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# Theory & Practice of Physical Culture

Athletic  
training

Sport  
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Academic  
physical education

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physiology

**Key issues of the modern sports science for discussion**

### **Advanced anti-doping education programs for the physical education and sports theory and practice**

Doping scandals have caused irreparable damage to the image of modern Russian sports, with repercussions of the doping issues clearly going far beyond the sports sector and sanctions for athletes as such as they are more and more harmful for the national prestige and Russian society on the whole. International litigations are mostly unsatisfactory and contradictory, with some doping cases being proved in courts and others clearly demonstrating biases and vested political interests geared to destroy fair competition in the modern sports.

Despite the critical situation in the Russian sports system in this context, the national anti-doping educational system is being persistently established and developed. The national anti-doping education programming is designed to cultivate zero tolerance to doping in sports and respect to the fair play principle in the young sports generation and in a wider sporting community to form a sound basis for updates in the national sports culture. The anti-doping education programming gives a special priority to the underage and teenage sports groups subject to the well-designed, systematic and customizable anti-doping training services highly sensitive to their actual sporting subcultures, interests, needs and motivations.

It is important that the basic anti-doping education programming gives the anti-doping education samples/ frames with guidelines to help develop specific anti-doping education service models well customized for specific groups, interests, sporting needs and progress agendas of the trainees – with a special attention obviously given to the social situations and repercussions of the ongoing conflicts and contradictions in the Olympic sports.

Thus, the preschool anti-doping education service models are age-specific and naturally focused on the key sports values, ideas and priorities, competitive rules and fair play principles rather than on specific doping control issues premature for this age. Such preschool anti-doping education models make special emphasis on short story tales about good and evil with good mostly winning the battles, characters agreeing to live honest lives etc. When the preschool anti-doping education service models are theoretically sound and well-designed, they may be highly successful in luring children into sports and fair competitions.

Pedagogically well-grounded basic anti-doping educational programs will typically offer introductions to the basics of the doping control system and top priority doping problems in the modern sports. Such basic anti-doping educational program may be customized for a general education school to complement the standard school Physical Education curriculum on a modular basis, with the theoretical anti-doping education content partially delivered in some other disciplines including Life Safety, Biology, etc. Modern anti-doping education models are increasingly important for the national vocational training system, with their specific design and contents fairly close to the school anti-doping education service models.

It should be emphasized that the national anti-doping education service programming efforts are naturally and primarily focused on the academic physical education and sports system graduates trained to become physical education teachers and sport trainers – and, hence, play the key role in the ongoing zero tolerance to doping cultivation efforts in the everyday trainings and competitions.

The doping control and anti-doping education issues are ranked among the top priorities by the national sports community and society with a special attention given to the anti-doping education competences of the national physical education and sports specialists across the whole physical education and sports sector in the country.

We encourage the national researchers and analysts to explore a variety of new promising approaches in pedagogy to facilitate the anti-doping education programming efforts the underage, teenage, youth and senior sports communities and physical education and sport sector specialists.

**Chief editor of TPPC, Honored Worker of Physical Culture of the Russian Federation, Doctor of Pedagogical Sciences, Professor L.I. Lubysheva**



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# Breathing trainer ‘Russian Snorkel New Breath’ application in junior swimmers’ training system: combined benefits analysis

UDC 796.015



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## Abstract

**Objective of the study** was to rate and analyze combined functionality benefits of the Russian Snorkel New Breath breathing trainer applied on a systemic basis in a junior swimmers’ training system.

**Methods and structure of the study.** We sampled for the Russian Snorkel New Breath breathing trainer application model testing experiment the 15-18 year-old swimmers (n=17) qualified CMS and MS and split them up into Experimental (EG, n=8) and Reference (RG, n=9) Groups. The groups were trained twice a day for two weeks to increase their aerobic capacities, with the EG using the Russian Snorkel New Breath breathing trainer for 25% of the total training time, and RG trained traditionally. The group progresses were rated by the pre- versus post-experimental 6x100m breaststroke tests, with the average interval times and post-swimming 10s heart rate recovery time fixed.

The multisided effects of the Russian Snorkel New Breath breathing trainer application model were rated by multifunctional computerized ESTECK Test System (MULTISCANPRO™) to produce the following test rates: II - integral index, CI - cardiac index, CO - cardiac output, SV - stroke volume, HR - heart rate, LF / HF - autonomous nervous system frequency index; and SI - Stress Index. The test data were statistically processed using standard nonparametric criteria, with Z criterion used to rate significance of the test data differences.

**Results and conclusions.** The Russian Snorkel New Breath breathing trainer assisted training model was tested beneficial for the skilled junior swimmers as verified by the EG progress in the combined functionality tests with the simultaneous drops in the physiological costs for the muscular workloads in the trainings. The EG that used the Russian Snorkel New Breath breathing trainer on a systemic basis was tested with significant improvements in the circulatory system performance with growth in the functioning efficiency test rates – particularly in the autonomous nervous system regulation functions and psycho-functional status (stress controls) on the whole.

**Keywords:** swimmers, ergogenic tools, breathing trainer, special physical fitness, functional fitness.

**Background.** Modern sports training systems apply a wide variety of ergogenic training tools to help the trainees adapt to extreme physical workloads, with the most efficient ergogens including dietary supplements and pharmacological, bioclimatic and physiological agents [1, 2, 5]. Increasingly popular and convenient among them are the modern breathing control systems [1, 5] due to the fact that breathing as a visceral function controls homeostasis on the one hand; and is widely manageable by external impacts to effectively modulate the bodily systems on the other hand [1, 7].

It is rather important for the sports trainings that the external respiration modulation by one or another method should secure the bodily gaseous homeostasis being controlled within a specific range [1, 7] to effectively regulate hypoxia and hypercapnia as the key functionality drivers thereby securing progress in functional mobilization and physical performance efficiency and stability [1, 3, 8]. In addition, the specific breathing function control methods have certain effects on the individual psycho-functional status [6]. On the whole, different breathing control methods have demonstrated powerful multisided effects on



the bodily system functions giving the means to vary them in a wide range and, hence, are ranked among the most effective combined-effect methods.

One of the most convenient, affordable and effective breathing control methods are different breathing trainers [1, 4, 5] including the Russian Snorkel New Breath breathing trainer designed for the swimming sport [4]. This breathing trainer system has proved of combined positive effects due to the simultaneous physical and physiological performance boosting factors associated with mechanical resistance to respiratory flows, low-frequency vibration of the expiratory flows in high-intensity physical activity with the controlled 'extra dead space' created by the system [4, 5] in training practices. The breathing trainer system effectively energizes the physiological bronchodilation mechanisms in high-intensity muscular work and activates mucociliary clearance mechanisms to increase thereby strength and endurance of the respiratory muscles [4].

A few studies have proved benefits of the Russian Snorkel New Breath breathing trainer for trainings albeit they were focused on a few specific bodily functions only [2, 4, 5]. We assumed that it could be beneficial to rate and analyze combined functionality benefits of the Russian Snorkel New Breath breathing trainer applied on a systemic basis in a junior swimmers' training system.

**Objective of the study** was to rate and analyze combined functionality benefits of the Russian Snorkel New Breath breathing trainer applied on a systemic basis in a junior swimmers' training system.

**Methods and structure of the study.** We sampled for the Russian Snorkel New Breath breathing trainer application model testing experiment the 15-18 year-old swimmers (n=17) qualified Candidate Masters and Masters of Sport and split them up into Experimental (EG, n=8) and Reference (RG, n=9) Groups. The groups were trained twice a day for two weeks to increase their aerobic capacities, with the EG using the Russian Snorkel New Breath breathing trainer for 25% of the total training time, and RG trained traditionally. The group progress was rated by the pre-versus post-experimental 6x100m breaststroke tests, with the average interval times and post-swimming 10s heart rate recovery time fixed.

The multisided effects of the Russian Snorkel New Breath breathing trainer application model were rated by multifunctional computerized ESTECK Test System (MULTISCANPRO™) to produce the following test rates: II - integral index, CI - cardiac index, CO - cardiac output, SV - stroke volume, HR - heart rate, LF / HF - autonomous nervous system frequency index; and SI - Stress Index. The test data were statistically processed using standard nonparametric criteria, with Z criterion used to rate significance of the test data differences.

**Results and discussion.** Given in Table hereunder are the pre- versus post-experimental test rates of the EG and RG. Both of the groups were tested with statistically significant progress in the 6x100m breaststroke test although the EG showed significantly better progress than the RG estimated at 6.1% ( $p < 0.05$ ) versus 1.9% ( $p > 0.05$ ), respectively. The EG was also tested

**Table 1.** Averaged pre- versus post-experimental physical fitness and functionality test data of the EG and RG ( $X \pm m$ )

Test	EG (n=8)		RG (n=9)	
	Pre-exp.	Post-exp.	Pre-exp.	Post-exp.
6x100m breaststroke, s	84,6±1,2	79,5±1,6*	77,0±1,1	75,5±1,2*
10s post-test HR recovery	63,0±3,0	56,8±2,3*	60,7±2,1	60,8±1,6
II, points	77,8±1,9	77,4±1,2	81,6±2,1	82,3±1,5
CI, l/min/m <sup>2</sup>	3,6±0,1	3,8±0,1	3,54±0,1	3,6±0,1
CO, l/min	6,5±0,3	7,3±0,3*	6,4±0,3	5,6±0,3
SV, ml	72,0±6,0	90,7±8,0*	83,1±8,9	79,0±4,9
HR, bpm	96,1±4,4	79,8±5,4*	81,7±3,9	84,0±2,4
LF/HF, %	1,5±0,2	1,2±0,2*	0,91±0,1	0,89±0,1
Stress Index, points	235,6±37,8	134,6±21,5*	113,1±16,4	105,9±16,3

*Note:* \*pre- vs. post-experimental data difference significant at  $p < 0.05$  (Z-criterion)



significantly better than the RG on the 10s HR recovery ('physiological cost') test scale: 9.9% ( $p < 0.05$ ) versus 0.2%, ( $p > 0.05$ ), respectively.

The blood circulatory system functionality tests showed significant progress in the EG; with the cardiac output and systolic volume tested to grow by 12.0% ( $p < 0.05$ ) and 26.0% ( $p < 0.05$ ), respectively; and the HR was tested to drop by 17.0% ( $p < 0.05$ ); with these progresses interpreted as indicative of the functional efficiency growth viewed as one of the key physical performance indices in sports [8].

Comparative analysis of the LF/ HF index variations (this autonomous nervous system response frequency rate is indicative of the sympathetic and parasympathetic divisions balancing in the autonomous nervous system) showed the EG making a shift towards prevalence of the parasympathetic division (20.1% growth,  $p < 0.05$ ). The shift versus the normal pre-experimental test rates may be interpreted as indicative of the autonomous nervous system functionality controls being optimized. This growth was significantly higher than in the RG with its only 2.2% ( $p > 0.05$ ) progress from the pre-experimental values (that were within the optimal range in fact).

Of special interest was the group progress on the psycho-functional stability rating Stress Index scale. Both groups were tested with healthy falls on this scale, although the EG progress was again significantly better than in the RG – 42.9% ( $p < 0.05$ ) versus 6.4% ( $p > 0.05$ ), respectively – to demonstrate practical benefits of the Russian Snorkel New Breath breathing trainer assisted trainings for the regulatory systems and stress controls.

**Conclusion.** The Russian Snorkel New Breath breathing trainer assisted training model was tested beneficial for the skilled junior swimmers as verified by the EG progress in the combined functionality tests with the simultaneous drops in the physiological costs for the muscular workloads in the trainings. The EG that used the Russian Snorkel New Breath breathing trainer on a systemic basis was tested with significant

improvements in the circulatory system performance with growth in the functioning efficiency test rates – particularly in the autonomous nervous system regulation functions and psycho-functional status (stress control) on the whole.

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# Women's team sports: dexterity test criteria

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## Abstract

**Objective of the study** was to develop a set of dexterity test criteria for junior (17-18 year-olds') women's team sports.

**Methods and structure of the study.** The dexterity test system for competitive and training process was tested on a sample of 17-18 year-old female students of Saint Petersburg Mining University and their peers from Lesgaft National State University of Physical Culture, Sport and Health.

**Results and discussion.** The dexterity test data analysis versus the test benchmarks showed the sprint and standing long jump test data of the Lesgaft National State University of Physical Culture, Sport and Health sample being higher than the benchmarks, i.e. the age averages; and the straight walk test data matching the average. Our analysis of the test data arrays showed that the physical fitness test benchmarks found in stage one of the study may be applied for the 17-18 year-old team sporting women's dexterity test purposes on an individual and group basis. We recommend using the test benchmarks found by the study for the skills-specific dexterity rating tests in this age group.

**Keywords:** *dexterity test criteria, standard conditions, extraordinary conditions, evaluation criteria, female athletes, team sports.*

**Background.** Dexterity rating test systems in team sports need to be designed to test specific motor skills in controlled-difficulty game situations by a set of efficient criteria; with dexterity interpreted as the individual quality critical for success of tactical and technical actions and game performance on the whole. As things now stand in the sports science, dexterity is commonly rated using combinations of traditional physical fitness tests [1-3].

**Objective of the study** was to develop a set of dexterity test criteria for youth (17-18 years old) women's team sports.

**Methods and structure of the study.** The dexterity test system for competitive and training process was designed using the following tests in standard conditions: 7m eyes-open straight walk test, s; 30m high-start sprint, s; and standing long jump, cm. Dexterity

in extraordinary conditions was rated by the following tests: 7m eyes-closed straight walk test, s; 3x10m shuttle sprint, s; and back-forward standing long jump test, cm. We sampled for the study the 17-18 year-old female students (n=115) from the team sports groups of Saint Petersburg Mining University's Physical Education Department; and their peers (n=30) from the team sports groups of Lesgaft National State University of Physical Culture, Sport and Health. The study was designed to first rate the standard conditions / extraordinary conditions-specific dexterity of the sample; and second to run the competitive/ training dexterity tests using the selected set of criteria.

**Results and discussion.** Given in Table 1 hereunder are the competitive/ training standard / extraordinary conditions-specific physical fitness test data of the sample.



**Table 1.** Competitive/ training standard-/ extraordinary-conditions-specific physical fitness test data of the Saint Petersburg Mining University sample (n=115)

Test		Group average	GTO-V standard	GTO-VI standard
Sprint, s	30m sprint	4,90±0,35	5,5	5,7
	3x10m shuttle sprint	8,41±0,83	8,7	8,8
Standing long jump, s	Front	2,13±0,35	1,7	1,8
	Back-forward	1,25±0,19	–	–
7m walk, s	Eyes-open	2,70±0,23	–	–
	Eyes-closed	3,09±0,32	–	–

The physical fitness data analysis showed the group averages in the above tests matching the GTO Class V and VI standards for the 16-17 and 18-24 year-old women, respectively. Note that the GTO system offers no standards for the back-forward standing long jump and 7m eyes-open/ closed straight walking tests for the age category. Knowing that the sample's physical fitness averages fall within the GTO age standards, we used the group averages in the non-GTO tests as criteria/ benchmarks for the age group dexterity tests. The actual standard / extraordinary-conditions-specific dexterity in the sprint, standing long jump and straight walk tests was rated by the following formula [1, p. 126]:

$$Kd=L1/L2,$$

Kd meaning the dexterity ratio; and L1 and L2 – the standard-/ extraordinary-condition-specific dexterity rates, respectively.

Furthermore, we obtained the individual standard-/ extraordinary-conditions-specific dexterity rates of the Saint Petersburg Mining University sample (n=115) and calculated the arithmetic means with arithmetic mean errors for every test. Given in Table 2 hereunder are the calculated standard / extraordinary-conditions-specific dexterity rates of the Saint Petersburg Mining University sample.

**Table 2.** Calculated standard / extraordinary-conditions-specific dexterity rates of the Saint Petersburg Mining University sample (n=115)

Test	Dexterity rate
Standard / extraordinary-specific sprint	0,58±0,05
Standard / extraordinary-conditions-specific standing long jump	1,71±0,25
Standard / extraordinary-conditions-specific straight walk	0,88±0,09

We used the above calculated values as criteria/ benchmarks to rate average individual dexterity of this age group. The second stage of the study was

intended to rate competitive/ training dexterity in the Lesgaf National State University of Physical Culture, Sports and Health sample (n=30): see the results in Tables 3, 4.

**Table 3.** Competitive/ training standard =-/ extraordinary-conditions-specific dexterity test data of the Lesgaf National State University of Physical Culture, Sport and Health sample (n=30)

Test		Group average
Sprint, s	30m sprint	4,74±0,36
	3x10m shuttle sprint	6,17±0,17
Standing long jump, s	Front	2,17±0,19
	Back-forward	1,8±0,10
7m walk, s	Eyes-open	2,56±0,12
	Eyes-closed	2,8±0,10

**Table 4.** Standard / extraordinary-conditions-specific dexterity test data of the Lesgaf National State University of Physical Culture, Sport and Health sample (n=30)

Test	Group average	Benchmark
Standard / extraordinary-specific sprint	0,76±0,05	0,58±0,05
Standard / extraordinary-specific standing long jump	1,21±0,10	1,71±0,25
Standard / extraordinary-specific straight walk	0,91±0,03	0,88±0,09

Note that the group averages for the Lesgaf National State University of Physical Culture, Sport and Health sample were higher than for the Saint Petersburg Mining University sample. Given hereunder in Table 4 are the standard-/ extraordinary-conditions-specific dexterity test data of the Lesgaf National





State University of Physical Culture, Sport and Health sample.

The dexterity test data analysis versus the test benchmarks showed the sprint and standing long jump test data of the Lesgaft National State University of Physical Culture, Sport and Health sample being higher than the benchmarks, i.e. the age averages; and the straight walk test data matching the average. Our analysis of the test data arrays showed that the physical fitness test benchmarks found in stage one of the study may be applied for the 17-18 year-old team sporting women's dexterity test purposes on an individual and group basis.

