The readiness formation of future biology teachers for healthcare-safety technologies realization in professional activity

Maryna Diachenko-Bohun¹ · Nataliia Hrytsai² · Maryna Grynova³ · Igor Grygus⁴ · Walery Zukow⁵

Received: 8 July 2018 / Accepted: 21 August 2018 / Published online: 25 August 2018
© The Author(s) 2018, corrected publication September/2018

Abstract

The deterioration of the quality of life, mental, physical, and social human disorders reveal themselves in reducing the level of its adaptation to daily psychological and physical stress, early development of neuroses, psychosomatic and mental illness in children and adults as well. Regarding this, one of the main strategies for the development of educational institutions is the organization of healthcare activities. In this context, the task of forming the readiness of future biology teachers to implement healthcare-saving technologies in the professional activity is gaining a significant importance. The need for development and substantiation of healthcare-saving activity theoretical and methodological foundations determines the relevance of the given problem and requires a profound rethinking of the essence as well as the content of healthcare-saving technologies educational implementation. The article reveals separate results of a pedagogical experiment conducted among future biology teachers within the educational process of the natural sciences faculties of pedagogical higher educational institutions. The experiment was aimed at forming the readiness of future biology teachers for the implementation of healthcare-saving technologies in their professional activities and was based on the introduction of active and interactive forms and methods of educational technologies in the formation of healthcare-saving knowledge, organization of health and conservation projects and the use of information-health technologies.

Keywords Health · Health-saving · Health-saving technologies · The readiness of future biology teachers for the implementation of health-saving technologies in their professional activities

✉ Walery Zukow
w.zukow@wp.pl

Extended author information available on the last page of the article

1 Introduction

The beginning of the twenty-first century was marked by a whole set of global changes in the social, economic and spiritual spheres of society, the formation of a new philosophy of life with a characteristic loss of values that existed before and the emergence of new ones. The deterioration of the quality of life, mental, physical, and social disorders of a person reveal themselves in reducing the level of its adaptation to daily psychological and physical stress, early development of neuroses, psychosomatic and mental illness not only in adults but also in children.

Formation, preservation and strengthening of children's health, the upbringing of a healthy child in pedagogy have been considered as one of the most important problems for a rather long period. The use of civilization and cultural approaches to the conducting of historical and pedagogical analysis has allowed to distinguish the main tendencies of health preservation and realization of healthcare-saving technologies development in pedagogical activity. The genesis study of the views on the idea of health preservation has historically highlighted two basic doctrines of health: Western (rational one) and eastern (empathic one). The analysis of scientific and educational literature gives us a ground to conclude that none of the "health" concept definitions are not universal and do not entirely satisfy the demands of pedagogical practice. In terms of children's healthcare and their own teaching experience, it is reasonable to determine the "health" as a dynamic state of the person (including its positive and negative indicators), which changes in the process of life under the influence of social and environmental environment.

Taking it into consideration, one of the main strategies for the development of educational institutions is the organization of healthcare activities. In this context, the task of forming the readiness of future biology teachers to implement healthcare-saving technologies in the professional activity is gaining importance.

The need for development and substantiation of healthcare-saving activity theoretical and methodological foundations determines the relevance of the given problem and requires a profound rethinking of the essence as well as the content of healthcare-saving technologies educational implementation.

2 Problem

2.1 Statement

The theory and technology of healthcare in education were studied by Bezrukykh (2004), Bohomolova (2006), Voronin (2006), Meshcheriakova (2005), Zvieikova (2009), Zymivets (2008), Naumenko (Naumenko 2005), Kolonkova and Litovchenko (2009), Solovyov (Solovyov 2001) and others. Technologies of schoolchildren's spiritual health formation were investigated by Zahriichuk (2006), Kozak (2008), Kobiakov (2006), Melnyk (Melnyk 2005), Svyrydenko (2007); psychological health – by Chebykin (1987), Antypenko (2004), Yevseyeva (2007), Zavgorodnia (2007), Romanovska and Shportiy (2005); physical one – by Aksionova (2005), Vasyilkova (2007), Karpiuk (2008), Tkachenko (2011), Bolotin and Bakayev (2015), Maged et al. (2007) and others.

