QUALIMETRY PEDAGOGICAL TECHNOLOGIES IN PHYSICAL CULTURE AND SPORTS

Irina Syrvacheva, Sergey Zuev, Venedikt Syrvachev

Summary: The need for and an example of how to create quality measurement techniques (qualimetric) pedagogical technologies in the sphere of physical culture, to achieve the desired (originally based) level of professionally important qualities in students is discussed. The methodology implements a combined method of measurements, including exclusive measurements of the non material properties of the education. In order to solve the problems, an expert-programmed information complex for registration and analysis of qualimetric information has been created to monitor the professional psychophysical preparedness of students and for the adoption of adequate and well timed pedagogical decisions for its correction.

Keywords: qualimetry humanitarian indicators, criteria and measurement technique, pedagogical experiment.

Introduction.

The presented work is one of the practical examples of the implementation of the provisions of the theory of exclusive measurements, formulated in the works of Professor I. Shishkin in estimation of non material properties (NMP) of commercial products and services related to quality control (qualimetry) – a section of metrology, studying the measurements of quality.

Measurements of NMP allows to establish a strict quantitative basis for many humanitarian, society and social sciences. The possibility of interpolation, prediction of the foreseeable future appears, that is one of the objectives of productive scientific activity [1,2].

1. Substantiation of the choice of the subject of the study.

The question may arise: why as an example the physical education and educational technology development in education and sport is taken?

It is known that physical culture, as a product of historical and philosophical development of the society, is not only the culture of the body, but also a combination of material and spiritual values, as the behavioral side of human activities, their evaluation and interpretation. Value orientations of physical culture are an essential component of the education of the individual, because they accumulate the entire experience, traces of external influences of nature, society, education. Most of the targets of physical culture can be understood as the cultivation of its healthy life styles (HLS), especially to young students, in turn, HLS as both behavior and human life is meant to be the creative side of the process of formation and perfection of personality, its social and professional integration.

Thus, health status, functional and psychophysical preparedness of graduates, the level of professionally important qualities should be the main indicators of the quality of education and physical education in the University. This approach provides relationship of intellectual, socio-psychological and motor components, allows a different, more adequate view of the problems to form the physical education of the student.

But there are problems. So, if you suppose that one of the main indicators of the student's health is his physical readiness, then, unfortunately, we must note the fact that this figure is decreasing from year to year. Primarily decreases the overall endurance as most essential to health, resulting in the ability to work, disease resistance, stress, strain, and contributes to the General life expectancy [3,4].

In our opinion, it is necessary to begin with the search for cause – consequence relations occurring in the field of physical culture, to try to explain them and, consequently, to improve the situation. The authors certainly do not aim to solve the entire problem that requires engaging (with the indispensable support of officials) of powerful intellectual capacities, but to identify some ways and specific ways for its decision -that's the purpose of the work.

Paradoxically, in the educational activities there is scope of knowledge and skills for which competence is always in short supply, although they are necessary for everybody and always. This relates to the system of knowledge and skills related to culture of self-preservation, effective possibility to work, personal health and healthy lifestyle, creative long life.

It is time to assume that today's poor health and psychophysical preparedness of students, are not
only and not so much due to the deterioration of the socio-economic living conditions, to the negative influence of biological factors, bad ecology, but mainly due to the underestimation by youth of wellness, preventive role of physical culture and sports, the absence of its scientific, physical and valeological knowledge and skills for organizing self-study and self-checking.

Hence this reason, that the prevailing health status of students is the imperfection of educational technologies (including curriculums) in the course of physical culture, seems almost obvious. And as a result such a this management solution as the immediate introduction into educational activities for physical culture (DAPC) of all the attributes of progressive, innovative educational technologies, including the focused organization of the self-study and self-checking, becomes evident. In practice the selection (and often only declarative recommendation to use) progressive technologies are those which, to varying degrees, are recognized, and sometimes-called innovative.