**Conclusion.** Extraordinary conditions in motor skills / fitness/ dexterity rating tests may be created by enabling one of the analyzer systems. The extraordinary-conditions-specific motor skills may be tested by the 7m eyes-closed straight walk test; 3x10m shuttle sprint test; and standing back-forward long jump test. The study found that the standard / extraordinary-

conditions-specific motor skills test data may be used to calculate individual/ group dexterity test averages. We found the age-group-specific averages in the standard / extraordinary-conditions-specific sprint, standing long jump and straight walk tests averaging  $0.58 \pm 0.05$ ;  $1.71 \pm 0.25$  and  $0.88 \pm 0.09$  points, respectively. We recommend using these benchmarks for the skills-specific dexterity rating tests in this age group.

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# Highly coordinated kicks in taekwondo: modern trends

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## Abstract

**Objective of the study** was to rate the highly coordinated kicks (HCK) execution trends based on the sport elite's competitive performance analysis.

**Methods and structure of the study.** The experimental study was run at "Dolphin" Secondary School in St. Petersburg. We analyzed video replays of 67 sparring bouts of the leading national team members (World/ European championship competitors) for the period of 2018-2020. We mined and analyzed the highly coordinated kicks execution and success data for analysis.

**Results and discussion.** The study found that most successful (more often rated as scoring kicks) in the modern elite taekwondo sparring bouts are the 180° Back Kick "Dwit Chagi" attempts than the 360° Reverse Side Kick "Bandae Yeop Chagi" and 540° Roundhouse Kick "Dollyeo Chagi" ones; with the kicks executed more often to the body than to the head. Success of the scoring kicks in sparring bouts depends on the kick speed, accuracy and timing. Therefore, we would recommend for the coaches and competitors making a special emphasis in trainings on the 180° Back Kick excellence techniques since these kicks are more likely to score in competitions.

**Keywords:** taekwondo, highly coordinated kicks, sparring fights.

**Background.** Taekwondo is ranked among the most dynamically progressing sports. The International Taekwondo Federation (ITF) takes persistent efforts to make the sport more entertaining and safer for athletes. In 2012, the Taekwondo Federation singled out a few highly-coordinated and difficult kicks for 'scoring' category. Every competitor is expected to execute at least one 180°-plus turn kick per bout, otherwise two points will be deducted. It should be mentioned that a 1-2-point deduction in the top-ranking event may be enough for win or loss. A timely scoring kick may be decisive for success and, therefore, the sports community gives a special priority in trainings to objective tests to rate the competitive highly coordinated kicks execution on a sound quantitative and qualitative basis [2-4].

**Objective of the study** was to rate the highly coordinated kicks execution trends based on the sport elite's competitive performance analysis.

**Methods and structure of the study.** The experimental study was run at "Dolphin" Secondary School in St. Petersburg. We analyzed video replays of 67 sparring bouts of the leading national team members (World/ European championship competitors) for the period of 2018-2020. We mined and analyzed the highly coordinated kicks execution and success data for analysis.

**Results and discussion.** The study found the sport elite making 2-4 highly coordinated kicks per round, with only 1-2 landed on target and the others missed due to effective defenses or own technical faults including imbalance, spinning out the court, contacting prohibited bodily parts, etc.

**Table 1.** Scoring highly coordinated kicks attempts per round, %

Scoring kick, %			Target	
180° Back Kick "Dwit Chagi"	360° Reverse Side Kick "Bandaeyeo Chagi"	540° Roundhouse Kick "Dollyeo Chagi"	Body, %	Head, %
59,2	31,5	9,33	71,5	28,5

**Table 2.** Highly coordinated kicks scored and missed per round, %

Attempted scoring kicks	Landed, %	Missed, %
180° Back Kick "Dwit Chagi"	53,1	46,9
360° Reverse Side Kick "Bandaeyeo Chagi"	27,6	72,4
540° Roundhouse Kick "Dollyeo Chagi"	13,8	86,2

The scoring highly coordinated kicks in practical competitions were estimated to vary within 21.8%-47.9% (under 35% on average) of the total attempts. Generally a highly coordinated kicks success rate depends on the power, speed, accuracy, skill class and physical fitness of the athlete, plus the opponent's defense. In competitive bouts the athletes make a variety of highly coordinated kicks to score: see Table 1.

The competitive sparring performance analyses found the modern taekwondo elite scoring mostly by the Back Kick "Dwit Chagi" (59.2%) followed by the Reverse Side Kick "Bandaeyeo Chagi" (31.5%) and only occasionally by the Roundhouse Kick "Dollyeo Chagi" (9.33% of the total). It should be noted that body kicks are made twice more often for scoring than the head kicks: 71.5% to 28.5% of the total, respectively. This may be due to the fact that the head kicks more often go imbalanced and, hence, non-scored under the valid rules of competitions.

The 180° Back Kick "Dwit Chagi" is different from the other two kicks by the limited spinning angle and, hence, higher speed and lower chance for a counter strike from the opponent. This may be the reason for its high success rate averaging 53.1% - versus the Reverse Side Kick "Bandaeyeo Chagi" and Roundhouse Kick "Dollyeo Chagi" rated successful in 27.6% and 13.8% of attempts, respectively: see Table 2.

Our analysis of the highly coordinated kicks statistics showed that many elite competitors strive to demonstrate the high-difficulty kicks (with larger spinning angles) in the attempts to score, albeit the risks of non-scores in these attempts and, consequently, losses in bouts are notably higher [1].

**Conclusion.** The study found that most successful (more often rated as scoring kicks) in the modern elite taekwondo sparring bouts are the 180° Back Kick "Dwit Chagi" attempts than the 360° Reverse Side Kick "Bandaeyeo Chagi" and 540° Roundhouse Kick "Dollyeo Chagi" ones; with the kicks executed more often to the body than to the head. Success of the scoring kicks in sparring bouts depends on the kick speed, accuracy and timing. Therefore, we would recommend for the coaches and competitors making a special emphasis in trainings on the 180° Back Kick excellence techniques since these kicks are more likely to score in competitions.

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# Cycled bobsleigh basics training system for 13-14 year-old beginners

UDC 796.015



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## Abstract

**Objective of the study** was to offer and test benefits of a cycled bobsleigh basics training system for the 13-14 year-old first-year trainees with a special emphasis on physical fitness.

**Methods and structure of the study.** We sampled for the study two beginner groups (of pushers and pilots, with no intergroup transitions allowed) on the following grounds: health; functionality of the bodily systems (with medical examination certificates); physical qualities tested by a set of traditional power, speed, speed-strength, coordination and flexibility tests including the 30m start/ run sprint test, 30s abs test, push-ups and pull-ups test, standing long jump, front lean and eyes-closed one-leg standing pre-training tests. The group progresses were tested by the same post-training tests complemented by the wheelbarrow acceleration and weighted squats tests.

**Results and conclusion.** The study found that the beginner training service shall be structured in micro-cycles and meso-cycles and prudently managed to prevent execution errors, injuries and overtraining. Every first-year training practice shall priorities physical progress of the trainees. The pre- versus post-training tests showed the new cycled bobsleigh basics training system for the 13-14 year-old first-year trainees being beneficial for their physical fitness and qualifications for special competitive training service.

**Keywords:** *bobsleigh, physical fitness excelling, athlete's competitive fitness.*

**Background.** In the L.P. Matveyev Sports Classifier, bobsleigh is ranked with Group 2 sports that require from athletes to drive special sports vehicles [3]. Valid rules of the International Bobsleigh Federation set an 18-year entrance limit for certified competitors to its international events; albeit basic trainings are allowed for the 14-plus year-old males. Such basic training systems are generally geared to advance their physical fitness, theoretical knowledge and, to a lesser extent, technical skills (dominated by the startup acceleration mastering practices using "wheelbarrow", "acceleration track" and a "bob" simulator) as specified by a long-term training plan. Bobsled driving skills are normally mastered only by the 16-plus year-olds [5, 6].

**Objective of the study** was to offer and test benefits of a cycled bobsleigh basics training system for

the 13-14 year-old first-year trainees with a special emphasis on physical fitness.

**Methods and structure of the study.** As provided by the valid Federal Standard for bobsleigh sport, the beginner training stage should include 3-6 trainings of 6-14 hours per week taking 2-3 years. In the first training year, the system includes: body conditioning - 75-85% of the total; technical trainings - 10-12%; and the tactical, theoretical, psychological training - 5-6% [2]. We sampled for the study two beginner groups recruited in May 2019 groups (of pushers and pilots, with no intergroup transitions allowed) on the following grounds: health; functionality of the bodily systems (with medical examination certificates); and physical qualities tested by a set of traditional power, speed, speed-strength, coordination and flexibility tests. The sample was 13-14 years

**Table 1.** Group 1 entrance test data

30m start sprint, s	30m run sprint, s	30-s abs test, count	Standing long jump, cm	Prone push-ups, count	Pull-ups, count	Standing front bends, count	Eyes-closed one-leg standing, s
<i>Speed</i>		<i>Speed-strength</i>		<i>Strength</i>		<i>Flexibility</i>	<i>Coordination</i>
4,3	3,7	30	226	26	2	3	5
4,8	4,1	2,8	231	28	3	4	4
5,6	5,1	29	182	20	9	3	3
4,7	4,2	31	186	19	8	3	3
5,3	4,6	27	161	23	6	2	3
4,8	4,2	28	192	19	5	1	3
4,9	4,3	27	201	18	7	3	4
5,8	5,3	27	161	21	8	4	3
5,0	4,4	28	189	17	11	2	2
4,4	3,9	29	213	27	13	4	4

old in recruitment period and turned 14 by the basic training startup time to meet the age limit of the valid sport rules. The sample was tested reasonably fit for the sport as the recruits had some training experiences in a few other sports before they left them for non-qualifications or other reasons [3].

**Results and discussion.** Given in Tables 1 and 2 are the group pre-training test data.

The cycled bobsleigh basics training system for the 13-14 year-old first-year trainees was designed to include the following three cycles [4]:

(1) First startup cycle including four traditional training micro-cycles with a stepped growth of the training loads focused on the body conditioning goals. The trainees are expected to master “wheelbarrow”, “accelerating track”, “bob” and “skeleton” simulators prior to the special technical trainings. The trainees will master the simulator control theory and practice with the vehicle movement, pushing, sit-in, balancing and control basics. The basics trainings take one micro-cycle [1];

(2) Second basic body conditioning cycle is the key training stage to make the athletes fit for the special training stage. This cycle includes four body condi-

tioning micro-cycles designed to complement the body conditioning with special physical training exercises to advance physical qualities (strength, speed, speed-strength, coordination and flexibility) critical for success in the sport. Each micro-cycle includes a wheelbarrow training with its weight rated at 20% of the maximum; one acceleration track training with the bob” and skeleton simulators weighing in 20% of the maximum. The trainings will be designed to master technical basics [2].

(3) And the third basic training cycle designed to advance the performance and stabilize the general and special physical fitness; with the special technical trainings increased in a gradual manner to make the athletes fit for future competitions. This cycle includes a body conditioning micro-cycle and a special preparatory micro-cycle to make the trainees fit for special skills trainings. The simulator-assisted trainings work using the wheelbarrow, accelerating track, bob” and skeleton simulators shall not be increased albeit the weights of the simulators are rated at 40% of the maximums [6].

By the end of the cycled bobsleigh basics training cycles (in autumn), the group progress were tested

**Table 2.** Group 2 entrance test data

30m start sprint, s	30m run sprint, s	30-s abs test, count	Standing long jump, cm	Prone push-ups, count	Pull-ups, count	Standing front bends, count	Eyes-closed one-leg standing, s
<i>Speed</i>		<i>Speed-strength</i>		<i>Strength</i>		<i>Flexibility</i>	<i>Coordination</i>
4,4	3,8	29	230	21	10	3	3
4,8	4,1	30	229	21	8	3	3
5,3	4,5	26	165	26	8	1	2
5,1	4,7	18	186	19	7	2	4
4,3	3,8	24	192	21	10	3	3
4,8	4,2	24	189	15	9	1	3
4,9	4,2	23	193	18	10	1	3
4,8	4,3	20	186	21	9	2	2
4,5	4,0	21	231	22	11	4	3
5,6	5,1	18	184	18	7	2	2

**Table 3.** Group 1 post-training test data

30m start sprint, s	30m run sprint, s	Standing long jump, cm	10m wheelbarrow acceleration, s	Weighted squats, kg
4,2	3,5	226	4,03	95
4,7	4,0	231	4,05	97
5,5	5,0	182	4,09	89
4,7	4,0	186	3,99	99
5,2	4,6	161	4,01	98
4,8	4,1	192	3,99	105
4,8	4,1	201	4,02	92
5,5	4,9	161	4,13	85
4,9	4,3	189	4,11	95
4,4	3,9	213	3,98	109

**Table 4.** Group 2 post-training test data

30m start sprint, s	30m run sprint, s	Standing long jump, cm	10m wheelbarrow acceleration, s	Weighted squats, kg
4,3	3,7	230	4,01	92
4,8	4,0	229	4,03	9,3
5,2	4,5	165	3,99	103
5,0	4,4	186	4,09	100
4,3	3,8	192	3,92	92
4,7	4,1	189	4,0	96
4,8	4,1	193	3,99	95
4,8	4,0	186	4,06	101
4,4	3,9	231	3,93	102
5,2	4,8	184	4,10	91

by the 30m start/ run sprint, standing long jump, 10m wheelbarrow acceleration and weighted squats tests – see the test data in Tables 3 and 4.

The post- versus pre-training group tests of the sample showed progress of both groups in physical fitness in every test and their nearing to the special training stage requirements. The sports basics training system included the wheelbarrow, accelerating track, bob and skeleton simulator mastering theory and practices to make the athletes fit for promotion to the special training stage. At this juncture, however, both of the beginner groups were tested still unfit for promotion to the special technical training level i.e. in need of special physical and technical excellence training service.

**Conclusion.** The cycled bobsleigh basics training system for the 13-14 year-old first-year trainees with a special emphasis on physical fitness was found beneficial for their physical progress on the way to qualifications for the special training stage and further progress in the sport.

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# 13-14 year-olds' emotionality-related sports training progress challenges and emotional control building service

UDC 796.08



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## Abstract

**Objective of the study** was to rate and analyze the key emotionality-related sports training progress challenges on a sample of the 13-14 year-old ice hockey players.

**Methods and structure of the study.** We used the following study methods: analyses of the relevant theoretical and practical literature, interviews, comparative analysis, correlation analysis, cluster analysis and factorial analysis (FactorLoadings (Unrouted; Varimaxraw) (Markedloadingsare>, 7000). We sampled for the study the 13-14 year old ice hockey players (n=40) in Moscow.

**Results and conclusion.** Correlation constellations of significant correlations of the individual social, emotional intelligence and social creativity rating factors plus the trainer-trainee emotionality domain analysis made it possible to consider the sports training system as the socially and emotionally active environment with its adaptability facilitation effects. The substantive characteristics of the most promising lines in the emotional controls building arsenal made it possible to offer the emotionality-related problems coping models in the context of the following key factors: high-difficulty spectrum that requires direct adaptation to the sport-specific requirements. The actual emotional difficulties having the higher factorial weight may be listed as follows: need for mental and physical progress despite the mental and nervous fatigue; need for the high execution standards, with the resource mobilizing for success; indirect adaptation to the sports training system requirements in the context of the trainer's emotionality and professional service controls (adaptation to the "failures in constructive communication, shortage of emotional support from the trainer"; "trainer's emotional fatigue and/or emotional isolation for unclear reasons"); trainee's own emotional control failures in coping with the sports training challenges ("need for a good analysis of failures to effectively 'forget' them").

**Keywords:** sports training, junior ice hockey player, training goals, emotionality, progress challenges.

**Background.** Key provisions of the modern sports training systems have been spelled out by the leading national researchers (L.P. Matveyev, M.Ya. Nabatnikova, V.N. Platonov, V.P. Filin). The 'modeling and goal-setting approach to sports training' [5] offered by L.P. Matveyev as a design framework gives the means to model the target athletic fitness at every training stage. It is clear that an integrated sports training system shall take into account every trainer-trainee interaction factor for success of the training service. Thus V.E. Zankovets analyzes a sports training system design on a subjective interaction basis with the "individual training viewed as a

controlled three-level process including: (1) direct link from the controller (coach) to the controlled (athlete) subject; (2) feedback to the coach; and (3) control system adjustment based on the feedback data flow' [1, p. 44].

As far as the key sports training system management issues are concerned, P.V. Kvashuk, N.P. Grachev and I.N. Maslov mention "an objective conflict of interests and goals in the sports reserve training systems" [2, p. 111]. As provided by N.V. Mezentseva, "coach is a central actor of a sports training system with his/her living standards and sports principles, philosophy and professional teaching skills ... pivotal for success

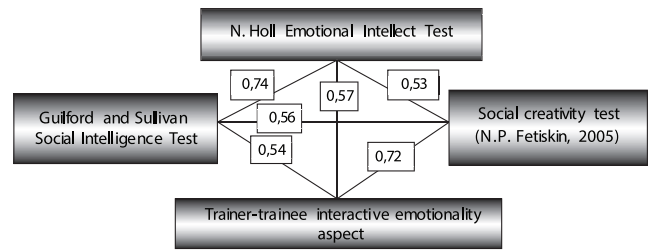
of the key goals of humanistic education in the “training-culturing-development” and competitive progress domains” [6, with. 1277]. G.A. Kuzmenko analyzes a few stress tolerance issues faced by junior athletes [3, p. 64] with a special emphasis on the emotional intelligence building aspects as it facilitates adaptation to the sport-specific cooperation and performance within the “a new national population sportization avener” as provided by L.I. Lubysheva [4, p. 99] and the relevant high social values.

**Objective of the study** was to rate and analyze the key emotionality-related sports training progress challenges on a sample of the 13-14 year-old ice hockey players.

