Development of health-saving environment at engineering university

Elvira Mugattarova¹ [0000-0001-9897-226X], Anatoly Bolotnikov¹ [0000-0002-9439-456X], Ruslan Garifullin¹ [0000-0001-9182-0474], Rais Imangulov¹ [0000-0003-3158-8815], Vladimir Kalmanovich¹ [0000-0001-7637-4496], Rafael Khairullin¹ [0000-0001-8027-9854]  
¹Kazan State University of Architecture and Engineering, Kazan, Russia  
asan611@yandex.ru

Abstract. Nowadays continuous professional training system is an area of growth, all-round youth education, a well-organized and up-to-date health-saving environment that implements innovations and new world achievements in science. In these terms creating health-saving environment at engineering university becomes relevant because professional qualification of the future specialist depends on the level of the environment in an educational institution. Development of health-saving environment in Kazan State University of Architecture and Engineering was analyzed with the use of a strategic planning method (SWOT-analysis), where Strengths is high use of health-saving technologies in academic process. This method shows that Threats for a health-saving university environment is annually increasing amount of high school students with health problems who entered School of Architecture and Design. The method defines Weaknesses of health-saving environment that is mostly a result of outside factors. These problems grow while they study at School of Architecture and Design. Opportunities for health-saving environment development at the university were found.  

Keywords: health-saving environment, SWOT-analysis, educational process, students, Engineering University.

1 Introduction

Today society needs well-educated workers and specialists with professional personal qualities who are focused on self-identification and successful self-realization in different spheres of public and professional activities to solve social economic problems [1]. Nowadays scientific technical progress greatly raises the role of a future specialist’s brain work. Intellectual activity increases demands for mental stability, long-lasting nervous tension and the ability of processing great amount of information [2]. A future professional has to accept abilities and capabilities with calm and clear head; and learn how to control an organism in these new circumstances. He should use physical culture and sports’ methods correctly to achieve it [3, 4]. Future specialists must be physically strong, must have high mental stability while studying at Engineering University. Students have to receive much more information than at school. There are more technical subjects at the University than humanitarian, so students should be able to learn them on their own in order to get knowledge. “The National Educational Doctrine of the Russian Federation” sets education to preference position in government policy and defines its main areas and its development plan till 2025. It is said there that government should determine that the main goal and the highest social value in educational sphere is to provide all-round health care to students and the development of youth’s responsible attitude to their own and other’s health. Educational system changes, new attitudes, ways and meaning appear in high school system. Higher educational establishments are intended to act as health-saving educational environment which provides saving and improvement of students’ health. We consider that this kind of environment is an indirect future bachelors' competence development factor at Engineering University. A health-saving environment is a physical and social surrounding area that helps a person to develop physical, mental and social skills to high level which is formed by different aspects in various life spheres [5, 6, 7].
2 Materials and methods
We used SWOT-analysis (a strategy planning method) while developing a health-saving environment at the University. This method helps to define strong and weak sides of health-saving university activities, to find further development perspectives, to find ways to solve current and possible future problems in this area.

3 Results
The following items were found while using a strategy planning method:

The strong part of the University is an active use of health-saving technologies and activities [8] such as:

- **Medical-hygienic technologies.** There is a licensed health centre in the University Sports Complex called “Tezuche”. It provides medical aid and consultation with a doctor. The health centre organizes different activities to teach students, scientific and pedagogical specialists medical hygienic technologies. “Tezuche” organizes a health check for students, scientific and pedagogical specialists every year and it also faces different challenges connected with education and professional skills of medical staff;

- **The ecological safe outside environment is developed at the University.** KSUAE is the equal educational area (campus) which includes the majority of educational and laboratory places, university housing, a canteen, sports complexes and a stadium, parks for students and professors to have a rest, which are placed not far from each other. There are neither industrial buildings with harmful emissions nor heavy traffic nearby;

- **Providing safety activities.** Regular trainings are organized at the University for self-protection in emergency situations which are held by specialists in labour protection, by fire inspections and by engineering services;

