The analysis of the application of computer in sport research based on content analysis method

Zhu Yanying[1] and Zhao Lina[2]

[1]*Ministry of Physical Education Teaching, Shijiazhuang University of Economics, Shijiazhuang City, China*
[2]*Sport Institute, Hebei Normal University, Shijiazhuang City, China*

_____

ABSTRACT

In order to broaden the idea as well as improve the rigor of sports researches, computers are more and more widely used in the field of sports. This paper conducts researches about current sports studies with the methods of literature, mathematical statistics, and logical analysis and so on, and finds some problems in the combination of computers and sports, including the incomplete cover of computer, the inappropriate use of computer and lack of sports invention as well as patent research. In view of the existing problems, the paper suggests that it should improve the computer expertise of sports workers, introduce professionals into the field of sports, obtain advanced and cutting-edge computer knowledge through multi-disciplinary as well as international exchange and strengthen sports cooperation, in this way to resolve the current problems existing in sports and achieve a more scientific development of research.

Keywords: computer, sports, research, content analysis, technology

_____

INTRODUCTION

Computer knowledge is an indispensable tool for modern office, learning and research, which promotes rapid development of human's progress and civilization. Besides, it not only reduces labor intensity but also greatly improve people's working efficiency, creating extreme wealth for community. From the simple typing and computing in early period to later software development, multimedia and telemetric transmission, computer plays a very important role in all aspects of human's life as well as in all domains [1]. Without exception, the computer knowledge has been penetrated as well as applied to all aspects of sports and become a favorable assistant for sports workers. In order to expand and strengthen the applications of computer knowledge in the field of sports, promote the innovation, change and open research ideas as well as accelerate the development of sports science, it is quite necessary to analyze the application status of computer knowledge and technology in sports science research [2-3].

For the sake of accuracy and objectivity and to reflect the status of China's sports research more comprehensively, the time span of the paper set from January 1980 to December 2013, and the object of research is all articles whose theme are sports and computer in database cnki.

EXPERIMENTAL SECTION

Literature
Through collecting the electronic or paper-based literature about the combination of sport and computer which are retrieved from the computer, it can have a understanding of the current status of computer knowledge and technology in sports research.

Mathematical statistics
Make data reduction and analysis of the collected data, and find out the characteristics and existing problems in the current research about the combination of computer and sports.

Logical analysis
Through the collection and analysis of data, the paper finds out the reason as well as proposes appropriate recommendations according to the existing problems.

THE STRUCTURE ANALYSIS OF THE COMBINATION OF COMPUTER AND SPORTS
Figure 1 shows the structural diagram about computer's function during the sports science research after its application into sports. The figure shows that computer knowledge and skills play different roles in three areas of sports after their application to physical education. In the field of school sports, the application of computer knowledge and technology is the most widely used, first is about the aspect of sports teaching, which includes the multimedia technology of computer, network technology as well as the applications of computer software. Secondly, the research work of school sports requires computer knowledge, what's more, the research of school's scientific training needs computer, besides, the application of computer in physical education management is quite common. Thanks to the computer knowledge, school sports management becomes more easy and smooth. Sports knowledge and technology make great contribution in the domain of competitive sports, which should first monitor athletes' various functions and skills, then build training system based on the scientific and objective analysis of the data, and develop sensing equipment to track the training, etc [4]. All these need the application of computer knowledge and technology. The existence and use of computer make the physical training more scientific, systematic and targeted, which is essential to improve athletes' level. What's more, computer knowledge and technology can make sports competition more objective and fair. For the computer software of competition management can avoid the errors caused by human factors and can greatly restore and prevent the disputes results from the referee miscarriage of justice. Besides, the research institutions set by sports also require computer. Computer can provide objective, accurate data for teams and organization of competitive sports and make timely, sentific programs and adjusted strategy for the improvement of athletic performance [5].
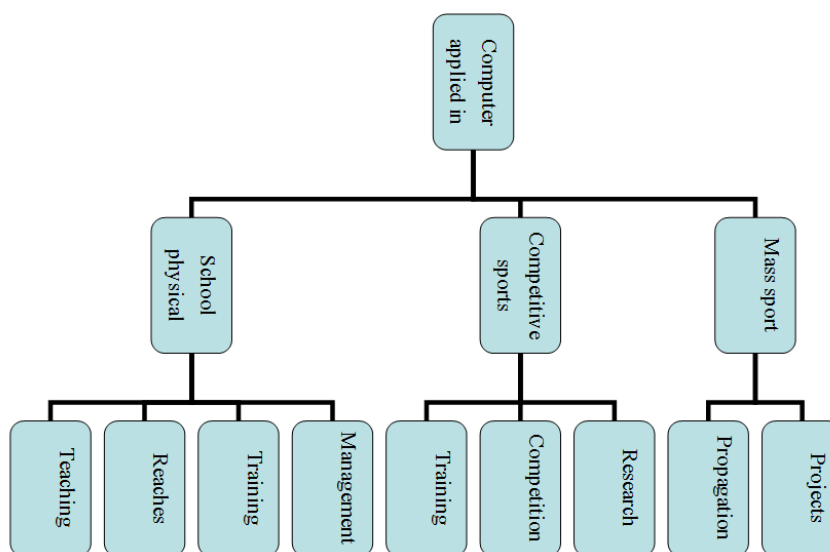