**Methods and structure of the study.** We used the following study methods: analyses of the relevant theoretical and practical literature, interviews, comparative analysis, correlation analysis, cluster analysis and factorial analysis (FactorLoadings (Unrouted; Varimaxraw) (Markedloadingsare>, 7000). We sampled for the study the 13-14-year-old ice hockey players (n=40) in Moscow.

**Results and discussion.** We found significant correlations of a few study factors based on the correlation analysis of the classical social/ emotional intelligence, trainer-trainee emotionality and social creativity tests of the sample: see Figure 1. Individual progresses of junior athletes are known to depend on the individual emotional and socializing resource being fully mobilized and put in trainings, with the trainer-trainee interactions heavily facilitated by the joint efforts to meet and overcome a range of emotionality-related challenges in the context of the individual athletic and competitive progress goals.

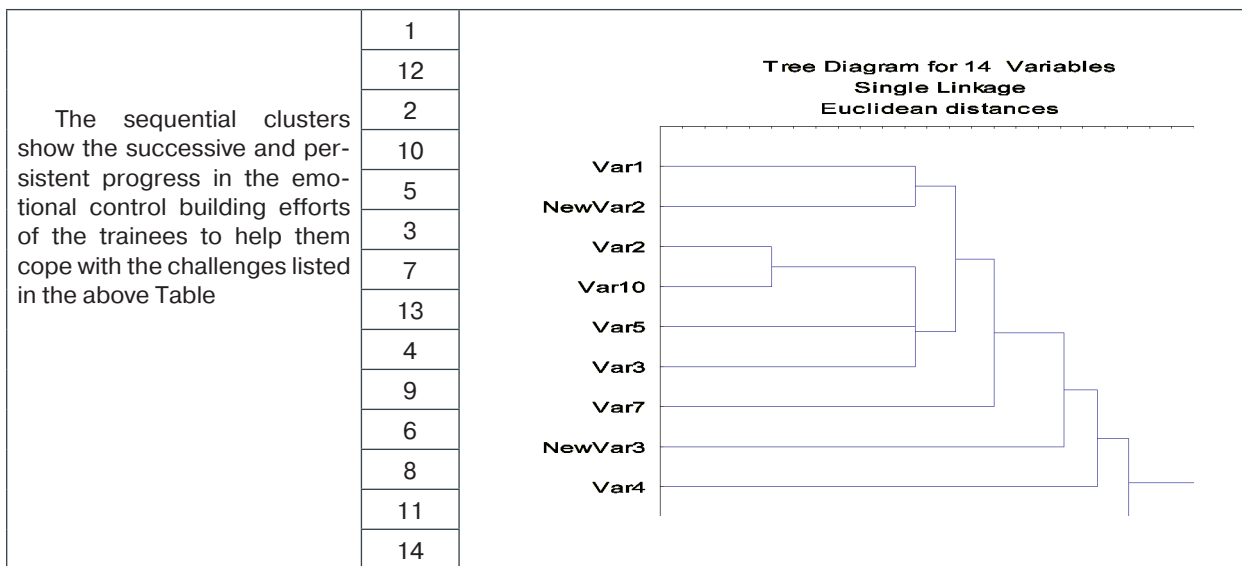
We grouped the sample into three groups (see Table hereunder) based on the trainer-trainee interac-



**Figure 1.** Correlation matrix (Correlations (Spreadsheet14): marked correlations are significant at  $p < 0.05000$   $N=24$  (case-wise deletion of missing data)

tion challenges in need of adequate reflexive analysis to detect the emotional barriers for progress. It should be emphasized that the junior players were found to basically adapt to the trainer’s behavioral model and cognitive process requirements at the beginner training stage.

The training service was found giving rise to a range of emotionality-related problems due to the perceived destructive trainer’s assessments of the actual progress and potential resource of the player – of high detriment to his individual long-term progress goals and sports agenda on the whole. In the efforts to cope with this sports training process challenges, the junior player needs permanent emotional maturation with due pedagogical support from the trainer and teammates with largely the same emotional challenges and basic competence in coping with them, for a good psychological and pedagogical support. Our cluster analysis found the primary/ basic (highlighted in the Table) objective and subjective correlated factors for the rank 1 and 2 challenges being successfully met, namely: competitive stress tolerance and success forecasting in highly competitive matches’ and trainer’s emo-



**Figure 2.** Focused training for persistent progress in coping with emotionality-related challenges in training process





**Table 1.** Emotional challenges reportedly faced by the junior players in the efforts to adapt to the objective and subjective training system requirements

Fields	Actual emotional challenges in adaptation	Factors	
		Unrou- ted	Varimax raw
Direct adaptation to the sport-specific requirements and environments	Training and excellence service with progress in sport-specific motor skills, adaptation to high-coordination workloads and stresses: rank 1	<b>-0,743</b>	
	Competitive stress tolerance and success forecasting in highly competitive matches: rank 2	<b>-0,786</b>	
	Need for physical and mental progress despite the nervous/ mental fatigue: rank 3	<b>-0,822</b>	
	Due diligence, executive discipline and culture, individual resource mobilizing to meet the sports training requirements: rank 4	<b>-0,913</b>	
	Self-reliant training for progress in the key physical and personality qualities: rank 5	<b>-0,773</b>	
Indirect adaptation/ trainer –trainee emotionality issues	Trainer’s wayward emotionality with unfair (as the trainee believes) attitudes to the trainee’s personality aspects: rank 6		<b>0,755</b>
	Trainer’s nervousness and “outbursts” in response to the trainee’s individual difficulties in the sports training: rank 7	<b>-0,721</b>	
	Need for a constructive dialogue and emotional support from the trainer: rank 8	<b>-0,786</b>	
	Trainer’s preference for a few teammates: rank 9	<b>-0,731</b>	
	Trainer’s emotional burnout, emotional isolation with a change in attitudes for unclear reasons: rank 10	<b>-0,737</b>	
Own emotional barriers on the way to the sports training system goals	Need for a good analysis of failures with the ability to ‘forget’ and repair the emotional damages: rank 11		<b>0,814</b>
	Need to put the sports training system on a businesslike basis with the emotionality-driven relations ranked second: rank 12	<b>-0,723</b>	
	Need for the trainee to feel the Self domain in the trainer-trainee interaction, with fair professional and personality assessments: rank 13	<b>-0,668</b>	
	Balanced attitudes to the teammates’ training/ competitive progresses versus the perceived personal poor progress, with concentration on own day-by-day progress goals and achievements: rank 14		<b>0,726</b>

tional burnout, emotional isolation with a change in attitudes for unclear reasons; and rank 1 and 3 challenges – training and excellence service with progress in sport-specific motor skills, adaptation to high-coordination workloads and stresses; and need for physical and mental progress in spite of the nervous/ mental fatigue: see Figure 2.

**Conclusion.** The study found a few priority emotionality-related challenges faced by the young players in the training process – that are in need of direct adaptation to the trainer’s requirements; indirect adaptation to the sport-specific progress requirements with the emotional control building facilitated by the trainer; and the self-reliant emotionality control trainings to cope with the challenges and barriers for progress. Based on the above priority challenges, trainer and/ or other contributors to the sports training system shall initiate and prudently manage a focused emotional control skills building process to facilitate the individual emotional maturation process with its cumulative benefits for the constructive and creative progress of a young athlete at every training and sports excellence stage.

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# Musical accompaniment in training process: benefits analysis

UDC 796:658



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## Abstract

**Objective of the study** was to rate benefits of differently styled musical accompaniments for the training process efficiency in academic kettlebell lifting sport.

**Methods and structure of the study.** The test data were processed by the variation statistics analysis [1] to obtain the following test rates: variation index in percent; result reliability rate  $S_x$ ; average accuracy rate  $C_s$ ; and arithmetic mean as the key test rate, with data presented in  $M \pm m_x$  format. Variation range of every index was rated by variation index.

**Results and conclusion.** The study found that music accompaniments of different styles facilitate the training process in somewhat different manners. The musical accompaniment backed trainings were tested to improve physical fitness of the sample by 12% on average. Rock music (rock musical accompaniment) was tested to spur up the performance higher than the other styles – by 22.1% on average versus 7.2% and 2.1% in the pop and classical musical accompaniment tests, respectively. This finding gives the grounds to recommend rock musical accompaniment being applied for the sports training efficiency and performance improvement purposes.

**Keywords:** *musical accompaniment, efficiency, training process, musical style, strength training.*

**Background.** Scientists have found great impacts of music on intellectual performance and physical fitness [3, 4]. In modern sports systems, music is often used to control the training process intensity and pace, with many people mobilizing themselves for workouts by active music for at least the following reasons:

- It mitigates/ delays muscle fatigue;
- Rhythmic music of specific style sets a movement pace and, hence, facilitates trainings;
- Musical accompaniment attunes and speeds up responses;
- Musical accompaniment effectively prolongs a training process.

“Music is legal doping for athletes,” maintains Dr. Kostas Karageorgis, School of Sports and Education Deputy Research Head at Brunel Uni-

versity. He reports in his last book ‘Inside Sport Psychology’ that musical accompaniment helps improve performance in running sport by up to 15% [5].

Modern kettlebell lifting trainings are always associated with high neuromuscular fatigues and overstrain that may effectively hamper progress and attempts to mobilize the individual resource in full. These negative effects may be mitigated by positive emotional background created by musical accompaniment to facilitate the training process and make it more efficient and effective, with extra motivations and positive mindsets for every athlete and for appeal of the sport on the whole. This is the reason why practical benefits of specific musical accompaniment styles may be of special interest for the sports community.



**Table 1.** Musical-accompaniment-free physical fitness test data

Test	Statistical indices			
	M±m	C <sub>s</sub>	S <sub>x</sub>	CV
Bench press maximum, kg	75	0,1	0,8	0,4
10-min one-hand snatch:				
16 kg	90	0,6	0,8	2,1
24 kg	70	0,7	1,2	2,3
32 kg (males)	62	0,4	0,6	2,1
10-min 32kg two-hand snatch (males)	32	0,1	1,5	0,3
10-min jerk:				
16 kg	43	0,2	0,4	0,5
24 kg	41	0,4	0,6	0,8
32 kg (males)	26	0,1	0,6	0,7

**Table 2.** Rock musical accompaniment backed physical fitness test data

Test	Statistical indices			
	M±m	C <sub>s</sub>	S <sub>x</sub>	CV
Bench press maximum, kg	82	0,2	0,7	0,3
10-min one-hand snatch:				
16 kg	120	0,7	0,9	1,1
24 kg	85	0,6	1,6	1,3
32 kg (males)	72	0,2	1,6	1,1
10-min 32kg two-hand snatch (males)	35	0,2	1,7	0,2
10-min jerk:				
16 kg	51	0,1	0,2	2,5
24 kg	52	1,4	0,7	1,8
32 kg (males)	32	1,1	0,5	1,7

**Objective of the study** was to rate benefits of differently styled musical accompaniments for the training process efficiency in academic kettlebell lifting sport.

**Methods and structure of the study.** We sampled for the study the 18-22-year-old kettlebell lifters from Tyumen Industrial University qualified Class II to CMS and tested them for one year in the training process with and without musical accompaniment. The groups were trained for 3 hours 3 times a week, with a special 20-minute warm-up prior to each training session making an emphasis on active movements and flexibility practices. The core trainings were dominated by athletics including bench press and one/ two-hand snatch and jerk with 12 kg, 24 kg and 32 kg (males) kettlebells. The sample was also trained twice a week in a gym on special training machines with dumbbells and weight plates.

For 2 months the group had been trained without musical accompaniment followed by 3 styles of musical accompaniment including rock, pop and classical music. Each musical accompaniment style had been tested for 2 months, with the musical accom-

paniment tempo varied within the range of 80-130 accents (beats) per minute (Moderato: moderate 80 accents per minute; Allegretto: more active 100 accents per minute; and Allegro: highly active 130 accents per minute). The test data were processed by the variation statistics analysis [1] to obtain the following test rates: variation index in percent; result reliability rate S<sub>x</sub>; average accuracy rate C<sub>s</sub>; and arithmetic mean as the key test rate, with the data presented in M±mx format. Variation range of every index was rated by variation index [2].

**Results and discussion.** We used the rock musical accompaniment pieces including alternative rock, alternative metal and hard rock ones dominated by rebellious colors. Given hereunder is the musical-accompaniment-free physical fitness test data (Table 1); rock musical accompaniment backed physical fitness test data (Table 2), and the pop musical accompaniment (Table 3) and classical musical accompaniment backed physical fitness test data (Table 4).

Pop musical accompaniment was composed of the most popular pop music, i.e. the 'light' and commonly accessible for apprehension.

**Table 3.** Pop musical accompaniment backed physical fitness test data

Test	Statistical indices			
	M±m	C <sub>s</sub>	S <sub>x</sub>	CV
Bench press maximum, kg	77	0,2	0,6	1,4
10-min one-hand snatch:				
16 kg	97	0,5	0,9	1,1
24 kg	75	0,5	1,3	1,3
32 kg (males)	68	0,3	0,4	1,1
10-min 32kg two-hand snatch (males)	36	0,2	2,5	1,3
10-min jerk:				
16 kg	50	0,2	0,2	0,5
24 kg	44	1,4	0,7	1,8
32 kg (males)	29	0,1	0,6	1,7

**Table 4.** Classical musical accompaniment backed physical fitness test data

Test	Statistical indices			
	M±m	C <sub>s</sub>	S <sub>x</sub>	CV
Bench press maximum, kg	74	0,1	0,6	0,4
10-min one-hand snatch:				
16 kg	92	0,6	0,9	2,1
24 kg	73	0,4	1,2	2,8
32 kg (males)	64	0,3	0,5	2,3
10-min 32kg two-hand snatch (males)	34	0,2	1,5	1,3
10-min jerk:				
16 kg	45	0,2	0,3	1,5
24 kg	42	0,5	0,3	0,9
32 kg (males)	27	0,1	0,6	1,7



**Table 5.** *Musical accompaniment -free and musical-accompaniment-backed physical performance differences*

	Musical-accompaniment-free versus rock musical accompaniment	Musical-accompaniment-free versus pop musical accompaniment	Musical-accompaniment-free versus classical musical accompaniment
Physical fitness difference	5,3	2,2	5,3

Classical musical accompaniment was composed of J. Haydn, W. Mozart and L. Beethoven masterpieces strictly organized and conceptually optimistic, with constant rhythmic beats, predominantly dance styles, melodic and simple.

Having compared the style-specific variation indices, we found the musical-accompaniment-free and pop musical accompaniment backed physical performances wider different than in cases of rock and classical musical accompaniment backed ones. Note that the variation range was still relatively narrow limited by variation index 10%: see Table 5.

The above findings can be explained by the encouragement effects of the musical accompaniment, with the athletes' performance prolonged, activated and allowing higher intensity practices. The sport groups also noted that the musical accompaniment helps cope with the physically difficult practices. Human body and mind appears adopting to the rhythmic accompaniment in terms of pace and intensity since the background rhythm releases the athlete of volitional pace control efforts and automates movements harmonized with the musical rhythm. As soon as the muscles are free from volitional control, they effectively relax, particularly the inactive ones, and ease movements.

**Conclusion.** The study found that musical accompaniments of different styles facilitate the training process in somewhat different manners. The mu-

sical accompaniment backed trainings were tested to improve physical fitness of the sample by 12% on average. Rock music was tested to spur up the performance higher than the other styles – by 22.1% on average versus 7.2% and 2.1% in the pop and classical musical accompaniment tests, respectively. This finding gives us the grounds to recommend rock musical accompaniment being applied for the sports training efficiency and performance improvement purposes.

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# Academic physical education system: questionnaire survey to rate student satisfaction

UDC 37.013



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## Abstract

**Objective of the study** was to analyze the student satisfaction with the academic physical education service.

**Methods and structure of the study.** We sampled for the questionnaire survey (run in 2018) university students (n=1000) from Belgorod, Kursk and Lipetsk Oblast universities. For the purposes of the study, we quoted the sample to make micro-models of the local student communities and academic physical education services in Belgorod, Kursk, Lipetsk and Stary Oskol cities. The questionnaire survey was designed to rate the communal dispositions and progress agendas in the academic physical education domain. The questionnaire survey data made it possible to analyze the student satisfaction with the academic physical education service. We found that the academic communities complement the standard academic physical education service by the following physical education and sports services: (1) elective academic sports; (2) leisure-time sports practices in gyms; (3) University mass physical education and sports / health events; and (4) GTO trainings and physical fitness tests.

**Results and conclusion.** Based on the questionnaire survey data, we analyzed the students interest in the elective academic sports; leisure-time sports practices in gyms; university mass physical education and sports / health events; and GTO trainings and physical fitness tests. Our main conclusion is that it is via the healthy values and priorities formation efforts that the student communities should be motivated for the academic physical education and sport service on an off-class basis to meet their physical progress and health needs unrelated directly to academic performance. Our study found the following most popular academic physical education service forms: leisure time physical education and sports practices in gyms; university mass physical education and sports / health events; GTO trainings and physical fitness tests; and elective sports in the academic physical education curricula. We found that, despite the relatively high commitment of students of the academic physical education service, some of them face attendance barriers due to gym service non-affordability and some psychological barriers. About half of the sample was found partially or fully uncovered by or disinterested in the academic physical education service. Based on the questionnaire survey data and analysis, we tend to believe that the main contributor to the still relatively low academic physical education satisfaction rates is the poor physical education and sports motivations in the student communities.

**Keywords:** *academic physical education system, project management technology, dispositions, individual physical progress agenda, student youth.*

**Background.** Modern academic physical education service may be defined as the combination of interrelated and interdependent physical education institutions and services designed to meet the health improvement and physical progress agendas of the university communities [2]. It is ideally a dynamic open

subsystem of a higher education establishment that needs an efficient management sensitive to the local physical education needs and preferences (dispositions). Such management may be efficient only when the academic physical education service is timely and effectively customized to the communal dispositions [3].



