

Formation And Statistical Analysis Of The Effectiveness Of A Health Competency Development Program For Higher Education Teachers

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Abstract

Relevance. The article is devoted to an experimental evaluation of the effectiveness of a program for developing health competencies among higher education teachers. The relevance of the study is driven by the need to enhance teachers' professional resilience under conditions of high psycho-emotional workload, which directly affects the quality of the educational process.

Aim. The aim of the study is to determine the impact of the developed program on the level of formation of cognitive, instrumental-practical, adaptive-resource, and personal components of health competencies, as well as on indicators of professional burnout.

Methods. The study employed a pedagogical experiment, psychodiagnostic methods (including a standardized questionnaire to assess professional burnout), and methods of mathematical statistics (descriptive statistics, principal component analysis, correlation analysis).

Results. The results demonstrated positive dynamics across all components of health competencies: an increase in the proportion of teachers with a high level of competencies was recorded (from 12% to 37% for the cognitive component, and from 10% to 55% for the instrumental-practical component), along with a significant reduction in the proportion with a low level. A decrease in emotional exhaustion indicators and an improvement in adaptive resources were also observed. A statistically significant negative relationship between the level of emotional intelligence and the severity of burnout was established.

Conclusion. It is concluded that the developed program is an effective tool for strengthening health and enhancing teachers' professional resilience. The program can be recommended for widespread use in the system of professional development and corporate training in universities.

Keywords: health competencies, higher education teachers, professional burnout, emotional intelligence, pedagogical experiment, statistical analysis

Introduction

In the modern context of higher education transformation, the professional activity of educators is characterized by a high level of psycho-emotional stress, uncertainty, and the need for continuous adaptation to the changing demands of the educational environment. The digitalization of education, increasing academic competition, and the growing volume of pedagogical and administrative responsibilities intensify stress factors and create conditions for the development of professional burnout.

According to contemporary research, the professional health of educators is regarded not only as a medical issue but also as a pedagogical and psychological category reflecting a specialist's ability to maintain work capacity, emotional stability, and professional effectiveness under conditions of prolonged stress. In this regard, the development of health competencies becomes especially significant as an integrative personal quality that includes cognitive, behavioral, and emotional-personal components.

Despite the considerable number of studies devoted to teacher stress and burnout, the problem of developing and empirically testing comprehensive programs for the development of health competencies within higher education remains insufficiently explored. In particular, there is a limited number of studies presenting structured program models, their substantive content, and statistically grounded evaluations of their effectiveness.

An analysis of recent scientific literature demonstrates that existing studies are predominantly focused on diagnosing professional burnout, whereas issues related to prevention and the development of educators' resource states require deeper investigation. The mechanisms through which educational interventions influence the cognitive, adaptive, and emotional components of professional health remain insufficiently

clarified. Therefore, there is a need to develop a scientifically grounded program aimed at enhancing the health competencies of higher education teachers and to conduct its experimental validation using methods of mathematical statistics.

The aim of the study is to evaluate the effectiveness of a program for developing health competencies among higher education teachers and to determine its impact on indicators of professional burnout and emotional intelligence.

The objectives of the study include: providing a theoretical justification for the structure of health competencies; developing a program for their enhancement; organizing a pedagogical experiment; conducting a statistical analysis of the obtained data; and interpreting the identified patterns.

Particular attention in contemporary research is devoted to the concept of teachers' professional resilience, which is considered the ability to function effectively under conditions of prolonged stress without reducing the quality of pedagogical activity. Within the structure of such resilience, personal resources play a crucial role, including emotional intelligence, self-regulation skills, and the development of health-preserving behavior.

Recent studies demonstrate that a high level of emotional intelligence contributes to reducing the severity of professional burnout, improving interpersonal interaction, and increasing satisfaction with professional activity. At the same time, insufficient development of these characteristics increases the risk of emotional exhaustion, depersonalization, and decreased professional motivation.