Research conducted by Aleksieyenko (2006), Bezrukykh (2004), Vasilieva (2004), Vershinina (2006), Zakopailo (2003), Lisitsyn and Sakhno (1988) indicate on the

formation of a value-based attitude to their health and environment, high motivation to healthcare as the most important component of future biology teachers' readiness to the healthcare-saving technologies implementation in professional activities.

Historical and pedagogical analysis of the emergence and development of the concept of "healthcare" in the education realm provided the ground to consider the concept of "healthcare-saving activity" as a process that contributes to the formation, strengthening and preservation of students' health at general secondary educational institutions.

To understand the specifics of the future biology teachers' professional pedagogical training, let us consider the essence of the concept of "healthcare-saving technologies". Healthcare-saving technologies are the ones that provide the activities of subjects of educational process in educational institutions in order to solve healthcare-saving tasks.

Analysis of pedagogical experience in the organizing of children's health preservation in the process of learning let to highlight the main areas of healthcare-saving technologies implementation in the professional activities of future biology teachers: educational one (aimed at knowledge and information processing skills development, allowing consciously to choose the actions necessary for healthy behaviour); behavioural one (aimed at the formation of healthcare-saving forms of behaviour); authorized one (aimed at the formation of children's own responsible attitude to health); social one (aimed at ensuring changes in the attitude towards their own health "Make your own choice!").

Understanding the "healthcare-saving technologies" term ensures the improvement of the content and selection of the most effective future biology teachers preparing forms and methods for the implementation of healthcare-saving technologies in their professional activities.

Thus, regarding the comprehensive analysis of the basic definitions, conducted within our study, the readiness of future biology teachers to implement healthcare-saving technologies in professional activities is considered as psychological and personal quality of higher pedagogical educational institutions graduates, formed as a result of a complex, scientifically and methodically-secured process. Its purpose is to provide students with the appropriate level of professional competence, which prepares them to the teaching of natural sciences, to the favourable healthcare environment creation in which students will not only preserve, but also develop their own health, form a careful attitude towards it.

The problem of future teachers training to the implementation of healthcare-saving technologies, however, has not been properly resolved until now.

3 Research questions

During the study, we need to answer the following questions:

- What is the basis of teacher's training for of healthcare-saving technologies implementation in the professional activity?
- What disciplines are the most important in training students for the implementation of healthcare-saving technologies in the professional activity?

- What teaching technologies are the most effective in the process of future educators' training for the healthcare-saving technologies implementation in the professional activity?
- What is the readiness of future teachers to implement the healthcare-saving technologies in the professional activity?
- What components constitute the readiness of students to implement the healthcare-saving technologies in the professional activity?
- What is the effectiveness of the healthcare-saving technologies implementation in the professional activities of future biology?

4 The purpose and objectives

Of the article resides in the development and introduction of the healthcare-saving technologies in the educational process of higher pedagogical educational institutions and verify their effectiveness experimentally in the professional activities of future biology teachers.

5 Methodology

Investigation of the future biology teachers' readiness to implement healthcare-saving technologies in the professional activities within the "Biology" course was conducted at Poltava National Pedagogical University named after V. G. Korolenko and some universities of Ukraine from 2011 to 2015. The basis of scientific research is the observation as a systematic purposeful study of the object; questionnaire as the most common method of obtaining information; comparison analysis as a method for comparing the features inherent in two or more objects.

The total of 548 students of experimental and control groups were involved in the experiment.

In the experimental group (EG), the students' training course was enriched with healthcare-saving material; innovative teaching technologies were introduced, which contributed to the formation of healthcare-saving knowledge system based on practical activities. In the control group (CG), teaching was carried out with a help of traditional teaching methods.

The evaluation of all the components of students' readiness in the control and experimental groups was carried out preliminarily. Between CG and EG students was also conducted the comparative analysis of the readiness index.

Due to quantitative and qualitative indicators the relative homogeneity of the students in CG and EG enabled us to provide greater reliability of the research results. Hence, an important factor at the development stage is the creation of identical starting conditions for the respondents of both groups.

Introduction of the methodology for future biology teachers' preparing for the healthcare-saving technologies implementation was provided by selected strategies. Healthcare-saving context of the educational process was realized through the

introduction of technologies of active and interactive forms and methods, based on effective communication between the subjects of this process, open dialogue and cooperation between teachers and students.

