doi: 10.15330/msuc.2021.25.102-106

Борис Савчук,
доктор історичних наук, професор,
професор кафедри педагогіки та педагогічного менеджменту, імені Богдана Ступарика,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Borys Savchuk,
Doctor of Historical Sciences, Professor,
Professor Department of Pedagogy and Pedagogical Management named after Bohdan Stuparyk,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
boris_savchuk@ukr.net
ORCID ID 0000-0003-2256-0845

Руслана Романишин,
доктор педагогічних наук, доцент,
професор кафедри фахових методик і технологій початкової освіти,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Ruslana Romanyshyn,
Doctor of Pedagogical Sciences,
Professor of the Department of Professional Methods and Technologies of Primary Education,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
ruslana.romanyshyn@pnu.edu.ua
ORCID ID 0000-0001-8480-2702

Ліліана Хімчук,
доктор педагогічних наук, доцент,
професор кафедри фахових методик і технологій початкової освіти,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Liliana Khimchuk,
Doctor of Pedagogical Sciences,
Professor of the Department of Professional Methods and Technologies of Primary Education,
Vasil Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
liliana.khimchuk@pnu.edu.ua,
ORCID ID 0000-0002-9243-3131

Леся Височан,
доктор педагогічних наук, доцент,
професор кафедри фахових методик і технологій початкової освіти,
Прикарпатський національний університет імені Василя Стефаника (м. Івано-Франківськ, Україна)

Lesia Vysochan,
Doctor of Pedagogical Sciences,
Professor of the Department of Professional Methods and Technologies of Primary Education,
Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk, Ukraine)
lesjavusochan@gmail.com
ORCID: 0000-0002-4951-0074

УДК 37.025

ФОРМУВАННЯ КОГНІТИВНОЇ ГНУЧКОСТІ ЯК БАЗОВОЇ КОМПЕТЕНТНОСТІ МАЙБУТНЬОГО ПЕДАГОГА: НАУКОВО-ТЕОРЕТИЧНЕ ОБГРУНТУВАННЯ ПРОБЛЕМИ

Анотація. У статті в руслі дискурсу зарубіжних і українських вчених здійснено науково-теоретичне обґрунтування проблеми формування когнітивної гнучкості як професійної компетентності майбутніх педагогів.

Показано, що когнітивна гнучкість предметно вивчається в психології, філософії, клінічній медицині, менеджменті, педагогіці, кібернетиці, інших галузях знань. Визначено сутність «опозиційного» до неї когнітивної регідності. Розкрито зміст сформованої на початку XXI ст. теорії когнітивної гнучкості. Її представники критикують «традиційну» модель освіти як «лінійну», бо інформація в ній подається в логічному, послідовному структурованому вигляді. Тому вона не відповідає суспільним викликам та потребам підготовки сучасного фахівця, який має швидко адаптуватися до нових соціальних умов та вимог педагогічної діяльності.

З'ясовано сутність професійної компетентності майбутнього вчителя, її основних структурних компонентів та педагогічних умов реалізації.

Визначено і схарактеризовано чотири основні компоненти когнітивної гнучкості як професійної компетентності майбутніх педагогів: 1) когнітивні здібності (володіння психофізіологічними і рецептивними здатностями і здібностями щодо адекватного розуміння сучасних суспільних й освітніх викликів); 2) адаптативні здібності (швидка адаптація до різних життєвих обставин, адекватна поведінка за різних ситуацій); 3) гнучкість мислення (адекватне сприйняття і реагування на зміни в професійному і соціальному середовищі); 4) емоційна гнучкість у «вузькому» сенсі означає ціннісно-емоційне сприйняття реалій професійного та соціального життя; спокійне, толерантне реагування на специфічні вияви поведінки здобувачів освіти, колег по роботі тощо.

Ключові слова: когнітивна гнучкість, професійна компетентність майбутнього вчителя, когнітивні здібності, адаптативні здібності, гнучкість мислення.

FORMATION COGNITIVE FLEXIBILITY AS A BASIC COMPETENCE OF A FUTURE TEACHER: SCIENTIFIC AND THEORETICAL SUBSTANTIATION THIS PROBLEM

Abstract. In the article, in line with the discourse of foreign and Ukrainian scientists, a scientific and theoretical substantiation the problem of forming cognitive flexibility as a professional competence future teachers is made.

