

## Innovative mechanisms of improvement of student's physical education system on the basis of interdisciplinary connections

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### Abstract:

The article deals with the problem of improvement of students' physical education system in various high educational institutions by creating interdisciplinary connections and enhancing the use of integrative teaching methods. The necessity of cultural (based on a health-related behaviour as a fundamental basis for thinking and activity) and physiological (related to the physical development of an individual) uniting of educational technologies into a single system that will contribute to students' healthy lifestyle during physical education is proved. The article revealed content-focused classes in the content of the newly established interdisciplinary course. Based on the analysis of library resources and our own teaching experience, we present some mechanisms for converting of existing physical education system into integrated educational health-related technology of teaching students considering theoretical and methodological principles of general sports and recreation education. For this purpose we found the interdisciplinary connections between the sciences related to a man and created an integrative course "Fundamentals of Health" that meaningfully helps to familiarize students of various high educational institutions with the general issues of human development, peculiarities of morphological changes under the influence of exercise for a better understanding of the usefulness of physical activity and development of conscious attitude and need for physical self-improvement.

**Key words.** Physical education system, interdisciplinary connections.

### Introduction

We live in a world where the rapid social, technological and cultural changes are observed. Our civilization is experiencing a crisis of traditional ideals (the higher meanings, values and goals), therefore there is the need to develop the effective ways and mechanisms of human health preservation, including physical self-improvement [2; 4].

Admittedly, one of the main drawbacks of physical education at the present day is the domination of practical approach, in which the most important is to improve the students' physical qualities. Until recently, the actual pedagogical technologies focusing more on direct impact on students than on their interaction with the environment, are exhausted nowadays [1; 3]. The study of this problem and our own pedagogical experience suggest that the improvement of physical education in high school should be carried out not only in the practical part but in the context of theoretical and methodological components. In our opinion, in universities there is a problematic situation which consists in the contradiction between the level of social requirements and efficiency of students' physical education.

According to the experts (V. Horbul', 2005; L. Kovalenko, 2006; R. Raevskyy, 2006; V. Kudelko, 2006; S. Kyryl'chenko, 2007; N. Semenova, 2014, etc.) the need to care about their own health is not developed in students. It is proved that one reason for health deviations in students is the lack of physical activity (I. Bodnar, 2000; E. Bulich, 2003; L. Malanyuk, 2010; E. Pristupa, 2010; B. Shiyan, 2010; O. Zhdanova, 2010, etc.). However, the lessons do not provide the required amount for students' physical activity and the developing of healthy lifestyle habits is situational and does not encourage them to exercise.

In addition, the modern organization and content of physical education in universities should be improved. Thus, scientists say that university and college students has no interest in the content of compulsory physical education classes (O. Dubohay, 2012, P. Durkyn, 2005; S. Putrov, 2006, etc.). The issue of optimization of students' physical education was studied by S. Kirilenko, 2004; O. Vashchenko, 2006; I. Zanevskiy, 2008; S. Litvinenko, 2008; H. Hryban, 2009, O. Shiyan, 2013).

Despite the fact that domestic and foreign scholars thoroughly studied the problem of improvement of physical education in universities we today observe that the issue of combining theoretical and practical components of training in the system of physical education by creating interdisciplinary ties is not studied enough.

**The connections of the research topic with scientific programs, plans, themes.** The work has been carried out according to the theme of the Consolidated Plan of research in the field of physical culture and sports

of Ukraine under the theme 3.9 "Improving the scientific foundations of sports for everybody, fitness and recreation" in 2011-2015. (State registration 0111U001735).

### Material and methods

The study was conducted during 2012-2013 years. Lviv, Kharkiv and Cherkasy Institutes and the University of Banking affiliated to the National Bank of Ukraine (Kyiv) served as an experimental basis. Questionnaires and statistical analysis of qualitative and quantitative indices were held before the pedagogical experiment and after its completion. All students who participated in the pilot study (370 people) were divided into two groups: a control one - educational process of physical education was held as usual (184 people); an experimental one - the process of physical education was accompanied by the introduction of the newly created course "Fundamentals of Health" (186 people).

