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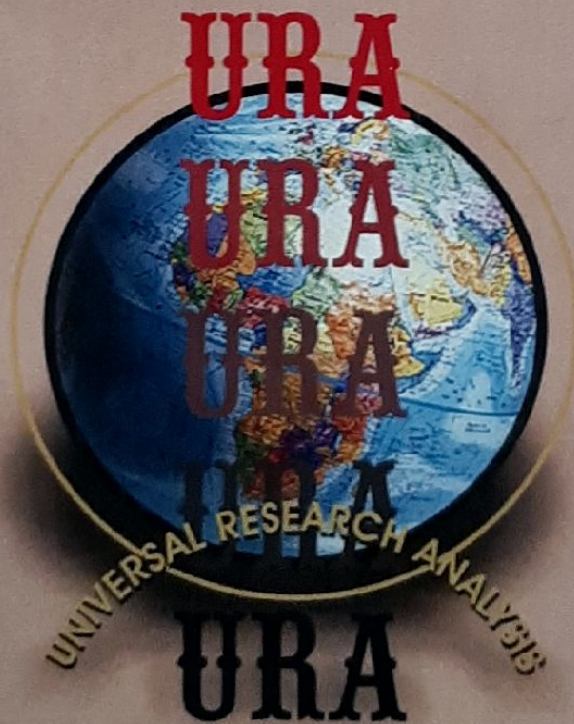
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INDEX

Sr. No.	Title of Research Paper	Author(s)	Page No.
1	Kitchen Gardens: A Traditional Agroforestry Practice in South and West District of Sikkim, India	H.K.Deshmukh, P Bhattacharya, Suprava Patnaik, Y.B.Taide, S.W.Choudhari, S.S.Harne, V.B.Shambharkar, V.P.Mane,	1-8
2	Awareness of Fitness and its Effects on Women's Health	Jyoti D Kamble	9-13
3	Comparative Study of Adopters and Non Adopters of Biogas Technology	P. Wanjari, Dr. Vandana Dhawad	14-19
4	Emerging Role of Computers in Sports	Dr.Sk.Md.A. M.K.Jagirdar, Dr. Suryakant P. Dhonde	20-27
5	The Study of Histopathological Changes in the Gills of Fresh Water Fish, Labeo Rohita Exposed to Electroplating Effluent	Dr.Umakant P. Kamble	28-33
6	Physico-Chemical Status of Various Borewell Water from Latur District M.S. India	Dr. S. G. Suryawanshi	34-38
7	राष्ट्रसंत श्री तुकडोजी महाराज यांच्या ग्रामगीतेतील विचार	डॉ. नरेंद्र देशमुख	39-44
8	भारतातील मानवी व्यंगाचा अचूक वेध घेणारे काव्य : भारत कधी कधी माझा देश आहे	डॉ.नरसिंग कदम	45-51
9	राजकीय विकासाची संकल्पना व सिध्दांत	चंद्रकांत मोरे	52-56
10	कवनाच्या प्रकाराचा समाजशास्त्रीय अभ्यास	अंगद कोते, डॉ. उल्का देशमुख	57-60

4

EMERGING ROLE OF COMPUTERS IN SPORTS

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Research Paper - Physical Education

The history of sports in India dates back to the Vedic era. Physical culture in ancient India was fed by a powerful religious rites. There were some well-defined values like the *mantra* in the *Atharva-Veda*, saying, "Duty is in my right hand and the fruits of victory in my left". In terms of an ideal, these words hold the same sentiments as the traditional Olympic oath: ".....For the Honour of my Country and the Glory of Sport." In India, *dehvada* or the body-way is defined as "one of the ways to full realisation." In the days and age of the *Rig-Veda*, *Ramayana* and *Mahabharata* men of stature and circumstance were expected to be competent in chariot-racing, archery, horsemanship, military tactics, wrestling, weight-lifting, swimming and hunting. The *guru-shishya* (teacher-pupil) relationship has always been an integral part of Indian sport from time immemorial. Sports till recent past was rarely ever taken seriously in our country, we were under the influence of our colonial masters and focused more on cricket or at the most football and hockey. A new dimension to sports was added only after 1982 Asian Games held in New Delhi. Subsequently training and provision of facilities, through not up to international standards, was being made available. Attempts were made to improve our sports infrastructure, which has definitely helped to a certain extent our sports persons in improving

their performance. But we still lack far behind.