- **Health-saving educational technologies:**
  a) **Ergonomic educational technologies.** They include different training instruments, active studying rooms and laboratories with modern equipment, student books with creative tasks, test books, books with didactic and business games, books with game classes, education programs and education plan and other materials. These technologies provide for comfortable psychological and pedagogical conditions for students’ and professors’ communication, interaction and cooperation. They also provide for safe classes conditions that would help to save student’s health [9];
  b) **Organizational pedagogic technologies.** Computer programs that organize the education process structure correctly are used while scheduling. They prevent students and professors from being tired, exhausted and having hypodynamy [10];
  c) **Psychological and pedagogic technologies.** Psychological and pedagogic educational process support is provided at the University. Individual and group psychologist’s consulting is organized at the University Psychology Centre;
  d) **Educational technologies.** They include programs that teach youth to maintain healthy lifestyle. Therefore psychological and sociological decades are held every year. They discover different aspects of students’ life there such as communication, family role, a conflict problem, it’s solving and prophylactics and other. These technologies are mostly realized during physical activities (practice and theory) in the health and sports camp called “Mesha”. Healthy lifestyle is promoted in KSUAE. 1. A phrase “The University is a territory without smoking and foul language” became the University slogan. 2. Students and workers got rid of bad habits while being in educational buildings and university housing. 3. Active physical activities and sport became usual at the University.

- **Physical and health-caring activities are concentrated on students’ health** [11]. A team of students take part in University Spartakiad in Tatarstan every year. The team is one of the top three since 2008. Students won the first place in 2018-2019 for the first time. KSUAE team is in the first place in “Health” Spartakiade among science and pedagogic workers of Universities in Tatarstan from 2012 to the present. Domestic games between departments of the University are held every year. The
number of students who practice different kinds of sports at the University increases every year. The following results have been achieved due to correctly organized physical health and sports activities at the University: 1. The University was named “The most sportive organization in the Educational area in Tatarstan” in 2015; 2. It was named “The best University in organizing mass physical health and sports activities” in 2017; 3. The University became a winner in a Russian competition called “The best physical and health activities organization among Higher Education Institutions” (from 5001 to 10000 students in a group).

**Outside danger** for students from different departments may vary because students can prepare for education in creative specialties (Architecture and Design) or in technical specialties (Engineering ones) at the University.

Let’s discover the outside danger for a health-saving University’s environment on the example of creative specialties. The amount of high school students with health problems who enter the Department of Architecture and Design increases every year. They are future students of the University. Students in Engineering have better health than students of creative specialties because the first had enough physical activities at school. Let’s find out the reason of the difference.

To enter the Department of Architecture and Design a lot of scholars go through strong professional preparation: 1. They study at school of Architecture and Design for children: at the studio from 5 to 10; at school from 5th to 8th form, at college from 9th to 10th form; 2. Scholars begin attending preparatory classes of the Department of Architecture and Design 5 days a week for 2 hours (a picture, a composition, a drawing disciplines).

Children in primary and secondary school can attend not only drawing school lessons but also the other different classes or spend much time walking outside or staying at home 1-2 days a week. Suddenly school pressure increases at high school. A daily preparation for an Equal State Exam and daily preparatory classes of the Department of Architecture and Design appear. Children lack rest and activities. Only 1 day – Sunday - is left for resting and recovery. Classes are held even during holidays. Students’ health becomes worse in this period and existing diseases appear again and become chronic [12].

A weekly amount of classes which are realized through activities during and after educational process is determined by figures in Table 1 according to sanitary epidemiological standards of educational process organization and conditions in educational establishments [13].

The profile education organization in 10th-11th forms at school shouldn't lead to educational workload increase according to norms and standards but the amount of classes after school is regulated by scholars and their parents. Sometimes the educational process passes at the high point of physical and emotional possibilities [14]. The growth of disease occasions number, psychological and emotional exhaustion among future students can reduce the amount of healthy students at the Department of Architecture and Design [15].

**Table 1.** The hygienic requirements for maximal weekly educational scholars' amount of classes according to sanitary epidemiologic standards.

| Forms | Maximal permitted weekly amount of classes in academic hours |
|-------|-------------------------------------------------------------|
|       | 6-days week, not more than | 5-days week, not more than |
| 1     | 21                                                           |
| 2-4   | 26                                                           |
| 5     | 32                                                           |
| 6     | 33                                                           |
| 7     | 35                                                           |
| 8-9   | 36                                                           |
| 10-11 | 37                                                           |

The growth of disease occasions number, psychological and emotional exhaustion among future students can reduce the amount of healthy students at the Department of Architecture and Design [15].
Let us consider weak sides of a health-saving environment at the university also on the example of creative specialties which mostly appear from outside factors. High school education is a complicated process in comparison with studying at secondary school. It demands for a flexible mind, good physiological organism functions, students' healthy physical form. First-year students get used to an educational process more difficult. Future students already have limited adaptive organism abilities by the time of entering the University [16].