To achieve the objectives the following **research methods** were applied: theoretical (theoretical analysis and synthesis of educational, scientific literature, legal documents on education and healthcare, Internet resources, teacher observation, content analysis) empirical (observation of vital functions and physical education of students; conversation, questionnaires, surveys); statistical: qualitative and quantitative analysis of the research results; statistical, comparative and factor analysis of data to assess the credibility of the obtained results.

**The aim** of this work is to develop and study a interdisciplinary course "Fundamentals of Health" for its implementation in physical education as an effective mechanism for creating of health-focused behaviour of students. To achieve the aim we have solved the following **tasks**:

1. To prove interdisciplinary links in the content of integrative course "Fundamentals of Health";
2. To reveal the content essence of integrative interdisciplinary course "Fundamentals of Health";
3. To summarize the experimental data obtained during the initial and control stages of the pedagogical experiment that was conducted to determine the efficiency of integration course "Fundamentals of Health" in the system of physical education for students.

### Results

Physical education in the modern sense should be regarded as relevant rules of students' behavior through the use of specific health knowledge in natural and social conditions [5]. In fact it is education of students' thought and consciousness to preserve their health adapted to normal biological adequacy [8]. The focus of the training sessions of the course "Fundamentals of Health" convert the system of physical education in high school into the educational process of health education that focuses on each individual student.

Conceptually, it is important that the content of the course is aimed at forming in students of any specialty some theoretical knowledge, teaching skills and practical skills to use means of physical training in order to not only survive in the harsh conditions of our time, but also to be competitive, highly able-bodied, adequately adapted to social conditions and as long as possible to keep their health and professional activity [6].

The logic of exploration of possible integration of various curricula contents and our own pedagogical experience allowed offering to unite in a single course the following disciplines:

- Theory and Methodology of Physical Self-improvement (recreation, rehabilitation, theory and methods of teaching motor actions);
- Physical Education (practical application of knowledge - physical exercise, any sport, etc.);
- Physiology and Psychology of Work (anatomy, physiology, psychology of work processes, etc.).

The content of interdisciplinary course "Fundamentals of Health" has been developed on the basis of scientifically proved methodology and concepts of interdisciplinary integration of disciplines that are relevant to the issue of the developing in students the healthy lifestyle habits, thus providing the generation of health knowledge [7].

The main functions of the developed curriculum are research (analysis of all physiological processes in terms of science), prognostic (forecasting of health-related activity), management (development of body constitution and improvement of the students' fitness) and recreational (development of healthy leisure habits).

The objectives of integrative interdisciplinary course "Fundamentals of Health" are: the development of individuals able to most effectively realize themselves in the society, responsibly treat the problems related to their own health, and control their own health and safe behaviour.

The essence of the course of health education consists not only in the teacher's mastery but proper students' activity while acquiring knowledge and skills.

The integrative interdisciplinary nature of the designed training course "Fundamentals of Health" is shown in *Fig. 1*.

The task of the theory and methodology of students' physical self-improvement is the development of the special knowledge that allows operating the general concepts, laws, principles, facts, rules, theories and practices, and physical education at the same time to develop physical qualities (abilities), motor skills, and provide the physical fitness. However health-relative activity in today's conditions is difficult to imagine without components related to physiological characteristics of working processes. It is the content of thoughts and feelings, values, interests and level of requirements development, working conditions, beliefs and so on. All

these components ultimately affect the life of every graduate and have a decisive impact on his/her health in future.

