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A survey study on the role of information technology and its contribution in sports and games

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Abstract
In today's modern world technology has greatly effected our life and every spheres of our life is not untouchable with it and so as in sports and games. The field of physical education and sports can make a significant contribution to the role that technologies play in our lives by carefully considering the benefits and liabilities of new information technologies on the whole person, body, as well as mind. Information technology play key role in the human being in particularly in field of sports and games, the use of technology in sports and games is growing rapidly. For instance, new devices are used for different reasons such as to help referees in decision-making and to quantify the athlete's performance during a game, thus helping the Coach to set the training program and the game strategy. It helps to avoid mistake in organization and administration of various sports and games at world level. Information technology in sports has established scientific discipline, Research activities, improve Learning and Coaching, Bio-Mechanical analysis, and field research have evolved. The contribution of technology in sports and games are Cricket, Athletics, and Basketball. Here are five exciting technologies being used in the sports industry, Instant Replay, Sensor Tools, Timing System, RFID Chips, and Equipment Development.

Keywords: Athletics, basketball, cricket, information technology, physical education, sports and games

Introduction

Technology can be most broadly defines as the entities, both material and immaterial, created by the application of mental and physical effort to achieve some value. In the usage, technology refers to tools and machines that may be used to solve real world problems in sports and games. Technology has intrinsic in the development and advancement of sports; much like it has in other aspects of life. With significant advances in technology, players now receive competitive advantages from the use of certain sporting equipment, and many view this as anathema to the spirit of sport. Using latest trends of technology is making sports safer in a number of ways. For example, the evolution of smart helmets and other wearable tech allows for better monitoring of potentially traumatic injuries, which paves the way for more immediate and effective medical care.

Instant replay is an example of the remarkable technology being used in sports today. With this technology, officials are able to see exactly what happened, providing a second perspective on sports events. Instant replay is used in games such as cricket, American Football, Rugby, Soccer, and even in combat sports. Sensor tools are often used to analyze whether a goal is valid or not. It is often used in cases where the naked eye cannot truly tell if a ball went past the goal line. Different sports use varying sensor tools. For example, cricket's Hawk-Eye is also used to determine where the ball would have landed if it had not hit a player's foot. This establishes whether the ball was unfairly blocked from striking the wicket. On the other hand, tennis sensor tools use laser beams to determine whether the tennis ball went out of bounds or not. Sensor technologies help to accurately determine the position of the ball at a given time. Timing systems, nobody uses a stopwatch when timing a race anymore. This means that differences in reaction time no longer affect the precision and consistency of a racing even. In many races today, the starter pistol is linked to a clock. Once the pistol goes off, the clock immediately starts timing the race. On the other hand, swimming uses a touch pad placed at the finish lanes as well as wearable inertial sensors to determine performance. Many racing events also use laser beams and photographs to determine winners.

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The results of timing systems are often provided to the nearest thousand of a second. However, world and Olympic records are only recorded to the nearest hundredth of a second. This technique was established to eliminate insignificant errors. RFID chips are often used to time individual contestants in an event. The devices use antennas that relay wireless signals. RFID chips are often used in long distance races to help broadcasters and viewers track the exact locations of contestants during a race. There are two types of chips used in races: Active and passive chips. Active chips have an in-built battery or power source and can determine the exact time a participant crosses a specific line. Passive chips can only be used with sensors placed in a mat because they do not have an in-built power source. Equipment development in sports and games safety is a key factor; equipment manufacturers have developed devices to reduce injuries on athletes.

In the 2010 season, special helmets were used in the National Football League after several players experienced concussion injuries. The helmets were designed to absorb shock caused by collisions and protect athletes from suffering head and neck injuries. Similar technology is being used for games such as auto racing and hockey to enhance the safety of participants. Technology has taken over today's modern world. Many professional and amateur sports bodies have embraced new technologies featuring certain gears and gadgets to protect athletes and make it easier to officiate the games.