It is shown that cognitive flexibility is studied in psychology, philosophy, clinical medicine, management, pedagogy, cybernetics and other fields of knowledge. The content of the formed beginning of the XXI century is revealed. theory of cognitive flexibility. Its representatives criticize the "traditional" model of education as "linear", because the information in it is presented in a logical, consistent structured form. Therefore, it does not meet modern social challenges and the needs of training a modern specialist who must quickly adapt to new requirements of pedagogical activity.

The essence of professional competence of the future teacher, its main structural components and pedagogical conditions of realization are found out.Four main components of cognitive flexibility as a professional competence future teachers are identified and characterized: 1) cognitive abilities (possession of psychophysiological and receptive abilities and abilities for adequate understanding of modern social and educational challenges); 2) adaptive abilities (quick adaptation to different life circumstances); 3) flexibility of thinking (adequate response to changes in the professional and social environment); 4) emotional flexibility in the "narrow" sense (value-emotional perception of the realities of professional and social life; tolerant response to specific behaviors of students, colleagues).

Keywords: cognitive flexibility, professional competence of the future teacher, cognitive abilities, adaptive abilities, flexibility of thinking.

INTRODUCTION

The problem formulation. In 2016 the World Economic Forum in Davos presented the results of a study which aimed to determine the 35 most requested basic skills among the competencies of the XXI century. The results were based on a survey of about 13 million people who worked in 2,500 campaigns in 9 leading industries, including education, in 13 countries: China, India, the United States, Brazil, Japan, Mexico, Germany, France and others. Here are the TOP-10 competencies: complex problem solving, critical thinking, creativity, people management, coordinating with others, judgment and decision-making, service orientation, negotiation, cognitive flexibility (Global Challenge Insight Report, 2016). The Davos Forum in 2020 stated that the formation of these skills should become a compass for the development of educational policy and learning in all countries of the world (World Economic Forum, 2020).

Among these competencies, cognitive flexibility (CF) acquires special significance for the personal and professional formation of the future teacher. On the one hand, it largely integrates the knowledge, skills, experience, personal qualities of all the above TOP-10 competencies. On the other hand, it was found that CF organically meets the requirements of professional competence of a teacher in today's complex, changing, filled with numerous challenges and threats world.

This formulation of the problem highlights the need for substantive scientific and theoretical justification of SF as a basic competence of future teachers, because in modern educational documents of Ukraine, which define the basic norms and requirements of their training, this competence is not yet given due importance.

Analysis of recent research and publications. This problem should be studied in parallel in two areas related to the formation of cognitive flexibility and professional competence future teachers.

In foreign and Ukrainian discourse, cognitive flexibility is seen as an interdisciplinary phenomenon. This was due to various vectors of her research. The fundamental foundations of the study of SF were laid by the Swiss psychologist and philosopher J. Piaget, who showed man as an active, dynamic and creative person, in his development he goes through a series of complex stages that shape and change his intellectual potential and mental attitudes. Foreign scientists study SF at the intersection of philosophy, psychology, physiology and other fields of knowledge in the projection of elucidating the role and place of man in the modern world and its adaptation to new challenges of modern civilization (RL Coulson, PJ Feltovich, MJ Jacobson, W. Keller, RJ Spiro and others). In the post-Soviet, in particular Ukrainian scientific space, this phenomenon is studied mainly in terms of age psychology, which reflects the understanding of the peculiarities of thinking, human behavior at certain stages of its formation (L. Baletska, M. Vartytsky, E. Galazhynsky, N. Guz, Y. Kulyutkina, N. Menchynska, J. Ponomareva, G. Sukhobska, V. Sheiko, etc.).

