European Journal of Contemporary Education
E-ISSN 2305-6746
2024. 13(4): 718-725
DOI: 10.13187/ejced.2024.4.718
https://ejce.cherkasgu.press




# The Level of Awareness of Health-Saving Educational Technologies Affects University Students' Cognitive and Educational Skills

Zhannat Saparkyzy [a, *], Gulzhas Toktaganova [a], Gani Baiulov [a], Nataliia Fominykh [b]

[a] Korkyt Ata Kyzylorda University, Kyzylorda, Republic of Kazakhstan
[b] Plekhanov Russian University of Economics, Moscow, Russian Federation

**Abstract**

The aim of this study is to longitudinally examine the cognitive and educational skills of university students regarding health-saving educational technologies (HSETs) through observation. In this context, 325 students affiliated to the faculty of education were included in the study. At the same time, 35 faculty members followed these students through observation between 2020–2023. In this context, the participants' cognitive skills, activation criterion levels, motivational needs criteria, and morale-value criteria were scored between 0 and 10 by each teacher. Accordingly, the participant's cognitive and educational levels of HSETs were determined as optimal (10 points), sufficient (8 points), acceptable (6 points), and critical (4 points). According to the findings, the cognitive criterion level of the participants decreased from 53.3 % to 8.1 %, the active criterion level from 64 % to 50 %, the motivational-need criterion level from 64.6 % to 42.6 %, and the moral value level from 36.2 % to 6.1 %. As a result, according to teacher observations, students' cognitive and educational skills towards HSETs have improved a lot. However, the level of activity criterion and motivational-need criterion was still high. Therefore, in order to improve the HSETs skills of the students, the curriculum could include the acquisition of these skills.

**Keywords:** health saving educational technologies, cognitive skills, educational skills, educaiton.

## 1. Introduction

Educational technologies have an important role in today's educational systems and constantly evolving technological tools offer various opportunities to support students' learning processes (Jin, Bridges, 2014). Especially in the field of health education, health saving educational technologies (HSETs) are attracting more and more attention (Kondratska, 2023). Health saving

* Corresponding author
E-mail addresses: zhannat290@gmail.com (Zh. Saparkyzy)

helps individuals to increase their health awareness and use health services more efficiently (Koycheva et al., 2019). In this context, the use of HSETs in students' educational activities has been an important area of research.

In recent years, youth health issues have become a very urgent problem, because there is a decrease in their motor activity, associated with many factors, and primarily with the use of modern achievements in the world of electronics (Nesi, 2020). Modern training programs and requirements for students have significantly changed their lifestyle: physical labor is practically absent, physical activity is minimized (Morrow et al., 2022; Woessner et al., 2021). In this regard, the use of HSETs in educational activities of students is one of the most urgent scientific problems. Therefore, it's critical to develop techniques for integrating physical activity with modern Technologies (Dao, yHong, 2024). The trend toward a more sedentary lifestyle calls for innovative teaching approaches that support young learners' physical and academic demands simultaneously (Cai et al., 2024). Reversing the trend of youth declines in motor activity may require integrating movement-based learning into the academic framework and scheduling regular breaks for physical activity.

The significance of student health and well-being in the demanding context of modern education cannot be emphasized (Marsh et al., 2023). Although there is substantial evidence linking academic achievement to health, educational institutions frequently have difficulty incorporating health promotion into their curricula (Blackford et al., 2022; Madsen, Bell, 2012; Wylie, Leedham-Green, 2017). This oversight may inadvertently cause students to experience higher levels of stress (Williams et al., 2015), physical inactivity (Fletcher et al., 2018), and related health hazards. Adding to the issue, neglect of this kind might worsen mental health problems and socio-emotional challenges, which are becoming more common among students (Upreti et al., 2024). In addition, the absence of a methodical approach to health promotion in educational institutions could exacerbate health equity disparities, especially for students from disadvantaged socioeconomic backgrounds (Lesser et al., 2024).