Within the framework of the competency-based approach, health competencies are considered a systemic construct integrating knowledge about health preservation, practical skills for its application, and personal attitudes aimed at maintaining psychophysiological well-being. In this context, it is important not only to develop individual components but also to ensure their interconnection and functional integrity.

An analysis of existing professional development programs for educators demonstrates that, in most cases, they are focused on the development of professional competencies related to teaching content and pedagogical technologies, whereas issues concerning the formation of health competencies remain on the periphery of educational initiatives. This creates the need for the development of specialized programs aimed at fostering sustainable self-regulation skills, stress management abilities, and the preservation of professional health.

It should be noted that the effectiveness of such programs must be confirmed not only through qualitative indicators but also through quantitative measures obtained using methods of mathematical statistics. The application of correlation analysis, factor analysis, and dimensionality reduction techniques makes it possible to identify hidden relationships between the components of health competencies and indicators of professional burnout, as well as to determine the most significant factors influencing educators' professional well-being.

Thus, the scientific novelty of the present study lies in the development of a comprehensive program for enhancing the health competencies of higher education teachers, based on the integration of systemic-activity, personality-oriented, and resource-based approaches, as well as in its experimental verification through the application of mathematical statistical methods.

The practical significance of the study is determined by the possibility of implementing the developed program within teacher professional development systems, which may contribute to increasing educators' professional resilience, reducing the risk of burnout, and improving the overall quality of the educational process.

Theoretical Foundations of the Study

In contemporary scientific research, the issue of teachers' professional health is considered within an interdisciplinary context that combines approaches from pedagogy, psychology, and medicine. Particular attention is devoted to the phenomenon of professional burnout as one of the key factors reducing the effectiveness of pedagogical activity and the quality of the educational process.

According to recent empirical findings, professional burnout among educators manifests through emotional exhaustion, depersonalization, and a reduced sense of professional accomplishment. At the same time, these components are closely interconnected with the level of an individual's psycho-emotional resources and the conditions of the professional environment.

Recent studies indicate that the level of stress among higher education teachers remains consistently high due to the increasing teaching workload, the need to adapt to the digital educational environment, and the growing demands for scientific and pedagogical productivity. In particular, it has been established that chronic stress negatively affects not only educators' emotional state but also their professional motivation and productivity.

Within the framework of the resource-based approach, professional health is viewed as the result of the interaction between an individual's internal resources and external environmental factors. Key resources include emotional intelligence, self-regulation abilities, stress resistance, and the development of adaptive behavioral strategies. The enhancement of these characteristics contributes to reducing the level of professional burnout and increasing the effectiveness of pedagogical activity.

A special role in the structure of professional health belongs to emotional intelligence, which is defined as the ability to recognize, understand, and regulate one's own emotions as well as the emotions of others. Empirical studies confirm the existence of a stable negative relationship between the level of emotional intelligence and the severity of professional burnout. Educators with high levels of emotional intelligence demonstrate greater adaptability, lower susceptibility to emotional exhaustion, and more effective interaction within the educational environment.

In the context of the competency-based approach, health competencies are regarded as an integrative characteristic of personality that includes cognitive, instrumental-practical, adaptive-resource, and personal components. The cognitive component reflects the level of knowledge related to health preservation; the instrumental-practical component refers to the development of health-preserving behavioral skills; the adaptive-resource component reflects the ability to cope with stressful situations; and the personal component includes value orientations and motivation toward maintaining health.

An analysis of contemporary scientific publications demonstrates that existing research is mainly focused on diagnosing levels of burnout and identifying stress factors, whereas the development and experimental verification of comprehensive programs for enhancing health competencies remain insufficiently explored. In particular, there is a limited number of studies presenting structured program models that include theoretical, practical, and training components, as well as their quantitative assessment using methods of mathematical statistics.