The problem of professional competence is studied comprehensively in the areas of finding effective approaches to determining the goals of education and ways to achieve them (V. Andrushchenko, G. Ball, V. Bibler, E. Bondarevskaya, O. Gazman, B. Gershunsky, N. Nychkalo, S. Sysoeva , L. Khomych and others); substantiation mechanisms of preparation the future teacher as the subjectpedagogical activity (G. Aksonova, R. Asadullin, E. Volkova, N. Grigorieva, V. Zhornova, N. Nikitina, N. Solovyova); formation of general and professional competence of a teacher (M. Vilensky, V. Hrynyova, E. Hryshyn, etc.); development of his personal, creative, professional potential (I. Bogdanova, N. Kichuk, L. Kondrashova, Z. Kurland, A. Linenko, N. Postalyuk, T. Rudenko, etc.). However, in the scientific literature the problem of formation cognitive flexibility as a basic professional competence future teachers is insufficiently substantiated.

THE PURPOSE OF THE RESEARCH – проаналізувати загальні методи дослідження стратегій позиціонування провідних університетів Західної Європи.

THE AIM AND RESEARCH TASKS

Scientific and theoretical substantiation the phenomenon of cognitive flexibility as a basic competence of professional training future teachers.

RESULTS OF THE RESEARCH

Cognitive flexibility is a complex, multilevel social phenomenon. This phenomenon is studied at the interdisciplinary level in terms of psychology, philosophy, clinical medicine, management, pedagogy and other fields of knowledge.

As a theoretical construct, CF originated in the psychology, which made a major contribution to its development. From the standpoint of this science, it is interpreted as the mental ability to switch from one thought to another and reflect on several things at once; as the ability to adapt thinking or attention in response to changing circumstances, goals, and / or external stimuli (Martin & Rubin, 1995; Scott, 1962). The first psychological experimental studies were aimed at finding out how the flexibility of cognitive abilities provides the solution of multiple "cognitively complex" problems (Scott, 1962).

Cognitive neurobiology considers CF as a manifestation of human brain activity. From the standpoint of this science CF is a crucial human ability allowing efficient adaptation to changing task challenges. Based on FMRI (functional magnetic resonance imaging), the researchers identified parts of the brain that respond to and regulate cognitive flexibility. Extrapolating this data to the realm of social life, they argue that "juggling multiple tasks simultaneously" is a commonplace and amplified by a wireless network. Although the potential of CF has natural physiological limitations, it can be significantly improved through targeted exercise and training (Leber et al, 2008).

Age physiology shows that the formation of CF begins in childhood, moreover it is regularly practiced under different circumstances and ends at about 20 years of age. From the standpoint of this science, CF is seen as the ability to switch attention from one subject to another, to make choices, to make alternative decisions. These abilities can be improved in the process of performing special exercises and tasks (Miyake et al, 2000).

In philosophy, the flexibility of thinking is considered through the prism of the categories "intelligence", "mind", "cognition". Its genesis is linked to the teachings of Plato and Aristotle on the "intelligent individual principle" and Democritus on a human being as a creature with mental flexibility. The study of the flexibility of thinking is traced through the evolution of philosophical ideas about the structure of knowledge of the world. It is associated with epoch-making discoveries in the development of natural sciences and humanities of the XVIII - XX centuries (Chenyshev, 1981).

From the standpoint of cybernetics, CF is seen as a part with a "small range of capabilities" that allows you to control the entire system. An example is a boat. Its steering wheel, which rotates in a limited range, allows you to control all directions (Flemming, 1996).

The emergence of CR is associated with the nature of the human brain, which tries to reduce uncertainty and therefore seeks stability. It is manifested in the individual's desire to avoid change, novelty, to maintain the usual way of thinking, old patterns of behavior. However, this method of adaptation to the environment is ineffective. A typical manifestation of CR is perseveration, which is expressed in the repetition of actions, duplication of operations that were effective before or in similar situations, but do not work under current conditions, inhibit the achievement of new goals (Kholodnaya, 2004; Scott, 1962; Shapiro, 1981).

At the beginning of the XXI century it was formed the Cognitive Flexibility Theory (CFTh), which is considered as a multilevel system that encompasses a body of knowledge about the phenomenon of CF. Education as its important component has been actively studied since the 1990s, so we will find out its essential aspects from the perspective of our study.

