

Diagnostic Testing of Student's Physical Condition as a Motive for the Sports Activity

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ABSTRACT

The relevance of the study of students' motivations for engaging in systematic physical activity is conditioned by recession of student's physical activity and health deterioration. Formation of demands in systematic physical activity is the overriding priority in the field of non-professional sports education in higher school. This article considers the possibilities of usage the diagnostic testing of the student's physical condition along with a specially designed educational content as a motive for the sports activity. A modern theory of activity serves as a concept, which defines a leading role in the student's motivation for physical activity. Methods of quantitative determination of the level of health and practical realization of health problems by means of physical culture are used in the research. The research allowed us to identify the causes of the lack of student's physical activity, to analyze the subjective self-evaluation of their health and physical fitness. The research also allowed us to evaluate the effectiveness of approach to the extramural students' physical education in higher school with the leading role of motivation of sports activity. This article will be useful for professionals working with students of extramural or distance mode of study in the field of non-professional physical education.

KEYWORDS

Formation of demands to physical activity, quantity of health, self-diagnostic procedure

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Introduction

Thematic justification

Statistic in the materials of the joint meeting of the State Council Presidium and the Presidential Council on physical fitness and sports promotion dated October 14, 2008 "On measures for further development of physical culture and sports in the Russian Federation" (2008) states that more than 40 percent of high education graduates cannot perform the minimum standards of physical training, 65 percent of young people are not regularly engaged in physical culture and sports.

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In this regard, the priority goals of work stated in the Development Strategy of physical culture and sports in the Russian Federation for the period up to 2020 are as follows:

Implementation of studies to identify the interests, demands and motivations of the various groups of the population and to determine the effectiveness of the work to promote physical culture and healthy lifestyle;

an increasing degree of awareness and knowledge level of different categories of the population on issues of physical culture and sports, healthy lifestyle, forming public opinion on the need to lead a healthy lifestyle and the need for systematic physical sport training (Strategy of the Physical Culture and Sports development in the Russian Federation for the period up to 2020, 2009).

There are several factors which influence the recession of physical activity and health deterioration such as unconscious attitude of students to their health, low-level motivation to physical training and underdevelopment of self-monitoring skills.

And while the functional indicators of the large part of students intervenes between “bad” and “adequate”, we find it important to attract physical education teachers’ attention to the health related direction according to which the teacher is focused on the students’ health, their performance and body resistance.

Awareness of the physiological processes in the organism influenced by physical activity, the role of physical activity that has an impact on the intellect and mental capacity, student’s lifestyle are important for the activation of motivation for physical training (Lotonenko, 1996).

One of the main tasks in the physical education of students is formation of demands to physical exercise. The formation process must be conscious in order to be effective, the demands cannot be imposed by force; they must comply with the value system of personality. Students are in need of motivation for satisfaction of forming demand, in other words they need argumentation for practical actions selection. As a result motivation becomes a stimulus of activity. It performs as the complicated mechanism correlation of external and internal behavioral factors that define the origin, direction and the ways of implementation of specific forms of activity including physical one (Piloyan, 1984).

Organization and methods of research

Methods of research

The following methods were used in the research: analysis of methodological literature, survey, diagnostic methods, pedagogical observation, pedagogical experiment and methods of mathematical statistics.

Pedagogical observation

The object of pedagogical observation was students of extramural mode of study. In the process of the pedagogical observation the following methods of registration were used: analysis of academic studies, the dynamics of change in the student’s attitude to physical training, recording of the student’s physical state.

Pedagogical experiment

A principle method of research was pedagogical experiment which was performed in 8 study groups.

Questionnaire

The questionnaire contained 5 multiple-choice questions.

Diagnostic methods

Integral criterion was used to determine the level of student's physical state. It was conducted in the following directions:

To assess the level of physical development several indexes were used: Lorentz's formula for calculating the ideal body-weight, the Solovyov index to determine the body type, weight indexes based on indicators of body fat, the percentage of body fat according to skin- and roll fold by the S. Rosenzweig method, body index calculation of fat and free fat mass.

To assess the level of functional indices of the cardiovascular system the following methods were used: determination and estimation of adapted possibilities of organism and the blood circulatory system (rest indicator) by the technique of R. Baevsky, A. Beresneva & R. Paleev (1987); Rufe-Dixon index; estimation of respiratory system (breath-holding tests on inspiration (Stange's test); determination of vital lung capacity (VC); determination of index of Skibinskaya for assessment of the cardiorespiratory system; estimation of musculoskeletal system (complex test of muscles and joints state).

Detection of the physical condition level (DPCL) was conducted by the method of Y.J. Vavilov (1997) and included bending arms in plank position, standing long jump, body lifting, hang on crossbar, angle body, 1000 metre run.

