



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2018; 5(1): 255-257
© 2018 IJPESH
www.kheljournal.com
Received: 08-01-2018
Accepted: 13-02-2018

Abhilash SS
Assistant Professor of Physical
Education, Govt. College,
Uduma, Kerala, India

Technological intercession in physical education and sports

Abhilash SS

Abstract

In the ever-changing world, technology has got its own influence because it has made the life of the people is made so fast and competent in each every aspect. Nowadays, technology has its own vital role to play in Physical Education and Sports. It is propelling the standards of evaluation and judging at a very high level. The technological advancements in physical education and sports help the profession to attain its goals in an easier and simplest way. Technology has stretched out its hands in the areas like teaching, coaching, performance, analysis, manufacturing sports materials, sports medicine, sports sciences, sports telecasting, etc, through which the profession has grown to such a height. When we talk about the technological intervention in physical education and sports, we must examine the circumstances that made the technology come into action in physical education and sports. Once where the profession was in need to carry out certain functions-to review the quality of motion, for performance analysis, assessment purposes, etc- the technology helped to solve that difficulties. Technology is helping to raise the standard of physical education and sports through its high influence applications on sports sciences in the case of sports biomechanics the role of technology is to be rated with high preferences because of its implicational values. It is mainly used for collecting data (kinetic and kinematic parameters), movement analysis, and all.

Keywords: Technological intercession, physical education, sports, Nowadays, technology

Introduction

In the ever-changing world, technology has got its own influence as the life of people has become fast and complex in each and every aspect. Nowadays, in physical education also technology has its own vital role to play. It has raised the standard of physical education and sports to a level far, far away from the level it was before. The technological advancement in physical education and sports helped the profession attain its goals in an easier and simpler way. Technology has extended itself into areas such as teaching, coaching, performance and analysis, manufacture of sports material, sports medicine, sports sciences, sports teaching, etc, by which the profession has grown to a great height. When we talk about the technological intervention in physical education and sports, we must examine the circumstances that made technology come into physical education and sports. Whenever a professional needs to carry out certain functions-to review the quality of motion, for performance analysis, for assessment, etc-technology has helped overcome those difficulties. Technology also helps raise the standard of physical education and sports through its highly influential applications in sports sciences. In the case of Sports Biomechanics, the role of technology can be treated with high preference because of its application value. It is mainly used for collecting data (kinetic and kinematic parameters), movement analysis, etc. In motion analysis, Sports Biomechanics makes an interdisciplinary approach with technology. The different methods that are used are as follows;

Applications of technology in sports biomechanics

For the motion analysis purpose, sports biomechanics makes an interdisciplinary approach with technology. The different methods are as follows;

Methods used for kinematic analysis

- **Still photography:** In this method, the whole movement is recorded on a single picture (or frame).it is used for qualitative analysis.

Correspondence
Abhilash SS
Assistant Professor of Physical
Education, Govt. College,
Uduma, Kerala, India

- **Cinematography:** It is a non-contact remote process of recording data and allows full freedom of action to the subject and can be utilized during the competition even without the knowledge of the performer and without any physical and mental interference to the performer. There are certain factors that are to be considered (cine cameras, types of cameras, lens, camera speed, exposure time, camera position, distance calibration factors, reference axes) while using the technology of cinematography. After development, the film can be used for biomechanical analysis. It will be projected on an analyzing projector and analysis will be done frame by frame.
- **Videography:** It is almost like cinematography. The major advantage of video over cinematography is its capability of instant replay. It is used for quantitative analysis. Now the analysis is done with high-speed video cameras and analysis units. Further, the images can be directly grabbed by a computer or laptop. As no celluloid film is used in the video cameras the running cost is negligible. Hence the 3d video system has almost replaced the cinematography.
- **Accelerometry:** With the use of technology, acceleration is determined with the use of a force transducer.
- **Goniometry:** A goniometer is the device to measure the joint angle. Nowadays the availability of electronic goniometers and biaxial & tri-axial electro goniometers the difficult task of obtaining angular displacement in different axes at a joint is made possible.
- **Dynamometry;** To measure kinetic values, the procedure of dynamometry is used. The force measuring device is called a force transducer is used.
- **Force platform:** the measurement of ground reaction force is important in many activities such as jumping, running, walking, throwing, etc. This is measured by using force platforms or dynamic platforms. In the force platform, triaxial transducers are used to measure force in all the 3 directions. ie; vertical anterior-posterior and lateral directions.
- **Computer stimulation:** Computer simulation is used for a computer model to evaluate the purpose of the model to changes in the system parameters.