Analysed in this context, the aim of the study is the scientific justification of the psychological and pedagogical conditions for the impact of HSETs in improving students' mental activity. The aim of the formative (educational) stage of this experimental study is the theoretical and experimental substantiation of the effectiveness of the use of HSETs to improve mental activity and pedagogical conditions for their application in the educational process. In this regard, the research is aimed at identification and analysis of the level of formation of HSETs, identification and analysis of the level of teachers' competence, identification of pedagogical conditions that determine the effectiveness of the organisation of the process of improving mental activity through HSETs.

## 2. Methods

### Research Model

This longitudinal study evaluates the impact of HSETs on the educational outcomes of 325 university students. In the study, G-Power (University of Düsseldorf, Düsseldorf, Germany) programme was used to determine the minimum sample size. Accordingly, when $\alpha$=0.05, power (1- $\beta$ = 0.80), and effect size = 0.29, it was calculated that at least 296 people should participate in the study. In this context, voluntary 325 participants who regularly attend formal education at universities were determined by random method. The study was designed to track changes in health habits, mental activities and general health status of the identified groups of students.

32 educators observed the development of students throughout their educational process and their use of health-protective educational technologies for three years. The educators were selected from among experienced teachers and academics who have a direct educational relationship with the students. Observers took regular notes on students' engagement, level of interaction, health awareness and use of technology.

Since this research is a longitudinal research, necessary arrangements were made by following the same sample group in order to ensure the integrity of the data. In this context, the awareness levels of the participants regarding health-saving educational technologies were examined at 3-year intervals. As environmental variables, the change in the duration of using these technologies was taken into consideration. In this context, the observers will record the changes in the participants during this period. The observers methodically recorded the impact of health-protective educational technologies used in students' in-class and extracurricular activities. Observations were standardized using structured observation forms and the objectivity of the

educators' notes was maintained. In addition, students' academic performance, class participation, and health-related behavioral changes were examined through regular questionnaires and assessments.

**Research Group**

A total of 325 university students from departments affiliated to the faculty of education voluntarily participated in the study. The students remained the same throughout the study and were not subjected to any selection criteria. The confidentiality of the participants was protected in accordance with ethical rules and standards set by the university. The study included undergraduate students who are actively studying at this university. Participants with absenteeism, studying in another department, double majors were not included in the study. All participants were informed about the purpose, reason and possible effects of the study. The entire study was conducted in accordance with the principles set out in the Declaration of Helsinki.

**Observation Analysis Approach**

In this study, the effectiveness of health-protective educational technologies used to improve the mental activities and healthy lifestyles of 325 university students will be observed by 32 teachers for three years. Students' progress will be analyzed through four criteria (Cognitive, Active, Motivational-Need, Moral-Value) and four different levels (Optimal, Adequate, Acceptable, Critical).

**Evaluation Criteria and Levels**

Cognitive Criterion: The student's theoretical knowledge about healthy living and health protective technologies.

Active Criterion: The student's ability to independently solve problems related to healthy living and apply these technologies to different educational activities.

Motivational-Needs Criterion: Motivation to use health-protective technologies to improve mental activity.

Moral-Value Criterion: Level of perception of healthy living as a value.

Each student will be evaluated on these four criteria according to a scoring system of 10 (Optimal), 8 (Sufficient), 6 (Acceptable) and 4 (Critical).

**Data Collection Procedure**

Teachers will assess students' performance at regular intervals using a standardized observation form. Observations will be made on students' use of health-protective technologies, mental activity levels, health knowledge, and adoption of healthy lifestyles. For each criterion, the observation form will clearly describe and score the behaviors demonstrated by the learner and the knowledge, skills, motivation, and values they embody. In order to ensure the validity and reliability of this observation form, firstly, content validity was ensured by consulting expert opinions, and then the form was tested in a pilot group and its construct validity was analyzed. In order to ensure the reliability of the measurements, independent observations were made on the same students by different teachers, and the coefficient of concordance between the scores (Cronbach's Alpha) was calculated as 0.85. This value shows that the observation form has high reliability and that the student's knowledge, skills, motivation, and values towards health protective technologies are measured objectively.