**Objective of the study** was to analyze the student satisfaction with the academic physical education service.

**Methods and structure of the study.** We sampled for the questionnaire survey (run in 2018) university students (n=1000) from Belgorod, Kursk and Lipetsk Oblast universities. For the purposes of the study, we quoted the sample to make micro-models of the local student communities and academic physical education services in Belgorod, Kursk, Lipetsk and Stary Oskol cities. The questionnaire survey was designed to rate the communal dispositions and progress agendas in the academic physical education domain.

**Results and discussion.** The questionnaire survey data made it possible to analyze the student satisfaction with the academic physical education service. We found that the academic communities complement the standard academic physical education service by the following physical education and sports services: (1) elective academic sports; (2) leisure-time sports practices in gyms; (3) University mass physical education and sports / health events; and (4) GTO trainings and physical fitness tests.

1. *Elective academic sports* are reportedly favored by 51.2% of the sample who attend specific sports groups. Note that the leisure time elective sports are naturally played by 93.2% of the Physical Education Department students.

2. *Leisure-time sports practices in gyms* are reported by 63.8% of the sample and 75.3% of the Physical Education Department students. It should be mentioned that more than half of the sample reported attending gyms in their free time. We found significant inter-university differences – apparently due to the academic service specifics. Thus the universities that score academic credits including the elective physical education and sports formats report higher leisure-time sport statistics. It was found, however, that the leisure-time gym practices not always meet the individual physical education and sports / health progress agendas – due to, above all, the students' financial difficulties: some of the respondents reported the gym services being non-affordable for them. It may be also pertinent to mention some psychological barriers reported by the physically unfit students that fail to meet the modern body shape standards – e.g. people with overweight etc.

3. *University mass physical education and sports / health events* are reportedly joined by 61.2% of the sample albeit 18.2% mention a lack of enthusiasm and interest in such actions; and 38.8% reported avoiding such events. Note that this finding falls in conflict with findings of other authors. Thus the

Students Social Support Center of Saint Petersburg National Research University of Information Technologies, Mechanics and Optics reported (as of 2015) only 19% of the students interested and 51% disinterested in the mass physical education and sports events [1].

It is not improbable that the difference is due to specifics of the surveyed universities. We found Belgorod Law Institute (67.6% interested) leading in this aspect and Belgorod State Institute of Arts and Culture being most disinterested in the mass physical education and sports events (20% interested).

4. GTO trainings and physical fitness tests are the most attractive academic physical education service formats for the sample, with 55.7% reportedly interested in this format, 8.4% interested although failing to join for some reasons; and 2.4% unaware of such academic physical education service domain.

It should be mentioned that our questionnaire survey data differ from the prior studies. Thus the Attitudes to Physical Education and Sports Survey by the Students' Social Support Center in 2015 found much lower interest in the GTO trainings and tests, with 27% and 44% of the sample reporting positive and neutral attitudes to the GTO service, respectively [1]. However, these data may be obsolete and the actual situation could have changed for the five years since then as the governmental physical education and sports and health service encouragement policies and practices with the promotion initiatives and incentives (academic credits, insignia, etc.) for the GTO service have been quite effective for this period.

On the whole, 65.3% of the sample reported being satisfied with the academic physical education service; 34.7% reported dissatisfactions with some service aspects; and 7.8% were extremely critical of the existing academic physical education service range and quality.

**Conclusion.** Our main conclusion is that it is via the healthy values and priorities formation efforts that the student communities should be motivated for the academic physical education and sport service on an off-class basis to meet their physical progress and health needs unrelated directly to the academic performance. Our study found the following most popular academic physical education service forms: leisure time sports practices in gyms; university mass physical education and sports / health events; GTO trainings and physical fitness tests; and elective sports in the academic physical education curricula. However, about half of the sample was found partially or fully uncovered by or disinterested in the academic physical education



service. Based on the questionnaire survey data and analysis, we tend to believe that the main contributor to the still relatively low academic physical education satisfaction rates is the poor physical education and sports motivations in the student communities.

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# Gto trainings and tests in academic physical education service: student group psychology, motivations and priorities survey

UDC 159.9.072



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## Abstract

**Objective of the study** was to rate and analyze the students' psychological types, motivations for and priorities in academic physical education and sports with GTO trainings and tests.

**Methods and structure of the study.** The study was run in 2019-2020 at the Belgorod State National Research University's (BSNU) Pedagogical Institute under the BSNU Contest for Grants for Social and Humanitarian Research Project No. 826-OD of 14.08, 2020. We used the following methods: reference literature analysis; semi-formal interviews formatted as recommended by S.A. Korneeva and Y.N. Gut; A.K. Osnitsky Self-control Qualities and Skills Survey; and the Cattell 16 Personality Factor Questionnaire. We sampled for the study 197 students.

**Results and discussion.** Based on the reference literature analysis and popular personality traits tests, we grouped the sample into typological groups with different multilevel self-control skills in the physical education and sports domain. We found that the adaptive, active and personality levels require different physical education and sports motivation tools in the GTO trainings and tests. Thus the sports-driven group with the high social self-assertion agenda was tested higher on the goal-setting and pursue, situation analyzing and modeling and progress rating and adjustment scales. The players and formalists groups were tested more impulsive, anxious, closed, whilst the sports driven group was found more dynamic, adequate and effective in communication domain. The survey data and analyses confirmed our prior assumption that that students may be motivated for habitual physical education and sports by the GTO training and test tools by focused motivational efforts with a high emphasis on their physical activation and self-controlling experiences both in the intellectual and emotional activity aspects and, what may be most beneficial for these initiatives, the self-controls tests and improvement service.

**Keywords:** *motivated individual activity, student types, key motivation, GTO toolkit, physical education and sports, intellectual and emotional activity.*

**Background.** University initiatives to motivate students for academic physical education and sports using the GTO tools [3] need to be based on modern psychological and pedagogical theory and technology with a special priority to the individual student types and their multilevel self-control, values and priorities in the physical education and sports domain. We proceeded from the assumption that students may be motivated for habitual physical education and sports by the GTO training and test tools by focused motivational efforts with a high emphasis on their physical activation and self-controlling experi-

ences both in the intellectual and emotional activity aspects and, what may be most beneficial for these initiatives, the self-control tests and improvement service.

**Objective of the study** was to rate and analyze the students' psychological types, motivations for and priorities in the academic physical education and sports with GTO trainings and tests.

**Methods and structure of the study.** The study was run in 2019-2020 at the Belgorod State National Research University's Pedagogical Institute under the Belgorod State National Research University





Contest for Grants for Social and Humanitarian Research Project No. 826-OD of 14.08, 2020. We used the following methods: reference literature analysis; semiformal interviews formatted as recommended by S.A. Korneeva and Y.N. Gut; A.K. Osnitsky Self-control Qualities and Skills Survey; and the Cattell 16 Personality Factor Questionnaire. We sampled for the study 197 students.

**Results and discussion.** Based on the semiformal interviews, the sample was grouped into the following typological groups: (1) sports-driven group tested with high genuine physical education and sports motivations dominated by the social assertion agenda; (2) players group tested with high success motivations dominated by the competitive ones; (3) nihilists group tested with high intrinsic physical education and sports motivations dominated by the personal assertion needs in physical education and sports domain; and (4) formalists group tested with high failure avoidance motivations dominated by the need for recognition, appreciation and academic progress on the whole.

We used the A.K. Osnitsky Self-control Qualities and Skills Survey to rate the students' self-control and motivations for the GTO trainings and tests [1, 2]. The self-rated self-control of the above groups was found significantly different. The self-control skill set tests found significant intergroup differences on many test scales. Thus, the sports-driven group significantly less often reported shortages of these skills versus the formalists group: 14 versus 25, respectively ( $p < 0.05$ ). The sports-driven group was also tested higher on the goal-setting and pursue, situation analyzing and modeling and progress rating and adjustment (when necessary) scales. The groups were also tested significantly different in the self-control skills component self-rates and analyses.

On the latter scale the groups were tested with largely the same trends, i.e. the sports-driven group was tested higher on the self-control skills functions rating scales versus the players and formalists groups: 68 versus 60 points, respectively, and significantly lower in physical education and sports absenteeism rates: 9 versus 29 points, respectively. These data means that the sports-driven group is highly intrinsically motivated for physical education and sports with a special priority to the social progress agenda and, hence, higher self-control on the whole including good self-management, orderliness, accuracy, practical realization of intentions and optimal operational control and management skills. It should be mentioned in this context that the players and formalists groups were tested significantly higher on the self-rated errors scale.

Individual self-control skills styles in the context of the personal motivations for the GTO trainings

and tests were also found group-specific. Thus the sports-driven and nihilists groups were tested higher on the caution, confidence, flexibility, practicality and stability scales than the players and formalists groups: 51 versus 42 and 10 versus 17 points on the positive (skills reported) and negative (no skills) scales, respectively. Furthermore, the sports-driven group was tested higher on the individual self-control skills styles scales than the players, nihilists and formalists groups: 64 versus 50 points, respectively.

We used Cattell 16 Personality Factor Questionnaire to further rate and compare the group motivations for and priorities in the GTO trainings and tests. On the group A factor scale (kindness, cordiality, concern, openness) the players group was rated more impulsive, anxious and reserved versus the sports-driven group tested more dynamic, adequate and effective in social communications. On the factor E scale (dominance, persistence/ conformity, dependence) the above groups were also significantly ( $p < 0.05$ ) different. On the factor H scale (courage, confidence/ shyness, restraint), the formalists group was ranked lowest due to the poor activity, more restrained and timid behaviors, low self-confidence and hesitant decision making.

Furthermore, the sports-driven group was tested with more flexible behavior and good stress situation management skills. The groups were also found different on the factors Q3/ Q4 scales, with the sports-driven individuals ranked highest on the self-control and management subscales. The M factor rating exercise found significant intergroup differences in the intellectual development domain. Thus the sports-driven nihilists groups were ranked highest on the intelligence, mental versatility and creativity subscales. It may be concluded, therefore, that the Cattell 16 Personality Factor Questionnaire data analysis found certain intergroup correlations of the group personality traits with the conscious behavioral self-controls, motivations for and priorities in the GTO trainings and tests under the academic physical education and sports curriculum.

**Conclusion.** Student groups tested with different motivations and key incentives for the GTO trainings and tests under the academic physical education and sports curriculum were also tested different on the following scales: self-rated self-controls in the practical physical education and sports domain; communicative and interpersonal relations building skills; emotional, volitional and intellectual qualities and skills; and the self-management and stress tolerance skills rating scale. The sports-driven group with its high intrinsic physical education and sports motivations dominated by the social assertion agenda was ranked highest on the feel/ action spontaneity



scale – that may be interpreted as indicative of the group's decision making and acting versatility and unpredictability; whilst the players group was ranked highest on the creativity scale indicative of the good individual creative resources and priorities.

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# Academic educational provisions to motivate students for physical education practices

UDC 373'013



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## Abstract

**Objective of the study** was to analyze benefits of special academic educational provisions to encourage students' physical education interests and motivations.

**Methods and structure of the study.** The study was run in 2018-2020 at Pedagogical Institute based on the "NRU Belgorod State National Research University research contest for grants to support public and humanitarian research" summary No. 826-OD of 14.08 2020. We used the following research methods for the purposes of the study: theoretical analysis of the reference literature; physical education service analysis; students' physical education progress data and physical education incentives/ encouragement initiatives; empirical studies with physical education service observations and trainer-trainee interaction analysis; questionnaire survey; training experiment; progress tests; and standard mathematical statistics methods for the survey data processing. We sampled 1,017 students for the study.

**Results and conclusion.** Based on the pedagogical stimulation theory and practical findings of a questionnaire survey, the university has taken efforts to spur up the students' physical education motivation based on the actual individual needs, priorities, interests, attitudes and agendas in the physical education domain, with socio-cultural microenvironments including educational methods and tools geared to facilitate constructive physical education activity. Facilitating academic educational provisions may be defined as the combination of material, pedagogical and psychological factors of university reality that encourage students for self-reliant progress in the physical education domain. Such university academic educational provisions at Belgorod State National Research University were found beneficial as verified by the physical education motivations survey that demonstrated progress in the students' physical education interests and motivations. Thus the unmotivated group was tested to contract from 58.2% to 18.3%; and satisfactorily and well motivated group to grow from 34.3% to 60% and 7.5% to 21.7%, respectively.

**Keywords:** *academic educational environment, stimulus situation, physical education interests and motivations, university students.*

**Background.** National universities give a high priority to the students' physical education interests and motivations; with such initiatives supported by the national research community that explores the physical education interests and motivations improvement methods with analyses of the subjective factors of influence on the students' physical education values, priorities and agendas in different physical education domains [3]. It should be mentioned, however, that the actual students' physical

education interests and motivations are still low. One of the solutions for this problem, in our opinion, may be offered by special academic educational provisions to encourage, under certain conditions, students' healthy interests in and motivations for the academic physical education and sport service.

**Objective of the study** was to analyze benefits of special academic educational provisions to encourage students' physical education interests and motivations.



**Methods and structure of the study.** The study was run in 2018-2020 at Pedagogical Institute based on the “NRU Belgorod State National Research University research contest for grants to support public and humanitarian research” summary No. 826-OD of 14.08 2020. We used the following research methods for the purposes of the study: theoretical analysis of the reference literature; physical education service analysis; students’ physical education progress data and physical education incentives/encouragement initiatives; empirical studies with physical education service observations and trainer-trainee interaction analysis; questionnaire survey; training experiment; progress tests; and standard mathematical statistics methods for the survey data processing. We sampled 1,017 students for the study.

**Results and discussion.** A questionnaire survey of 2018 found 58.2%, 34.3% and 7.5% of the sample unmotivated, satisfactorily motivated and well motivated for the academic physical education service, respectively. Based on the pedagogical stimulation theory by L.Y. Gordin, Z.I. Ravkin et al. [2] and practical findings of the questionnaire survey, the university has taken efforts to spur up the students’ physical education motivations based on the actual individual needs, priorities, interests, attitudes and agendas in the physical education domain [1, 2, 5]. The personal motivations are also in need of external incentives that may be secured by special academic educational provisions defined by some analysts (by B.N. Bodenko, A.T. Kurakin, Y.S. Manuilov) as natural and artificially created socio-cultural environment including educational methods and tools geared to facilitate constructive physical education activity. Facilitating academic educational provisions may be also defined as the combination of material, pedagogical and psychological factors of university reality that encourage students for self-reliant progress in the physical education domain.

In structural terms, the academic educational provisions considered herein prioritizes harmonized management at different levels, with due material and technical assets; human resource; wide range of physical education service models and tools; programmatic and practical provisions for efficient physical education service; and sound traditions-based relationships in the university environment. Thus the physical-education-motivating academic educational provisions at Belgorod State University offers extensive material and technical physical education infrastructure including the S. Khorkina Sports Training Center with a 50-meter swimming pool, gymnastics gyms, indoor training venues, universal team sports hall, halls for choreography,

table tennis, kickboxing, chess club, fitness gyms, etc. [4].

The physical-education-interests-and-motivations-hampering depersonalization aspects of the existing physical education and sports infrastructure are effectively removed in the academic educational provisions by active inclusion of every student in the training process, with a trainee expected to contribute to the teamwork with reasonable assistance from trainers. The academic educational provisions tools may be listed as follows: a set of physical education interests and motivations encouragement teaching aids, with combined material, moral and psychological incentives; stimulating situations and goals; encouraging microenvironments, etc. The trainees’ physical education interests and motivations are further encouraged by extra-curricular physical education services, sports events and volunteering service, with a special priority to synergy of the academic educational provisions actors.

Nowadays special role in physical education interests and motivations facilitation academic educational provisions is played by the GTO trainings and tests, with the academic educational provisions acting as a permanent physical education interests and motivations driver. The physical education stimulating tools include: special settings with the teacher programs for the physical-education-centered educational process; orienting situations with a range of options for trainees (different in physical education practice difficulty levels, special goals, GTO test deadlines, training service standards etc.); corrective situations with a special role played by the practical positive experience; self-motivational situations with the trainees given full freedom in opting for a range of physical education models and tools and physical education process self-management (including volunteering service). Such physical education interests and motivations facilitation tools have been found effective in the analyzed academic educational provisions.

Practical efficiency of an academic educational provisions heavily depends on how well the objective and subjective physical education conditions, interests and motivations are combined to effectively motivate students for physical education service customizable for age, gender and typological specifics on an individual basis. Such academic educational provisions were found beneficial as verified by the physical education motivations survey (of 2020) that demonstrated progress in the students’ physical education interests and motivations. Thus the unmotivated group was tested to contract from 58.2% to 18.3%; and satisfactorily and well motivated group to grow from 34.3% to 60% and 7.5% to 21.7%, respectively.



**Conclusion.** Modern physical-education-interests-and-motivations-facilitating academic educational provisions should be ranked prerequisite number one for the students' physical education motivations, conditional on every student being involved in personally meaningful physical education activities. The academic educational provisions considered herein includes a range of the following physical education provisions: subject-specific and socio-psychological environments; sports events and festivals; practical service, with a wide range of physical education models and tools; educational; leisure-time (extra-curricular physical education and sport services); organizational (physical education management system, student self-government in the physical education domain, etc.). Generally the more diverse is the academic educational provisions the more efficient are the physical education interests and motivations encouragement initiatives.

*The study contributes to the Belgorod State University State Order for 2020-2022. № 0624-2020-*

*0012 'Substantiation of integrated professional progress method for university education: universal competency, professional priorities and future teacher versatility formation dominants'*

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# New academic physical education and sports service model for disadvantaged health groups

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## Abstract

**Objective of the study** was to analyze benefits of a new academic physical education and sport service model for the disabled and disadvantaged health groups based on the neurohumoral regulation and psycho-physiological status tests and analyses.

