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Information technology for physical education: experience and challenges

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Background. The present informational society development process may be described as dominated by the increased contribution of the modern information and communication technologies (ICT) to a wide variety of human activity domains including the physical education system with more and more priority being given to the professional and informational competency building process in the physical culture university students, coaches, athletes and management personnel. This is the reason why a special emphasis is given today to the issues of modern IT application in the national physical culture and sports sector on the whole and in the physical culture and sport specialists' (bachelors, masters and postgraduates) training and advancement system [7].

Objective of the study was to analyze and generalize the practical experience of the modern information technology application for the physical education purposes and to set new goals for the application IT improvement process.

Study results and discussion. The author working in close cooperation with a research team of the Theory and Practice of Gymnastics and Information Technology Application in Physical Culture and Sports Department of Udmurt State University have accumulated practical experience in the future physical education and sport specialist training with application of modern ICT. We appreciate the valuable contribution of a few manuals developed and published by the Department, including "Information technology application in physical culture and sports" [5], "Practical manual for IT application in physical culture and sports" [10], "Fundamentals of theoretical and practical work in physical culture and sports" [2], and "Theoretical and practical fundamentals for the physical culture and sport specialists' training supported by modern information and communication technologies" monograph.

New-generation didactic materials based on the modern IT are being actively developed and implemented to support the academic education process, including the following: multimedia education systems/ software; multimedia progress control software and tests; educational databases including the relevant audio-, video- and graphical data; educational websites; multimedia lectures and presentations; digital video; training simulators to help master and develop special skills; remote training courses etc. [3, 6, 8, 9, 11].

As demonstrated by the practical experience [6, 8, 11], the new-generation didactic materials are largely different from the traditional ones in the following aspects: they combine audio-, video-, graphics, animation and textual blocks to effectively produce the multimedia training environment; they are interactive that means that a permanent feedback is used to timely adjust the training process; obtain any additional data when necessary; have options of the system operations; individualize the education path; process large volumes of information; almost immediately obtain the data required in one or another situation; increase the education process automation (by the relevant process control/ monitoring tools etc.); create a facilitating educational environment via due IT-based interactions of the trainee with the training tools and interpersonal relations of the trainees and educators. For example, the multimedia education systems/ software developed by the Theory and Practice of Gymnastics and Information Technology Application in the Physical Culture and Sports Department make it possible to notably improve the quality of education due to the following: relevant education process and progress control and self-control tools; multiple revisions of the learnt education material by every student (including the video-material replays in standard, slow or snap-shot modes etc.); timely detection of deficiencies in the progress of every student at any stage of the software application; individualized pace of the education material delivery process; interactive design of the dialogue with the education tool; competition simulation formats; refereeing service simulation format; and, what is most important, the individualized and independent design of the education process that may be easily customized for every university athlete that needs to leave the classes at times for training sessions and competitions [1, 5, 9].

In the context of the IT competency building in the future physical education specialists, due priority is to be given to their competency in the modern information and communication technology application in the athletic training process, as this may be one of their core responsibilities in future professional careers [4]. It may be pertinent to make a special emphasis on the computer tools of competitive performance modelling and forecasting that give the means to make due and timely adjustments to the education/ training process and notably improve the sport assets (including sport facilities, appliances, outfits and equipment) build-up and management process. The relevant modern technologies may be highly beneficial for the biomechanical analyses of athletic performance, the analytical data being generated by modern hardware/ software systems including high-speed video-cameras, special software tools equipped with sensors fixable on the athletes' body; and all these systems may help notably improve the coordination skills mastering process and quality.

Furthermore, the modern ICT offer great opportunities and toolkits for organization and management of sport competitions [1, 8, 11]. The tools may be used to advertise the competitions in the web, report accomplishments of the competitions and upload the video-reports to YouTube where the competitive data may be reviewed and analyzed any time beyond the timeframe of the competitions. It is traditional for many sport disciplines today to apply video-captures for dispute settlements, photo-finish applications, for documentation production and keeping (including protocols of competitions) and other purposes. As things now stand, an increasing range of the physical culture and health improvement services is being offered via different fitness centres and health facilities, with the services being customized to people of different fitness levels using modern IT-based equipment and software to rate the trainees' performance and progress i.e. monitor their health and physicality in the process. The technologies give the means for the trainees and coaches to obtain process data and rate progress for a certain timeframe (week, month or year) and to plan and model the training loads. A coach/ instructor having access to the training database may apply the data to control the training process and adjust it by timely recommendations. For the last few years, special computerized systems have been increasingly offered for medicinal, physical culture and sport applications. This is the reason why a growing priority is being given to the future physical education and sport specialist training in the technology application domain.

It is the graduate qualification theses that are presently ranked among the main forms of the state assessment of the bachelors' education quality, the theses being designed to demonstrate the bachelor's knowledge and skills in many aspects including the modern information and communication technologies applicable for theoretical research and practical works in the physical culture and sports sector. A modern student may apply a wide variety of special tools to efficiently mine, store, produce, employ and disseminate data with concern to his/her research work. The modern toolkits include special data-processing software (Statistica, SPSS, etc.) that, if duly mastered by the student, make it possible to improve the quality of the graduate qualification theses and efficiently apply the knowledge and skills for problem solving in the professional careers.

In the last few years special attention has been given to the informational and practical support and education/ training process management in the educational establishments and sport institutions. Computerization of the informational and practical support and education/ training process management in the education establishments and sport institutions is ranked among the top-priority issues today. Computer banks and databases to process the research/ education data and make it available via the local and telecommunication networks are considered today among the key services provided by the modern education establishment and sport institution. Therefore, the efforts to improve the professional education and university sports/ health improvement process using the computerized databanks to process the education/ research data, provide due information/ practical materials and support the process by telecommunication network operations – require the relevant IT technology being applied to control the education and training processes in the relevant education establishment or sport institution. In the educational practices, among other things, the students must learn to keep the Electronic Logbooks that are widely implemented today in practice by general education and special sport schools, and the relevant systems need to be put in place to familiarize the students with the Electronic Logbooks. Some universities are being equipped with Magellan Control System and other systems.

Conclusion. For further progress of the modern ICT in the physical education universities and sport institutions, they are to be timely equipped with modern information and communication tools; with the IT competency and qualification of the educators, coaches and service personnel being persistently improved; and due actions need to be taken to step up the relevant research activity to find new ways for the ICT being efficiency applied in the national physical culture and sports sector. Inter-university service centres may be established to collectively employ the most advanced and high-cost technologies and equipment.

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Abstract

The study was designed to analyze and generalize the practical experience of the modern information technology application for the physical education purposes and to set new goals for the application IT improvement process. The study methodology was based on analyses of the available theoretical and practical reports and initiatives to generalise and apply the relevant software and education tools for the physical education specialist training at Udmurt State University. The study outlines the main avenues for the further modern IT research and implementation in the national physical culture and sports sector, and gives a few concrete examples of how the modern information and communication technologies may be applied to bring direct and potential benefits for the physical culture and sports projects in the following domains: (1) physical education and sport specialist training system; (2) athletic training system; (3) sport event organization and management process; (4) health improvement and physical culture projects; (5) institutional and management arrangements for the relevant theoretical and practical works; (6) athlete's functionality tests; (7) trainees' physical progress and health monitoring projects; (8) psychological tests; and (9) informational and practical support and the education and training process management in the relevant education establishments and sport institutions. The solutions offered by the study will help design the relevant research processes with a higher priority being given to the modern information and communication technologies applicable in the physical culture and sports sector; and successfully implement them in the education and training processes.