**Statistical Analysis**

The data collected will be used to observe each student's progress at the beginning and at the end of the intervention. Each observer will analyze their own observations to identify changes and improvements in students' performance, and these observations will be compared with each other to identify an overall trend. This process will be used to evaluate the effectiveness of health-protective educational technologies, and the findings will shed light on the process of students' adoption of healthy lifestyles. In this context, the normality analyses of the participants' data were performed with Kolmogrov Smirnov Test, and it was determined that the data showed normal distribution. Since there is only one group and 2 different time measurements in our research, the data of the participants were analyzed with Paired Sample T test. The significance level in the study was determined as 0.05. The effect size (ES) magnitude was defined as follows: < 0.2 = trivial, 0.2 to 0.6 = small effect, >0.6 to 1.2 = moderate effect, >1.2 to 2.0 = large effect, and > 2.0 = very large.

## 3. Results

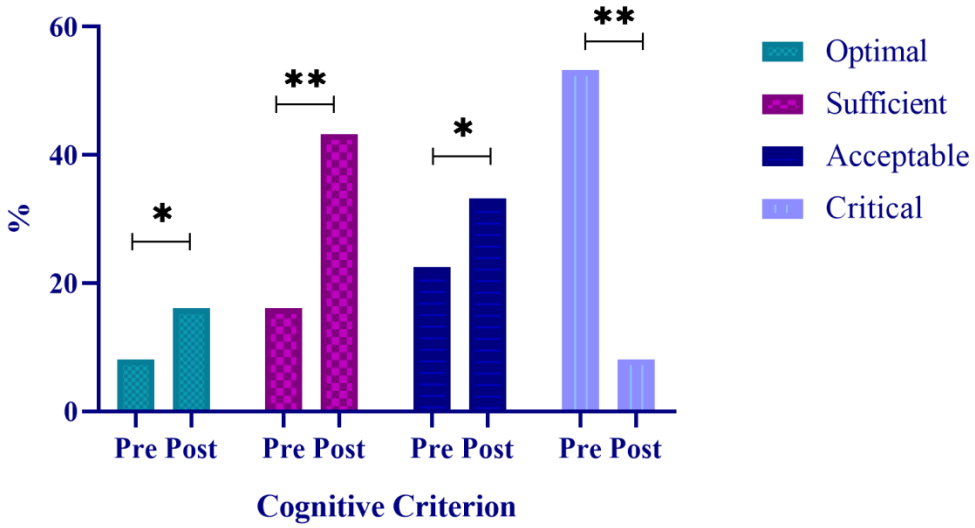


**Fig. 1.** Characteristics of the level of organization of the process of improving the mental activity of students through health-saving technologies (according to the cognitive criterion):
* p < 0.05, ** p < 0.001

Characteristics of the level of organization of the process of developing students' mental activity through health-saving technologies, were studied according to the cognitive criterion (Figure 1). Accordingly, the number of participants at the optimal level in the first measurement was 8.1%, and in the last measurement, it increased to 16.1 % (t = 2.897, p = 0.034, Cohen's d = 043). The number of those at the Sufficient level increased from 16.1 % to 43.3% (t = 9.567, p < 0.001, Cohen's d = 075). The number of those at Acceptable level increased from 22.5 % to 33.2 % (t = 3.927, p = 0.004, Cohen's d = 068). The number of those at the Critical level decreased from 53.3 % to 8.1 % (t = -7.895, p < 0.001, Cohen's d = 097).

