

SCIENTIFIC COMMUNICATIONS IN SPORTS INFORMATICS

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ABSTRACT

The article examines the history of the formation of communities and the development of scientific communications in the field of application of mathematical methods, computer science and digital technologies in sports in Russia and in the world.

Keywords: sports informatics, information technologies in sports, computer science in sports, scientific communications in sports.

INTRODUCTION

Modern elite sport is increasingly becoming not so much a competition of the athletes themselves, but rather a competition of sports training technologies. The determining role here is played by the level of development of the national system of sports science and innovation. In most countries that are successful in sports, effective national models of sports science management have been formed, in which horizontal and interdisciplinary connections are ensured by scientific societies and associations [1]. It is also generally accepted that modern sports science cannot do without the use of mathematical methods and information technologies, and interdisciplinary connections are extremely important in this area. There are many examples of such applications - from analyzing data on the condition of athletes and modeling physiological processes under load [2] to finding optimal solutions for the placement and replacement of players in a team [3]. Trends in the intellectualization and digitalization of many spheres of life, including sports, determine the urgent need to combine the experience of sports sciences with the capabilities of the exact sciences and achievements in the field of applied mathematics and computer science. At the same time, the main mechanism for the development of science is scientific communication, defined as a set of types and forms of professional communication [4]. It should be noted that professional communities of scientists are drivers of scientific communications throughout the world, and the formation of sustainable active communities in any field is one of the forms of intensifying progress in this area. The field of mathematical methods, computer science and digital technologies in sports is no exception. Both in the world and in Russia, such communities are being formed and are developing dynamically. Development of the direction of cybernetics in sports in

our country The history of computer science and cybernetics in our country is full of dramatic events. Over the past time, these disciplines have undergone significant changes and paradigm shifts, certain directions have repeatedly emerged and disappeared, and attempts have been made to apply the methods of these sciences to various subject areas, including sports [5]. On November 1–2, 1965, the first conference in the USSR “Cybernetics and Sports” was held at the State Center for Physical Culture and Physical Culture, dedicated to the application of mathematical approaches to the analysis and management of sports activities. About 700 specialists participated in the conference, 120 reports were announced [6]. The conference participants were scientists in the field of biomechanics, biochemistry, morphology and physiology of sports, engineers, specialists in mathematics, as well as coaches and teachers of physical education. During the conference, it was shown that cybernetic methods were most effectively used for research and modeling of physiological processes during muscle activity, modeling the dynamics of the physical state of athletes (fitness assessment), modeling education and training, modeling the collection and processing of information in sports. At the opening of the conference, one of the founders of the cybernetic direction in physiology, Professor N.A. Bernstein (founder of modern biomechanics of human movements and the theory of movement control, founder of the physiology of activity), spoke about the role of cybernetic research in human motor activity. Presentations were made by famous scientists - V. M. Zatsiorsky, N. I. Volkov, V. S. Farfel, S. S. Kislitsyn, V. V. Rosenblatt, I. P. Ratov, D. D. Donskoy, L. A. Vainshtein, Yu. V. Verkhoshansky and many others [7]. The conference participants unanimously noted the need to create a special body to coordinate scientific research on the problems of cybernetics in sports and the rational use of the potential of scientific teams. Such a body was soon created - the All-Union Scientific Committee on Cybernetics under the Scientific Methodological Council of the Union of Sports Societies and Organizations of the USSR. This body functioned successfully until 1968, when the Union of Sports Societies was disbanded and the Union-Republican Committee for Physical Culture and Sports under the Council of Ministers of the USSR was formed. The second conference “Application of computer technology in science and sports (cybernetics and sports)” took place on September 10–12, 1968 on the initiative of the NMS section “Cybernetics and Sports” of the Central Council of the Union of Sports Societies and Organizations and was also held at the State Center for Physical Culture and Sports. The conference focused on general theoretical aspects of the use of computers in sports, multivariate statistical analysis of research results in sports and the use of computers to solve biomedical problems. More than 100 specialists representing 39 institutions from 27 cities took part in the conference, and 38 reports were heard. Summing up the results of the conference, its

chairman, Professor A.D. Novikov, noted the increasing importance of mathematization of scientific research, both in the theory and practice of sports, while pointing out the existing limitations [8]. In 1969, a monograph by V. M. Zatsiorsky was published, which outlined existing examples of the application of cybernetics and mathematics in sports at that time, which were tested by practice [9]. Two decades later, when the application of mathematics in sports had already gone a certain way, in his work “Caution – statistics!” V. M. Zatsiorsky wrote with alarm that “... over the past thirty years, mathematical statistics has become widely used in sports science, but, unfortunately, very often with such errors and absurdities that this leads to the discrediting of statistical methods and the appearance of a large number of works either completely meaningless or containing such major errors that scientific results are devalued” [10]. The author pointed out three reasons for this, which are still relevant today: the availability of computers, low requirements of reviewers and poor training of scientific personnel. In 1978, a group of American biomechanists came to GCOLIFK and when asked why they almost never cite Soviet works in their publications, Professor C. Dillman replied: “I studied Russian for two years and began reading “Theory and Practice” . But I don’t understand where the authors get their results and conclusions from. There are a lot of words, but the methodology is not described, there are no statistical data. And I stopped reading Russian literature” [10]. However, in the Soviet and later Russian school of sports science there is a sufficient number of good and outstanding works where mathematical methods are applied correctly. Already in the modern period, they have successfully applied mathematical methods and computer science to the problems of sports medicine, physiology, biomechanics and bioenergetics of sports and have made a significant contribution to the development of these areas, creating around them scientific groups and schools, scientists and professors of the State Center for Physical Education: M. A. Andryunin, G. V. Barchukova, R. L. Boush, N. I. Volkov, S. M. Gordon, V. V. Zaitseva, V. L. Karpman, S. P. Levushkin, V. R. Orel, G. I. Popov, O. I. Popov, S. G. Seiranov, V. N. Seluyanov, V. D. Sonkin, R. V. Tambovtseva, V. L. Utkin, A. A. Shalmanov, Al. A. Shalmanov, M. P. Shestakov, M. I. Shikunov and others. One of the leading organizations in the application of mathematics and information technologies in sports and the organizer of scientific communications is the Research Institute of Information Technologies of the Moscow State Academy of Physical Culture (NIIT MGAPC), which was created in 1995 as a result of the reorganization of a problem laboratory for solving problems informatization of the sphere of physical culture and sports. The Institute has become a recognized center for scientific communication in the development of expert systems for planning training loads in various sports and

biomechanical analysis of human movements using high-speed video recording and mathematical modeling.

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