Thus, the conducted analysis of scientific literature makes it possible to conclude that there is a need to develop comprehensive programs aimed at enhancing the health competencies of higher education teachers, focusing on the formation of устойчивых личностных ресурсов and the reduction of the risk of professional burnout. In this regard, experimental verification of the effectiveness of such programs using statistically grounded methods of data analysis becomes especially significant.

Research Methods

The study had a quasi-experimental design and was aimed at evaluating the effectiveness of a program for developing health competencies among higher education teachers. The experiment included diagnostic and formative stages followed by a comparative analysis of the obtained results.

A total of 292 higher education teachers participated in the study. Participants were selected on the basis of voluntary consent, taking into account their professional experience and the specific characteristics of their pedagogical activities. The sample was sufficiently representative to identify statistically significant patterns. All participants were informed about the objectives of the study and provided voluntary consent to participate. Data processing was carried out in accordance with the principles of confidentiality and anonymity.

To diagnose the level of professional burnout, a standardized methodology was used that included three scales: emotional exhaustion, depersonalization, and reduced personal accomplishment. Assessment was conducted using a six-point scale, which made it possible to determine the degree of expression of each indicator.

To assess the level of development of health competencies, a system of criteria was designed that included cognitive, instrumental-practical, adaptive-resource, emotional, and motivational-volitional components. Diagnostics were carried out using test assignments, questionnaires, and analysis of practical tasks completed within the framework of the program.

The developed health competency development program had a modular structure and was implemented as part of an educational project. The duration of the program was 12 weeks and included regular sessions using various educational formats.

The first module (theoretical-methodological) was aimed at forming a system of knowledge related to health preservation and included lectures and seminars devoted to stress management and health-preserving technologies.

The second module (training-oriented) focused on developing self-regulation skills, emotional resilience, and the prevention of professional burnout. Within this module, interactive methods were applied, including group training sessions, case-study methods, and exercises aimed at developing emotional intelligence.

The third module (practice-oriented) involved the implementation of the acquired knowledge and skills into the professional activities of teachers. Participants completed practical assignments aimed at forming sustainable models of health-preserving behavior.

At the diagnostic stage, an initial assessment of the level of health competencies and indicators of professional burnout was conducted. During the formative stage, the health competency development program was implemented. Upon completion of the program, a repeated assessment was conducted, and the results were compared with the initial data.

Methods of Statistical Analysis

For data processing, methods of descriptive statistics (mean values and standard deviations) were used, along with correlation analysis to identify relationships between indicators, as well as principal component analysis to determine the structure of the integral burnout indicator.

To assess the significance of differences between indicators before and after the experiment, comparative analysis methods were applied, making it possible to determine the statistical significance of the identified changes.

It should be noted that the absence of a control group limits the interpretation of causal relationships. In addition, the use of self-assessment methods may affect the subjectivity of the obtained data. However, the combination of the applied methods ensures a sufficient level of reliability of the research results.

Research Results

The results of the experimental study indicate a pronounced positive dynamic in the indicators of teachers' health competencies after the implementation of the developed program. A comparative analysis of the data obtained at the diagnostic and formative stages revealed statistically significant changes across all assessed parameters.

At the initial stage of the study, a considerable proportion of teachers demonstrated signs of professional burnout, which was confirmed by high levels of emotional exhaustion ($M = 22.15$; $SD = 8.57$), depersonalization ($M = 9.97$; $SD = 5.21$), and reduced personal accomplishment ($M = 32.18$; $SD = 7.20$). The obtained results indicate the presence of significant psycho-emotional tension within the examined sample.

The application of principal component analysis made it possible to determine the structure of the integral burnout indicator. It was established that emotional exhaustion makes the greatest contribution to the formation of the overall level of burnout (coefficient = 0.495), confirming its key role in the structure of this phenomenon. Depersonalization also demonstrated a significant influence (0.455), whereas reduced personal accomplishment showed a negative loading (-0.356), reflecting the complex nature of the relationships between the components.