Today you can often hear about the innovation economy, the introduction of innovations in all spheres of our life, in many technologies. They talk a lot about it, many works are dedicated to them. But we would like to know much more about the quality estimation of the results of these innovations. Not all innovations lead to positive results. As far as education is concerned, we can cite as an example the United State Examination (USE, EGE), which is treated now clearly that it has both positive negative sides. Hopes at the end of the 90-ies that the main instrument to encourage high quality, progressive developments in education, the State educational standards (SES) (theoretically, it was supposed to be that way), have failed. When designing SES all the rules of national and international standardization have been violated. Particularly high damage caused the violation of the rules of anticipatory (advanced) standardization.

Our SES do not satisfy this rule. In their formulation of requirements for compulsory minimum content and level of training of the graduates, thus they do not stimulate the improvement of education quality, do not give it innovative, "advanced nature." All this is a typical feature of those normative documents, according to which we all work and which, as one can see, do not quite satisfy modern requirements [5].

Under such circumstances, particular significance is the right choice and realization of the management decision. And to do that one must create one's own professional business strategies, take into account the fact that harmonious quality pedagogical process is possible not only as a true reproduction of the "rolled smooth," educational technology, but, and it is the most important, in comprehensive assessment and analysis of the results of the use of it, with subsequent corrections of management decision. In these circumstances, evaluation, and namely measurement of quality-with greater pedagogical technologies, i.e. their qualimetry becomes really the main factor for improving the educational process in the University, including the physical culture.

2. Required concepts and definitions.

A more correct solution of the task requires clarification of certain concepts and definitions in the area of that aspect.

The surrounding reality is represented by objects, properties and phenomena of the material and of the spiritual world. Objects of market relations, for example, are products, goods and services, their most important property being their quality. Quality is something that satisfies and even delights clients - Edward Deming, the author of the concept of total management (TQM) thought. Quality is multidimensional. The generally accepted or established by law characteristics (measures) of quality, are common in their quality relation for different types of products, goods and services, but differ in individual quantity relation terms of solo for them are called quality indicators [1]. In General, product quality is customer satisfaction is achieved by improvements in technology, which is based on evaluation of data (of measured) values of quality parameters, its quality control (qualimetry).

The concepts of "products", "user", "technology" have a special meaning in education [5.9]. What, for example, is the product of the University? The main perception rooted, by the way, at attestation of universities is that University products are its graduates! This is a wrong opinion. Products of the University is to increase the knowledge and skills among students of secondary education to the level corresponding to the level of the higher education. Or who is the consumer of the educational services in the University? At attestation again it is believed that those are the employers, to whom after the education the graduates arrive to work. However, consumers of the educational services at the University are the students! A feature of
this market is that the consumers (students) are often not themselves aware of their needs, which change during training when moving from course to course.

And finally, what should be understood by the pedagogical technology concept? The concept of "educational technology" appeared as a synonym for programmed education evaluation in 60-ies in the West, when in the educational process audiovisual equipment became widely implemented. Still the fundamental concept remained the personally oriented education, certainly, with its motivational component. In the broad sense technology is understood as the science (narrowly - set of methods) about the laws of functioning of any complex system.

Three major, interrelated and interdependent components are included in that concept:

1. Ideology – the information component (what for?). Those are the concept and the principles on which the system relies. The educational system is based on the following principles: scientism, accessibility, consistency, prospects, connection to practice and others.

2. "Tools" of work (what?) – is the instrumental component. In education those are the educational institution, their equipment, utilities, sanitary and other conditions, tutorials, methodical assurance, software, computers, sports halls, etc.

3. Personnel (who?) - the social component of technology: requirements for the people realizing the technology. So it is in education—there are educational and cultural requirements for the pedagogues and managers. Here the requirements or account of initial knowledge of the students, as well as the requirement for increase of knowledge at the given stage of education can be added.

According to UNESCO (1996) the pedagogical technology refers to a systematic method of planning, implementing and, most important, the evaluation of the whole process of teaching and learning, taking into account the human and technical resources and the interactions between them to achieve a more effective form of education.