The content of the theory and methodology of physical self-improvement involves the development of methodological skills not so much "biomotor activity" (movement techniques) as to improve psychomotor abilities of automated control of action mechanisms (reactivity, efficiency and motor stability that determine the development of motor skills). Simultaneously the abilities related to reflection, making the proper decisions connected with motor skills are developing. Abilities are known not to be inherited by biogenetic human nature (unlike instincts), nor in society - they occur only during the activities. We know that learning is not possible without reflection. Reflection in this case we are considering as part of the structure as a single mechanism of self-perception, self-understanding, and health related and sports activities. Physical education does not have a set of therapeutic and preventive or remedial measures, as a way of expansion and enrichment of human experience in preserving their health. Health education becomes a matter of designing and mental control, not just a result of remedial impact on the physical condition of a person, the mode of functioning flies to the mode of personality's development. The ability to use the tools of physical education should be the result of the knowledge gained from the theory and methodology of physical self-perfection.

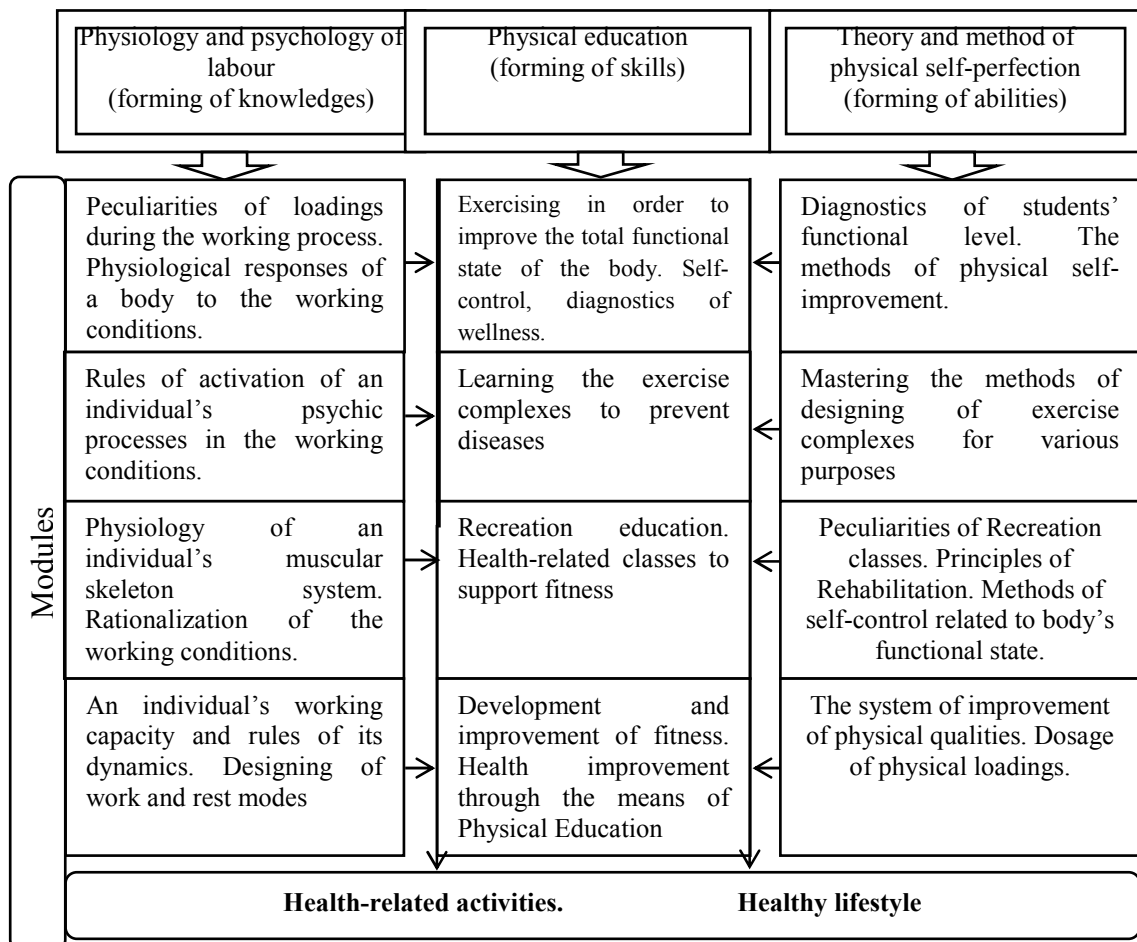


Fig.1. Integrative, interdisciplinary nature of the course "Fundamentals of Health"

To teach students to preserve their own health separately from the effects on the body during work is not possible, as a person can not be considered outside the work as it was already stated in previous chapters. Do not expect that someone other than an a person him/herself, will manage the working process so as not to damage his/her own health [9; 10; 11; 12].