**Methods and structure of the study.** We sampled for our study – run at Surgut State University – first-year undergraduate and specialty students (n=25) qualified with the disabled and disadvantaged health groups and therefore, certified for exemptions from practical physical education classes based on entrance medical examinations. Their vegetative-level adaptabilities were analyzed using the vegetative-vascular reactions profiling ORTO-Expert Test system with Science software toolkit. We made statistical and spectral analysis of the quiescent and orthostatic heart rhythmograms and psycho-physiological status using Universal Activator AC-9K Test system.

**Results and conclusion.** The study found the vegetative, neurohumoral regulation and psycho-physiological statuses of the disabled people and those with disadvantaged health being rather diverse and, hence, these health groups are in need of special individualized rehabilitative physical education service models – with a special priority to active training methods plus reasonable health awareness, motivational, self-reliant training and health culture building elements.

**Keywords:** *disabled and disadvantaged health groups, neurohumoral regulation, psycho-physiological status.*

**Background.** Negative demographic processes with the young population health deterioration trends reported by the national statistics have resulted in the growing numbers of university entrants qualified with the disabled and disadvantaged health groups [2, 3, 6]; whilst the inclusive education theory and practice with the relevant staffing, programmatic and organizational provisions for these groups are still far from efficient [1, 3, 5]. This situation gives rise to multiple problems and contradictions due to the shortage of efficient inclusive education technologies with individualized health-improvement, rehabilitation, preventive and other training models and tools [2, 4].

**Objective of the study** was to analyze benefits of a new academic physical education and sport service model for the disabled and disadvantaged health groups based on the neurohumoral regulation and psycho-physiological status tests and analyses.

**Methods and structure of the study.** We sampled for our study – run at Surgut State University – first-year undergraduate and specialty students (n=25) qualified with the disabled and disadvantaged health groups and therefore, exempted from practical physical education classes by the entrance medical examinations. Their vegetative-level adaptabilities were analyzed using the vegetative-vascular reactions profiling ORTOExpert Test system with Science software toolkit. We made statistical and spectral analysis of the quiescent and orthostatic heart rhythmograms and psycho-physiological status using Universal Activator AC-9K Test system.

**Results and discussion.** The study data showed the sample being extremely heterogeneous in many aspects albeit a significant proportion of the disabled people and those with health limitations exempted from the regular practical physical education classes



were found reasonably fit for individualized therapeutic physical education service. Professional specialist training at university implies compliance with a range of educational requirements and standard that is not always possible for the disabled and disadvantaged health groups. Therefore, the education services need to be reasonably individualized both for the health needs and actual psycho-physiological test rates. We should emphasize that the psycho-physiological status tests showed wide variations in the disabled and disadvantaged health groups.

Surgut State University has implemented, within its physical education and sport theory and practice curriculum, a new individualized rehabilitative physical education model for the first-year disabled and disadvantaged health group students certified for exemptions from the regular physical education classes. The model includes the following interrelated elements: health tests; physical education service design; and public defense of the new physical education service model. Work on the new physical education model would start from every student health tests and analyses with consideration for the individual health motivations, values, priorities and the cognitive, identification and operational aspects and practical health-rehabilitation experiences. The analyses would highlight errors and drawbacks in the individual health cultures to offer practical recommendations on how the individual rehabilitative physical education service should be designed.

Then the designers would tackle the physical education service practices to identify the health risks of the most common health disorders plus the functionality risks classified by the bodily functional systems – to put together an individual health rehab strategy. Special provisions in the physical education model would be made for the harsh climatic conditions of the Yugra North, with the students' climatic sensitivities being tested, analyzed and prevented. The risk assessment component would make an emphasis on the rehabilitative element of the individual physical education service with a comprehensive description of the pathological issues and rehabilitation potential followed by a rehabilitation forecast.

Individual physical activity regimen would be optimized in the physical education model starting from the biological age, physical development and harmony, physical fitness and harmony, postural control, physical typing and functionality tests with the HR threshold, peak and safe range rating tests – to find an individual optimal rehabilitative physical education service model with the body shaping and functionality improvement elements.

Psycho-physiological self-regulation module is ranked among the key elements of the individual rehabilitative physical education service model, with the students required to self-rate their stress tolerance and anxiety to develop the best stress control strategies under psycho-emotional pressures, knowing the potential consequences for the individual functional systems. The same approach applies to the other physical education model elements. Thus the individual healthy lifestyle would be designed with account of the individual biorhythms and chronotypes. The individual rehabilitative physical education service model design would be finalized by a model defense that includes a public defense of the physical education model theory followed by a practical demonstration of the individualized sets of rehabilitative physical exercises.

**Conclusion.** The study found the vegetative, neuro-humoral regulation and psycho-physiological statuses of the disabled people and those with disadvantaged health being rather diverse and, hence, these health groups are in need of special individualized rehabilitative physical education service models – with a special priority to active training methods plus reasonable health awareness, motivational, self-reliant training and health culture building elements.

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# Effects of oxidizing potential of working muscles on blood pressure of athletes from strength sports

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## Abstract

**Objective of the study** was to conduct a comparative analysis of the effects of the growth of oxidizing potential of the working muscles and changes in the body composition on the BP rates in hypertensive athletes from strength sports.

**Methods and structure of the study.** The study involved 55 strength sports representatives (powerlifters) of different qualifications (CMS, MS) and of heavy weight categories only (body weight -  $101.4 \pm 5.3$  kg). The athletes were randomly divided into two groups: Experimental ( $n=35$ ) and Control ( $n=20$ ). The mean age of the male athletes was  $31.0 \pm 7.3$  years. The Experimental Group athletes were trained for 120 days (3 times a week) in accordance with the following protocol: the traditional strength training system was supplemented by the aerobic load (training on a cycle ergometer, 7 high-intensity intervals (with the pedaling power of 100% of MOC), 2 minutes each, and a low-intensity interval with heart rate at the level of 85% of AnT, 2 minutes. The high intensity interval training (HIIT) session lasted 28 minutes. The Control Group athletes were trained for 120 days (3 times a week) in accordance with the traditional strength training protocol.

**Results and conclusion.** The study found that the 120-day physical rehabilitation led to the reduction of the fat mass in the hypertensive athletes of heavy weight categories. A well-known body mass index (or subcutaneous adipose tissue) reduction strategy, causing significant changes in blood pressure, can be achieved through dietary interventions only, without physical exercise. However, we proved that HIIT, apart from the athlete's body composition, has a therapeutic and prophylactic effect on the cardiovascular system. The aerobic training protocol we developed based on the metabolic variables will help athletes to effectively and safely influence the prevention and treatment of AH. A further priority area is pedagogical work among athletes from strength sports aimed to include aerobic cycling trainings in the training protocols.

**Keywords:** *physical rehabilitation, arterial blood pressure, powerlifting, interval training.*

**Background.** Arterial hypertension, often referred to as the "silent killer", is the most common abnormal diagnosis in athletes from strength sports. It is a well-known fact that strength sports representatives have a high percentage of muscle mass [3], which should positively affect their metabolic status [6]. The skeletal muscle fibers are divided into two main categories: oxidative muscle fibers and glycolytic muscle fibers. Such a working muscle composition may affect the strength and speed qualities [11], ability to effectively recover after physical activity [7], and blood pressure

[5]. The metabolic characteristics of the muscle fibers (oxidizing potential, capillarization, and mitochondrial mass) change under training loads. As a result, a high percentage of oxidative muscle fibers in the skeletal muscles is one of the main predictors of the low blood pressure rates [4]. The high body mass index (BMI) is also associated with cardiovascular diseases, an increase in premature mortality, and a 30% higher risk of death from all causes, with an increase in BMI for every  $5 \text{ kg/m}^2$  [9]. Accordingly, any reduction in BMI will lead to the prevention of cardiovascular diseases and an





increase in life expectancy. Other studies showed that it is the excess subcutaneous adipose tissue that is strongly associated with the mortality rate due to cardiovascular diseases and all-cause mortality [8]. Later, Colpitts et al. [2] indicated that: 1) BMI is a strong predictor of the development of metabolic syndrome (with arterial hypertension as its factor); 2) to prevent further cardiometabolic risk, attention should be paid to the muscle quality (the growth of the oxidizing potential) rather than to the greater muscle gains. Several meta-analyses (Keating S.E., 2017; Wewege M., 2017) revealed that high intensity aerobic training (High Intensity Interval Training (HIIT)) can be an effective component of the body composition correction programs. Moreover, the meta-analysis of Viana et al. showed that it is HIIT that contributes to the reduction of the total fat mass by 28.5% as opposed to continuous aerobic training [10]. Besides, recent systematic reviews and meta-analyses (Costa E.C., 2018; Way K.L., 2019) showed that: 1) HIIT and continuous aerobic training (moderate-intensity continuous training) lead to a consistent decrease of blood pressure at rest in adults provisionally diagnosed with arterial hypertension; 2) HIIT is associated with a greater increase in maximal oxygen consumption (MOC) as opposed to moderate-intensity continuous training; 3) HIIT results in a significant reduction in the nighttime diastolic blood pressure as opposed to moderate-intensity continuous training; 4) HIIT leads to a greater decrease of the daytime blood pressure as opposed to moderate-intensity continuous training. At the same time, the effects that reduce blood pressure after trainings are more pronounced in those with a higher baseline blood pressure rate and under the influence of HIIT as opposed to the moderate-intensity continuous training [1]. However, it has not yet been established what is the main therapeutic factor in the blood pressure reduction, reduction of body weight (fat component), or cardio-respiratory and metabolic adaptation caused by HIIT.

**Objective of the study** was to conduct a comparative analysis of the effects of the growth of oxidizing potential of the working muscles and changes in the body composition on the blood pressure rates in hypertensive athletes from strength sports.

**Methods and structure of the study.** The study was carried out on the basis of the Sports Medicine Department of the Russian State University of Physical Education, Sport, Youth, and Tourism (RSUPESYT). Sampled for the study were 55 representatives of strength sports (powerlifters) of different qualifications (CMS, MS) and of heavy weight categories only (body weight –  $101.4 \pm 5.3$  kg). The athletes were randomly divided into two groups: Experimental ( $n=35$ ) and Control ( $n=20$ ). The mean age of the male athletes was  $31.0 \pm 7.3$  years. As re-

quired by the ethical standards in scientific research in the physical culture and sports sector in 2020, all subjects gave their voluntary written informed consent to participate in the study (extract from Protocol No. 5, meeting of the Ethics Committee of FSBEI HE "RSUPESYT" of 26.10.2017). The tasks set forth in the study were fulfilled using the following research methods: interview, inspection, 3-time blood pressure measurement, bioimpedansometry (bioelectrical impedance analysis), gasometric analysis, and mathematical statistics methods. Bioimpedansometry was performed using the "Medass - ABC-02" device (Russia) and was aimed to measure subcutaneous adipose tissue (%) and BMI ( $\text{kg}/\text{m}^2$ ). The step load test was performed on the cycle ergometer "MONARK 839 E" (Monark AB, Sweden). The initial load equaled 25 W, every 2 minutes the load increased by 20 W. The gasometric analysis was carried out using the gas analyzer "CORTEX" (Meta Control 3000, Germany) aimed to measure oxygen consumption and carbon dioxide emissions every inhale-exhale cycle. Heart rate and R-R intervals were registered using the heart rate monitor "POLAR RS800" (Finland). The test was performed at a rate of 75 revolutions $\times$ min<sup>-1</sup> until MOC and AnT were registered. The study also included self-monitoring of blood pressure according to the clinical guidelines developed by the Russian Medical Society on Arterial Hypertension (RMSAH) and approved at the session of the Plenum on November 28, 2013, and the Special-Purpose Cardiology Committee on November 29, 2013. The certified traditional automatic household tonometers were used for self-monitoring of blood pressure. Blood pressure was measured in the morning (7-8 a.m.). The subjects took 3 measurements with a minimum of 1-minute interval on the left hand. All the blood pressure rates were recorded in the table, the mean values were recorded in the archival data. The Experimental Group athletes were trained for 120 days (3 times a week) in accordance with the following protocol: the traditional strength training system was supplemented by the aerobic load (training on a cycle ergometer, 7 high-intensity intervals (with the pedaling power of 100% of MOC), 2 minutes each, and a low-intensity interval with the heart rate at the level of 85% of AnT, 2 minutes. The HIIT session lasted 28 minutes. The Control Group athletes were trained for 120 days (3 times a week) in accordance with the traditional strength training protocol.

**Results and discussion.** The 120-day intervention reduced the subcutaneous adipose tissue rates in the Experimental Group athletes by 2.6% and their BMI – by  $0.7 \text{ kg}/\text{m}^2$  ( $p < 0.05$ ). In the Control Group, these indicators did not change statistically significantly. Also, after 120 days of physical rehabilitation,

**Table 1.** Comparative analysis of blood pressure and body composition rates in athletes from strength sports

Group (n=55)	Subcutaneous adipose tissue, %		BMI, kg/m <sup>2</sup>		Systolic blood pressure, mmHg		Diastolic blood pressure, mmHg	
	0 Days	120 days	0 days	120 days	0 days	120 days	0 days	120 days
EG (n=35)	32.0±3.1	29.6±3.0	34.6±1.5	33.8±1.5	159.1±5.8	151.7±4.9	93.3±7.3	85.9±6.7
CG (n=20)	33.3±4.5	33.5±4.5	35.0±2.2	35.3±2.1	158.0±6.1	156.1±6.0	92.7±5.1	94.1±6.0

Note. EG - Experimental Group; CG - Control Group

**Table 2.** Gasometric test rates in athletes from strength sports

Group (n=55)	OC at the level of AnT, ml/kg/min			OC at the level of MOC, ml/kg/min		
	0 days	120 days	Δ	0 days	120 days	Δ
EG (n=35)	26.9± 2.5	30.8±1.8	3.9*	31.5±2.5	35.8±1.2	4.3*
CG (n=20)	26.3± 3.2	25.8± 3.0	0.5**	30.9±2.8	31.3±2.9	0.4**

Note. EG – Experimental Group; CG – Control Group; the asterisk (\*) on the right indicates the statistically significant differences between the indicators –  $p < 0.05$ ; \* –  $p > 0.05$ ; \*\*

the BR rates in the Experimental Group athletes decreased significantly: systolic blood pressure - by 4.7% and diastolic blood pressure - by 5.6% ( $p < 0.05$ ). In the Control Group, the blood pressure rates did not change statistically significantly (Table 1).

After 120 days of training, the oxygen consumption (OC) at the level of AnT and MOC increased significantly in the Experimental Group: by 14.5% and 13.6%, respectively. There were no statistically significant changes in the oxidizing potential of the working muscles in the Control Group (Table 2). The two-way analysis of variance (ANOVA) revealed that HIIT significantly reduces both systolic and diastolic blood pressure, with the difference significance level of 0.001 (significant at  $p = 0.0000004$  and  $0.0000004$  for systolic and diastolic blood pressure, respectively). The fat mass correction does not affect the degree of reduction of blood pressure, so the null hypothesis is not discarded.

**Conclusion.** The study found that the 120-day physical rehabilitation led to the reduction of the fat mass in the hypertensive athletes of heavy weight categories. A well-known BMI (or subcutaneous adipose tissue) reduction strategy, causing significant changes in the blood pressure, can be achieved through dietary interventions only, without physical exercise. However, we proved that HIIT, apart from the athlete's body composition, has a therapeutic and prophylactic effect on the cardiovascular system. The aerobic training protocol we developed based on the metabolic variables will help athletes to effectively and safely influence the

prevention and treatment of arterial hypertension. A further priority area is pedagogical work among athletes from strength sports aimed to include aerobic cycling trainings in the training protocols.

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# Monitoring of hemodynamic indices in elite athletes in conditions of time zone offset

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## Abstract

**Objective of the study** was to identify changes in the central hemodynamic indices in highly-skilled athletes after a flight across several time zones.

**Methods and structure of the study.** The study included an analysis of the functional state of the cardiovascular system in the female swimmers of the same age group who had the sports qualifications of Masters of Sport and higher. The subjects were examined after flying through several time zones to the training camps and three weeks after their stay outside their habitual time zone. The measurement logic and procedure are described in detail in this paper.

The athletes' reaction to physical loads was assessed based on the indicators and indices that reflect the state of both the adaptive and functional capabilities of the cardiovascular system. Moreover, to calculate these values, the data obtained from the biological rhythm evaluation should be sufficient and no load testing should be required.

**Results and conclusion.** Despite its controversy, the index method is quite informative and, with the right choice of estimates, facilitates a quick and cost-effective evaluation of the functional capabilities of athletes and their hemodynamic indices in particular. This makes it possible to plan the training tactics, which, in turn, makes it possible to achieve the maximum sports result at minimum "physiological" and health costs taking into account not only the influence of physical loads but also the effects of changes in the climatogeographic conditions and time zone offset.

**Keywords:** *functional capabilities, cardiovascular system, adaptive capabilities, physical loads, flight.*

**Background.** The cardiovascular system is known to be indicative of the adaptive reactions of the body to almost all environmental factors, including physical loads [2, 4]. It is its functional reserves that most often determine and limit the sports result, while the hemodynamic disorders become the first indication of inconsistent excess and distribution of physical loads while designing the training process [3]. Such inconsistency may lead to a reduction in the gain of the training experience and, as a consequence, sports result, as well as to the development of various undesirable syndromes. Any attempts to improve the result by intensifying the training loads in these conditions will lead to overtension and overtraining. That is why a quick, accessible, and timely assessment of the cur-

rent adaptive reserve and functional state of the body, especially hemodynamics, provides a trainer with the relevant information on planning the intensity and distributing the training loads. Among the indicators that objectively characterize the functional reserve of the athlete's body, the central hemodynamic indices are of the principal interest.

**Objective of the study** was to identify changes in the central hemodynamic indices in highly-skilled athletes after a flight across several time zones.