In that sense a particular approach require also the indicators of the quality of educational technology or all the activities of the University (Chair). Here is the question: can the educational activities be reduced only to market relations? Is it possible to relegate it to the level of "buy and sale" and operate with exclusively market categories "demand", "offer", "market"? Can "income" or "effect/cost ratio" be considered as the main indicator of the effectiveness of the University? There have been discussions on this matter for long time.

An alternative view attaches to the education, especially the education in the sphere of physical culture, far more important sense, considering it as the fulfillment of social order for health, as the mission of the graduate school for the formation of the society, and the personality of the future specialist. This view is widely supported in academic circles and among teaching staff of universities, but it imposes special, yet little studied, requirements to the nomenclature of the indicators of the quality of educational technologies and their rank significance [5, 6, 7, 8].

However, it should be noted that all methodologies and tools in education, including magazine "Pedagogical measurements" are not included in the State Fund measurement techniques for 17 kinds of directions of activities envisaged by the Law on inurement of unity of measurements for State regulation, are not legitimate today.

In these circumstances, for the basis of quality control for educational technologies it is appropriate to take international instrument, free of Russian laws, for example, "measurement technique in the quality of education and educational services (hereinafter referred to as the" methodology "). Developed by the International Professorial Association, approved by the UN, and it has been endorsed by the 4-th 6-th and the meetings of the CIS Inter parliamentary Assembly and approved by the State inspection for certification of educational institutions of Russia [7].

Adaptation of the selected “Methodology” as a basis quality control tasks for pedagogical technologies and its experimental application in one of the areas of educational activities (physical culture) is the content of this report.

3. Modernization of the “Methodology” of measuring of the Quality of education.

In the paper proposed the following tasks are considered:

the formation of a hierarchical structure and nomenclature of the educational quality indicators for assessing the effectiveness of educational technologies, as well as determining the weight coefficients of these indicators;
-the development of procedures of obtaining measuring information in continuous monitoring of quality indicators in the investigated field of education;
-the application of the provisions of the "Methodology" in the procedure of convolution of single indicators (i.e. indicators of lower hierarchy level) to integrate into indicators of higher levels, up to and including only one generalized measure of the quality of education;
-the choice of evaluation criteria, i.e. basic (standard) values;
-to ensure the required quality of management decisions, based on the results of the application of the program-created expert system for working with the nomenclature of indicators;
-comparative analysis of the effectiveness of educational technologies.

It was principally difficult to solve the first task. Here, in addition to the requirements of the laws of the RUSSIAN FEDERATION "on education", "on higher and postgraduate professional vocational education", State educational standards and other normative documents required holding profession descriptions, study the opinions and demands of the employer, of the leading specialists and on its basis to correct the qualification requirements for the specialist – the University Graduate. Up till now one cannot say that this problem is solved in its entirety and that it is universal. However, the proposed nomenclature and weights of indicators of effectiveness of pedagogical technology relate to the instruments of education quality management, and their validity is hard to valuate. However, disputes about the weights of these indicators are continuing.

The second and subsequent tasks, are based on the provisions of the basic methodology of quality control, they are described in detail in the "methodology" so their implementation is largely technical in nature and does not represent special difficulties.

4. Organization and results of the Experiment.

An experiment, by using modernized "Methodology" was held long (over 4 years) to assess the effectiveness of the use of reasonably selected innovative educational technologies ("problem-modular", the technology of "advanced " education and Ranking "readiness assessment technology) in the training in the field of physical culture in the Vladivostok branch of the Russian Customs Academy [8, 9]. The decision on the effectiveness of the technology used was taken from the comparison of the values of the generalized measure of quality education and physical education in the experimental group \( Q_{\text{experience}} \) in the educational process of which one or other of the selected innovative technologies is implemented and the similar one for the control group \( Q_{\text{counter}} \), organization of educational process in which the result has been the traditional introduction in the educational process of varying innovative technology (efficiency) will be positive, if the ratio \( Q_{\text{experience}} / Q_{\text{counter}} \) exceeds unit.