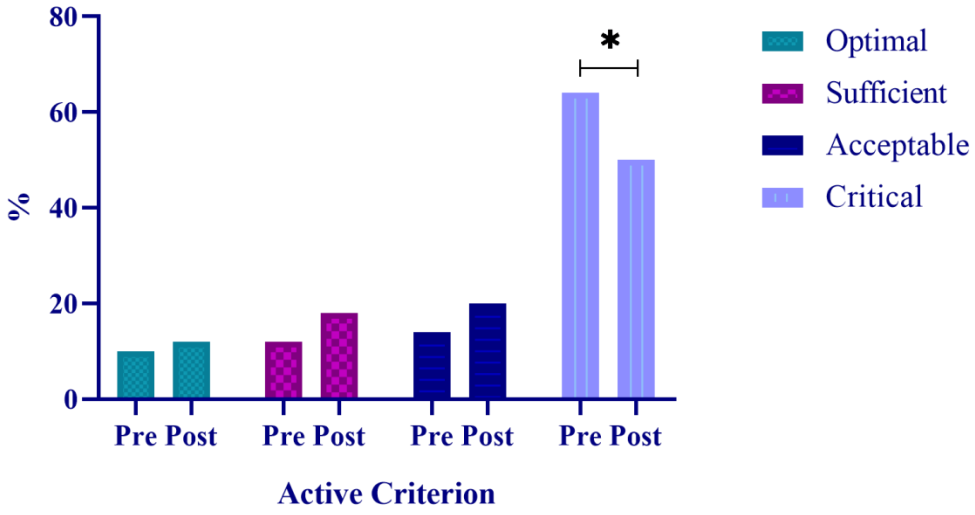


**Fig. 2.** Characteristics of the level of organization of the process of improving the mental activity of students through health-saving technologies (according to the active criterion):
* p < 0.05, ** p < 0.001

In Figure 2 the characteristics of the level of organization of the process of developing students' mental activity through health-saving technologies are analyzed according to the active criterion. Accordingly, the number of participants at the optimal level increased from 10 % before the observation to 12 % after 3 years, from 12 % to 18 % at the sufficient level, and from 14 % to

20 % at the acceptable level (p = 0.05). Those at the critical level decreased from 64 % to 50 % (t = -3.453, p = 0.009, Cohen's d = 0.072).

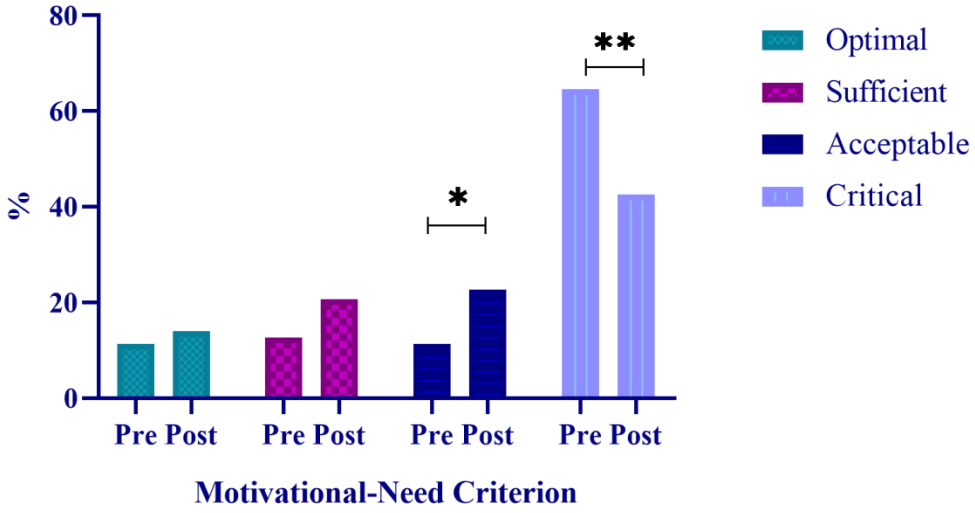


**Fig. 3.** Characteristics of the level of organization of the process of improving the mental activity of students through health-saving technologies (according to the motivational-need criterion):
* p < 0.05, ** p < 0.001