CFTh adherents criticize the "traditional" model of education as "linear" because the information is presented in a logical, consistent structured form. The design of such training is reflected in school textbooks. However, as the amount of material increases, both its complexity and unstructuredness increase. Therefore, traditional linear learning loses its effectiveness because it cannot reflect different alternative views, does not allow to choose information, does not develop creative thinking (Boger-Mehall, 1996).

At the beginning of the XXI century CFTh's educational paradigm has evolved in line with the new challenges of a globalized society. Its cornerstones of "openness" and "flexibility" are defined as the basis for organizing the learning process. It is claimed that learning according to the system of "ready knowledge presented in closed structures" limits the process of cognition, leads to "reductive prejudices", simplifies understanding of the world and does not allow to comprehend its diversity, projects uniformity of thinking and rigidity of action. Meanwhile life and work in the modern world are becoming increasingly complex, so the application of knowledge in it requires CF. This involves creating a learning environment based on hypertext, which allows you to form "complex, open, flexible habits of mind", creates opportunities for selection of knowledge and facts, their creative interpretation and free human development (Spiro et al, 1991; Spiro, & Collins, 2006).

At the beginning of the XXI century in pedagogical science and the system higher education the problem of formation and increase the level professional competence of the future teacher became actual. It has received a proper legal justification, a comprehensive scientific and theoretical understanding. The Law of Ukraine "On Higher Education" interprets competence as a dynamic combination of knowledge, skills and practical skills, ways of thinking, professional, ideological and civic qualities, moral and ethical values, which determines a person's ability to successfully carry out professional and further educational activities and is the result of learning at a certain level of higher education (Law of Ukraine, 2014).

The content of the professional competence of a teacher, scientists include such components as knowledge of the subject, teaching methods, pedagogy and psychology; professional self-awareness; individual-typical features; professionally significant qualities (Zyazyun, 2008). The structure of professional teacher competence distinguishes the following elements: special competence in the field of education; methodical competence in the field of formation of knowledge, skills, abilities; psychological and pedagogical competence in the field of motives, abilities, orientation (Professional pedagogical education, 2011, p. 76).

Successful training of future teachers to master professional competence can be carried out by creating the necessary pedagogical conditions: motivation for future pedagogical activities; implementation of the activity approach in the organization the basic forms of training; organization formation process of professional skills future teachers at the creative level (Professional pedagogical education, 2011).

It is important for our study to understand the problem of professional competence in line with the main aspects of the formation cognitive flexibility. In particular, it is a question of preparation the future expert who is capable: to model educational process according to the next public challenges; think creatively and quickly generate and implement new ideas and technologies in the learning process; constantly study and implement the needs and requests of students. This provides the acquisition holistic experience in the effective solution of professional and life problems, the performance of functions related to various social roles. Based on the essence and content of the theory of cognitive flexibility and the tasks and requirements of training future teachers, we can identify four main components of the formation of SF as their professional competence. Let's characterize their essence.

The first component is cognitive abilities, which include memory, psychophysiological and receptive abilities and the ability to adequately perceive and understand modern social and educational challenges posed by globalization, the dynamic development of innovative technologies, the threats posed by the pandemic. , interests and aspirations of students, etc.

The second component is adaptive abilities, closely related to the first. Their formation also involves rapid adaptation to various life circumstances; adequate behavior in various situations that occur in the educational process and professional and interpersonal relationships; rapid psycho-emotional adaptability due to the nature of interpersonal relationships; the ability to easily change behavior, the nature of relationships, activities in accordance with changes in the socio-cultural situation; the ability to quickly and painlessly tolerate mistakes and changes in plans, to put yourself in the place of another person, to reach understanding and joint agreements, to avoid conflicts.

The third component is flexibility of thinking. It involves a conscious perception of socio-cultural diversity, an adequate response to changes in the professional and social environment; the perception that all ideas, views, beliefs are equally important as variants of human experience; understanding of various dimensions of the realities of professional relations, views, including assessments of learning outcomes; understanding of causal changes in the social environment and professional relations; Possession of general systemic frameworks of thinking and ways processing and analysis of information, which allow to adequately communicate in certain situations of social and professional interaction and effectively solve related tasks and problems.