Physiology and psychology of labour is the chapter of human physiology, which studies the changes that occur in the human body under the influence of working process, defines and develops measures of rationalization of work processes that will promote high efficiency. Thus, the subject of psychology and physiology of labour is working process of a person in his/her psychological and physiological manifestations. We believe that in today's market economy we can consider to be competitive a graduate who is able to preserve his/her own health in the working conditions, be able to increase his/her level of working capacity, and consequently, professional capacity, using the system of health-related measures.

Generalizing the survey data at an initial stage of the pedagogical experiment we single out three aspects. The first one was concerned the results showing the impact of our proposed content of physical

education on the amount of physical activity of students, in other words we determined whether the number of students engaged in exercise increased. Second, we studied the level and quality of theoretical knowledge and skills acquired by students. And the third aspect dealt with the study of the dynamics student absenteeism in the control and experimental groups because of cold on the basis of medical certificates [6].

After the academic year in the experimental group (EG), where the educational process on physical education was organized with using the developed integrative course, the number of students who are actively engaged in physical activity increased to 91.3% and in the control group (CG) - only to 56.5% (Fig. 2).

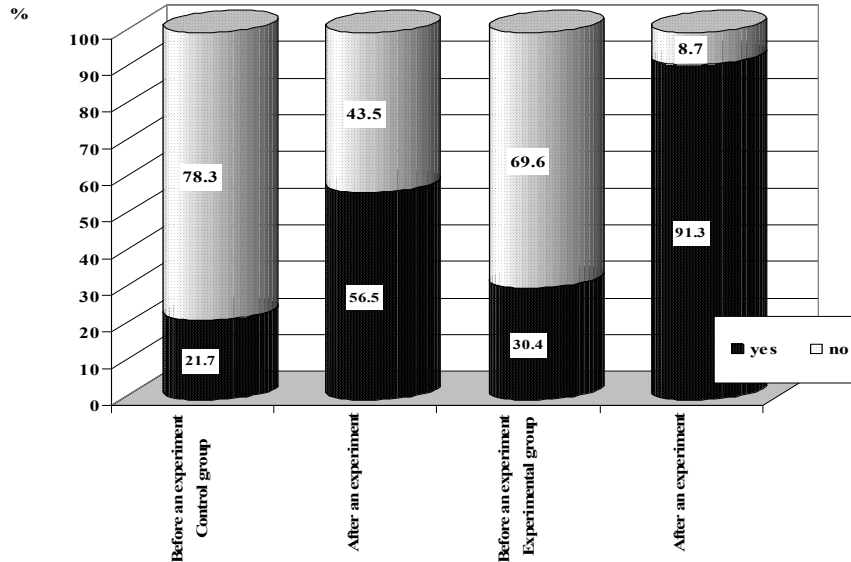


Fig. 2. Self-estimation of students their own physical activity (in%)

Only 4.3% of students in CG both before and after the experiment believed that their knowledge and skills are sufficient to take measures to preserve their own health. However, after the experiment 95.6% of respondents in EG positively rated their knowledge and skills compared to 4.4% of students who considered their knowledge as sufficient before the experiment.

On the basis of educational documentation dealt with dynamic changes concerning absenteeism due to cold by the students of CG and EG we received during the year the results that showed a decrease in number of the students suffering from cold in the EG (Fig. 3).