In Figure 3 the characteristics of the level of organization of the process of developing students' mental activity through health-saving technologies are observed according to the criterion of motivational need. Accordingly, the number of participants who were at the optimal level before the observation increased from 11.3 % to 14 % (p > 0.05), at the sufficient level from 12.6 % to 20.6 % (p > 0.05), and at the acceptable level from 11.3 % to 22.6 % (t = 3.026, p = 0.022, Cohen's d = 0.52). The number of critical levels decreased from 64.6 % to 42.6 % (t = -5.677, p > 0.001, Cohen's d = 0.88).

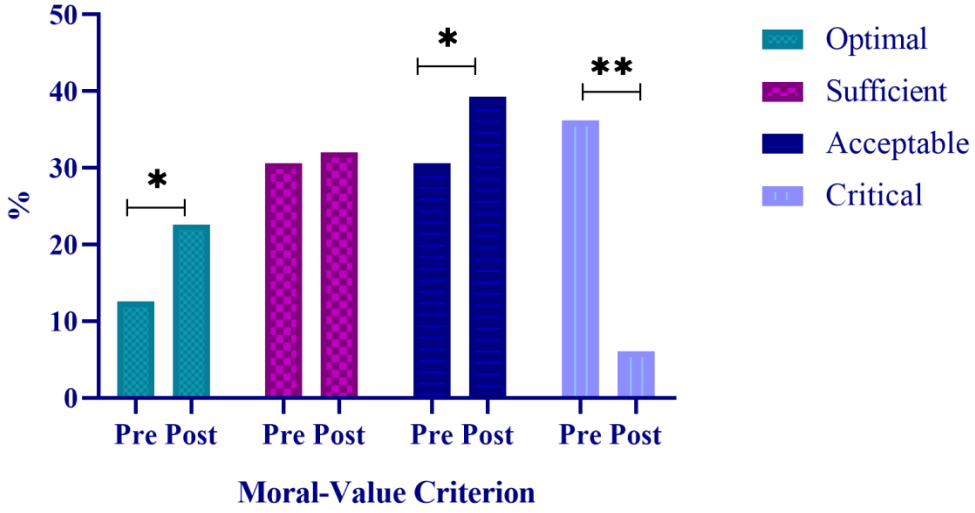


**Fig. 4.** Characteristics of the level of organization of the process of improving the mental activity of students through health-saving technologies (according to the moral-value criterion):
* p < 0.05, ** p < 0.001

In Figure 4 the characteristics of the level of organization of the process of developing students' mental activity through health-saving technologies are analyzed according to the criterion of moral value. Accordingly, before the observation, the number of participants at the optimal level increased from 12.6 % to 22.6 % (t = 3.269; p = 0.021), at the sufficient level from 30.6 % to 32 %

($p > 0.05$), at the acceptable level from 30.6 % to 39.3 % ($t = 2.925$, $p = 0.032$, Cohen's $d = 0.37$). The critical level decreased from 36.2 % to 6.1% ($t = -8.969$, $p < 0.001$, Cohen's $d = 0.91$).

## 4. Discussion

Important trends and implications for faculties of education are illustrated by this long-term survey of university students' cognitive and instructional abilities with reference to HSETs. In the participants' theoretical understanding and systematic knowledge of health saving technology, the number of those with a critical level of cognitive criteria decreased from 53.3 % to 8.1 %, while the number of those with an optimal and sufficient level increased. This allowed us to conclude that the educational activities provided at the faculty of education had a positive impact on cognitive skills. At the same time, this significant increase in theoretical knowledge demonstrates the successful integration of HSETs into the curriculum, potentially reflecting the effectiveness of innovative teaching methods and the assimilation of these concepts into students' academic routines (Sepulveda Larraguibel, Venegas-Muggli, 2019).