Fig. 1: The structure diagram of computer's application in sports

In the field of mass sport, the application of computer knowledge and technology mainly reflects in these aspects such as the research and development of new projects, the spread, communication training and so on [6]. Through network and multimedia, mass sports workers, sports instructors and fitness instructors can communicate and learn from each other. Moreover, it can find out the prevalent project with local, national characteristics and makes efforts in their protection and propagation. Therefore, computer and sports are inseparable.

RESULTS AND ANALYSIS

After rigorous analysis of the study of objects, the paper finds the researches about sports and computer have the following characteristics.

Extensive research content
Retrieve relevant papers about "Sports" and then "Computer" relatively with the use of computer network systems. The content includes physical education, sports research, sports management, sports training, sports competitions and so on.

Table 1 shows that after the analysis of the literature about the combination of computer and sports, it can be found that physical education is the most involved, and the number of paper of this kind is 264, which accounts for 47.2% of the total amount. The second is the research about other aspects. Although the content is relatively fragmented, it mainly makes detailed analysis about one part of teaching, training or competition, and the number of this paper is 104, which accounts for 18.6% of the total amount. The third is about sports management, including physical education management and computer management system, the number is 102 and takes 18.2% of the total amount. The fourth is about training, whose number is 32 and accounting for 5.7%. The fifth is about applied research, the number is 22 and accounts for 3.9%; the sixth is about sports competition, the number is 19 and accounts for 3.4%; the last is about sports statistics, whose number is 16 and percentage is 2.9%. Therefore, it shows that the application of computer is mainly in physical education, while the research about sports training, scientific research and competition is relatively small. For the reason is that the schools has more convenient access to knowledge and equipment, which provides favorable condition for computer's implication. However, it is difficulty for the sports staff in other areas to contact computer knowledge as their capacity is limited, which results in the less chance of analyzing the combination of computer and sports. Therefore, we need to strengthen computer's implication in technical training, research and competition, and solve the problems by improving the training of sports stuff as well as uniting with computer professionals.

Table 1. The statistics of articles' content about the combination of computer and sports

content	teaching	training	research	management	competition	statistics	other
number	264	32	22	102	19	16	104
percentage	47.2%	5.7%	3.9%	18.2%	3.4%	2.9%	18.6%

Frequency distribution is normal
From the early 80s of last century to the year of 2013, it can be seen that before 2010, the total number of research about the combination of computer and sport is increasing year after year from our existing 16 Sports Core Journal (see Table 2). The number of the related articles in the 1990s of the last century is more than tripled than that in the 1980s, and it reaches the summit in the first decade of the twentieth century, during which there are 107 papers about the combination of sports and computer. Since the 1980s of last century, The "Sport Science" has published 49 articles about the combination of computer and sports. During the ten years from 2000 to 2009, it published more than 26 articles about this topic and become the Sports Core Journal which has published the most articles about the combination of computer and sports so far. Besides, "Shanghai University of Sport", "Beijing University of Sport", "China Sport Science and Technology" and "Wuhan Institute of Physical Education" all published more than 10 articles about the combination of sports and computer within 10 years. Table 2 also shows that the years with fastest development of this research is from 1990s to the first decade of 21century, which is the most glorious period of computer's implication to various fields of sports.