**Methods and structure of the study.** The study included an analysis of the functional state of the cardiovascular system in the female swimmers of the same age group who had the sports qualifications of Masters of Sport and higher. The



*Changes in the functional indicators of the cardiovascular system of the highly-skilled female athletes outside their geographic region and habitual time zone.*

Indicators	Before the departure	1st day of stay	2nd day of stay	3- day of stay
VT	3 ± 0.3	16 ± 1.7	17 ± 1.9	12 ± 1.4
FCI	2.66 ± 0.03	2.57 ± 0.04	2.50 ± 0.05	2.56 ± 0.04
TSC	96 ± 2.71	79 ± 2.88	82 ± 2.77	89 ± 2.90
CDC	1.61 ± 0.02	1.55 ± 0.04	1.56 ± 0.03	1.6 ± 0.04
CE	16.3 ± 1.19	14.3 ± 1.39	13.9 ± 1.21	14.0 ± 1.34
CEC	2600 ± 114	3036 ± 127	2880 ± 117	2835 ± 124
RI	66.9 ± 2.71	66.7 ± 2.87	62.7 ± 2.70	63.6 ± 2.69
	7th day of stay	14th day of stay	Before the departure	At home
VT	4 ± 0.7	2 ± 0.6	2 ± 0.6	-3 ± 0.4
FCI	2.60 ± 0.03	2.56 ± 0.04	2.52 ± 0.06	2.67 ± 0.04
TSC	95 ± 2.44	97 ± 2.51	98 ± 2.67	103 ± 2.51
CDC	1.74 ± 0.03	1.66 ± 0.02	1.73 ± 0.05	1.69 ± 0.03
CE	12.9 ± 1.13	14.8 ± 1.11	13.4 ± 1.31	15.5M ± 1.17
CEC	2867 ± 101	2501 ± 114	2552 ± 121	2542 ± 119
RI	64.5 ± 1.81	61.0 ± 1.71	58.6 ± 2.21	65.1 ± 2.19

subjects were examined after flying through several time zones to the training camps and three weeks after their stay outside their habitual time zone. The measurement logic and procedure are described in detail in this paper [1].

The athletes' reaction to physical loads was assessed based on the indicators and indices that reflect the state of both the adaptive and functional capabilities of the cardiovascular system. Moreover, to calculate these values, the data obtained from the biological rhythm evaluation should be sufficient and no load testing should be required.

The available data included: heart rate (HR), systolic (SBP) and diastolic (DBP) blood pressure, pulse (PP) and average dynamic (ADD) pressure, systolic volume (SV) and cardiac output (CO). Based on the daily average values of these indicators, we calculated: vegetative index of Kerdo ( $VT=(1-DBP/HR)\times 100$ ), index of functional changes in the circulatory system ( $FCI=0.011HR+0.014SBP+0.008DBP+0.014A+0.009BM-0.009H-0.27$ ), where A is age, years old; BM – body mass, kg; H - height, cm; type of self-regulation of circulation ( $TSC=DBP/HR\times 100$ ), circulatory deficiency coefficient ( $CDC=DBP/HR$ ), circulatory endurance coefficient ( $CE=HR/PP\times 10$ ), circulatory efficiency coefficient ( $CEC=(SBP-DBP)\times HR$ ), Robinson index or double product ( $RI=HR\times SBP/100$ ).

**Results and discussion.** The data obtained are presented in the table. Due to the abundance of the digital material, the table presents the milestone results only, as the remaining data did not differ statistically significantly from those reported.

The analysis of the dynamics of changes in the hemodynamic indices showed that the data obtained during the present study were similar to those obtained in the earlier studies. The female athletes were characterized by a fairly high adaptive reserve of the body, in spite of some degree of tension of the adaptation mechanisms reflected by the acceptable FCI value. They also had an excellent aerobic working capacity defined by the Robinson index (double product), because the lower the double product at rest the higher the maximum aerobic capacity and hence the adaptive and functional capabilities of the body. This is natural given the specialization of the female athletes, which is primarily aimed to train endurance.

However, with the high potential hemodynamic resources in girls, there is almost no resource economization, and this, again, is observed in a state of rest. The changes in the circulatory deficiency and efficiency coefficients indicated an increase in the energy expenditures on the blood flow. Nevertheless, these indicators were within the physiological norm and did not give cause for concern. In our case, a rather sharp decrease in the endurance rate (almost to the lowest level), which characterizes the level of preparedness of the cardiovascular system for physical loads indicated a significant decrease in the functional capabilities as a reaction to flight rather than the onset of fatigue, because the initial CE was within the norm. These values no longer restore, so such a pronounced decrease is associated not so much with the internal restructuring as with the changes in the central regulatory mechanisms. This is evidenced by



the sharp increase in the Kerdo index, which reflects the vegetative balance shift towards sympathicotonia, which inevitably leads to the functional tension and exhaustion of the bodily reserves. Such energy consumption may be varied, but in our case, it leads to the shift of tension in the circulatory system towards the heart, which significantly increases the strain on the heart, as evidenced by the change in the type of self-regulation of circulation. Competitive and training load planning in these conditions becomes particularly challenging, since this reaction may last for days.

**Conclusion.** The picture observed in the group of girls indicates that all changes in the circulatory system are the result of urgent adaptation of the autonomic regulation system. It is important to understand that the hemodynamic indices were assessed in the state of rest, which reflects a reaction not to the immediate physical load but to the time zone change. This makes it possible to assess the athlete's initial state and can and should therefore be used to plan training loads. The increase in the depth of breathing under intense physical loads is inevitably accompanied by a decrease in its frequency, which, in terms of the high HR caused by sympathicotonia, will lead to the disruption of the inter-system relationships between the motor and vegetative functions. In this case, the increased Hildebrandt coefficient will be a prognostic value of the physiological failure of the body to further perform intense physical loads.

Consequently, it is mandatory to take into account the effects of the time zone offset on the athlete's body, especially in event of changes in the regulatory status due to the latitudinal displacement. In some

cases, the negative effects of such displacement can be eliminated by means of well-constructed recreational activities. In other cases, there is a need for strict hemodynamic treatment of the bodily reaction to physical loads.

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# Ontokinesiological knowledgebase building professional physical training model for female police personnel

UDC 796.01



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## Abstract

**Objective of the study** was to analyze benefits of an ontokinesiological knowledgebase building professional physical training model for female police personnel of the Ministry of Internal Affairs of the Russian Federation.

The study analyzes a kinesiological resource and knowledgebase with its elements as the key progress factor for police personnel (of both sexes) training; gives a definition of 'police officer's kinesiological resource; categorizes and characterizes police officers by their kinesiological resource; and underlines the leading role of anthropic technologies in the kinesiological resource building process. Based on the study data, we offer a kinesiological resource knowledgebase building professional physical training model for police personnel as beneficial for the training process management efficiency.

The ontokinesiological resource knowledgebase building elements in the professional physical training service for female police personnel provide a sound framework for the professional physical training service design and management models for cadets and other groups of trainees in the Ministry of Internal Affairs educational system as it makes it possible to effectively excel the service-specific motor skills and qualities on an age-specific basis.

**Keywords:** *ontokinesiological approach, Ministry of Internal Affairs, female police personnel, physical fitness, adaptation, general physical fitness, special physical fitness.*

**Background.** Professional physical training system of the Ministry of Internal Affairs of the Russian Federation is geared to develop a range of professional service specific physical and mental qualities and skills, improve the health standards, and make the police personnel highly fit for the service missions and responsibilities. The human ontokinesiology basics developed by V.K. Balsevich define kinesiology as the key factor of individual activity with the muscular movement development and excellence elements to build up good health and physical fitness. We used this basic idea for the purposes of the study as the theoretical basis offered by the researcher makes it possible to develop a range of progressive methods and technologies to optimize individual health and physicality in every age stage [1, 2].

**Objective of the study** was to analyze benefits of an ontokinesiological knowledgebase building professional physical training model for the female police personnel of the Ministry of Internal Affairs of the Russian Federation.

**Results and discussion.** The professional physical training system applied in the police personnel trainings is geared to develop the professional service responsibilities, qualities and skills including: high psychological fitness; physical and mental stress tolerance with every biofunctional system well fit to stand the service pressures; endurance under high-intensity physical pressures; special motor skills; high service-specific energy costs; with all the above requiring excellent physical fitness for success of the service missions and responsibilities.



The kinesiological resource building elements in the female police personnel professional physical training will be designed to secure due general and special physical fitness for the whole multianual service period, with the female police officers required to pass the age-specific physical fitness tests as provided by the relevant departmental regulations. Modern professional physical training service will include, among other things, a sound ontokinesiological knowledgebase for the age-specific physical training service to be efficient in its every method and tool.

V.K. Balsevich defines kinesiological resource as the morphologically, functionally, biomechanically and psychologically sound and operable combination of qualities and skills for purposeful motor actions with certain quantitative and qualitative characteristics [2]. In application to the police service, kinesiological resource may be defined as the dynamic training system intended to secure progress in the key professional physical and psychological qualities and skills as required by the service-specific general and special physical fitness standards for success of the service missions.

Female police personnel is formally categorized by ages into the following groups: Group 1: 25-minus year-olds; Group 2: 25-30 year-olds; Group 3: 30-35 year-olds; Group 4: 35-40 year-olds; Group 5: 40-45 year-olds; and Group 6: 45-plus year-olds. Each of the age groups is required by the valid MIF regulations to pass general physical fitness tests and service-specific combat skills tests. In terms of the kinesiological resource building mission, we would categorize the female police personnel as follows:

Category 1: Full-time 18-25 year-old cadets and trainees plus the 18-29 years old recruits to the service with/ without special education qualified for the Police Officer Training Course. This category needs to fast develop the service-specific motor skills; adapt to the service environments including the service missions and responsibilities; and fully mobilize the individual genetic resource for physical progress and physical fitness. Internal individual physical progress resource needs to be mobilized in full for a balanced progress, adaptation and motor skills building for success of the training.

Category 2: 30-40 year-old police officers with/ without special education qualified for the Police Officer Training Course. Adaptation process of this category is often difficult and time-consuming and, hence, special physical training service may be beneficial for adaptation. Unless this category is permanently trained, its kinesiological resource will slowly and inevitably fall. It should be men-

tioned that the kinesiological resource should be prudently customized to the external environmental and social requirements [4], otherwise the individual internal resource may not be mobilized effectively.

Category 3: 18-45-plus year-old police officers (of both sexes) with special professional education that may be grouped into: (1) 18-29 year-olds and (2) 30-45-plus year-olds. Normally the 18-29 year-old group demonstrates well-developed controlled kinesiological resource; whilst the 30-45-plus year-olds are in need of customizable physical training services (including the body conditioning ones) to spur up their motivations for habitual physical activity. Individual physical and mental evolution with age is never immune from deterioration of physical qualities and motor skills in many aspects including strength, endurance, agility and flexibility; and it is quite common for physical activity and muscular strength to fall with age.

The kinesiological knowledge building education will give a special role to the anthropic technologies geared to develop the individual healthy values and priorities [3]. Professional adaptation is a key goal of a female police officer training service classifiable into the preparatory, professional adaptation and self-reliant progress stages [5]. Category 1 in this context needs a special adaptability facilitation service for the whole training period till recruitment to active service. Category 2 needs a special adaptation service for at least six months since recruitment to active service. And for Category 3 the adaptation service may be limited by the practical individual needs. For example, it may be extended for the female police officers with special family needs that force them to opt for family or career. Unless this conflict is sensibly resolved/ mitigated, they may be exposed to stress, emotional burnout, inferiority complexes etc. The adaptation facilitation service may be reasonably limited for the well-motivated women focused on professional progress and success.

Ontokinesiological knowledgebase on the whole helps excel and manage individual physical qualities and motor skills at every stage of ontogenesis, and this is the reason why it a due priority should be given to the modern professional physical training service by police cadets, trainees and active officers.

**Conclusion.** The kinesiological resource knowledgebase building elements in the professional physical training service for female police personnel provide a sound framework for the professional physical training service design and management models for cadets and other groups of trainees in the Ministry of Internal Affairs educational system as





it makes it possible to effectively excel the service-specific motor skills and qualities on an age-specific basis.

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# Law institute cadets' physical and health progress analysis

UDC 796.011.1



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## Abstract

**Objective of the study** was to analyze the law institute cadets' physical and health progress for the academic study period.

**Methods and structure of the study.** The study was run in 2016-2021 to cover the whole academic study period. We sampled the cadets of Putilin Belgorod Law Institute of the Ministry of Internal Affairs (n=82, including 35 females and 57 males). Health of the sample was rated by the G.L. Apanasenko Health Test set (1988), with the test data supported by the morbidity statistics reported by the academic Medical and Sanitary Service. Physical fitness of the sample was rated by the 10x10m shuttle sprint, 1km race, pull-ups (males) and 1-min sit-ups (females) tests.

**Results and discussion.** The study found the cadet's health varying in a wavelike manner for the study period, with growths in the strength indices and cardio-respiratory system functionality rates. The formal morbidity-related absenteeism statistics demonstrate virtually double progress for the study period. The physical fitness tests showed physical progress of the sample for the period that may be interpreted as indicative of the regular physical education service being beneficial for the cadets. The academic health, morbidity and physical fitness test and progress analyzing system was found important for the academic physical education service design and management purposes.

**Keywords:** *cadets, health, working capacity, physical education, physical training, education.*

**Background.** Training service provided by the educational system of the Ministry of Internal Affairs is diverse and challenging in many aspects to train a versatile specialist with profound knowledge of law, excellent physical fitness, tactical skills in criminality control domain, high mastery in using the service weapons and good physical and mental health standards for high performance throughout the whole professional career. The law enforcement personnel training system gives a special priority to the Physical Education discipline with a wide range of methods and tools to secure high physical fitness and mental performance in the training process and professional service [2, 3]. The Physical Education service is geared to shape up the key professional

qualities and skills with the well-trained responses to professional situations and challenges, fast decision-making abilities and high mental and physical stress tolerance [1, 5]. Individual progress of every cadet in the Physical Education service is tested by efficient physical fitness / health tests with academic morbidity analyses.

**Objective of the study** was to analyze the law institute cadets' physical and health progress for the academic study period.

**Methods and structure of the study.** The study was run in 2016-2021 to cover the whole academic study period. We sampled cadets of Putilin Belgorod Law Institute of the Ministry of Internal Affairs (n= 82, including 35 females and 57 males). Health of the

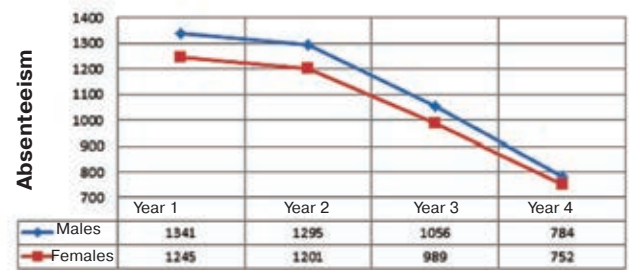


**Table 1.** Health test data analysis: female group

Year	Data	Kettle index	Points	Strength index	Points	Vital index	Points	Robinson index	Points	Post-20 -squats recovery time	Points	Total points	Health rate
1	Mean	20,95	0,14	48,92	0,71	45,62	0,43	76,21	3,00	1,50	3,00	7,29	Good
	Error	2,17	0,38	9,77	1,38	8,42	1,40	2,08	0,00	0,00	0,00	1,80	
2	Mean	21,42	0,14	44,99	-0,14	47,21	0,71	77,63	3,00	1,50	3,00	6,71	Satisfactory
	Error	2,19	0,38	4,58	0,38	11,60	1,70	2,45	0,00	0,00	0,00	1,80	
3	Mean	20,16	-0,25	53,49	1,25	40,25	0,29	68,75	2,14	1,30	3,00	6,13	Satisfactory
	Error	1,86	0,46	10,05	1,58	17,23	1,11	29,84	2,67	0,00	0,00	3,48	
4	Mean	20,39	-0,14	49,94	0,43	46,05	0,71	79,20	3,00	1,50	3,00	7,00	Good
	Error	2,19	0,69	11,14	1,62	4,19	0,95	0,00	0,00	0,00	0,00	1,63	

sample was rated by the G.L. Apanasenko Health Test set (1988), with the test data supported by the morbidity statistics reported by the academic Medical and Sanitary Service. Physical fitness of the sample was rated by the 10x10m shuttle sprint, 1km race, pull-ups (males) and 1-min body bending (females) tests.

**Results and discussion.** The morbidity-related absenteeism data analyses found the highest morbidity rates in the beginner training period – that may be due to the natural transitional challenges faced by the former schoolchildren entering the university. Given on Figure 1 hereunder is the morbidity-related absenteeism statistics reported by the academic Medical and Sanitary Service. Note that the morbidity sharply falls since the third year, with the senior cadets falling sick twice as seldom as the first-year ones.



**Figure 1.** Morbidity-related absenteeism statistics

The gender difference in morbidity/ absenteeism statistics may be due to the shorter number of females in the sample. Given in Tables 1 and 2 is the detailed analysis of the gender-specific health test data.