In contrast, the level of active criterion showed a modest decrease from 64 % to 50 %, which can be interpreted as students maintaining a relatively low ability to problem solve and actively apply HSET knowledge in various educational activities (Onipko, Dyachenko-Bohun, 2018). The relatively high retention of practical skills compared to theoretical understanding may reflect the effectiveness of hands-on teaching methods or students' preference for practical learning experiences (Bakiko et al., 2023). Furthermore, the ongoing retention of practical skills would suggest that the curriculum's experiential learning elements are more successful and stick in students' memories. This conclusion is consistent with theories of education that highlight "learning by doing" as an essential element of more profound involvement and comprehension (Fadeke Adeola Atobatele et al., 2024). In order to overcome the identified gaps in cognitive criteria, educators could think about adding additional project-based assignments, internships, and simulation exercises to the curriculum. These activities would force students to use their HSET knowledge in real-world situations.

The number of those with a critical level of motivational need has decreased from 64.6 % to 42.6 %, although it is still higher in the current situation. While this decline is significant, the remaining level still reflects a moderately high motivation among students to engage with HSETs, which is encouraging for educators aiming to instill such values (Kondratska, 2023). This aspect of the findings highlights the importance of sustaining and promoting student interest and perceived interest in health-saving practices in educational settings (Kondrashova et al., 2020). It also highlights how important it is to create state-of-the-art teaching techniques that will engage students in health-saving behaviors and increase their interest over time (Stepanova et al., 2023). These tactics could include incorporating current health topics into the curriculum, encouraging student participation in the topics studied, and giving students the chance to observe how HSETs are used in the real world. In this way, the intrinsic value of these practices can be increased for both students and their future employers.

The decrease in the proportion of students exhibiting critical moral values towards HSETs from 36.2 % to 6.1 % and the increase in the levels of optimal and adequate moral values is an indication of a positive change in the ethical perception of HSETs in the student population. These results reflect a deeper integration of health awareness principles as core values rather than just academic concepts (Klymovych, 2019). The growth in optimal and adequate moral values underlines the potential success of pedagogical strategies aimed at promoting a values-based approach to health and well-being in the educational environment (Haydon , 2004). It highlights the importance of a values-based educational framework that not only conveys knowledge but also instills the moral imperatives of adopting and promoting a healthy lifestyle, which is crucial for the development of future educators and public health advocates.

## 5. Conclusion

Faculty members have noted a positive overall development in cognitive and educational capabilities toward HSETs. Though there has been a general reduction, the persistently high activity criteria and motivational need criteria indicate that some components of learning are more resilient than others. The requirement for an educational program that strategically addresses all domains – cognitive, active, motivational-need, and moral-value—in order to provide a thorough and well-rounded grasp of HSETs is highlighted by this differential resilience. Consequently, it is

advised that the curriculum emphasizes the integration of HSETs abilities with solid theoretical foundations and value-based education in addition to just requiring students to acquire these skills. Among the strategies might be more reflective and participatory teaching techniques that link theory to practice and help students develop a stronger sense of personal connection to the principles of a healthy lifestyle. Furthermore, using case studies, real-world problem-solving scenarios, and peer-teaching approaches may improve students' moral values, motivation, and cognitive comprehension of HSETs. It is recommended that more research be done to investigate the underlying reasons of the trends that have been seen and to identify the best remedies to deal with the decreases in moral-value and cognitive standards. External elements, such as cultural, socioeconomic, and institutional influences that transcend the classroom, should also be taken into account in this type of research since they may have an impact on student participation and perception.