Table 2. The time and frequency of the publication of the articles about the combination of computer and sports

Journal	Publishing time				
	1980-1989	1990-1999	2000-2009	Since 2010 to now	total
Journal of Shanghai sport institute	0	14	6	1	21
Journal of Beijing sport University	0	10	13	3	25
Journal of Shandong sports institute	1	2	6	0	9
Physical education and science	2	2	3	0	7
Journal of Chengdu sport University	0	5	1	0	6
Journal of Guangzhou sport University	1	3	4	1	9
Sports science	8	15	26	0	49
The Chinese sports science and technology	5	14	4	1	24
Journal of Wuhan institute of Physical education	3	5	11	0	19
Sports culture Tribune	0	0	2	0	2
Journal of Tianjin University of Sport	2	4	5	0	11
Journal of Xi'an University of Sport	1	9	7	0	17
Journal of Capital Institute of physical education	0	0	7	1	8
Journal of Shenyang Sport University	1	2	6	0	9
Shandong Sports science & Technology	5	6	4	1	16
Journal of Physical Education	0	6	2	0	8
Total	29	97	107	7	-

Literature in various forms

Table 3 shows the type segment of scientific literature. From the table we can see that the journal takes 85.5% of the total amount, the second is almanac, whose number is 11 and account for 3%；the third is PhD thesis and conference papers, each of them has 11 articles and takes 2%；then is the newspaper encyclopedia and patent, whose number is 3 and account for 0.5%, besides, the others has 33 articles and its percentage is 5.9%. This means that the application of computers in sport is still not deep. It is only limited in the use of the basic knowledge of computer while lack novel research and inventions of the combination of computer and sport. Therefore, we should strengthen the application of computer's professional knowledge in the field of sports, and develop electronic products as well as entities electronic intelligent products about this field.

Table 3. The type segment of scientific literature

Form	Journal	Ph.D thesis	Conference papers	newspaper	encyclopedia	almanac	patent	others
number	478	11	11	3	3	17	3	33
percentage	85.5%	2.0%	2.0%	0.5%	0.5%	3.0%	0.5%	5.9%

Rich applications of computer knowledge

Table 4 is the statistics of the content of computer knowledge related to the sport. From the table we can see that the number of software design is the most, it has 255 articles and takes 45.6%; the second is the computer network, whose number is 119 and accounts for 21.3%, this field mainly refers to the sport teaching, information transmission and sport management through internet; besides, the number of articles about multimedia is 89 and accounts for 15.9%, the technology of multimedia mainly reflect in sport teaching and training, what's more, it is important in the dissemination of mass sports; and the number of programmer is 50 and takes 8.9% of the total amount; and other aspects has 46 articles. This means that the application of computer's basic knowledge is more while the application of professional knowledge is less.

Table 4. The statistics of the content of computer knowledge related to the sport

content	Software Design	computer network	programmer	multimedia	other
number	255	119	50	89	46
percentage	45.6%	21.3%	8.9%	15.9%	8.2%

Various types of studies

From table 5 people can see that the theoretical study has 291 articles and takes 52.1% percentage; applied research has 238 articles and accounts for 42.6%；while the percentage of practice research and experimental study is small, which is 3.6% and 1.8% respectively. These mean that the application of computer is mostly stay on the theoretical study, while lack the high-tech experimental study [7]. Therefore, we should pay more attention about the research on entity and innovation in the future.

Table 5. The statistics of the types of study about the combination of computer and sports

Type of study	Theoretical study	Applied Research	Practice Research	Experimental Study
number	291	238	20	10
percentage	52.1%	42.6%	3.6%	1.8%

THE EXISTING PROBLEMS OF THE CURRENT SPORTS RESEARCH

Through the collection and analysis of the data, the author finds several problems about sports research and proposes corresponding solutions and suggestions.