India's IT Services industry was born in Mumbai in 1967 with the establishment of the Tata Group in partnership with Burroughs. The first software export zone, SEEPZ – the precursor to the modern-day IT park – was established in Mumbai in 1973. More than 80 percent of the country's software exports were from SEEPZ in the 1980s. The National Association for Sport and Physical Education (NASPE) believes that technology can be an effective tool for supplementing instruction when used appropriately. Therefore, the primary purpose of this document, developed by a task force of NASPE's Physical Education Steering Committee, is to provide guidelines for using technology to help students achieve the Standards for Physical Education. Teachers now face a generation of students who have never known life without a computer, video game console, cellular phone or Internet access; and that is changing the scope of education dramatically. Technology tools can provide objective data on activity levels and creative methods for individuals to engage in physical activity. Studies have indicated that active gaming can promote higher levels of energy expenditure compared to seated video games, as well as increasing heart rate and oxygen consumption. National School Health Policies and Programs Study indicated that 42% of physical education teachers receive staff development training on using physical activity monitoring devices; 37% on using technology overall. Also, between 17% and 49% of the teachers studied received additional training for administering fitness tests, assessing student performance, and developing portfolios and individual physical activity plans: areas in which technology can supplement instruction and help in managing data. Those statistics in addition to the recent release of updated National Educational Technology Standards for Teachers underscore the importance of developing guldens for proper technology use in physical education. Information Technology has become an important inter-disciplinary partner for sports, this way physical education has its branches of Sports psychology, Sports Statistics, Biochemistry, Sports Medicine, Kinesiology and Biomechanics etc. Taking into consideration its association with other disciplines and its various aspects, computer can be used and are being sued in physical education and sports. Human play, as embodied in sports, is one of most important in expressions of human culture.

Benefits of information technology in physical education
Technology, in general, has positively reshaped physical education classes with apps, online videos, personal computer, laptop, Zoom app, Google Meets, and Google class room, using these online aides instructors create a more varied and dynamic classroom in modernization of world using technology to teach physical health allows educators to create more activities and show how important their goals are and how to achieve their goals in a stipulated time and with proper planning and better utilization of technology in physical education. Pedometers are probably one of the first examples that come to mind when discussing technology and physical activity. Heart rate monitors are used to measure a student's pulse while engaged in activities. The goal of physical education is to develop physically literate individuals who have the knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity.

The information age was 1970's. The change was brought to the society with the creation of world web (the web). As change in technology, changes channels of communication and message content. The early 1960's, the computer technology establish protocols which become as the internet in 1969. And later development of Hypertext Mark-up Language (HTML) in 1989 that became the basic for the development of web in 1993. The web was introduced to the public at large. During the formative days of the web lot of things was include such as email, blog, face book, twitter, lot of website, journals, you tube etc.,. Another important fact of information technologies being used in sports is seen in the trend analysis done by administrators in sports, franchises and leagues while the most basic functions are storing data used to determine statistics, disclosing the score of a game or uploading pictures for fans to view thorough out a game.

In the past, task such as developing rosters (name list) of athletes, managers, officials, timekeepers, drivers and medical staff was took much time to done the work with hand. but the institution of IT in sports, team administration was now able to not only create detailed roasters of these individuals but can schedule them for work. Also, most profession sports venues have very modern scoreboards that are programmed to update statistics and information directly to a computer system. So with the use of such modern technology, almost every area of sports has become dependent of automation due to relevance that it implies to the lives of spectators all over the world. Through the help of the internet and other web services, live feeds of sports events have become so accessible anywhere in the planet. Most of the professional sports in the world have long used instant replay and other high tech aid to help the referees to make a right call. Video replay systems to check referees call for many years. Basketball referees use replay system to make sure players is shooting wishing the time allotted by the shot clock. In international cricket, the third umpire has been used for certain situation. The umpires who are out of field can communicate via wireless technology. The third umpire is asked to adjudicate on run out decision. In Football/Soccer the replays could be used to decide off-side decisions, whether a ball passes over the goal line or not.