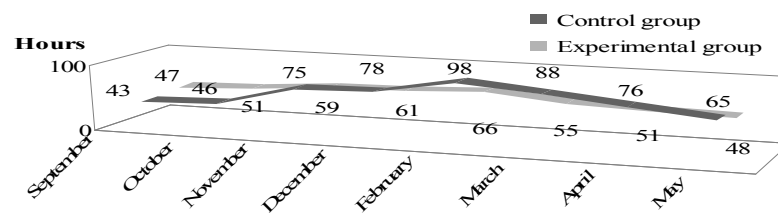


Fig. 3. Dynamics of absenteeism due to cold by the students both in CG and EG during the academic year (number of hours)

The students in CG missed 569 hours of classes because of illness, and the students in EG - 438 hours. It is about 12.3 hours per student in CG and 9.5 hours per student in EG. In September the number of missed hours because of illness is virtually identical: 43 hours in CG and 47 - in EG.

The control stage of pedagogical experiment was carried out in three directions: to study morphological changes in the organism of students; tracking the dynamics of changes in the level of their physical fitness and students' self-esteem of the degree of their healthy lifestyle practical skills [6].

The analysis of the morphological changes of indices showed some improvements of fitness level (FL) ( $p < 0.05$ ) in EG students, while such changes haven't occurred among the student in CG. While at the beginning the average value of this index was  $0.56 \pm 1.1$  conventional units (c. u.) (56%), which corresponds to the average level of the scorecard, at the end of the experiment, it increased to  $0.71 \pm 1.1$  c. u. (71%), which allows to recognize that the level of physical health of the students in EG is higher than average.

There were also positive changes in the index of functional changes (IFC) ( $p < 0.05$ ) in the students of EG: from  $2.8 \pm 0.02$  c. u. before the experiment that indicates the stress adaptation mechanisms to  $2.6 \pm 0.01$  c. u. after the experiment that indicates a satisfactory level of adaptation. The students in CG had unsatisfactory adaptation level.

The analysis of Skibinskij's index (SI) ( $p < 0.05$ ) indicates that the CG students both before and after the experiment had satisfactory functionality level. However, before the experiment EG students' average values ( $24.5 \pm 1.7$  c. u.) corresponded to satisfactory estimation of the students' fitness level; after the experiment this level can be considered as good ( $36.6 \pm 1.7$  c. u.) (Table 1).

Table 1. Dynamics of morphological index changes in CG and EG students (c. u.).

Statistical indices	Control group ( $n = 184$ )						Experimental group ( $n = 186$ )					
	before experiment			after experiment			before experiment			after experiment		
	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error
FL	0.55	0.05	0.02	0.62	0.04	0.02	0.56	2.2	1.1	0.71	2.3	1.1
IFC	2.8	0.05	0.02	2.7	0.05	0.02	2.8	0.05	0.02	2.6	0.03	0.01
SI	24.6	3.3	1.6	25.9	2.9	1.4	24.5	3.4	1.7	36.6	3.4	1.7

Note. The difference is statistically significant for  $p < 0.05$ .

The summarized test outcomes data concerned physical fitness indices point to the growth in all results among EG students at the end of the academic year (Table. 2).

Table 2. Dynamics of fitness index changes in CG and EG students (c. u.).

№	Control group ( $n = 184$ )						Experimental group ( $n = 186$ )					
	before experiment			after experiment			before experiment			after experiment		
	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error	$\bar{x}$	$S$	aver. error
1	<b>Standing long jump (m)</b>											
	1.80	0.03	0.01	1.81	0.03	0.01	1.81	0.05	0.02	1.96	0.06	0.03
2	<b>Press ups (lying) (times)</b>											
	17	2.4	1.24	18	2.4	1.22	16	2.5	1.2	19	2.5	1.2
3	<b>Sit ups (times)</b>											
	41	1.8	0.9	42	1.75	0.8	41	1.8	0.8	47	0.9	0.4
4	<b>Skipping (times per 1 min.)</b>											
	149	2.4	1.2	154	1.17	0.03	150	3.4	1.7	159	1.5	0.7
5	<b>Shuttle run 4 x 9 m (sec.)</b>											
	11.03	0.2	0.1	10.98	0.2	0.1	11.01	0.2	0.1	10.56	0.2	0.1

Note. The difference is statistically significant for  $p < 0.05$ .