**References**

Bakiko et al., 2023 – *Bakiko, I., Konovalchuk, A., Mordyk, M.* (2023). Attitude of students of grades 5-11 towards physical education. *Health-Saving Technologies, Rehabilitation and Physical Therapy*. 4(1): 34-42. DOI: https://doi.org/10.58962/HSTRPT.2023.4.1.34-42

Blackford et al., 2022 – *Blackford, K., Portsmouth, L., Crawford, G., Burns, S., Jancey, J., Leavy, J.* (2022). The Health Promotion Curriculum: Evolving and Embedding Competencies in Contemporary Courses. In International Handbook of Teaching and Learning in Health Promotion (pp. 109–131). Springer International Publishing. DOI: https://doi.org/10.1007/978-3-030-96005-6_8

Cai et al., 2024 – *Cai, S., Liu, Y., Dang, J., Zhong, P., Shi, D., Chen, Z., Hu, P., Ma, J., Dong, Y., Song, Y., Raat, H.* (2024). Clustering of Multilevel Factors Among Children and Adolescents: Associations With Health-Related Physical Fitness. *Journal of Physical Activity and Health*. 21(1): 29-39. DOI: https://doi.org/10.1123/jpah.2023-0051

Dao, Hong, 2024 – *Dao, J., Hong, L.* (2024). Application of Exercise Recommendation Model Based on Deep Reinforcement Learning. *International Journal of Computer Science and Information Technology*. 2(1): 378-383. DOI: https://doi.org/10.62051/ijcsit.v2n1.39

Fadeke Adeola Atobatele et al., 2024 – *Fadeke Adeola Atobatele, Percy Chris Kpodo, Isabel Obiageli Eke* (2024). A Systematic Review Of Learning Community Impacts On International Student Success. *International Journal of Applied Research in Social Sciences*. 6(3): 421-439. DOI: https://doi.org/10.51594/ijarss.v6i3.967

Fletcher et al., 2018 – *Fletcher, G.F., Landolfo, C., Niebauer, J., Ozemek, C., Arena, R., Lavie, C.J.* (2018). Promoting Physical Activity and Exercise. *Journal of the American College of Cardiology*. 72(14): 1622-1639. DOI: https://doi.org/10.1016/j.jacc.2018.08.2141

Haydon, 2004 – *Haydon, G.* (2004). Values education: sustaining the ethical environment. *Journal of Moral Education*. 33(2): 115-129. DOI: https://doi.org/10.1080/0305724042000215186

Jin, Bridges, 2014 – *Jin, J., Bridges, S.M.* (2014). Educational Technologies in Problem-Based Learning in Health Sciences Education: A Systematic Review. *Journal of Medical Internet Research*. 16(12): e251. DOI: https://doi.org/10.2196/jmir.3240

Klymovych et al., 2019 – *Klymovych, V., Oderov, A., Romanchuk, S., Lesko, O., Korchagin, M.* (2019). Motivation of Forming Students' Healthcare Culture on Principles of Interdisciplinary Integration. *Sport Mont*. 17(3). DOI: https://doi.org/10.26773/smj.191017

Kondrashova et al., 2020 – *Kondrashova, L.V., Kondrashov, M.M., Chuvasova, N.O., Deforzh, H.V., Kalinichenko, N.A.* (2020). El ahorro de salud como dirección estratégica de la formación del personal docente [Health saving as strategic direction of teaching staff training]. *Revista de Investigación Apuntes Universitarios*. 11(1): 450-461. DOI: https://doi.org/10.17162/au.v11i1.596 [in Spanish]

Kondratska, 2023 – *Kondratska, H.* (2023). Health-saving technologies in the formation of competencies of specialists in the field of knowledge education. *Scientific Journal of National Pedagogical Dragomanov University. Series 15. Scientific and Pedagogical Problems of Physical Culture (Physical Culture and Sports)*. 5(165): 57-61. DOI: https://doi.org/10.31392/NPU-nc.series15.2023.5K(165).12

Koycheva et al., 2019 – *Koycheva, T., Budnik, A., Khyzhniak, I.* (2019). The Health Saving Technologies at a Pedagogical University. *Georgian Medical News*. 297: 117-123.