Benefits of information technology contribution in sports and games

Increase accuracy in time measurements of sport performance. Enabling referees, umpires, and sport officials to make better decisions on rule infringements. Improvements in the design of sport equipment and apparel. Providing spectators with better viewing of sport performance. The game changing benefits of technology in sports and games are weather control, improved field conditions, better viewing experience, better coaching and scouting, modernized training, and make the game fair. The future technology of sport and games, technological innovation is a major driving force behind change in usage of latest trends in for better accuracy and fair play in sports and games. Technology is helping to build better sportsmen and women while keeping athletes safer in the field and enhancing the fan experience to improve decision-making and entertainment value technology has entirely revolutionized the manner in which we are able to design apparel and equipment. From shoes and uniforms to gloves, helmets, and sporting equipment is now more high-tech and high functioning.

Cricket

Cricket is a very traditional sport, and changes to the rules and playing conditions are not taken lightly. Sports have varied in their take up of modern technology. Fortunately, cricket has not ignored the possibilities of using technology to aid the game, for the players, umpires and specators.

Over the years cricket has incorporated into the game a few of the latest technological advances available, such as decision reviews for catches, LBW, no balls and run-outs. There have also been some rejections of technology, such as the use of aluminum cricket bats, but generally the ICC has been rightly cautious about making changes to the game that will impact the players and spectators.

Is having the best of the technology on the field and off the field. By which we can take an accurate decision with the help of using different aides such as cameras different situations to take a decision about the game with a very fair decision by which fair game can be continued. Hawkeye, a computer system first used in 2001 for showing the path of the cricket ball. Snick-o-Meter, a very sensitive micro phone located in one of the stumps, which pick up the sound when ball nicks the bat.

Here are discussions about a few of the technological innovations that are in cricket or are being discussed to be included.

Third Umpire

In international cricket, the third umpire has been used to supplement the role of the two umpires on the ground. The third umpire is equally qualified, and sits off the ground with access to TV replays of certain situations (such as disputed catches and boundaries) to advise the central umpires. The umpires out on the field are in communication via wireless technology with the other umpire. The third umpire is also asked to adjudicate on run out decisions, which he uses video replay and makes a decision without consultation with the two central umpires.

Decision Review System (DRS)

Cricket has joined some other world sports and has included an umpire referral system in some international matches. Such a system was first trialled in 2008 (in a Test series between Sri Lanka and India). Unlike in tennis where the challenge and referral decision is clear cut using hawke-eye technology, the cricket referral is adjudicated by the third umpire, and is open to further errors. The actual way it works may change and develop, but when it was first brought in this is how it worked.

Players are allowed to challenge decisions made by the on-field umpires, and have them referred to the TV official. For each innings of the Test, each team can challenge any decisions, though they will be limited to three unsuccessful challenges per innings. Only the batsman on the receiving end of the umpire's original decision or the captain of the fielding side can appeal by making a "T" sign with both forearms at shoulder height. The third umpire uses the technology of the hot spot and slow-motion replays at different angles to gain information and make decisions.

It all sounds great for the players and viewers at home, but the pressure is on the umpires. In reality, the process often takes too long and can distract from the game. When the teams have challenges remaining near the end of an innings, players tend to make frivolous challenges on the off-chance of getting a decision overturned. So there are still problems that need to be ironed out, but the referral system is a great step forward for cricket.

TV Technology

- **Hawkeye:** A computer system first used in 2001 for showing the path of a cricket ball. It is commonly used and an indispensable tool for cricket commentators around the world to confirm the decisions of the umpires. It is used as part of the DRS for adjudicating LBW decisions. Read more.

- **Snick-o-Meter:** A very sensitive microphone located in one of the stumps, which can pick up the sound when the ball nicks the bat. This technology is only used to give television audiences more information and to show if the ball did or did not hit the bat. Unfortunately at this stage, the umpires do not get the benefit of hearing 'snicko', though a Real-time Snickometer is being developed to supplement Hot Spot technology. Read more.rpm sky sports

- **Ball Spin RPM:** Starting during the TV coverage by Sky sports for the 2013 Ashes series, they were able to show an RPM (revolutions per minute) counter, showing how fast the ball was spinning after release. It is not clear how this is measured, though it would need a high-speed camera focused on the ball, possibly using the same images that are captured for the Hawkeye system.