Methods of mathematical statistics

Nonparametric test χ^2 (Chi-squared test) was used for comparison of two factual static series. Chi-squared test considers the differences of individual values of classes frequencies, as a result, it indicates the proximity of two distributions. The distinction between the distributions series are inconsiderable if the value of chi-squared test do not exceed the table values. The distinctions between two distributions can be considered as reliable if they achieve or exceed the critical value $\chi^2_{0.05}$ and are more reliable if they achieve or exceed $\chi^2_{0.01}$. Statistical processing was conducted on a computer using SPSS-17 statistics package.

Experimentation facility

Experimental work was performed in the Naberezhnye Chelny Institute of the Kazan Federal University.

Stages of research

The research was conducted in three stages:

1) The first stage – the preparatory stage: analysis of the state of the research problem in the pedagogical theory and practice; development of methodology of the study.



2) The second stage – the principle stage: development of experimental program for extramural students; realization of experimental work for efficiency checking of this program;

3) The third stage – the final stage: conceptualization and generalization of research results; elaboration and presentation of research results.

Results and discussion

Content of experimental educational program developed for a mode of extramural study

According to R.A. Piloyan's (1984) research the structure of physical activities can be introduced as follows:

- 1) focusing on the social significance of physical activity;
- 2) acquisition of information about a subject of demand (updating of demand);
- 3) problem recognition (motive choice);
- 4) decision-making (goal setting);
- 5) pursuit of ambition (implementation of training);
- 6) acquisition of immediate information (reinforcement of assurance in correct actions);
- 7) self-assessment of physical activity results (emotional attitude to the result) (Piloyan, 1984).

A. Lotonenko (1996) gives the following classification of sports activity characteristics:

- 1) Satisfaction. It is based on correspondence to human needs. Physical activity is highly respected in society, so it also satisfies the requirement of both the person and society as a whole;
- 2) Force of attraction. Certain useful social goals which connect with the individuals interests are formed at each stage of social development. Their union is the key to effort the force of attraction of physical activity.
- 3) Commitment. Successful implementation of activities is supported by a certain degree of commitment and inalterability in society (Lotonenko, 1996).

The main task of the teacher is to find and use motives which activate the process of learning and cognitive activity. It was found that the actualization of sports activity motivations in the period of high school preparation the student does not need additional educational effort (Bulavkina, Nikitin & Polov, 1997).

The desire to do something arises only when the student recognizes the meaning of upcoming activities. First of all it is necessary to reveal the meaning of physical activity, to explain the students what they have to do and why. It is necessary to initiate the students into theoretical, practical and social significance of a healthy lifestyle. If students are aware of the need of physical activity, they will be involved in it.

To activate the motivations for the physical activity it is important to know the physiological processes in the organism occurring at the physical activity, the impact of physical activity on intellect and mental capacity, as well as on the student's lifestyle.

In order to make the physical culture a full-rate factor for acquiring professional skills, it should have personal significance for students, which involve:

- 1) awareness of the role of the physical activity in personal life;
- 2) positive attitude to the physical culture;
- 3) engagement in sports activity in any convenient form;
- 4) personal motivations for the physical activity which are based on demands formed on the interest to the physical culture and sport.

Demands and motives can stimulate the subject to action not only to master the object but also to avoid it. In the second case the object has a negative valence. In simple cases the positive valence of the object can be directly determined by the aggravation of the biological body needs. Often the negative valence is connected with threat for life and health coming from the object, possible sense of discomfort and reduction of social status (Smirnov, 1995).

Theoretical basis of the theory of activity which determines the leading role of motivation in the human activity (Vygotsky, 1956; Leontiev, 1971) influenced the development of program of discipline "Physical culture" for extramural students. It included a pre-lecture during the session for extramural students, lectures during the basic term, examination on self-diagnostic of physical state and final paper – "Planning of personal physical activity". Five lectures with visual components were prepared for experimental groups. The lectures included: presentation slides with text; pictures; schematized materials that allow to create a descriptive model of lecture; tables; diagrams; mathematical formulas with automatic calculation of input results; video Of 2-8 minutes long with and without a sound.

Special focus was on the concept of "health". N.M. Amosov (1987) writes about the medical definition of health: "Can we determine health as the state of the body without disease or as the time between the diseases? Perhaps, our medical practice considers health in this way. "If there is no disease, the person is healthy". But the indicator of health is officially of no concern for medical system. He writes: "The definition of health as a complex of normal indicator is insufficient. The scientific approach to the definition of health should be quantitative. "The quantity of health is what we need" (Amosov, 1987). He proposes to determine the quantity of health as a 'reserve capacity' of basic fundamental systems. The health is a 'reserve capacity' of the whole organism.