**Table 2.** Health test data analysis: male group

Year	Data	Kettle index	Points	Strength index	Points	Vital index	Points	Robinson index	Points	Post-20 -squats recovery time	Points	Total points	Health rate
1	Mean	21,32	-0,38	63,33	0,08	57,15	1,00	83,08	3,00	1,00	5,00	8,69	Good
	Error	1,83	0,65	8,08	1,32	8,15	1,29	3,33	0,00	0,00	0,00	2,02	
2	Mean	22,35	0,00	65,59	0,57	60,96	1,07	85,20	0,43	1,00	5,00	7,07	Good
	Error	1,65	0,39	7,02	1,22	11,99	1,49	2,62	1,09	0,00	0,00	2,40	
3	Mean	23,83	0,30	60,16	0,00	57,97	1,20	84,00	3,00	1,00	5,00	9,00	Good
	Error	2,08	0,48	6,72	1,15	6,87	1,14	0,00	0,00	0,00	0,00	2,27	
4	Mean	24,38	0,22	63,82	0,00	57,78	1,11	84,00	3,00	1,00	5,00	9,50	Good
	Error	2,18	0,67	11,42	1,58	11,01	1,54	0,00	0,00	0,00	0,00	2,27	

**Table 3.** Physical fitness test rates

Test	Female group, years				Male group, years			
	1	2	3	4	1	2	3	4
10x10m shuttle sprint, s	29,88±0,2	29,69±0,3	29,02±0,2	28,98±0,24	26,25±0,26	26,52±0,24	26,31±0,2	25,67±0,3
Mean points	5±0,13	5±0,08	4,91±0,09	4,91±0,09	3,85±0,27	3,42±0,26	3,35±0,2	4,09±0,3
1km race, s	4,29±0,1	4,19±0,06	4,08±0,11	4,05±0,08	3,26±0,05	3,22±0,03	3,31±0,1	3,29±0,1
Mean points	4,36±0,27	4,42±0,15	3,85±0,25	4,18±0,23	4,08±0,24	3,83±0,24	3,73±0,2	3,6±0,27
Pull-ups/ sits, reps	31,27±1,6	32,24±2,3	36,33±0,7	36,4±1,3	16,17±1,4	14,73±1,1	14,5±0,5	16,09±0,7
Mean points	4,82±0,18	4,91±0,21	3,92±0,23	2,8±0,25	4,75±0,18	4,82±0,12	4,2±0,29	4,18±0,3

The above table demonstrates the females' health rate changing in a wavelike manner for the study period, starting from 7.29±1.80 points in year 1 and falling to 6.13±3.48 points in year 3, with some growth to 7.00±1.63 points thereafter in year 4, with account of the overall fall in the morbidity rates.

The male group was also tested with fairly good health in year 1 rated by 8.69±2.02 points with some sag thereafter followed by another growth to 9.50±2.27 points in year 4 – mostly due to the growth in the strength indices, Robinson and Kettle indices.

A special priority in the study was given to the physical fitness tests since the law enforcement service sets high physical fitness standards for the personnel. Given in Table 3 are the physical fitness test data of the sample. It should be noted that the valid regulations regrettably require no flexibility and movement coordination tests in trainings.

The physical fitness variation analysis shows notable albeit moderate progress in absolute physical fitness rates for the study period. Note that the physical fitness scores actually fall year-to-year since the yearly physical fitness benchmarks grow, although no falls in the absolute physical fitness were found for the study period. The absolute smooth physical fitness growth for the study period may be interpreted as indicative of the regular Physical Education service being beneficial for the cadets.

**Conclusion.** The study found the cadet's health varying in a wavelike manner for the study period, with growth in the strength indices and cardio-respiratory system functionality rates. The formal morbidity-related absenteeism statistics demonstrate virtually double progress for the study period. The physical fitness tests showed physical progress of

the sample for the period that may be interpreted as indicative of the regular Physical Education service being beneficial for the cadets. The academic health, morbidity and physical fitness test and progress analyzing system was found important for the academic Physical Education service design and management purposes.

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# Chess training system digitalization process analysis

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## Abstract

**Objective of the study** was to analyze the evolution of digital transformation of the types, tools, and methods of chess training that not only help achieve high sports results but also create, in terms of inclusive environment, effective conditions for the development of a harmoniously developed and socially responsible personality.

**Methods and structure of the study.** We conducted a content analysis of the decrees, acts and federal laws, regulatory documents of the Ministry of Sports of the Russian Federation, the World Chess Federation and the Chess Federation of Russia, the Digital Economy Development Fund, the Center for Strategic and International Studies that regulate the social practice of digitalization of the state sports training system as a key component of management transformation in the physical education and sports domain. We also generalized the first-hand and foreign scientific and practical experience of transformation of the training and competitive activities of chess players with the help of the artificial intelligence, cloud and IT architecture (including cybersecurity). The study was conducted at the premises of the Russian State Social University and other sports institutions.

**Results and conclusions.** The periodization of digital transformation of the chess training system based on the structural changes was presented. It should be noted that the explosive growth of digital transformation over the past twenty years has radically transformed the system of sports training in terms of all its components. Digital transformation of sports training based on the information and communication technologies, use of the synergistic potential of the artificial intelligence, cloud and information and communication architecture in achieving the necessary level of cybersecurity of the training outcome, which successfully implements a socio-educational function, makes it possible to unlock the intellectual and activity potential of a chess player, transform it into a sports result, and strengthen the image of chess sport.

**Keywords:** chess sport, digital transformations, artificial intelligence (AI), digitalization, chess training system, information and communication technologies, computerized learning.

**Background.** Modern chess training system may be defined as the complex multisided service determined by the sport positioning, national traditions and national and global progress trends. Presidential Decree “On the national progress goals of the Russian Federation for the period up to 2030” mentions digital transformations in the national economy and social sector including health, sports and education systems and ranks them among the key policy priorities [6]. It may be pertinent to consider at this juncture, in the context of the mainstream national policies and modern global

chess movement progress trends, the recent landslide advancement of the digital transformations in chess sport [2].

Presently the digital transformations in the national physical education and sports sector is clearly influenced by the COVID-19 pandemic and the related deepening economic crisis. The International Olympic Committee (IOC) had to cancel the 2020 Summer Olympic Games in Tokyo and virtually every other summer and winter event in 2020. The situation offers, however, a window of opportunities for chess as an intellectual sport (as



defined by the IOC) that has in fact made a successful revolutionary transition from the offline to online reality. In 2020, the International Chess Federation (FIDE) deployed the Chess.com high-tech platform with freemium accounts and initiated an online World Chess Olympiad with 163 national teams and more than 1,500 competitors including the ones with disabilities [8].

**Objective of the study** was to consider the ongoing digital transformations in the chess training system and their benefits for the chess sport progress, popularity and accomplishments in many aspects including equal and inclusive opportunities that secure harmonized and socially responsible progress for everyone in sport.

**Methods and structure of the study.** We analyzed, for the purposes of the study, the physical education-and-sports-related decrees, federal laws, legal and regulatory documents of the Strategic Research Center of the Russian Federation and Digital Economy Development Foundation [6, 7]. Of special interest was an analysis of the Physical Education and Sports Sector Digitalization Concept developed by the Ministry of Sports for the period 2019-2024, in the context of the sports training systems and physical education and sports management reforms [4]. We also made a systematic analysis of the valid regulatory and legal provisions of the Russian Chess Federation and FIDE with concern to the chess training system based on the global chess movement progress analyses [5]. We generalized the relevant policy documents, archive materials, study reports on the chess training system and systematized our own practical training and coaching service digitalization experiences having implemented the digital training technologies at the

Russian State Social University's Chess House [1-3]. It should be mentioned in this context that Russian State Social University task force is developing a digital eco-platform "World Chess Class Digital" viewed as a client-sensitive social project.

**Results and discussion.** The chess training system digitalization process is driven by the following resources, models and concepts: B. Skinner's programmed teaching concept; P.Y. Galperin's intellectual progress and concept staged formation model; W. Stern psychographing method; computerized chess training methods by A. Turing, C. Shannon, M.M. Botvinnik and G.K. Kasparov; growing modern AI/ IT/ communication/ cloud technologies by F. Rosenblatt, D. Rumelhart, D. Hassabis, M. Lai etc. [1]. It should be emphasized that the ongoing chess training system digitalization is advanced by the synergized IT/ communication, cloud and BigData technologies applied in the relevant chess databases including ChessBase and ChessAssistant, plus resources of the modern AI "AlphaZero" and neural networks [3]. Note that the modern chess training system digitalization process secures the online environments effectively complementing the offline ones rather than opposing them. Given in Table 1 hereunder is the chess training system digitalization history analysis.

Our own coaching and teaching experience accumulated at the Chess House of Russian State Social University gives us the grounds to believe that the modern chess training system digitalization technologies secure fast individual progresses with special benefits for the personality development agenda and equal progress opportunities in the sport. The radical ongoing digitalization of the chess training system methods, models and tools has heavily contributed to the amazing progress of

**Table 1.** Chess training system digitalization history analysis: key points

Period	Innovations	Applications	Developers
1985 till now	ChessBase project	BigData service for chess training system and tournaments	ChessBaseGmbH, Germany
1991	World Wide Web project	Chess trainings and competitions	Berners-Lee, United Kingdom
1996 till now	ChessAssistant project	BigData service for chess training system and tournaments	Convekta, Ltd, Russia
1996- 1997	DeepBlue vs. World Champion Match	3.5- 2.5 win byDeepBlue	IBM, Japan
1996 till now	Chess play-and-learn software projects	Chess trainings and competitions	ChessBaseGmbH, Germany; Convekta, Ltd, Russia
1999 till now	Chess game portals	ICC; PlayChess; Chess Planet; Chess.com for chess trainings and competitions	USA, Germany, Russia
2017 till now	AI AlphaZero project	BigData service for chess training system and tournaments	DeepMind, USA
2020	Magnus Carlsen Chess Tour: global online event	Chess tournament in a digital environment	International Chess Federation, Magnus Carlsen



the chess sport at Russian State Social University. This social formally unisporting university has lately been very successful in training many gifted chess players including the national team members.

The ongoing chess training system digitalization process, however, needs to be further supported by the Ministry of Sports by extensive regulatory provisions with the road maps for the Federal Sports Training Standards revision in application to chess. The valid FSTS approved in 2015 has outdated since then with their archaic chess training system that needs being digitalized in every its element [2]. Regrettably, the theoretical and practical provisions for the chess training system digitalization process in the Chess Sport Development Program of the Russian Federation for the period up to 2024 are limited by only the cheating control provisions for chess tournaments.

**Conclusion.** The chess training system digitalization service with its IT/ communication, AI, cloud and cyber security components and benefits for the inclusive social and educational services offers great opportunities for an individual intellectual resource mobilization for progress and success in modern chess sport. The persistent efforts to improve the available online chess play-and-learn systems with the relevant cloud/ IT/ communication services has fast simplified the chess training system process and made it more efficient. Progress of the chess training system digitalization service, however, is still limited by the shortage of top-skilled training personnel having the modern digital competencies testable by the relevant test systems (KPI). It is a high time for the Ministry of Sports to create the relevant ITC and cloud service registers. The national academic education system should take efforts to renew and complement the chess training service by modern digital training and progress test elements. The efforts to train the chess sport reserve need to be facilitated by the Federal Sports Training Standards revisions in the context of the modern chess training system digitalization trends and the global and national economic and epidemiological situations.

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# Elite sports: mission, resource and progress survey and analysis

UDC 796.011.1



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## Abstract

**Objective of the study** was to highlight the key social problems faced by the modern elite sports in the context of the global social trends with their contradictions and conflicts.

**Methods and structure of the study.** The study was designed to analyze the key negative factors of influence on the modern elite sports on the whole and their socio-cultural mission in particular using the following research methods: discourse analysis; analysis of the reference study reports; verification analyses; interviews and a questionnaire survey. We sampled for the interviews reputed physical education and sports experts (n=50) with 10-plus-year practical experiences; and the 1-year Russian State University of Physical Education, Sports, Youth and Tourism master students (n=58) majoring in the Elite Sports and Training Systems discipline under the academic Sports curricula.

**Results and discussion.** Modern elite sports may be ranked among the key social progress phenomena as they are increasingly attractive for many people the world over. Their progress, however, is riddled with multiple and growing negative trends and problems that may undermine their global popularity and entertainment aspects with time. It may be stated with confidence that the modern elite sports tend to divert from their socio-cultural mission to evolve into a global business product with the bets and national accomplishments determined rather by pressures from influential global political powers than the traditional fair-play and let-the-best-win principles. Their social problems are rather mounting than being addressed and solved. It should be mentioned that the modern sports are totally different from those in the late XIX and early XX century in the essential contents, social functions, competitiveness, newly emerged gender issues, mounting pressures from influential political powers and many other serious aspects.

**Keywords:** *sports, values and priorities, social problems, doping, sports theory.*

**Background.** Modern elite sports are not immune to many social problems as they go through the turbulent period that may potentially result in their imminent crisis and decline in the near future – unless the global sport community takes persistent and well-coordinated efforts to prevent their deterioration trends in the new century and settle the growing conflicts. A special role in these efforts should undoubtedly be played by the sports science on the whole and multidisciplinary studies in particular to comprehensively explore the problematic issues and find the best ways out of the mounting crisis.

**Objective of the study** was to highlight the key social problems faced by the modern elite sports in

the context of the global social trends with their contradictions and conflicts.

**Methods and structure of the study.** The study was designed to analyze the key negative factors of influence on the modern elite sports on the whole and their socio-cultural mission in particular using the following research methods: discourse analysis; analysis of the reference documents; verification analysis; interviews and a questionnaire survey. We sampled for the interviews reputed physical education and sports experts (n=50) with 10-plus-year practical experiences; and the 1-year SCOLIPE master students (n=58) majoring in the Elite Sports and Training Systems discipline under the academic Sports curricula.





**Results and discussion.** The study data were grouped into the following categories: “Sports in modern social perceptions”; “Young people’s attitudes to the youth Olympic movement”, and “Actual social problems of the elite sports “.

#### Sports in modern social perceptions

Sports have long been ranked among the key factors of influence on the national positioning, assertion and recognition in world community although this mission is lately being questioned and revised. It should be above all underlined that that the Russian population enthusiastically supports the national athletes competing in the top-ranking international events to demonstrate thereby its high patriotism. Attempts to ban the national team from competitions in the 2018 Olympics in Pyeongchang were perceived by many with concern albeit most still believed that the Games should not be boycotted. As reported by Levada Center, most of the respondents wanted the team to compete (71%), and only 20% expected the Olympic Games being boycotted [6]. This position of the national majority appears constructive enough as the people appear to appreciate the genuine mission and meaning of the Olympic Games ideally considered free of any political agenda; to give athletes an opportunity to prove themselves on sports arenas in fair competitions and encourage constructive and peaceful dialogue and cooperation of nations and continents. Many people live a fairly pragmatic life, with their well-being dependent rather on the domestic policies and practices than successes on the global sports arenas, with a special priority given to economic progress, prosperity and efforts to level down social stratification [5].

Despite the generally enthusiastic attitudes to the national successes in the major events, people’s opinions on elite sports and their health effects are more cautious if not negative. Opinion that ‘professional sports destroy health’ was fully supported by 30% of the sample and supported with reservations by 39% [2]. These beliefs appear reasonable enough since the modern elite sports welcome only absolutely healthy people physically and mentally highly fit for enormous pressures on the verge of natural human abilities and resources. However, many families still support their children willing to become professional athletes, with 51% of the sample welcoming their elite sports careers and 38% opposing them. This support may be fueled by the widespread belief that elite sports are rather beneficial and promising in terms of incomes and global popularity, with 55% of the sample found to believe in high incomes in modern elite sports [4].

#### Youth attitudes to the youth Olympic movement

Any elite sports / Olympic sports analysis cannot ignore their social connections with the youth Olympic movement [1]. Our questionnaire survey offered the

sample to share their ideas on how the Youth Olympic Games format may be improved. Most of the sample (85%) suggested the cultural and educational components of the Youth Olympic Games being expanded and advanced by the relevant sports and Olympic movement history programs with conferences, symposia, contests, Olympic quizzes, quests, etc.

#### Social problems of elite sports

Our study highlighted the following key social problems faced by modern elite sports.

*Doping issues* may not be limited by the doping code violations by some national teams with the relevant ethical considerations, since the progress of the global industry of illegal medicines cannot be ignored in this context. It is only natural that the traditional sporting ethical norms and principles are increasingly ranked secondary to the doping-propelled competitive accomplishments, wins, financial profits and other benefits.

*Therapeutic exclusivity* issues are the cases when some athletes are allowed taking performance enhancement medications on doctor prescriptions whilst the others are stained by arbitrary doping charges when take them. The sports community increasingly reports these cases. There is still a question whether or not the therapeutic exclusivity issues are really significant, and what are their actual contributions to the competitive accomplishments?

*Global political situations* are often difficult and controversial enough to notably hamper progresses in elite sports. Some countries strive to be as exclusive and dominant in sports as they are in politics and economics. With the ongoing globalization in many fields and regions, modern sports are increasingly viewed as footholds or experimental grounds to test new enforcement or soft-power technologies to force the opposing nations accept the policies and ideologies viewed as the only possible and productive by the leading ‘exclusive’ nations.

*Transgender issues* of the modern sports are due to the transgender people’s invasion in youth sports. In the US, for example, families of junior female competitors require their transgender peers being banned from events and sports on the whole for the transgender rivalry, as they believe, deprives their children, and natural athletes on the whole, of a chance to win [3]. It has become quite common for male athletes to change their gender to qualify for women’s competitions. These efforts, unless they are stopped, may cause the traditional women’s sports to stall if not break down with time.

Experts have mentioned some other social problems of modern elite sports including the technical and genetic doping issues; natural limitations of human bodily abilities; fast professionalization of the global elite sports; IOC and WADA influences (that



may encourage unity or fuel conflicts); Internet technologies; social networks in sports, etc.

**Conclusion.** Modern elite sports may be ranked among the key social progress phenomena as they are increasingly attractive for many people the world over. However, their progress is riddled with multiple and growing negative trends and problems that may undermine their global popularity with time. It may be stated with confidence that modern elite sports tend to divert from their socio-cultural mission to evolve into a global business product with the bets and national accomplishments determined rather by pressures from influential global political powers than the traditional fair-play and let-the-best-win principles.

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# Anti-doping training model for university athletes as sporting culture building element

UDC 796.06



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## Abstract

**Objective of the study** was to test benefits of a new anti-doping education model for economic university athletes. Methods and structure of the study. The anti-doping education model testing experiment was run at Plekhanov Russian University of Economics in cooperation with RUSADA. The model offered lectures in anti-doping theory, practical workshops and progress tests. On the whole for 2018-2020 the anti-doping education course was completed by the 3353 university athletes aged 18-12 years from the 1-3rd year flows of the Plekhanov Russian University of Economics.