The conducted pedagogical experiment consisted in the search and introduction of effective ways of forming the future biology teachers' readiness for the implementation of healthcare-saving technologies in the educational process of natural sciences faculties at higher educational institutions, and revealing the relationship between the implementation of the developed method and the criteria formation of the given phenomenon (motivational-value, cognitive-informational, procedural-activity and personal-suggestive one). For the experiment implementation, the working hypothesis was put forward that the criteria formation level of future biology teachers' readiness to the implementation of healthcare-saving technologies in professional activities depends on the continuous supplementation of the educational courses with a content, forms, methods, means and special healthcare-saving technologies that will ensure the transformation of the acquired knowledge, skills and abilities of future educators into the readiness for the implementation of healthcare-saving technologies in professional activities.

The level and index of readiness for the healthcare-saving technologies realization in the professional activities of control and experimental groups' students were determined by the developed methods for assessing the criteria formation of the phenomenon under investigation, which was implemented after every stage of the research.

Estimation of the motivational-value criterion formation of future biology teachers' readiness for the implementation of healthcare-saving technologies was carried out on the basis of the "Motivation of professional activity" methodology (based on the development of K. Zamfir in the modification of A. Rean) (Rean 1999; Batarshev et al. 2007). The assessment of future biology teachers' readiness to the implementation of healthcare-saving technologies is based on the index that integrates and characterizes the degree of students' competence necessary to provide health care at a general secondary educational institution.

The calculation is based on the analysis of the students' response to the question "The cards for the evaluation of future biology teachers' competence regarding the implementation of healthcare-saving technologies in professional activities" (authorial development). The formation study of procedural-activity criterion was based on the usage of "The cards for the evaluation of future teachers of biology' procedural-activity criterion level of readiness to the implementation of healthcare-saving technologies in professional activities" Diagnostic card encompasses seven groups of future biology educators' skills for the healthcare-saving technologies implementation in professional activities: namely, gnostic, predictive, evaluation, design, constructive, communicative and organizational skills. Students evaluated their own level of the implementation independently. For this reason they marked the corresponding filed of the diagnostic card. The analysis of the cards data was conducted by converting the marks of students to the points: for the evaluation of one particular skill, the low level corresponded to two points, the average one – to four, the high one – to six points. The maximum number could not exceed 42 points.

The personality-suggestive criterion level estimation is based on the analysis of the integrated index, which characterized the level of students' communicative skills

necessary for the formation of a healthy lifestyle of secondary general educational institutions' students. The index was evaluated with a help of the answers analysis to the O. Leontiev's questionnaire (modified version) "Diagnosis of pedagogical communications effectiveness" and the test for the empathy assessment according to the "Diagnosis of the empathy level" method elaborated by Yusupov (Batarshev et al. 2007).

6 Results

6.1 The diagnostic stage

Regarding the analysis of the students' healthcare-saving technologies competence level, the situation is as follows (before the experiment): 10,41% of students believe that they have full proficiency of healthcare-saving technologies; 68,52% – possess a certain part of competence, but not sufficient; do not have any competence – 11,74%; It's hard to answer – 9,33%.

The revealed data underlines the necessity for a complex implementation of healthcare-saving technologies in the professional activities of future biology teachers, since only one in every ten of the interviewed students believes that he has sufficient level of healthcare competence, and seven out of ten define their level of knowledge as insufficient. An in-depth study of this issue implies the subjective nature of the knowledge assessment performed by students, since even among those 10,41% who considered themselves to have high proficiency of healthcare-saving technologies, 48% of them could not answer specific questions about the content of these technologies, give examples and conditions of use.

The analysis of students' responses to the practical skills of strengthening their own health condition showed the following results: 54,76% of respondents believe that they possess these skills; 38,32% – have insufficient level of competence; 1,78% – do not possess any competence; 5,14% of students found it difficult to answer.