A deeper insight into the advances made in Europe, America, China and Japan and Russia, we find that there have been lot of new dimensions are being added towards overall development of sport and a sportsperson as well. This includes management, training, nutrition, training, gear and equipments, and at advanced level physiological testing, biomechanical analysis, performance analysis and a whole range of technologies that can be strapped on, attached to, or integrated into the athlete or their equipment. One of the advantages of scientific development was that of computer technology. Today computers have revolutionized our lives. Computer aided technologies have for outperformed our traditional capacities. This is also true in the field of sports. Probable use of computer aided technologies will provide answers to the questions like what do we lack? Where do we fail? Why do fail to achieve these international standards. What has been the key to super human performances of the sportsmen from all over the world and that too in a consistent manner?

Basic elements:

Some of the basic elements essential for development of sports include management, training, monitoring and practice. Each has its own role to play. Computers have come in to definitely increase the efficiency of each of these elements.

Management:

One of the key problems that we face in our own country is the presence of multiple sports authorities and federations, each with their own agenda. These bodies are handled unprofessionally with the heads often being political appointees, who have not background, understanding and or intention of taking their job seriously. Thus act more as a hurdle towards development of sports.

The defeatist mind set and lack of long term perception and planning of the sports federations is yet another cause which has hampered overall growth of sports. Heavy dependence on government support to run the sports federation is another major hurdle; this is further complicated by problems of fund management.

Lack of adequate, updated and biased information about various athletes and sports persons, both existing and emerging, is another aspect of sports management that

needs to be looked into.

Computer technologies supported by dynamic heads of federations dedicated, professionals in fields of sports can jointly bring about a huge change in the whole sports scenario. Management of the federation, its finances and data base of various athletes or sports persons will help selection of new sports person, provide them with adequate infrastructure and facilities so that their performance could be enhanced by providing them with additional coaching.

Other issues related to sports management include doping allegations, match fixing, biased selection procedures, violence in sports etc are key problems that are hampering sports. An exhaustive database of the athletes about their medical history, performance records, behavioural responses with colleagues, under stress etc can also help to improve on their performances. Computer based information system comes in handy to overcome these issues.

For example a properly recorded medical history, data on pre and post training sessions related to their cardio-respiratory responses, medicines that an athlete takes for illness or improving stamina etc can be compared immediately with internationally banned medicines or steroids so that the coaches, managers and athletes minimize the possibility of a athlete being banned/ disqualified from competition. Bias in selection procedure due to favouritism, political pressure and other human elements can be overcome by using computer software's which process the selection procedure without any human element making it a transparent and fair process. Similar databases related to physiological and psychological behaviour of athletes will help the trainers to understand the mind set of the athletes, their short comings and advantages, which then can be put to their best use and get improved results in their performance and development as a human being.

Training:

Training is the key to success. In past training was more of trial and error and application of tried and tested knowledge, but lacked any scientific base. Today training in sports has undergone a sea of change, which is apparent from the performances put forth by the athletes. Wherever the training is supported by scientific methods and computer technology it has contributed tremendously to state of fitness and athletic training. This

has pushed athletic performance to dizzying new heights in the millennium. Today computers are used extensively to identify trends for the purpose of optimizing outcomes is common. Sophisticated computer technologies are now commonly available and have been used extensively by countries of eastern block to bring about fantastic performances by the athletes. Uses of computers to measure, monitor and analyze performances have been put to use relatively recently i.e after 1980's. Use of computer technologies can be as simple as video recordings to a whole range of advanced technologies that can be strapped on, attached to, or integrated into the athlete or their equipment for physiological testing, biomechanical analysis, and performance analysis.

One of the key elements in training is the coach. Today the coaches are better equipped as compared to their predecessors, who primarily depended on their experience and wisdom. The performance of an athlete is substantially dependant on the relation between him and the coach. Performance of the athlete is influenced by his trust, and relations and emotional dependence on the coach.

A coach when supported by technology and data base or information on the athletes background can handle the training in a much better way. Physiological data, psychological data and the athlete's socio-economic background helps to coach to have a better understanding of the athletes he will be training. Data of such a nature is well diversified and complex but computer can help him to narrow down to identify the problem areas, concentrate on the same and use it for better training.

A coach has to remember that the physiological need of every sport varies and the physical state of athlete is of prime importance. Thus the athlete prepares his body to suit the physical demands of the sport. Computers enable us to accurately measure almost anything from maximal heart rate and lung capacity, oxygen mix and body temperature regulation to muscle fibre composition, maximal muscle contractile pressure and hydration levels. This not only enables coaches and trainers to assess what areas their athletes need to focus on in their training, but also assess how effective the training methods implemented are in bringing about the desired physiological changes and how these training methods may be improved to produce better results.

Coaches have multiple responsibilities and hence simply cannot manage the

barrage of information, observations, calculations and factors, both negative and positive that eventually affect training and hence user friendly computer based interactive software comes in handy to improve even the coach's performance.