Conclusion

Many kinds of research proved that the teaching and learning process is positively affected by the technologies. And here in physical education and sports, we can notice the advancement in each and every aspect. So far sports biomechanics is concerned apart from some extent it cannot serve its best without technology. Even though the technology is available worldwide, in India the condition doesn't seem very promising. Experts believe that even though, all the above-mentioned facilities are today available, they are at very few centres in India. Moreover, the sports personnel have limited exposure to all the above equipment. All the above techniques are very sophisticated and require experts and specialists to use them efficiently. Our country lacks the right professionals required for the same. We have few centres that provide these services but most of them are limited access to every individual in the community. We need to make it accessible to every individual who is or wishes to be active and to facilitate all these. Scientific evolutions will always lead to more advanced technology, however, unless and until it is made widely accessible, the impact can never be seen extensively. It needs to be seen how long it takes for all this widely

appreciated technology to find a stronghold on Indian soil.

Methods Used For Kinematic Analysis

- i) **Still Photography:** In this method, the whole movement is recorded on a single picture (or frame). For this, a still camera will be used and the shutter always remains open and some special procedures are used for controlling the light passing through the lens. They are;
 - 1) Stroboscopy
 - 2) Rotary Still Shutter
 - 3) Light Streak Photography
 - 4) Interrupted Light Photograph
- ii) **Cinematography:** Cinematography has been used more frequently than any other procedure for quantitative analysis of human motion because it has a better resolution than any other photographic method. It is a non-contact remote process of recording data and allows full freedom of action to the subject and can be utilized during the competition even without the knowledge of the performer and without any physical or mental interference to the performer. There are certain factors that are to be considered while using the technology of cinematography. They are given below;
 - 1) **Types of Camera:** The camera that is mainly used for performance evaluation in sports is an intermittent pin registered camera that works with the use of film and a Rotary prism camera that provides a frequency up to 25000fps with a short exposure time.
 - 2) **Lens:** The choice of lens depends upon the distance from the object and recording area.
 - 3) **Camera Speed:-**As a rule, the faster the speed of movement, the higher the requirement of the operating speed of the camera. Otherwise, the resolution power will be poor.
 - 4) **Camera: Position:-**For biomechanical evaluation, the camera should be placed perpendicular to the plane of motion of the object.
 - 5) **Measurement of Time:** The time spectrum can be obtained from the operating speed of the camera.
 - 6) After developing the film it can be used for biomechanical analysis. It can be projected onto analyzing projector and analysis can be done frame by frame.
- iii) **Videography:** Video and cinematography have many similarities. The filming procedure is similar in both cases. It is almost like cinematography. The major advantage of video over cinematography is its capability of instant replay. It is used for quantitative analysis. Now the analyses are done with high-speed video cameras and analysis units. Further, the images can be directly grabbed by a computer or laptop. As no celluloid film is used in the video cameras the running cost is negligible. Hence, the 3d video system has almost replaced cinematography.
- iv) **Accelerometry:** By applying technology, acceleration is determined with the use of a force transducer. In this approach, the force exerted on a constant mass when being accelerated is measured. The mass is accelerated against a force transducer that gives a voltage signal proportional to the force. As the mass is constant, the force exerted is proportional to acceleration. Thus, a voltage signal proportional to the acceleration is obtained.