Higher demands are required to students at Building University because of its specifics. The students of creative specialties, particularly students of the Department of Architecture have the hugest physical and emotional stress. "Continuous designing" period passes 4 times a year (twice a semester) at the Department of Architecture and Design in addition to tests and examinations period.

Continuous designing is a whole week during which students prepare a project on a certain theme (visualization, conception, model) and don't attend other classes. Tests and examinations period at specialized educational establishments is very busy time for students who have to use all their skills and abilities at once. As a result students catch chronic fatigue syndrome after passing continuous designing period, being very exhausted and stressed. This disease has recently become popular among youths. It appears when a person is exhausted and doesn't disappear even after a long-lasting holidays. Activating disease factor is unbalanced intellectual and emotional stress without any physical activities [17, 18].

Here are the reasons that influence on a chronic fatigue syndrome development process: 1. Students feel psychological stress during a continuous designing period: they worry about the task, think if they cope with it and if they do it correctly, worry about deadlines, if they fulfill the parents' hopes. All these feelings influence the educational success [19]; 2. Hypodymany development. Students do their work sitting at the table without moving. They also can work while standing or leaning down. The thing is that students of architecture specialty draw by hands the first year. And students of 2-5 courses draw using computer; 3. Irregular eating timetable. Students eat fast food - quickly cooked unhealthy meals. They drink energetics with no limit. They don't have everyday rest and sleeping routine. Students of architecture specialty regularly don't sleep enough and they can even not go to bed the day before exams because of stress or as a result of drinking energetics; 4. Students spend free time in a passive way and don't want to do any physical activities. So they sleep or communicate in social network in their free time; Students of architecture specialty are creative and vulnerable so they are more influenced by stress and psychological health problems than students of other specialties.

4 Discussion
Here are potential solutions of the chronic fatigue syndrome problem of students at the Department of Architecture and Design: 1. Composing special methodical materials for Students of architecture specialty with exact rules, with ways to maintain healthy lifestyle during educational process (tests, exams and continuous drawing); 2. Showing students the special physical activities and exercises complexes from different health improving systems that can help them to overcome unbalanced intellectual and emotional stress during and after exams and continuous drawing [20,21,22]; 3. Presentation of the exercises complexes with mental fitness elements on work place that is held during preparing courses for applicants who enter the Department of Architecture and Design [23]; 4. Presentation of health improving methods with exercises and theoretical materials that is held for preparing courses professors.

5 Conclusion
The authors come to the conclusion that in spite of the outside danger and weak sides of Engineering University a health-saving educational environment development in KSU AE can be defined as effective enough and perspective.

References
[1] Khuzhin R A and Greb A V 2019 Physical education service contribution to technical university graduate’s professional competitiveness Theory and Practice of Physical Culture 4 pp 12

[2] Kokun O, Imas Y, Vovkohon A, Potop V, Korobeynikov G, Korobeynikova L, Gorashchenco A and Polevaya-Secaryanu 2018 A Physical education and sports as a tool for formation of students’ psychophysiological readiness to their professional work Journal of Physical Education and Sport 18(2) 143 pp 966-971

[3] Panachev V, Zelenin L, Opletin A, Legotkin A and Kusekova R 2018 Aspects of health-improving and sports-mass work students Journal of Global Pharma Technology 10(5) pp 268-273

[4] Pashchenko L G and Krasnikova O S 2017 Influence of motor mode on physical health of university students Teoriya i Praktika Fizicheskoy Kultury January (6) pp 24-26

[5] Filonenko V I, Nikulina M A, Patrakov E V and Kovtun O P 2018 Social representation about health and health preservation in young students Sotsiologicheskie Issledovaniya January (7) pp 152-157

[6] Ishkineeva F, Ozerova K, Ahmetova S and Kaveeva 2019 A Students healthy lifestyle and the strategy of adaptation to the university environment International Journal of Innovative Technology and Exploring Engineering 9(1) pp 5123-26

[7] Resolution of the Government of the Russian Federation of 04.10.2000 N 751 ”On the national doctrine of education in the Russian Federation” http://www.consultant.ru/document/cons_doc_LAW_97368/ (last accessed 2020/02/09)