16,21% of the respondents have full competence of individual projects creation for the formation of students' healthy lifestyle; 47,54% answered that they have some knowledge but it is insufficient; 25,47% – do not have any competence; 10,78% of students found it rather difficult to answer. As a result of the survey, it was found that 41,55% of future biology teachers believe that they have full competence of smoking prevention, alcohol and psychotropic substances abuse; insufficient amount of knowledge – 44,84%; do not have any competence – 8,74%, for 4,87% of respondents it was difficult to give a definite answer to this question. The results of the survey among teachers showed that 39,88% of them consider themselves to fully possess all the knowledge necessary for the healthcare-saving technologies implementation in the professional activities of future biology teachers; 53,17% have a certain part of competence but it is insufficient, 1,99% of respondents do not have any knowledge in this realm, 4,96% - found it hard to.

The interactive educational methods play an essential role in the healthcare-saving technologies implementation of future biology teachers' professional activity. Survey results indicate that 47,88% of teachers use interactive methods in the process of natural sciences disciplines teaching; business and role games are used by 42,15% of

educators; method of brainstorming – 38,71%; work in small groups – 61,11%; trainings – 36,14% of the interviewed teachers.

The obtained data reveals that the level of practical use of modern pedagogical technologies, which is a basic component of healthcare-saving technologies, is lower than the knowledge of healthcare-saving technologies in general, that implies the fact that the obtained knowledge does not find practical implementation in the professional activities of future biology teachers. Thus, the above indicators cannot be regarded as satisfactory, which underlines the need for methodological improvement regarding the implementation of healthcare-saving technologies in the professional activities of future biology teachers within educational institutions.

6.2 The development stage

The pedagogical experiment encompassed the introduction into the educational process of higher educational pedagogical institutions the system of healthcare-saving technologies (namely, the technologies of active and interactive forms and methods in the formation of healthcare-saving knowledge system, technologies of health-context learning organization, technologies of health-saving projects organization, health portfolio technology, the usage of information and health technologies, technologies of students' independent healthcare-saving work organization, technology of healthcare-saving critical thinking formation, social healthcare-saving technologies) to ensure the effectiveness of future biology educators' readiness to the formation of healthcare-saving environment at secondary schools. Particularly, multimedia learning technologies played a significant role in shaping the future teachers' healthcare-saving competence, visualizing the learning process (for instance, multimedia lectures). Students also used electronic textbooks, multimedia presentations, training simulators, communicative programs, videoconferencing as an important source of healthcare knowledge.

Performing of the tasks provided by the program of the pedagogical experiment in the control and experimental groups allowed the summarized data obtaining on the basis of which, for the purpose of statistical analysis, the law of readiness levels distribution for future biology teachers to implement healthcare-saving technologies was elaborated separately for each criterion: motivational-value, cognitive-informational, procedural-activity, person-suggestive criterion in particular. On the basis of the generalization of the results, high, medium and low levels of future biology teachers'

Table 1 Levels of future biology teachers' readiness for the implementation of healthcare-saving technologies in professional activity at the stage of the ascertaining (qualifying) experiment

Levels	Control group (%)	Experimental group (%)
High	–	–
Middle	26,03 ± 0,14	23,69 ± 0,13
Low	73,97 ± 0,11	76,31 ± 0,11

readiness to realize healthcare-saving technologies in the professional activity were determined. The results can be observed in Table 1.

The results of the study indicate that low level of future biology educators' to the implementation of healthcare-saving technologies in professional activities (control group – $73,97 \pm 0,11$ and experimental group – $76,31 \pm 0,11$).

According to the results of the experiment, obtained during the study of future biology teachers' readiness level for the implementation of healthcare-saving technologies in professional activities, one can conclude that the experimental group students have a high level of motivation-value criterion (80,9%) and a personality-suggestive criterion (81,5%) respectively, the middle level is observed in the formation of the procedural-activity criterion (79,52%) and cognitive-informational one (79,38%); in the control group index of the readiness of future biology teachers to implement healthcare-saving technologies is smaller: the average level is observed in the motivational-value criterion (60,69%), cognitive-informational one (61,05%), activity one (62,15%), and personality-suggestive one (60,78%).

The difference between the levels of motivation-value, cognitive-informational, procedural-activity and personality-suggestive criteria of future biology teachers' readiness to the healthcare-saving technologies implementation in the professional activities of the experimental and control groups requires verification of validity, which is carried out with a help of K. Pearson calculating criterion.

For a comparative assessment of the effectiveness of the process of forming the readiness of future biology teachers to implement healthcare-saving technologies in their professional activities, the results obtained during the ascertaining and forming (molding) experiments, as shown in Table 2. were summarized.