According to the scale of test results evaluation of the EG students at the beginning of the experiment the average standard ratios showed their lower than average level of physical fitness, and were estimated as satisfactory: standing long jump –  $1.81 \pm 0.02$  (m); press ups (lying) -  $161.2$  (number of times); sit ups -  $41 \pm 0.8$  (number of times); skipping -  $150 \pm 1.7$  (number of times); shuttle run –  $11.01 \pm 0.1$  (sec.).

After the experiment the quality estimation increased which indicates the level of physical fitness that meets the assessment "good" and is higher than the average: standing long jump –  $1.96 \pm 0.03$  (m); press ups (lying) -  $19 \pm 1.2$  (number of times); sit ups -  $47 \pm 0.4$  (number of times); skipping -  $159 \pm 0.7$  (number of times); shuttle run –  $10.56 \pm 0.1$  (sec.). These changes almost did not happen among CG students.

To define and carry out the comparative analysis of the practical skill levels of healthy lifestyles in students and their readiness for further implementation of physical education in the future life, students conducted tests on a specially created questionnaire. By the content, this test-questionnaire provided five structural components (theoretical and methodological, cognitive, psycho-physiological, motivational, and cultural) and determined the levels of (high, medium, low) health competence development, and physical education of students.

It should be noted that in the EG 19.1% of students had a high level of health competence, 25.1% of students had an average level, and 55.8% of students had a low level of health competence before the experiment. After the experiment a high level could be observed at 53.1% of students, average - 35.6% of students, low - 11.3% of students. In the EG 17.8% of students had a high level of health competence, 25.0% of students had an average level, and 57.2% of students had a low level of health competence before the experiment. After the experiment a high level could be observed at 22.6% of students, average - 25.2% of students, low - 52.2% of students (Fig. 3).

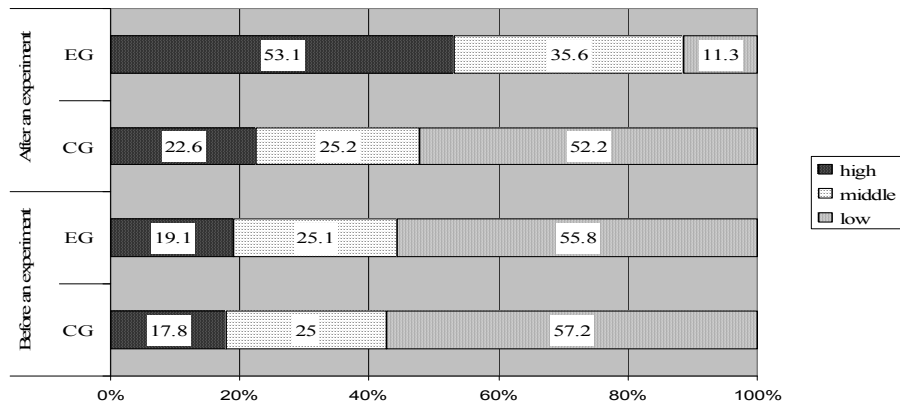


Fig. 3. Self-estimation of CG and EG students their level of development of healthy lifestyle practical habits (%)

The factor analysis of the data obtained after the experiment shows that all the components of physical education in EG students are, according to their self-esteem, higher than in students of CG. The most developed component can be considered motivational and activity component (65.3%), second place is taken by the theoretical and methodological one (56.5%), the third position is cultural (52.2%), the fourth - cognitive (47.8%), and the last position belongs to psycho-physiological component (43.5%).