Lesser et al., 2024 – *Lesser, I., Thomson, C., Lem, M.* (2024). Green Exercise as an Opportunity to Promote Equity in Physical Activity Engagement Across Diverse Populations. *Journal of Physical Activity and Health*. Pp. 1-3. DOI: https://doi.org/10.1123/jpah.2024-0091

Madsen, Bell, 2012 – *Madsen, W., Bell, T.* (2012). Using health promotion competencies for curriculum development in higher education. *Global Health Promotion.* 19(1): 43-49. DOI: https://doi.org/10.1177/1757975911428818

Marsh et al., 2023 – *Marsh, H.W., Dicke, T., Riley, P., Parker, P. D., Guo, J., Basarkod, G., Martin, A.J.* (2023). School principals' mental health and well-being under threat: A longitudinal analysis of workplace demands, resources, burnout, and well-being. *Applied Psychology: Health and Well-Being*. 15(3): 999-1027. DOI: https://doi.org/10.1111/aphw.12423

Morrow et al., 2022 – *Morrow, D., Kirk, A., Muirhead, F., Lennon, M.* (2022). Letting the World See through Your Eyes: Using Photovoice to Explore the Role of Technology in Physical Activity for Adolescents Living with Type 1 Diabetes. *International Journal of Environmental Research and Public Health*. 19(10): 6315. DOI: https://doi.org/10.3390/ijerph19106315

Nesi, 2020 – *Nesi, J.* (2020). The Impact of Social Media on Youth Mental Health. *North Carolina Medical Journal.* 81(2): 116-121. DOI: https://doi.org/10.18043/ncm.81.2.116

Onipko, Dyachenko-Bohun, 2018 – *Onipko, V., Dyachenko-Bohun, M.* (2018). Ethics of Enhancement of Health-Saving Technologies in Educational Environment of Higher Educational Agency. *The Sources Of Pedagogical Skills*. 22: 157-161. DOI: https://doi.org/10.33989/2075-146x.2018.22.185273

Sepulveda Larraguibel, Venegas-Muggli, 2019 – *Sepulveda Larraguibel, Y., Venegas-Muggli, J.I.* (2019). Effects of Using Thinking Routines on the Academic Results of Business Students at a Chilean Tertiary Education Institution. *Decision Sciences Journal of Innovative Education*. 17(4): 405-417. DOI: https://doi.org/10.1111/dsji.12191

Stepanova et al., 2023 – *Stepanova, G.A., Kassymova, G.K., Arpentieva, M.R., Kurmanbai, D.B., Lyskova, G.T.* (2023). Inclusive Health-Saving Education: Ecological Model of Modern Educational Relations. *Materials of International Practical Internet Conference "Challenges of Science"*. Pp. 40-52. DOI: https://doi.org/10.31643/2023.05

Upreti et al., 2024 – *Upreti, K., Kushwah, V. S., Vats, P., Alam, Md. S., Singhai, R., Jain, D., Tiwari, A.* (2024). A SWOT analysis of integrating cognitive and non-cognitive learning strategies in education. *European Journal of Education*. DOI: https://doi.org/10.1111/ejed.12614

Williams et al., 2015 – *Williams, H., Simmons, L.A., Tanabe, P.* (2015). Mindfulness-Based Stress Reduction in Advanced Nursing Practice. *Journal of Holistic Nursing*. 33(3): 247-259. DOI: https://doi.org/10.1177/0898010115569349

Woessner et al., 2021 – *Woessner, M.N., Tacey, A., Levinger-Limor, A., Parker, A.G., Levinger, P., Levinger, I.* (2021). The Evolution of Technology and Physical Inactivity: The Good, the Bad, and the Way Forward. *Frontiers in Public Health*. 9. DOI: https://doi.org/10.3389/fpubh.2021.655491

Wylie, Leedham-Green, 2017 – *Wylie, A., Leedham-Green, K.* (2017). Health promotion in medical education: lessons from a major undergraduate curriculum implementation. *Education for Primary Care*. 28(6): 325-333. DOI: https://doi.org/10.1080/14739879.2017.1311776