The fourth component is emotional flexibility in its "narrow" sense. It is about the value-emotional perception the realities of professional and social life; calm, tolerant response to specific manifestations students behavior, colleagues, parents representatives of various institutions, etc.; empathy for people in need of social support and assistance; adequate behavior in various conflict situations; maintaining balance and tolerance in disputes of a personal and professional nature.

CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The issue of formation of cognitive flexibility and professional competence of the future teacher has received a comprehensive justification in various fields of knowledge. Scientific evidence shows that these phenomena have a common substantive basis and suggests that CF is an important component of the professional competence of the

future teacher. Understanding should stimulate appropriate adjustments to the regulations that determine the content and nature of teacher training in higher education institutions of Ukraine.

The subject of further research should be the conduct of experimental work on the formation of CF as an important component of the professional competence of the future teacher.

REFERENCES

Boger-Mehall, S. R. (1996). Cognitive Flexibility Theory: Implications for Teaching and Teacher Education. In B. Robin, J. Price, J. Willis & D. Willis (Eds.), Society for Information Technology & Teacher Education International Conference (9th, Washington, DC, March 10-14, 1998): https://www.learntechlib.org ›primary...

Chanyshev, A. N. (1981) A Course of Lectures on Ancient Philosophy. Mosca: High School. 594 p. (in Russian)

Flemming, F. (1996). Transformational Dialogues. Facilitator Training Manual №1. An instruction manual of practical techniques for facilitating personal change. http://www.worldtrans.org/TP/TP1/TP1TOP.HTML

Global Challenge Insight (2016). Report. The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution. https://www.eduget.com.

Kholodnaya, M. (2004). Cognitive styles. About the nature of the individual mind. St-Petereburg: Piter. http://www.ipras.ru/cntnt/rus/media/on-layn-bibliote/knigi1/holodnaya_2.html. (in Russian)

Law of Ukraine. (2014). «About higher education» (2014). 01.07.2014 № 1556-VII: zakon.rada.gov.ua ›laws / 1556. (in Ukrainian)

Leber, A. B., Turk-Browne, N. B., & Chun, M. M. (2008). Neural predictors of moment-to-moment fluctuations in cognitive flexibility. Proceedings of the National Academy of Sciences of the United States of America, 105, 36. 10.1073/pnas.0805423105.

Martin, M. M., Rubin, R. B. (1995). A new measure of cognitive flexibility. Psychological Reports, 76(2), 623-626. https://doi.org/10.2466/pr0.1995.76.2.623.

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager T.D. (2000). The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. Cognitive Psychology, 41(1), 49-100. https://doi.org/10.1006/cogp.1999.073.

Professional pedagogical education: competence approach (2011): monograph / for order. O.A. Dubaseniuk. Zhytomyr: ZhSU Publishing House. I. Franko. 412 p. (in Ukrainian)

Scott, W. A. (1962). Cognitive Complexity and Cognitive Flexibility. Sociometry, 25(4), 405-414. https://doi.org/10.2307/2785779

Shapiro, D. (1981). Autonomy and rigid character. New York: Basic Books. https://doi.org/10.1037/h0085135.

Spiro, R. J., Collins, B. P., & Ramchandran, A. R. (2007). Modes of openness and flexibility in cognitive flexibility hypertext learning environments. In B. Khan, (Ed.), Flexible learning in an information society, (pp. 18-25). Hershey, PA: Information Science Publishing.10.4018/978-1-59904-325-8.ch002

Spiro, R.J., Feltovich, P.J., Jacobson, M. & Coulson, R.L. (1991). Cognitive flexibility, constructivism and hypertext: advanced knowledge acquisition in the structured domains. Educational Technology, 31(5), 24-33. https://www.researchgate.net/publication/200772846_Cognitive_Flexibility_Constructivism_and_Hypertext_Random_Access_Instruction_for_Advanced_Knowledge_Acquisition_in_Ill-Structured_Domains

Zyazyun, I. A. (2008). Philosophy of pedagogical action: monograph. Cherkasy: Type. Bohdan Khmelnytsky National University. 608 p. (in Ukrainian)

World Economic Forum (2020). URL: https://www.sncmedia.

Received *12.07.2021*
Accepted *02.08.2021*