The coverage of computer technology in sports is not comprehensive

From the table 6 we can see that the literature about the research of teaching and management is relatively much, while the research about competition, training, scientific research, statistics and performance is less; besides, the content mainly includes school sports, competitive sports and mass sports, and their number of articles are 239, 16 and 0. In response to this situation, the department concerned should encourage and support the sports workers to study business with their advantages and strengthen the application of computer technology into work, in this way to further improve their efficiency [8].

Table 6. The statistics of the research about the combination of computer and three major areas of sports

range	school sport	competition sport	mass sport
number	239	16	0

Improper use of computer expertise

From table 7 people can find that from the basic software technology to the development of software and program, they all included in the research. However, the basic and common technology is more, such as the articles about computer network is 121 and the articles about software application is 29. And the expertise of computer is less: the article about software development is 10, program is 7 and hardware development is 1, which means the research is not deep enough. This problem results from the limited computer knowledge and technology of sports workers [9]. To solve such drawbacks, it is necessary to improve the computer knowledge and skills of sports workers and introduce professionals into the field of computer to fill up the blank.

Table 7. The statistics of the research about the application of computer's basic knowledge as well as expertise in sports

content	computer network	software application	software development	program	hardware development
number	121	29	10	7	1

Lack of sports inventions and patents

Among the literature about the combination of computer and sports, the applied research is lot, to the contrary, the experimental research is not much and the research about inventions and patent is little, which only has two patents. Advanced sports invention should be based on the advanced technical knowledge, and it is an effective protection to combine the modern computer technology with sport [10]. Besides, through various channels, relevant sports departments and parties should enhance inter professional communication of sport and computer and learn advanced computer technology to apply into sport, in this way can provide new ideas and methods for sport's invention and creativity.

CONCLUSION

The application of computer has become deeper and wider in different fields of sports. The number of relevant papers keeps on increasing from the 1980s to the year of 2010, and then the number has decreased since that year. The contents concerned are physical education physical education, sports training, sports research, sports management, sports competitions, sports statistics and so on. During the three parts of sports research, the research about school sports and competition is more, while the mass sport is less. The type of research is mainly academic dissertation with a small number of patented technologies and inventions. Academic dissertation includes application, theory, practice and laboratory research, but the majority belongs to the theoretical research. The computer knowledge and technologies used are commonly used software and tools, multimedia network technology and software, while the more professional software technologies are used less, which is due to the lack of computer expertise of the relevant workers.

Suggestions

The paper analyzes computer's application in the field of sports. According to the particular situation, the paper suggests the sports workers to pay more attention to the rapid development of computer technology, promote the application of the combination of computer and sports, explore new methods as well as promote new invention. Besides, it should encourage the cooperation between sports workers and computer professionals to make more contribution for sports career, at the same time facilitate international cooperation and introduce advanced technology to our country, making China's sports always keep advanced as well as forward-looking.

REFERENCES

[1] Wang hua, *Appl. of Valu. Eng.*, **2012**, (14), 200-201.

[2] Wang Tianjun, *J. of Spor. Sci.*, **2000**, (2), 34-36.

[3] Ding Ning, Our country university sports scientific research present situation and the dynamic research, Suzhou University, **2010**.

[4] Wang Huijuan, *J. Jiamusi Inst. of Edu.*, **2009**, (4), 157.

[5] Zhang Daorong, *J. of Beijing Spor. Univ.*, **2003**, (4), 458-459.

[6] Hochberg Y, Mulrtiple comparision Procedures. Jahn Wiley & Sons, **1987**.

[7] Noether G. E., *J. of the Amer. Stat. Assoc.* **1987**, (82), 645.

[8] Ruifang Hope Adams, *Open Edu. Res.*, **2012**, (4), 62-69.

[9] Hagler M. O.; Marcy W. M., Wiley Encyclopedia of Electrical and Electronics Engineering, **1999**.

[10] Ross J.; Schulz R., *British J. of Edu. Tech.*, **1999**, (1), 5-24.