The purity of the experiment was provided by the permanence of the composition of the groups, with the exception of natural dropouts, the social composition of teachers in the experimental and control groups, as well as the permanency of the composition of the Expert Commission. Quality control results were compared after one year, when it was possible to believe that the introduction of progressive technologies and corresponding educational and methodical complex discipline (LMCS) will occur.

It should be noted that all calculations were performed using an application program, in Windows, with the conservation of the results in the database, including their graphics. And actually the estimation of the quality of the training of a student and as well as of the entire training group is easily visible from its computer processing by a special coauthors program, introduced in as "The expert quality control information complex" is a coauthors development too. "The Complex" allows to obtain both operational and "accumulated" estimation of the quality of the used pedagogical technology with its Educational Methodological Complex (LMCS), for example, a survey of the graduates of the year 2010, compared to the 2006 survey of students.

Analysis of the results of the experiment gave the value \( C = Q_{\text{experience}} / Q_{\text{counter}} \) – the comparative generalized coefficient of the introduction in educational process of the innovative learning technologies (KPI) (in particular, the credit-modular technology and the technologies of advanced education):

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C = \frac{0.474}{0.681} = 1.436 \quad \text{that is more than one- it is effective} \ [9].
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Conclusion

Certainly, the positive result from the introduction in educational process of progressive methods is predictable, but the examples of quality control ODFK, completed with the use of the proposed improved "Methodic", allows to estimate this effect quantitatively and helps to answer a number of questions that arise when discussing the need, actuality and practical value of the developed "Methodic".

In addition, the experiment has shown once again that modern qualimetry offers methodological possibilities of quantitative analysis of the qualitative conditions of production. It, in fact, can be seen as an interpretation of qualimetric methods in pedagogy. Qualimetry is capable to become a "bridge" that would allow education to a new level from quality (subjective) assessment of pedagogical data to a quantitative (objective) one, based on mathematical-statistical analysis of qualitative education indicators to various pedagogical technologies.

However, in order to correctly determine public policies that positively affect the quality of education, and to control this process, one must have all Russian nomenclature of indicators of the quality of education on all its sides, a unified methodology for their measurement and evaluation criteria for the received values.

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Information about the authors

Irina Sergeevna Syrvacheva Perm State Pedagogical Institute (Faculty of physical education and Sport (1963), Associate Professor (1989), doctor of Pedagogics. (2010). his research interests include pedagogic dimension., advanced technologies in education and sport. Job location: St.-Petersburg branch of them. V.b. Bobkova Russian Customs Academy, Department of physical training, associate professor. Postal address: 192241 Russia, St. Petersburg, Sofia str. 52 House lit.

Web address : odo@spbrta. ru
Tel.: 8 (812) 269-21-26.
Sergej Nikolaevich Zuev Russian State University of physical culture and sports, youth and tourism (1971), doctor of Pedagogics. (1999), Professor (2002). Research interests: professionalization, pedagogic dimension, professional-applied physical preparation, advanced technologies in education and sports.

Work place: Rossijsk Aya tamozhenn Aya Academy, Professor of physical training. Postal address: 140009, Moscow region, lubertz, Komsomolskiy Prospekt, 4

Web address: rta_2009@mail.ru

tate: 8 (495) 559 00 33.


Work place: Military educational and scientific Center (MILITARY) NAVY "Naval Academy, Admiral of the fleet of the Soviet Union this year, Kuznetsova, senior lecturer in hydroacoustics Division mailing address: 197045, St. Petersburg, Ushakovskaja naberezhnaya, 17/1

Web address: vunc-vmf@mil.ru

Tel: 8 (812) 496-16-18 (reception).

e-mail: syrvachev0340@yandex.ru;

Tel: + 7 911 759 1445