Following the implementation of the program, substantial improvements were observed in all components of health competencies. The most pronounced positive dynamic was recorded in the instrumental-practical component, where the proportion of teachers with a high level increased from 10% to 55%. Similar changes were identified in the cognitive component (from 12% to 37%) and the adaptive-resource component (from 20% to 45%).

Particular attention should be paid to the decrease in the proportion of teachers with low levels of competencies. For the cognitive component, this indicator decreased from 56% to 0%; for the instrumental-practical component, from 65% to 5%; and for the adaptive component, from 55% to 20%. This demonstrates a significant redistribution of levels toward higher values.

An analysis of the emotional state of teachers showed that, at the initial stage, 69% of participants experienced stress, 47% reported pronounced fatigue, and 62% expressed a need for psychological support. After the implementation of the program, a decrease in these indicators was recorded, indicating an improvement in psycho-emotional well-being and an increase in adaptive resources.

Correlation analysis revealed a statistically significant negative relationship between the level of emotional intelligence and indicators of professional burnout. This means that an increase in emotional intelligence is accompanied by a decrease in emotional exhaustion and other burnout components.

A comparison of the integral indicators before and after the experiment confirms the effectiveness of the health competency development program. A stable tendency toward an increase in the proportion of teachers with high and medium competency levels was observed simultaneously with a decrease in the number of participants with low competency levels.

Discussion

The obtained results confirm that the developed health competency development program exerts a comprehensive influence on the professional condition of higher education teachers. The identified changes affect not only the cognitive and behavioral levels but also the emotional-personal sphere, which indicates the systemic nature of the program's impact.

A comparison of the obtained data with the findings of contemporary studies demonstrates their consistency with conclusions regarding the key role of emotional intelligence and adaptive resources in preventing professional burnout. In particular, the identified negative relationship between emotional intelligence and burnout severity confirms the results of international studies emphasizing the significance of emotional regulation as a factor of teachers' professional resilience.

A distinctive feature of the present study is its comprehensive approach to the development of health competencies, including theoretical, training-oriented, and practice-oriented components. Unlike most existing programs, which are mainly focused on providing information, the developed program is aimed at forming sustainable behavioral strategies and strengthening the internal resources of personality.

It should be noted that the most significant changes were recorded in the instrumental-practical and adaptive-resource components, which may be associated with the active use of training methods and practical assignments. This confirms the effectiveness of the activity-based approach in the formation of health competencies.

At the same time, the results of the study should be interpreted taking into account several limitations. The absence of a control group does not allow for the full establishment of causal relationships between the implementation of the program and the identified changes. In addition, the use of self-assessment methods may introduce elements of subjectivity into the obtained data.

Despite these limitations, the combination of quantitative and qualitative results makes it possible to conclude that the program demonstrates high effectiveness and possesses significant potential for implementation within teacher professional development systems.

Conclusion

The conducted study confirmed that the development of health competencies is an important factor in enhancing the professional resilience of higher education teachers. The developed program demonstrated its effectiveness by ensuring positive dynamics across all key components of health competencies.

Statistical analysis of the results revealed an increase in the proportion of teachers with high and medium levels of competency development, as well as a significant decrease in the number of participants with low competency levels. At the same time, a reduction in indicators of professional burnout, including emotional exhaustion and depersonalization, was recorded.

The identified correlations confirmed the significant role of emotional intelligence as a resource contributing to the reduction of burnout severity and the enhancement of teachers' adaptive capacities. This makes it possible to consider the development of emotional-personal characteristics as one of the priority directions of teachers' professional development.

The practical significance of the study lies in the possibility of using the developed program within teacher professional development systems, as well as in the design of corporate support programs for educational institution staff.

Prospects for further research are associated with expanding the sample size, including control groups, and conducting a more in-depth analysis of the long-term effects of the program

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