plates)

Theories of Scientific Research The scientific research system differed as a result of the cognitive breakthroughs and the tremendous progress in the technological advancements and the ability to innovate in the development of software programs, the abundance of research, the multiplicity of results and the many laws that serve the scientific research system, including:

- A- Scientific research ethics
- B - Methods of modern scientific research
- C - Intellectual freedom of the researcher until proven truth, consistency and objectivity of the research transactions

D - Use of electronic offices and websites for research, whether (Dactuarah - Masters)

E - Interconnection of the pillars of scientific research (statistics science - construction and measurement methods of measurement).

Technological applications There has been nothing wrong with the development of technological innovations such as the development of innovations in sports devices and electronic inventions, the development of electronic programs and the development of educational software that serves the educational process and development in the techniques of e-learning, including distance learning , Virtual classrooms, e-schools in many educational institutions advocated by international accreditations and under the total quality system.

In the field of injuries and sports the most areas that benefited from the field of technological development through progress in the invention of sports devices that help to detect sports injuries and work to identify the degree of injury and locate and work on re-congratulations again, and take advantage of what is known as technological engineering In the manufacture of sports equipment and training or rehabilitation in the field of injuries, including many: -

- 1 - the use of Robot in the determination of sports injuries
- 2 - producing micro smart chips to control the sugar of patients and players to determine the nutrients
3. Video capture (to identify places of injury that cannot be determined in the normal way)
4. Smart dressings (dressings that protect against serious complications that may be associated with the seizure of bacteria and declare the need for antibiotics)
5. Smart Shirt (invented in the state of Georgia in the United States by monitoring vital activities and monitoring the injury and determine the duration of hospitalization and the duration of rehabilitation
- 6 - the treatment of obesity - the technology of electronic photography

Of the knowledge in any field or any institution or company or university or college must be recruited through the organizational structure of the educational institution is the administrative department of sports is an important sections of the institutions through which the organizational strategies and plans of operation of the college or institution to seek the development system and technological innovations In the department of management to the continuous development through the use of access databases to know the data of players and coaches and Adrien and the number of sports statistics and the championship and the use of sports calendar Execl in the organization of tournaments and sports forums at the level of the shop Or international. In the end, the use of technology and the use of educational media and e-learning is useful in the modernization and development of the system, whether educational, training, and administrative or research.

References

- Anderson, R., Harrison, A., & Lyons, G. M. (2005). Rowing: Accelerometry-based feedback - can it improve movement consistency and performance in rowing? *Sports Biomechanics*, 4(2), 179-195. doi:10.1080/14763140508522862
- Barris, S., & Button, C. (2008). A review of visionbased motion analysis in sport. *Sports Medicine*, 38(12), 1025-1043. doi:10.2165/00007256-200838120-00006
- Barros, R. M., Misuta, M. S., Menezes, R. P., Figueroa, P. J., Moura, F. A., Cunha, S. A., . . . Leite, N. J. (2007). Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. *Journal of Sports Science and Medicine*, 6(1), 233-242.
- Bennett, J. (2015, Nov 4). NFL teams are now practicing plays in virtual reality. Retrieved from <http://www.popularmechanics.com/technology/a18074/the-nfl-is-taking-virtual-realityseriously/> Ceseracciu, E., Sawacha, Z., & Cobelli, C. (2014). Comparison of markerless and marker-based motion capture technologies through simultaneous data collection during gait: Proof of concept. *PloS one*, 9(3), e87640. doi:10.1371/journal.pone.0087640
- Choppin, S., & Wheat, J. (2013). The potential of the Microsoft Kinect in sports analysis and biomechanics. *Sports Technology*, 6(2), 78-85. doi:10.1080/19346182.2013.819008
- Crowell, H. P., Milner, C. E., Hamill, J., & Davis, I. S. (2010). Reducing impact loading during running with the use of real-time visual feedback. *Journal of Orthopaedic & Sports Physical Therapy*, 40(4), 206-213. doi:10.2519/jospt.2010.3166
- Cummins, C., Orr, R., O'Connor, H., & West, C. (2013). Global positioning systems (GPS) and microtechnology sensors in team sports: A systematic review. *Sports Medicine*, 43(10), 1025-1042. doi: 10.1007/s40279-013-0069-2
- Dellaserra, C. L., Gao, Y., & Ransdell, L. (2014). Use of integrated technology in team sports: A review of opportunities, challenges, and future directions for athletes. *The Journal of Strength & Conditioning Research*, 28(2), 556-573. doi:10.1519/JSC.0b013e3182a952fb
- Ehrlenspiel, F. (2001). Paralysis by analysis? A functional framework for the effects of attentional focus on the control of motor skills. *European Journal of Sport Science*, 1(5), 1-11. doi:10.1080/17461390100071505
- Ferreira, F. T., Cardoso, J. S., & Oliveira, H. P. (2015). Video analysis in indoor soccer using a quadcopter. *Proceedings of the International Conference on Pattern Recognition Applications and Methods (ICPRAM)*, Lisbon, Portugal, (pp.78-86)