[8] Gafiatulina N K, Makadey L I, Gluzman I V, Lozhechkina A D, Volkova L A and Bandurin A P 2019 The role of health-saving technologies in the process of students educational and professional socialization Eurasian Journal of BioSciences 13(2) pp 1557-63

[9] Do J.-H, Jo Y.-G, Lim J.-S and Yang C.-H 2019 The motivation of physical education class in liberals arts participation, sports personality, and development of sociality in the university students International Journal of Recent Technology and Engineering 8(2 Special Issue 6) pp 208-214 DOI: 10.35940/ijrte.B1039.0782S619

[10] Koksalı̇m E, Garcia C and Rabadi G 2014 The optimal exam experience: a timetabling approach to prevent student cheating and fatigue International Journal of Operational Research 21(3) pp 263-278 DOI: 10.1504/IJOR.2014.065408

[11] Irhin V N, Irhina I V and Nikulin I N 2013 University sports and recreation activities system as a factor of ensuring the students health World Journal of Medical Sciences 9(3) pp 162-166 DOI: 10.5829/idosi.wjms.2013.9.3.1131

[12] Bakiko I, Savchuk S, Dmitruk V, Radchenko O and Nikolaev S 2020 Assessment of the physical health of students of middle and upper grades Journal of Physical Education and Sport 20 №39 286-290 DOI: 10.7752/jpes.2020.s1039

[13] Resolution of the Chief state sanitary doctor of the Russian Federation of 29.12.2010 N189 Moscow " on approval of SanPiN 2.4.2.2821-10" Sanitary and epidemiological requirements for the conditions and organization of education in General education institutions" http://nivanscool.ucoz.ru/dokument/novye_normy_sanpin_dlya_shkolnikov.htm (last accessed 2020/02/19)

[14] Kuchma V R, Sukhareva L M, Rapoport I K, Shubochkina E I, Skobлина N A and Milushkina O Yu 2017 Population health of children, risks to health and sanitary and epidemiological wellbeing of students: Problems, ways of solution and technology of the activity Gigiena i Sanitariya 96(10) pp 990-5 DOI: 10.18821/0016-9900-2017-96-10-990-995

[15] Ewert B 2017 Promoting health in schools: Theoretical reflections on the settings approach versus nudge tactics Social Theory and Health 15(4) pp 430-447 DOI: 10.1057/s41285-017-0036-3

[16] Bailey T H and Phillips L J 2016 The influence of motivation and adaptation on students’ subjective well-being, meaning in life and academic performance Higher Education Research and Development 35(2) pp 201-216 DOI: 10.1080/07294360.2015.1087474
[17] Akshayaa L, Vishnupriya V and Gayathri R 2019 Awareness of chronic fatigue syndrome among the college students – a survey Drug Invention Today 11(6) pp 1369–71
[18] Shi J, Shen J, Xie J, Zhi J and Xu Y 2018 Chronic fatigue syndrome in Chinese middle-school students Medicine (United States) 97(4) pp 9716 DOI: 10.1097/MD.0000000000009716
[19] Griggs S 2017 Hope and mental health in young adult college students: An integrative review Journal of Psychosocial Nursing and Mental Health Services 55(2) pp 28-35 DOI: 10.3928/02793695-20170210-04
[20] Breedvelt J J F, Amanvermez Y, Harrer M, Karyotaki E, Gilbody S, Bockting C L H, Cuijpers P and Ebert D D 2019 The effects of meditation, yoga, and mindfulness on depression, anxiety, and stress in tertiary education students: A meta-analysis Frontiers in Psychiatry 10 (APR) pp 193 DOI: 10.3389/fpsyt.2019.00193
[21] De Vries J D, van Hooff M L, Geurts S A and Kompier M A 2016 Exercise as an Intervention to Reduce Study-Related Fatigue among University Students: A Two-Arm Parallel Randomized Controlled Trial PloS one 11(3) e0152137 DOI: 10.1371/journal.pone.0152137
[22] Nasibullina D M, Nasibullin T R and Krasulina N A 2019 Individual academic physical education programs for special health groups for physical progress Teoriya i Praktika Fizicheskoy Kultury № 4, pp 54-56
[23] Butzer B, Ebert M, Telles S and Khalsa S B 2015 School-based Yoga Programs in the United States: A Survey Advances in mind-body medicine 29(4) pp 18-26