The overview lectures consider problems of responsibilities for personal health which is quiet often entrusted to external organizations: medical, educational, psychological, etc. It allows to reveal the traditional way of thinking according to which the person's role in his health maintenance comes down to following a prescription of a non-professional. "Diseases, including psychosomatic ones, which cause premature ageing and death cannot be called accidental, it is a result of ignorance and disregard to our own health" (Khata, 2001).

In conclusion, students have become familiar with the self-diagnosis methods of physical development levels and functional and physical fitness.

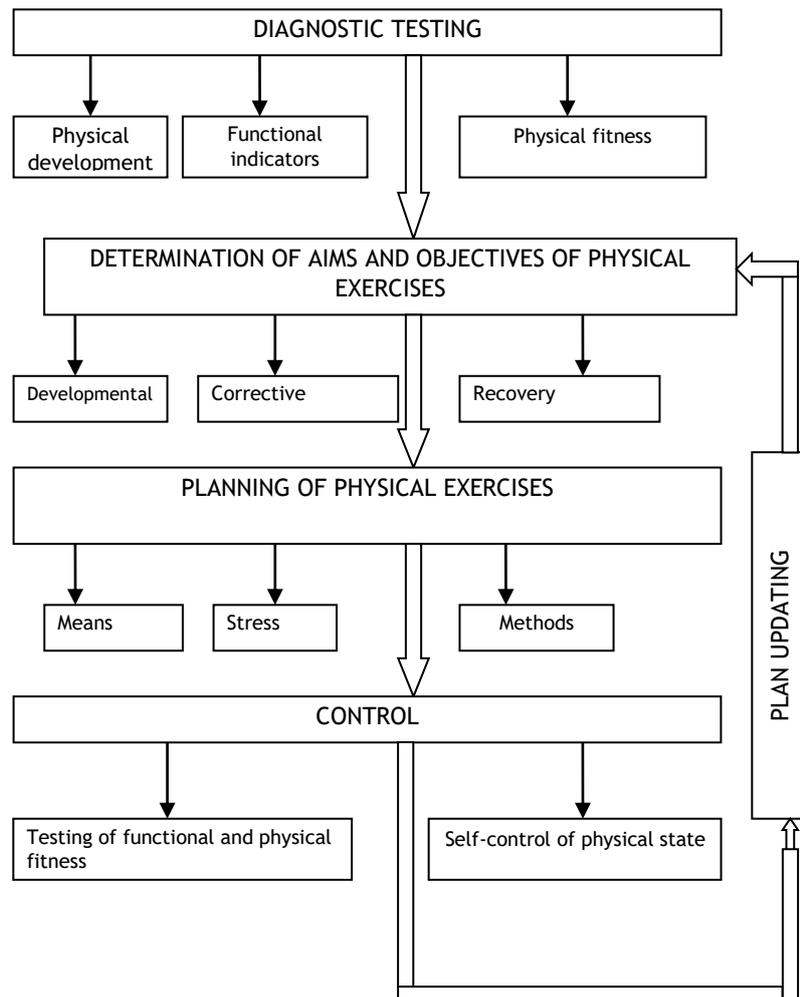


Figure 1. Scheme for management and organization of individual physical training for students of distance and extramural modes of study.

Stages of the pilot training program implementation

The study involved participation of the first year students of extramural mode of education (232 students). During the first session the extramural students they were invited to fill in a questionnaire. The questionnaire consisted of 5 questions to determine the self-assessment of health, physical fitness, motivation for the physical exercises and sport, the students' attitude to the discipline "Physical culture".

At the end of the year the students wrote a test consisting of 4 tasks:

- 1) Assessment of physical development by 8 criteria (proper weight, body type, % of body fat, disposal of fat, body balance).
- 2) Determination of functional indicator's level by 6 criteria (cardiovascular system, respiratory system, excitatory system, musculoskeletal system).
- 3) Complex testing to detect the physical condition level (DPCL) by 6 criteria (strength level, endurance, flexibility, speed) (Vavilov, 1997).

4) Planning of (week-long) physical training on the base of physical and functional condition analyses.

In the period of course work students had the opportunity to consult with teachers on the Internet.

After 3 months, during the winter session, was conducted re-questionnaire and the lecture course and was executed the final work "Planning of personal physical training".

Experimental verification of the effectiveness level of offered education

Analyzing of answers to the question about self-assessment by students of their health, we can notice that in the second questionnaire the determination level was estimated more critical. The first test demonstrates that 31% of students admit the level of their health as "good", but in the second test this percentage is only 23. And we can see that the number of students who asses their health "under average" had increased almost for 12% ($\chi^2 = 13.672$ critical value χ^2 under the significance level $p < 0.01$ composed 13.277) (table 1).

Physical fitness was estimated even more critical. The first test demonstrates that only 9% of students had estimated it as "below average" or "poor", in the second is only 42% ($\chi^2 = 13.672$ critical value χ^2 under the significance level $p < 0.01$ composed 13.277) (table 2).