- **Hot Spot:** The hot spot technology is mostly used to review whether the bat has hit the ball, particularly when there is a small nick. If there is contact, the small amount of heat generated is indicated by a change to that area of the bat. Hot Spot uses two infra-red cameras positioned at either end of the ground. These cameras sense and measure heat from friction generated by a collision, such as ball on pad, ball on bat, ball on ground or ball on glove. Using a subtraction technique, a series of black-and-white negative frames is generated into a computer, precisely localizing the ball's point of contact. Following some controversy after the 2012 UK Ashes series, there is doubt over the accuracy of Hot Spot.

- **Front-foot Technology:** The third umpire monitors the landing foot of bowlers after each ball and communicates to their on-field counterparts whether it was a legal delivery. They were previously doing this after each wicket, but the technology is now quick enough and

accurate enough to do it for every ball.

New technology
Cricket is a sport steeped in tradition. Making changes to the rules that have been in place for a long time is not taken lightly. In addition to the uses of technology that are discussed above, here are a couple more ideas

- **Immediate No Ball Calls:** Give the umpires immediate feedback about whether a front foot no ball has been made. It would be simple to include some technology that gives the umpire a beeping sound if the bowler crosses the popping crease, like in tennis for let or fault calls. This will mean that the umpire does not need to be distracted and looking down as the bowler delivers the ball, and can focus on what the batsman and fielders are doing.
- **No Balls for chucking:** It is difficult to monitor each bowling delivery during a match for bent arm throwing, but new technology is being developed that could possibly be used for such a thing. Previously, any player reported for an illegal bowling action had to undertake 3D biomechanical analysis of their action in a laboratory. New technology using inertial sensors is being developed that could possibly be used to test a bowling action during matches to see if they are bending their arm too much during the bowling delivery. Inertial sensors use similar technology to that used in mobile phones. These sensors will be light, cost-effective and wearable on the bowler's arm and most importantly will not hinder bowling performance while still allowing information about the bowling action to be assessed in near real-time in both match and training environments.

Athletics
The increasingly high-tech tools used computer simulations, advanced video cameras, wind tunnels, and sophisticated mathematical and physics models that enable athletes to break down their physics models that enable athletes to break down their physical motions into their component parts to look for flaws or ways to improve.

Basketball
The NBA uses replay vision to review "last touch" decisions in the final 2 min of games and also to determine whether players release the ball before the shot clock expires. Use of technology in basketball helps the referees to judge better helps the coaches to train better and finally helps the players to review and perform better in future matches.

Conclusion
The contribution of information technology plays an prominent role in for the development of physical education and it is also very essential to promote the friendly and fair play in sports and games by which we can see many changes and developments takes place to improve the standard of sports and games in today's millennium world teaching methodology and usage of proper technology to improve the standard of sportsmanship and quality of output of a good coach using scouting for the future development. Hence, my study says that the contribution of Information Technology is a rapidly growing and adopting new trends to change the future of world sports and games.

References
1. Chopade, Prakash M. Information and Communication Technology (ICT) in Physical Education, Angel Publication, New Delhi.
2. Banerjee Amit. Information and Communication Technology (ICT) in Physical Education, Angel Publication, New Delhi.
3. Anniss M. The Impact of Technology in Sports. United States: Heinemann Educational Books; c2015.
4. Ross S. Sports Technology (New Technology). London: Evans Brothers Ltd; c2011.
5. Google Search Engine.
6. Edmundson C. Sports Technology: Optimising Sports Performance. London: Bloomsbury Sport; c2015.
7. Marinho DA. The Use of Technology in Sports-Emerging Challenges. London: Intech Open; c2018.