As a result of the introduction of the educational-methodical course "Healthcare-saving technologies in the professional activity of future teachers of biology" into the educational process of natural sciences faculties of higher educational pedagogical establishments and ensuring the continuity of the forming process of the future biology teachers' readiness to implement healthcare-saving technologies, 80,0% of students

Table 2 Dynamics of future biology teachers' readiness levels for the implementation of healthcare-saving technologies in professional activities (for each criterion)

Criterion	Group	Ascertaining experiment	Forming experiment
Motivation-value	KG	43,78	60,58
	EG	43,88	78,44
Cognitive-informational	KG	43,78	60,36
	EG	44,04	80,00
Procedural-activity	KG	43,91	62,13
	EG	43,68	77,92
Personality-suggestive	KG	43,73	61,47
	EG	43,80	81,24

Table 3 Levels of future biology teachers' readiness for the implementation of healthcare-saving technologies in professional activities at the of the forming (molding) experiment

Levels of formation	Control group (%)	Experimental group (%)
High	3,41 ± 0,35	17,47 ± 0,05
Middle	28,15 ± 0,44	29,31 ± 0,08
Low	68,44 ± 0,28	53,22 ± 0,12

involved in the experiment reached a high level of the cognitive-information criterion, 81,24% – high level of personality-suggestive criterion. 78,44% of experimental group students according to the motivational-value criterion and 77,92% according to the procedural-activity criteria have achieved the high level of readiness to the implementation of healthcare-saving technologies in professional activities.

After the conducting of the experiment, the index of readiness to introduce the healthcare-saving technologies in the professional activity of the control and experimental groups students according to the motivational-value, cognitive-informational, procedural-activity, and person-suggestive criteria were practically identical. On the basis of the summarized results of the pedagogical experiment high, medium and low levels were determined. The results are shown in Table 3.

The analysis of the Table above showed that students of the experimental group showed higher index of the readiness to implement healthcare-saving technologies in their professional activities than the control group students. Thus, the high level of future biology teachers' readiness of in the experimental group went up by 17,47%; average – up by 29,31%; the low went down by 53,22% after the forming experiment. In control groups the high level of formation increased to 3.41%; the average was down to 28,15%, the low dropped to 68,44%.

Using the given data, we will construct a tabular (Table 4) and graphical (Fig. 1) representation of the criteria formation dynamics for the readiness of future biology teachers to implement healthcare-saving technologies in their professional activities. Analysis of the graph showed that before the experiment, the levels of the motivational-

Table 4 Dynamics of future biology teachers' readiness levels for the implementation of healthcare-saving technologies in professional activities

Levels of formation	Ascertaining experiment	Forming experiment	Increase	Ascertaining experiment	Forming experiment	Increase
	Control group (%)			Experimental group (%)		
High		3,41%	3,41%		17,47%	17,47%
Middle	26,03%	28,15%	2,12%	23,69%	29,31%	5,62%
Low	73,97%	68,44%	–5,53%	76,31%	53,22%	–23,09%

Fig. 1 Dynamics of future biology teachers' readiness levels for the implementation of healthcare-saving technologies in professional activities

value, cognitive-informational, procedural-activity, personality-suggestive criteria of readiness to the implementation of healthcare-saving technologies in the professional activities of the experimental and control groups were almost identical, but at the stage of the forming experiment, the difference between the readiness levels of the both groups students became apparent.

The readiness for the implementation of healthcare-saving technologies in the professional activity of the control group students changed with a slight variation whereas in the experimental group its level significantly outnumbers the previous one.

The results of the conducted pedagogical experiment showed a positive dynamics in the formation of the readiness of future biology teachers to implement healthcare-saving technologies in professional activities, which was provided by the improvement of the educational process of universities through the introduction of the educational and methodological complex "Healthcare-saving technologies in the professional activities of future biology teachers" and ensuring the continuity of the future biology teachers' readiness forming process on the basis of special healthcare-saving technologies introduction.

7 Conclusion

Thus, the effectiveness of the implementation of healthcare-saving technologies in the professional activity reveals itself in the fact that students of the experimental group showed higher readiness index than the ones of the control group. The results of the study indicate a positive dynamics of the experimental groups' students, which confirms the effectiveness of the proposed experimental innovations.