Table 1. Answers for question "How would you rate your health" (n = 232)

Answer	First questionnaire		Second questionnaire	
	Frequency	%	Frequency	%
excellent	12	5,2	14	6
good	72	31	54	23,3
average	115	49,6	102	44
below average	23	9,9	50	21,6
poor	10	4,3	12	5,2

Table 2. Answers for question "How would you rate your physical fitness" (n = 232)

Answer	First questionnaire		Second questionnaire	
	Frequency	%	Frequency	%
excellent	8	3,4	12	5,2
good	69	29,7	52	22,4
average	135	58,2	71	30,6
below average	5	2,2	52	22,4

We colligate/connect the result changes of the health level and psychical fitness self-assessment in such a short time with the self-assessment test that allowed learning more about their organism in rest and in the moment of physical activity.

The questionnaire has 3 questions related to the student's attitude to physical activity.

Table 3. Answer for question “Do you exercise” (n = 232)

Answer	First questionnaire	Second questionnaire
3 and more times in a week	18%	22%
1-2 times in a week	36%	46%
no	46%	32%

The number of students who regularly engaged in physical activity had not increased significantly (4%). The analysis showed that there is no statistically significant differences in this index between the results of two questionnaires ($p > 0,05$). However, there is a significant reduction (14%) of the number of students who do not exercise, but the changes are statistically significant ($\chi^2 = 9,873$ critical value χ^2 at a significance level of $p < 0.01$ is 9.210) (Table 3).

Those students who answered “no” were asked to answer for the following questions:

Table 4. Answer for question “Would you like to exercise”

Answer	First questionnaire	Second questionnaire
	n= 106	n= 74
yes	78%	91%
no	10%	2%
no answer	12%	7%

Here we can notice the percentage of students who wanted to engage in physical training but for some reasons did not start. In the first questionnaire this percentage is 78%, in the second questionnaire it is 91% ($\chi^2 = 6,910$ critical value χ^2 at a significance level of $p < 0.05$ is 5.991).

Table 5. Answers for questions “Reasons why you do not engage in physical training”

Answer	Frequency rank of selected reason	
	First questionnaire	Second questionnaire
	n= 106	n= 74
no free time	1	1
lack of perseverance, patience	5	2
having more important and interesting things	3	10
tiredness	4	6
lack of knowledge and skills	7	8
laziness	6	4
lack of sports facilities, sport classes near the house	2	9
high prices for sports and wellness facilities	8	3
lack of own sport equipment	9	7
no group of friends for joint training	10	5
Commitment of work, in family	11	11
satisfaction with health and physical state	12	12
no reasons	13	13

We were surprised by the high rating of reason “there are more important and interesting things” in the testing, because confessedly in the questionnaire of the full-time students this rating was not so high. In the second questionnaire rating of this question had reduced dramatically that pleased us.

In general, the analysis of the causes of changes in ratings demonstrates more self-critical approach of students. So the reason “lack of perseverance and patience” in the second questionnaire took high 2nd place, “laziness” rose by 2 points, “tiredness” fell for 2 points, etc.

Conclusion

The results of the suggested approach to the program development “Physical culture” for the students of extramural mode of education was that the lectures of the winter session on “The social and biological bases of physical culture”, “Individual choice of sports or training systems”, “Basis of methods of individual training” became more important and interesting for our students, and also that some students performed their final work “Planning of individual physical training” on the high level.

The research allowed us to identify the causes of the lack of student’s physical activity, to analyze the subjective evaluation of their health and physical fitness. Also the research allowed us to evaluate the effective approach to physical education of extramural students in higher education with the leading role of motivation of sports activity. Some students began to train by themselves in reliance on the organization of individual physical train suggested by us during the course of physical culture for students of extramural mode of education.

The analysis of results of the experiment demonstrated statistically significant differences between the results of two questionnaires. We do not disconcerted by low increase in percentages of students who are engage in physical activity because we understand that the level increase of personal physical training is not a simple or prompt process. We are satisfied that the attitude of some students to physical activity has changed.

Recommendations

It was found that the suggested program of the discipline “Physical Education” for students of extramural mode of education effectively influenced on the increasing of information awareness and knowledge on aspects of physical culture and sports, healthy lifestyle, on formation of public opinion about the necessity of healthy lifestyle and systematic physical culture and sports, because this program has a leading role of motivation to physical activity, also it has special educational content that is considered in different directions and aspects the notion of “health” and finally combines the methods of quantitative determination of health and practical implementation of health problems with the help of algorithm of individual train organization.

This article can be advantageous as a practical matter for professionals working with students of extramural or distance mode of study in the field of non-professional physical education.

Taking into account of research results we can recommend to expand the conceptions of the article which are connected with the leading role of motivation for physical activity in the field of physical education to educational institutes of secondary vocational education.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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