Monitoring and Practice:

Training also has its two arms i.e practice and monitoring. Both these are essential for overall improvement of athlete performance. Planning of practice sessions have to schedule in accordance with seasons, athletes availability, which is a problem in India, is greatly aided by computers. Such technologies also help the coach to monitor regularity and discipline with individual athlete and the team. Practice time monitoring with help of videos and other equipments as seen earlier helps to understand the levels of physical fitness, their bio-mechanic responses, mistakes that may lead to physical damage to athlete's body etc. Monitoring performance from results and identifying performance breakdown points have provided significant insight towards improvement of athlete performance.

A systematic record of athlete practice and performance helps to analyse the shortcomings, weakness and more importantly the efforts taken towards overcoming these and its effects on improving performance. Super slow motion replays have enabled coaches to see exactly how the body is moving during an action, which has both provided a greater understanding of how that action actually occurs and also to assess how well their athletes are performing them.

Computers have allowed us to gain greater understanding of key physiological areas that are vital to exercise and sport, such as the body's energy systems, muscle fibre compositions and the cardiovascular system. We can also monitor and measure how different sports require the use of different aspects of human physiology. By gaining better insights into the physiological requirements of elite sport, we can now better understand what areas of physiology an athlete needs to develop for their sport. For example, a sprinter needs a higher percentage of type II muscle fibres and greater efficiency of the anaerobic energy systems, while a marathon runner requires predominantly aerobic orientated energy efficiency with a greater body fat percentage body composition.

Computer based simulations helps an athlete to understand the bio-mechanics

and provides him a three dimensional overview of his performance. Development of three dimensional (3D) recordings has further enhanced ability to assess the technique of an athlete. Being able to see an action from all angles throughout the whole motion phase, rather than from one view point, gives greater information on areas such as transition, balance, force distribution and compensation. Coaches and athletes can now record in high quality slow motion almost any action, rotate the viewing angle, pause, slow or speed up the motion and vary magnification. This all helps to provide a greater understanding of how the body works and moves, and how an athlete may vary their technique to be more efficient. Once this is known he can focus on maximizing the use of his own energy to drastically improve his performance by using dormant energy or channelizing his energy in a rather more constructive manner.

Use of video with facilities like playback, slow motion helps in two ways. One the athletes are able to see their own performance and thus are able to analyse their own styles, shortcomings and areas where they can improve. Consistent monitoring will also help his coach and the athlete himself a scale to compare his own progress. Secondly watching videos of other athletes contribute towards a better observation and understanding of the new techniques, their flaws, scoring systems etc. This will help the athlete to prepare for the competitions in a better way.

Yet another aspect of use of computers is its increased portability. It helps in greater use in monitoring and measurement of both physical and technical aspects of a sport has increasingly moved out of the lab to the real time competition environment. It has increased the ability of coaches, trainers and athletes to communicate with each other. The athletes are benefitted by having access to a range of coaches and mentors for different aspects of their performance, physiotherapists, nutritionists, psychologists and more. Portable computer technology now allows each these important contributors to an athlete's success to send, receive and discuss information and developments whenever and wherever they need to, resulting in improved and quicker development throughout an athlete's training cycle.

Use of web based information updates the athletes of new rules and game regulations so that he avoids mistakes that can possibly give him negative scoring or in

extreme events disqualify him. Another dimension is use of World Wide Web will help an athlete to have interactions with other athletes, coaches etc for recent developments in training and techniques and opportunities for further studies, scholarships etc.

Negative Impacts of Computers:

Today our lives are completely influenced with technological advances. We just cannot imagine living without our cell phones, laptops, domestic appliances etc. These appliances and dependence on technologies have made our lives easy! The question is it really so? There are certain inherent questions that are being raised today? Even in sports the super human feats achieved by athletes in various fields are quite astonishing. The question is weather are we loosing the true spirit of sports. Olympics were primarily based on human abilities and celebrating the peak of these abilities. Today it is more of technology rather than an athlete.

Sophisticated technologies have a rather regressive effect. Some technological developments decrease costs, in most cases new computerised equipment increases the cost and inevitably reduces access to it.

It creates a gap between those who have access and those who do not. Thus the levels of training, preparedness, etc do not match in real time conditions. Those who do not have this technology are placed at a significant disadvantage in their development. This is reflected in huge gaps between the winners and losers.

Computers are becoming more and more influential in training and development of athletes the more essential they become. This can significantly reduce the development of a sport at all levels. In countries where funding for a particular sport is relatively lower, those athletes will be further disadvantaged, potentially restricting the expansion and even restricting further the number of countries able to compete in a sport. This, in turn, has an indirect impact on participation at grass roots levels, as the inspiration to young, aspiring athletes in those nations diminishes.

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