### Discussion

The motives of preserving health are closely related to the motor (work) activity, and the individual's social development that is a powerful subjective factor in increasing productivity [8; 15]. The market economy of our country is characterized by instability, presence of crises, unemployment that creates such living conditions which require maximum physical health of future graduates. Tough and sometimes "unhealthy" competition among graduates in the labour market, dependence on the business interests of employers requires from young people psychological stability, high mental and physical performance and outstanding resistance to harmful environmental effects [13; 14]. Today's labour market requires extremely healthy person because employers prefer such experts. The chosen disciplines in the content of integrative course "Fundamentals of Health" (theory and methodology of physical self-improvement, physical education, physiology and psychology of work) are focused on the problems of developing of healthy lifestyle among students, and the formation of interrelations between them helps to develop the students' competence in the conservation of their health throughout their lifetime.

Due to the interdisciplinary course "Fundamentals of Health" in the process of physical education managed to include educational, social and internal environment of each participant of educational communication. It is important to design psychic reality by studying the physiology and psychology of work, creating conditions for self-designing, students' self-improvement in the direct work with a view to studying the theory and methodology of physical perfection. The main goal of an open system of new quality physical education is to teach students how to acquire healthy habits, to support their own inceptions and not impose teachers' ones, to consider the student as a friend and partner. It is important that the students have opportunities to create perspectives, determine the content and organization of healthy lifestyle [6].

### Conclusions

1. Vital activity of graduates of various professional orientations is closely related to employment and social life that makes and defines the range of scientific disciplines that are combined into a single interdisciplinary course "Fundamentals of Health" for students of high educational institutions of different professional orientations. The content of this course integrates and combines the following disciplines "Theory and Method of Physical Self-improvement" (theory of health-related education), "Physiology and Psychology of labour" (psycho-physiological experience of work) and "Physical Education" (practical health-related activities of every person). The chosen disciplines are focused on the problems of health preservation, and the formation of interdisciplinary relationships between them helps to develop the students' competence in health preservation of a new quality. The essence of interdisciplinary links brings to the fore the fact that the object of knowledge is one, angles of its perception – mutually complementary, and methods of learning and transformation are different and individual. Integrative links between the designated disciplines, socio-cultural nature of sports and recreation education which transfer to a new professional and wellness world and the new, inscribed in this system world of cultural identity, culture of health-related thinking and culture of health.

2. In the content of integrative course "Fundamentals of Health", the contrasting knowledge about various aspects of health preserving technologies is replaced by a synthesizing universal approach to the educational environment in which different types of object-oriented skills are the parties forming the system

behavior and lifestyles throughout future professional activities of students. The basis of this course contains the basic socio-cultural ideas available (based on the culture of health as a fundamental basis for thinking and activity) and anthropic (related to the development of the individual) educational health preserving technologies in the field of physical education, and integrative, project-oriented methods of development of healthy lifestyle among students. The content of interdisciplinary, integrative course "Fundamentals of Health" is a kind of psycho-pedagogical support of physical education in competence-oriented directions to educate the students to develop need for physical self-improvement.

3. Systematization and statistical analysis of the obtained results confirms that the created integrative interdisciplinary course "Fundamentals of Health" structurally combined general and specific theoretical content related to the structure of the physical training, the necessity and ways of constant renewal of special basic knowledge. The efficiency of this course was confirmed during the pilot pedagogical experiment and demonstrated the increase in the physical activity of EG students and the evidence of development of health-related knowledge and reduction of absenteeism due to illness. The best confirmation of the efficiency of the course "Fundamentals of Health" is also improved by EG students' morphological parameters: the level of physical health and functional status of the organism, the degree of adaptation (index of functional changes); and functional reserves of the body (Skibinskij index); positive dynamics of changes in the level of physical fitness and improvement of the healthy lifestyle.