**Results and conclusion.** Having analyzed the survey data, we found 91.3% of respondents holding to the following doping explanations: competitive failures, belief that doping is an integral part of modern sports, neglect of health risks, and pressure from coach, family and friends. Therefore, the psychological and pedagogical anti-doping service to athletes shall be ranked on top of the modern sports priorities. The progress tests, questionnaire survey and anti-doping education model tests showed benefits of the anti-doping training for sporting university students in the anti-doping culture formation and healthy lifestyle promotion domains.

**Keywords:** doping, anti-doping culture, questionnaire survey, university sports.

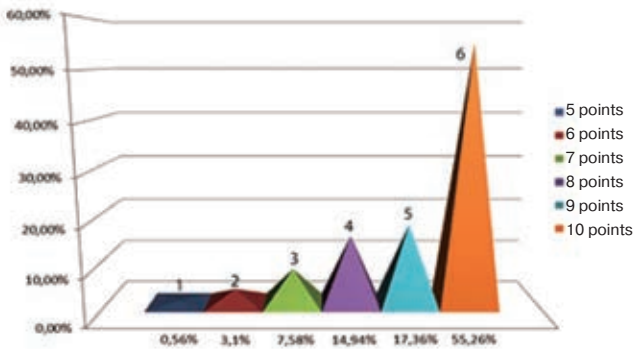
**Background.** Global anti-doping initiatives are relatively new as they were formally started since the first World Anti-Doping Code (WADC) was adopted in 2003, and this may be one of the explanations for the still poor doping awareness in athletic communities, sports clubs, federations and physical education and sports institutions – that need to be persistently updated on the key anti-doping provisions and potential liability for violations of the valid anti-doping codes. In 2021, a new WADA Education Standard came into force to facilitate the anti-doping culture building initiatives in sports. This is the reason why the modern anti-doping education system reports a growing need for new theoretically grounded anti-doping education methods.

**Objective of the study** was to test benefits of a new anti-doping education model for economic university athletes.

**Methods and structure of the study** The anti-doping education model testing experiment was run at Plekhanov Russian University of Economics in cooperation with RUSADA, with the Physical education Department faculty trained and certified by RUSADA for anti-doping education service to sporting students. The model offered lectures in anti-doping theory, practical workshops and progress tests. The *theoretical course* offers the following topics: “Anti-doping movement history”, “Russia’s contribution to international sports and Olympic movement”, “Global Olympic movement as university sporting culture formation factor”, and “Student sports history, progress and present situation”. And the *methodological and practical course* includes: “Anti-doping rules”, “Doping control procedure”, “Family role in the AC formation process”, and “Doping control psychology in sports”. The *progress tests* were run

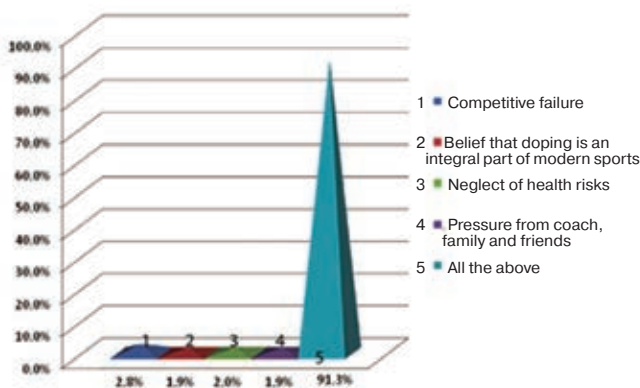
in the relevant Google format upon completion of every topic, followed by an online training and certification by RUSADA. On the whole for 2018-2020 the anti-doping education course was completed by the 3353 university athletes aged 18-12 years from the 1-3<sup>rd</sup> year flows of the Plekhanov Russian University of Economics.

**Results and discussion.** Given on Figures 1 and 2 are the anti-doping knowledge test data of the sample.



**Figure 1.** Anti-doping knowledge test data of the sample

It should be mentioned that: (1) 2435 students (72.62%) were tested excellent on the anti-doping knowledge scale scoring 9-10 points; (2) 755 students (22.52%) were tested good and satisfactory with 7-8 points; and; (3) 163 students (3.66%) were tested low and poor with 5-6 point scores. We also profiled the key reasons for doping in sports from the anti-doping educational and psychological service standpoints: see Figure 2.



**Figure 2.** Reasons for doping in sports reported by the sample

Having analyzed the questionnaire survey data, we found 91.3% of the sample giving the following doping explanations: competitive failures, belief that doping is an integral part of modern sports, neglect of health

risks, and pressure from coach, family and friends. Therefore, the psychological and pedagogical anti-doping service to athletes shall be ranked on top of the modern sports priorities.

**Conclusion.** Global communities are increasingly concerned with the doping issues in sports and, hence, the demand for modern anti-doping education service in the national physical education and sport sectors has been growing lately. Our questionnaire survey and anti-doping education model tests showed benefits of the anti-doping training for sporting university students in the anti-doping culture formation and healthy lifestyle promotion domains.

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# Future physical education teacher: self-reliant professional progress agenda formation model

UDC 37.02



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## Abstract

**Objective of the study** was to offer and experimentally test benefits of a future physical education teacher's SRPP agenda building model recommended as complementary to the standard university physical education curricula.

**Methods and structure of the study.** The future physical education teacher's self-reliant professional progress agenda may be interpreted as the self-activation process geared to secure spiritual and ethical development on an integrated basis, to attain new personality qualities for professional success. The future physical education teacher's self-reliant professional progress agenda may be presented as composed of motivations, values and cognitive, operational and reflexive analyzing components. The new model testing experiment was run at Physical Education, Sports and Life Safety Institute of I.A. Bunin Yelets State University in 2016-2019. We sampled for the study the 2-4-year students (n=65). Progress in the model testing experiment was rated by the K. Zamfir's Teaching Motivations Test adapted by A. Rean; cognitive component rating test; operational component test; and the reflexive analyzing component test.

**Results and conclusion.** The physical education teacher's self-reliant professional progress agenda formation service is recommended being based on the following organizational provisions: pedagogical support in the professional skills building process using an incentives and motivation system and a competitive environment; immersion of future physical education teachers in the self-reliant professional progress agenda formation process; involving students in joint creative activities to help them mobilize the personality and professional resource for progress; and due emphasis on the reflexive analyzing competencies building in the future physical education teachers for own progress rating and correction.

**Keywords:** *personality, physical education teacher, self-reliant professional progress, self-fulfillment, self-reliant professional progress agenda.*

**Background.** Modern academic physical education system gives a high priority to the self-reliant professional progress agenda formation in the future physical education teacher to meet the growing social demand for qualified, creative and competitive teaching service for high quality education. The future physical education teacher's self-reliant professional progress agenda formation issues have been addressed by foreign and national researchers. Thus T.V. Kiseleva, L.M. Mitina, O.V. Moskalenko et al argue that a professional progress is inseparable from the personality growth since they

both prioritize the self-development goals in the teacher's creative self-fulfillment process [3, 4, 6, 7]. A.V. Batarshv, I.V. Vasyutenkova, I.S. Makariev, O.V. Moskalenko and I.Y. Stepanova connect the professional and personality progress with basically the self-development processes and with the pedagogical resource mobilizing for constructive professional and creative growth so that own uniqueness is effectively employed for success in the teaching career [1, 2, 5, 8].

Based on a theoretical analysis of the concept, the future physical education teacher's self-reliant



professional progress agenda may be interpreted as the self-activation process geared to secure spiritual and ethical development on an integrated basis, to attain new personality qualities for professional success. The future physical education teacher's self-reliant professional progress agenda may be presented as composed of motivations, values and cognitive, operational and reflexive analyzing components.

*Motivations and values* may be defined as the individual array of needs and motives for and beliefs in constant self-improvement hard work to advance the personality qualities and professional skills; with a complex of factors and aspects that mobilize the individual for progress in mastering the physical education and sports theory and practice, build up practical abilities and skills, and get proficient in modern physical education and sports / rehabilitation technologies.

*Cognitive component* implies the future physical education teacher competences in physical education and sport service, pedagogy and methodology with abilities to design and manage the professional service knowing the basic self-reliant professional progress concepts, categories, logics and principles.

*Operational component* includes a set of progress testing and analyzing, design, management and communicative skills for the physical education teacher being fully fit for the physical education and sports service design and management using a wide range of modern physical education and sport / rehabilitation technologies.

And the *reflexive analyzing component* implies understanding and assessment of own self-reliant professional progress for professional success, with timely and efficient revisions of own behavior, errors and physical education and sport service standards when necessary.

**Objective of the study** was to offer and experimentally test benefits of a future physical education teacher's self-reliant professional progress agenda building model recommended as complementary to the standard university physical education curricula.

**Methods and structure of the study.** The new model testing experiment was run at Physical Education and sport and Life Safety Institute of I.A. Bunin Yelets State University in 2016-2019. We sampled for the study the 2-4-year students (n=65) majoring in physical education specialty under 44.03.01 Pedagogical Education (bachelor level) discipline; and split up the sample into Experimental and Reference Groups (EG, n=31; RG, n=34).

A progress test set for the future physical education teacher's self-reliant professional progress agenda rating included: K. Zamfir's Teaching Moti-

ations Test adapted by A. Rean [5]; cognitive component rating test; operational component test; and the reflexive analyzing component test. The new future physical education teacher's self-reliant professional progress agenda formation experiment offered the following organizational provisions for the future physical education teacher's self-reliant professional progress agenda formation model.

*Provision one:* pedagogical support of the future teacher's self-reliant professional progress driven by a system of incentives and motives in a competitive environment viewed as a trigger for the individual resource mobilizing, creative self-development and professional success.

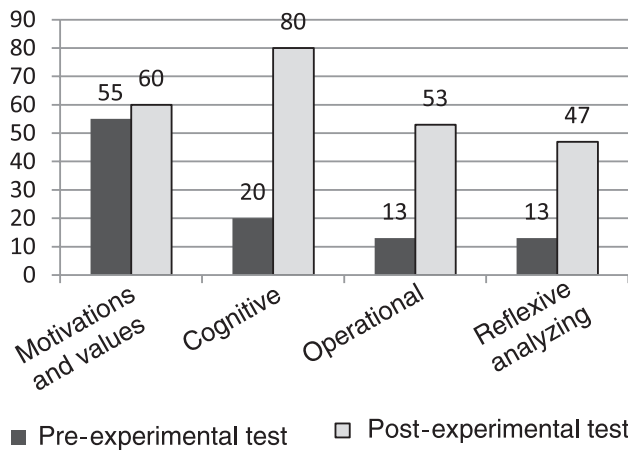
*Provision two:* immersion of the future physical education teacher in the self-reliant professional progress agenda building process; with the stepped-difficulty practical training tasks (including case studies, business games, etc.) to advance the general pedagogical and professional competencies and accumulate the basic professional service experience. Such tasks will be formed using the freely accessible learning materials available on the relevant professional education sites plus materials provided by partner educational organizations.

*Provision three:* involving students in joint creative activity to help them mobilize resource for the personality and professional growth, with the joint creative activity geared to contribute to the professional training quality with a variety of efficient tools including dialogues with collective experience building and analyzing elements. Training groups will be formed in different manners – arbitrarily by some lists; on a homogeneous or heterogeneous basis (by the competence/ fitness levels); on sympathies to formal/ informal leaders, etc. – to facilitate progress in communicative skills and experiences. Such groups will delegate roles and responsibilities, discuss different views, join and share knowledge and skills, etc., with the joint creative activity effectively shaping up the professional communication skills to form a basis for self-development, effective learning and self-improvement.

*Provision four:* systemic progress tests to correct the future physical education teacher's self-reliant professional progress agenda building process, with a special priority to the reflexive progress rating tools including case studies of professional success histories. For example, after a case study or a practical task, students will analyze their solutions versus the peer/ trainer solutions using the above learning materials available in databases. Purposeful training of reflexive analyzing skills will facilitate progress in the professional decision-making for success in the future teaching service and in professional communication skills for a constructive teamwork, shar-

ing of practical experience and addressing specific pedagogical situations.

**Results and discussion.** Given on Figure 1 hereunder are progress test data yielded by the future physical education teacher's self-reliant professional progress agenda formation model testing experiment.



**Figure 1.** EG progress test data yielded by the future physical education teacher's self-reliant professional progress agenda formation model testing experiment

A comparative analysis of the pre- versus post-experimental progress test data found the following: (1) EG made significantly better progress than the RG in virtually every component of the future physical education teacher's self-reliant professional progress agenda formation training – to demonstrate benefits of the new model; (2) In motivations and values component the group progress was the lowest that may be due to the relatively high pre-experimental score of the sample on this test scale.

The RG was tested with significantly lower progress in the future physical education teacher's self-reliant professional progress agenda formation training, particularly in the cognitive (plus 18%) and reflexive analyzing (plus 11%) domains – that means that the university shall take focused efforts to advance its training standards in the future physical education teacher's self-reliant professional progress agenda formation service.

**Conclusion.** The physical education teacher's self-reliant professional progress agenda formation service is recommended to be based on the following organizational provisions: pedagogical support in the professional skills building process using an incentives and motivation system and a competitive environment; immersion of the future physical education teachers in the self-reliant professional progress agenda formation process; involving students in joint creative activities to help them mobilize the personality and professional resource for progress; and due emphasis on the reflexive analyzing competences building in the future physical education teachers for own progress rating and correction.

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# Sports-prioritizing student self-management model for progress of academic mass sports

UDC 796.034



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## Abstract

**Objective of the study** was to theoretically substantiate and offer for practical application an sports-prioritizing student self-management model customizable for academic environments.

**Results and discussion.** Presently the national government supports every constructive sports-prioritizing student self-management model, with the student communities actively involved in every management process to become responsible parties to the decision making on the key issues of university life and social activity. The developed sports-prioritizing student self-management model discussed herein includes objectives, methodologies (with the key approaches and principles), contents (service areas), toolkit (instruments and service provisions); and deliverables (i.e. mass sports progress rated by quantitative and qualitative criteria). It is important that the sports-prioritizing student self-management activity, to be efficient, shall be encouraged by every contributor in productive cooperation with the academic physical education department and sport clubs to explore and mobilize every progress opportunity for mass sports at university.

**Keywords:** modeling, sports-prioritizing student self-management model, progress of mass sports, physical education and sports.

**Background.** Lately the national universities have taken persistent efforts to reverse the health deterioration trend in the student communities by the initiatives to encourage healthy and sporting lifestyles. A special role in these initiatives has been given to the academic mass sports encouragement policies in the context of Federal Law No. 329-FL of 04.12.2007 “On Physical Education and Sports in the Russian Federation” that defines mass sports as the “sports domain which mission is to facilitate popular physical education and physical progress by a variety of methods including organized and/or self-reliant trainings, physical education services and mass sports events”.

It is common understanding nowadays that the traditional and largely outdated youth physical education service models and approaches give little if any

chance for progress. Modern physical education systems and mass sports models give a special priority to the student self-reliant training methods sensitive and customizable to the actual physical progress interests and needs of the student communities [5, 6]. A special contribution to such academic mass sports movements is expected from the student self-management bodies. It should be noted that the student self-management concept still needs being clearly defined, although mostly considered as a special form of independent social activity of students; personality formation and individual creative resource mobilizing tool; professional values and priorities formation basis; personality self-development and civic maturation facilitation service domain; students’ activity channeling format established by a student community on its own initiative; etc. [4].



**Table 1.** Sports-prioritizing student self-management model customizable for university environments

Elements	Content
Objective	Facilitate progress of academic mass sports
Methodology	Key approaches: theoretical/ systemic, practical, individualized Principles: integration, democratization, social focus, openness and accessibility, continuity and progress; versatility of forms and progress avenues
Content	Key operations: trainings, competitions, volunteer service, refereeing, educations, promotion
Toolkit	Service forms: mass physical education and sports events and projects; master classes from sports celebrities; discussions of sporting lifestyles; refereeing in sports competitions; master classes from the sports-prioritizing student self-management activists, etc. Interactions: live and distant service using modern communication tools Service provisions: service customization for the trainees' needs and interests; motivations and incentives for independent social practices; synergized cooperation with the other physical education and sport service systems at the university

National universities implement different student self-management models including headmen-led task forces, student councils, student governments and parliaments, student research communities, etc. The sports-prioritizing student self-management model received a new impetus in 2013 under auspices of the Russian Student Self-Management Committees Association (SSCA) and has been supported based on the new Russian Student Sports Development Concept for the period up to 2025 that spells out the key progress avenues for the sports. However, a special study found inconsistencies in understanding of the student self-management role, concept and functions by universities [6]. This is the reason why the sports-prioritizing student self-management forms need to be modeled and customized to the actual academic environments.

**Objective of the study** was to theoretically substantiate and offer for practical application a sports-prioritizing student self-management model customizable for academic environments.

**Results and discussion.** Modeling as a theoretical research method was analyzed by A.N. Averyanov, V.G. Afanasyev, B.A. Glinsky, B.S. Gryaznov, B.A. Pyatnitsyn, V.A. Schtoff, N.O. Yakovleva et al [1]. V.I. Zagvyazinsky interpreted a model as the simplified version of a subject process/ fact/ event convenient for theoretical customization [3]. A.M. Novikov, D.A. Novikov specified the following three main functions of modeling: (1) descriptive function that refers to the model being abstracted for simpler explanation of the subject phenomena/ processes; (2) forecast function i.e. the means to predict future properties and states of the modeled systems; and (3) normative function to not only to describe the existing system but also construct its normative image as required by the specific expectations, interests and preferences of the modeling subject [2].

Based on the above considerations, we designed our sports-prioritizing student self-management model customizable to university environment (see

Table 1). It should be emphasized that this self-management form is governed by an student self-management committee acting in close cooperation with the PE department and academic sports clubs in the academic mass sports encouragement policies and practices.

**Conclusion.** Presently the national government supports every constructive sports-prioritizing student self-management model, with the student communities actively involved in every management process to become responsible parties to the decision making on the key issues of university life and social activity. The sports-prioritizing student self-management activity shall be encouraged in productive cooperation with the academic physical education department and sport clubs to explore and mobilize every progress opportunity for mass sports at university.

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