- v) **Goniometry:** A goniometry is a device to measure joint angles. Nowadays with the availability of electronic goniometers and biaxial and triaxial electro goniometers, the difficult task of obtaining angular displacement in different axes at a joint is made possible.

Methods Used For Kinetic Analysis

- **Dynamometry:** To measure kinetic values, the procedure of dynamometry is used with the help of a force measuring device called a force transducer. It has a proportional dependence on the force applied and the measured value. The measured value should show a simultaneous change to the changing force and the force-time curve should be distortion-free. This is very important in Sports Biomechanics as the force applied by the human body keeps on changing during the course of any movement.
- **Force Platform:** The measurement of ground reaction force is important in many activities such as jumping, running, walking, throwing, etc. This is measured by using force platforms or dynamic platforms. In the force platform triaxial transducers are used to measure force in the 3 directions, ie; vertical, anterior-posterior, and lateral directions.

Method Used For Predictive Analysis

- i) **Computer Simulation:** Computer simulation is used for a computer model to evaluate the response of the model to changes in the system parameters. In simulation experiments are carried out under carefully controlled conditions on the real-world system that has been modelled. This simulation allows the exploration of the capacities and limitations of the human movement without endangering the athlete.

Sporting Applications

Here are some examples of the sports we have successfully applied technology to. In all cases a partnership with sports professionals was essential to tuning the technology;

- **Swimming:** Using a small wearable device a swimmer can now train in his own pool and on his own but gather performance data as though they were supported by a coach and timekeeper in an instrumented pool with video analysis.
- **Running:** Stride and gait characteristics including lower limb movement, ground contact events, pronation or supination, and hip movement can all be monitored using wearable technology. Calibrated in laboratories using video-based markers these technologies have the potential to provide race day information to athletes.
- **Boxing, Martial Arts and Combative Sports:** In combat sports, it all happens so quickly. The best practice for scoring often involves a number of judges and set areas that can count as scoring areas. Enter the electronic age where we can monitor striking, defending, and scores quicker than the eye can see. Impact force can also be monitored. Put this all together to have a real-time judging system and analysis of weak points in defence or attack. Combine this with safety equipment and it's a winner all around.
- **Tennis:** A major challenge faced by Tennis coaches and sports scientists is to be able to accurately measure what athletes are doing in the training and competition environment. We examine Tennis's first service with a range of sensors.

- **Walking:** It is not just a recreational pass—time, but an Olympic sport and something we all need to do to get around. So whether we are looking for illegal walking action, gait analysis, post-operative recovery compliance, planning healthy cities, or helping those at fall risk, this new technology has a lot to offer everyone.

Conclusion

Many researchers have proved that the teaching and learning process is positively affected by technology. In physical education and sports, we notice advancements in each and every aspect. It is a very powerful instructional tool. It enhances student learning. Technology is important as an assessment tool in physical education and sports. It engages students, making the learning fun and meaningful. A combination of these characteristics enhances student learning. As far as Sports Biomechanics is concerned, except to some extent, it can't serve its best without technology.

References

1. Rai Ramesh. Biomechanics-Mechanical Aspect of Human Motion, Agrim Publication, Punjab, 2003.
2. Jose Pino-Ortega, Markel Rico-Gonzalez, The Use of Applied Technology in Team Sport, 2021.
3. Matt Anniss. The Impact of Technology in Sports, Heinemann, 2015.
4. Philip Omoregie, Article-The Impact of technology in Sport Performance, 2016.
5. Franz Konstantin Fuzz, Aleksandar Subic, Martin Strangewood, Rabindra Mehhta. Routledge Handbook of Sports Engineering, Routledge, 2013.
6. Daniel Almeida Marinho, Henrique Pereira. The Use of Technology in Sport, INtech Open, England.
7. Seth Jenny E, Jennifer Krause M, Tess Armstrong. Technology for Physical Educators, Health Educators and Coaches, Human Kinetics, 2020.
8. Steeve Haake. The Engineering of Sport, CRC Press, 1996.