The article does not cover the entire set of issues and does not encompass all aspects of improving the efficiency of the healthcare-saving technologies implementation in the

future biology teachers' professional activities. Prospects for further scientific research can be observed in the expansion of the practical focus of healthcare activity biology of teachers in secondary schools and improving the training of teachers to implement healthcare-saving technologies in the system of postgraduate education.

Authors' contributions MD-B, NH, MG, IG, WZ participated in the design of this study. MD-B, NH, MG performed the statistical analyses. MD-B, NH, MG, IG, WZ drafted the manuscript. MD-B, NH, MG were involved in data collection and/or made important intellectual contributions to the interpretation of data and the writing of paper. All authors critically revised and approved the final version.

Compliance with ethical standards

Ethics approval and consent to participate The research related to human use complied with all the relevant national regulations, institutional policies, and was in accordance with the tenets of the Helsinki Declaration. The study protocol was approved by the Ethical Committee of Poltava V. G. Korolenko National Pedagogical University, Poltava, Ukraine. The Ethical Committee consented in writing to the study. During realization of tests, all participants provided informed consent and used all measures for maintaining anonymity of participants.

Consent to publish Respondents give written informed consent to publish the study results anonymously.

Competing interests The authors declare that they have no competing interests.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

- Aksionova, O. (2005). Rehabilitation of physical health of children of educational institutions on the basis of a differentiated approach. *Director of the School*, 14, 25–26 [in Ukrainian].
- Aleksiyenko T. (2006). The role of national-mental values in the socialization of personality. *World of Education*. 4:20–23. [in Ukrainian].
- Antypenko, T. (2004). School for health promotion: Psychological support for children of grades 1–11 in the School of Health. *Psychologist*, 44, 17–19 [in Ukrainian].
- Batarshv, A. V., Alekseyeva, I. Y., & Mayorova, Y. V. (2007). *Diagnostics of professionally important qualities*. Sankt-Petersburg: Piter 192 p. [in Russian].
- Bezrukih, M. Health-saving school (2004). Russian academy of education, Moscow, MPSI, 240 p. [in Russian].
- Bogomolova, L. (2006). *Pedagogical support of health-preserving processes in preschool and general educational institutions: author's abstract*. Moscow: Institute of Theory and History of Education of the Russian Academy of Education [in Russian].