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### References

- Anan'ev B. H. . 2001. Chelovek kak predmet poznaniya / Borys Herasymovych Anan'ev. – SPb. : Pyter– 288 s. – (Seryya : Mastera psikhoholyy).
- Apanasenko H. L. . 2007. Knyha o zdorov'e / H. L. Apanasenko. – K. : Medknyha– 132 s.
- Davydenko D. N. 2006. Zdorov'e y obraz zhyzny studentov : ucheb. posobyie / D. N. Davydenko, A. P. Shklyarenko. – Volhohrad : VolHU, – 132 s.
- Dementyy L. Y. 2005. Otvet-stvennost' lychnosti kak svoystvo subekta zhyznedeyatel'nosti : dys. ... d-ra psikhol. nauk : 19.00.09 / Lyudmyla Yvanovna Dementyy. – M., – 329 s.
- Dubohay O. D. 2012. Fizychno vykhovannya i zdorov'ya: navch. posibnyk / avt. kol. : N. N. Zavydivs'ka, O. V. Khanikyants ta in. ; za zah. red. O. D. Dubohay. – K. : UBS NBU, – 271 s.
- Zavydivs'ka N. N. 2012. Fundamentalizatsiya fizkul'turno-ozdorovchoyi osvity: aspekt zdorov'yazberezhuval'noho navchannya studentiv : monohrafiya / Nataliya Nazariivna Zavydivs'ka. – K. : UBS NBU, – 402 s.
- Zavydivs'ka N. N. 2012. Osoblyvosti mizhdystyplinarnykh zv'yazkiv u systemi fizkul'turno-ozdorovchoyi osvity studentiv vyshchyykh navchal'nykh zakladiv / N. N. Zavydivs'ka // Slobozhans'kyy naukovosporyvnyy visnyk : nauk.-teoret. zhurn. – Kharkiv : KhDAFK, – # 2. – S. 186–190.
- Korobeynykov H. V. 2008. Psykhofyzyolohyeheskaya orhanyzatsyya deyatel'nosti cheloveka : monohrafiya / H. V. Korobeynykov. – Belaya Tserkov' : [RVIKV BNAU], – 137 s.
- Nazarenko L. D. 2003. Ozdorovyitel'nyye osnovy fizycheskykh uprazhneniy / L. D. Nazarenko. – M. : VLADOS, – 240 s. – (Byblyoteka uchytelya fizycheskoy kul'tury).
- Prezlyata H. 2006. Zanyattya fizkul'turoyu ta zdorov'ya : medyko-pedahohichnyy monitorynh / H. Prezlyata, A. Shpil'chak. – K. : Shkil. svit ; Vyd. L. Halitsyna, – 112 s. – (B-ka «Shkil. svitu»).
- Nosko M.O., Harkusha S.V., Voyedilova O.M. 2014. Zdorov'yazberezhuval'ni tekhnolohiyi u fizychnomu vykhovanni. Monohrafiya. – K.: SPD Chalchyns'ka N.V., – 300s.
- Khoroshukha M. F. 2009. Osnovy zdorov'ya : [ navch. posib. dlya stud. vyshch. navch. zakl.] / M. F. Khoroshukha, O. O. Pryymakov, V. H. Tkachuk. – K. : Vyd-vo NPU imeni M. P. Drahomanova, – 373 s.
- Ts'os' A. 2006. Pidhotovka studentiv do samostiynykh zanyat' fizychnymy vpravamy / A. Ts'os', T. Ovcharenko // Sportyvnyy visnyk Prydniprov'ya. — # 1. – S. 51–56.
- Tsyupryk A. 2004. Dydaktychni umovy orhanizatsiyi samostiynoyi roboty studentiv na osnovi osobystisno-oriyentovanoho pidkходу / A. Tsyupryk // Naukovi zapysky Ternopil's'koho derzh. ped. un-t im. V. Hnatyuka. Seriya: Pedahohika : [zb. nauk. pr.]. – T., – Vyp. 5. – S. 69–74.
- Chekonov A. D. 2010. Formyrovanye zdorov'esberehayushchey stratehyy obrazovatel'noho uchrezhdenyia / A. D. Chekonov // Ynformatsyya y obrazovanye: hranytsy kommunykatsyy INFO"10 : sb. nauch. tr. / sost. A. A. Temerbekova, Y. V. Chuhunova. – Horno-Altaysk : RYO HAHU, – № 2. – S. 247–252.