- Bolotin, A., & Bakayev, V. (2015). Structure and content of the educational technology of managing students' healthy lifestyle. *Journal of Physical Education and Sport*, 15(3), 362–364. <https://doi.org/10.7752/jpes.2015.03054>.
- Chebykin, O. (1987). *Improving the psychological training of teachers to control the emotional states of students. Emotional regulation of educational activities* (pp. 266–268). Odessa: South Ukrainian National Pedagogical University named after K. D. Ushynsky [in Ukrainian].
- Karpiuk, R. (2008). *Professional training of future specialists in adaptive physical education: theory and methodology: [monograph]*. Lutsk: OJSC Volyn Regional Printing House 504 p. [in Ukrainian].
- Kobiakov, Y. (2006). *Design and implementation of health-developing technology of physical education of students of high schools: author's abstract*. Moscow: Pedagogical Academy of Postgraduate Education [in Russian].
- Kolonkova, O., & Litovchenko, O. (2009). In) (Ed.), *Health-saving technologies in an educational institution*. Kiev: School world 128 p. [in Ukrainian].
- Kozak, L. (2008). Personally oriented learning as a health-preserving technology. Pedagogical Education: Theory and Practice. *Pedagogy. Psychology. Kiev, University*, 10(P. 2), 37–41.
- Lisitsyn, Y., & Sakhno, A. (1988). *Human health – Social value*. Moscow: Thought 270 p. [in Russian].
- Maged, N., Boulos, K., & Wheeler, S. (2007). The emerging web 2.0 social software: An enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal*, 24(1), 2–23. <https://doi.org/10.1111/j.1471-1842.2007.00701>.
- Melnyk, O. (2005). System approach to the formation of the culture of health of participants in the educational process. *Primary School*, 11, 14–16 [in Ukrainian].
- Meshcheriakova, G. (2005). *Organizational and pedagogical support for the implementation of health-saving technologies in the educational process of the university: The author's abstract*. Stavropol: North-Caucasian State Technical University [in Russian].
- Naumenko, Y. (2005). Health-saving activity of the school. *Pedagogy*, 6, 37–44 [in Russian].
- Rean, A. A. (1999). *Psychology of the study of personality*. St. Petersburg: Publishing house of Mikhailova VA 288 p. [in Russian].
- Romanovska, D., & Shportiy, T. (2005). Conditions for the preservation of schoolchild's psychological health. *Safety of Life*, 3, 55–58 [in Ukrainian].
- Solovyov, G. (2001). *Healthy way of life: scientific-theoretical and methodological foundations: [tutorial]. Part 1*. Stavropol: SSU 180 p. [in Russian].
- Svyrydenko, S. (2007). The Formation of the Skills of a Healthy Lifestyle. *Primary Education (School World)*, 16, 12–15 [in Ukrainian].
- Tkachenko, R. (2011). Formation of a healthy lifestyle by means of basketball. *Physical Education in Schools of Ukraine*, 1, 14–15 [in Ukrainian].
- Vasilieva, N. (2004). Organizational and pedagogical conditions for preserving the health of students when teaching in the secondary school: author's abstract. St. Petersburg, St. Petersburg Academy of Postgraduate Teacher Education [in Russian].
- Vasyukova, O. (2007). Experience of formation in students of healthy lifestyle skills by means of physical education. *Physical Education at School*, 5/6, 30–34 [in Ukrainian].
- Vershinina, I. (2006). *Formation and development of the value attitude to health in high school students of secondary general education schools: author's abstract*. Moscow: Mordovian State Pedagogical Institute named after M. Evseyev [in Russian].
- Voronin, D. (2006). *Formation of the Health Preserving Competence of Students of Higher Educational Institutions by Means of Physical Education: author's abstract*. Kherson: Kherson State University [in Ukrainian].
- Yevseyeva, O. (2007). To mental health through educational tasks. *The Way of Education*, 1, 38–41 [in Ukrainian].
- Zahriichuk, L. (2006). Formation of the culture of health of junior pupils through the introduction of health-saving educational technologies. *Primary school*, 11, 1–4 [in Ukrainian].
- Zakopailo, S. (2003). *Pedagogical bases of education in boys of 10-11 classes of values of a healthy way of life: author's abstract*. Kyiv: Institute for Education Problems of the Academy of Pedagogical Sciences of Ukraine [in Ukrainian].
- Zavgorodnia, O. (2007). The problem of psychological health: the attempt of theoretical analysis. *Practical Psychology and Social Work*, 1, 55–60 [in Ukrainian].
- Zviekova, V. (2009). *Preparation of future teachers for the organization of healthcare of students' leisure: author's abstract*. Odessa: South Ukrainian National Pedagogical University named after K.D. Ushynsky [in Ukrainian].

Zymivets, N. (2008). Social-pedagogical technologies of formation of responsible attitude to health in student's youth: author's abstract. Lugansk State Pedagogical University named after Taras Shevchenko. [in Ukrainian].

Affiliations

Maryna Diachenko-Bohun¹ · Nataliia Hrytsai² · Maryna Grynova³ · Igor Grygus⁴ · Walery Zukow⁵

Maryna Diachenko-Bohun
ecos.poltava2015@gmail.com

Nataliia Hrytsai
grynat1104@ukr.net

Maryna Grynova
grinovamv@gmail.com

Igor Grygus
grigus03@gmail.com

¹ Department of Ecology and Methodology of Teaching Biology of Poltava V. G. Korolenko National Pedagogical University, Ostrohradsky 2 St, Poltava 36003, Ukraine

² Department of Biology, Oncology and Medical Physiology of Rivne State University of Humanities, Plastova 31 St, Rivne 33000, Ukraine

³ Faculty of Natural Sciences of Poltava V. G. Korolenko National Pedagogical University, Ostrohradsky 2 St, Poltava 36003, Ukraine

⁴ Institute of Health Sciences, National University of Water and Environmental Engineering, Soborna 11 St, Rivne 33028, Ukraine

⁵ Department of Spatial Management and Tourism, Faculty of Earth Sciences, Nicolaus Copernicus University, Lwowska 1 St, 87-100 Toruń, Poland