

# The Concept of Professional Reflection in Ukrainian Psycho-Pedagogical Literature: Regard or Disregard for Neurophysiological Factors?

Nataliia DENHA<sup>1</sup>,  
Tetiana BAKUMENKO<sup>2</sup>,  
Svitlana SAIAPINA<sup>3</sup>,  
Ruslan LASHTA<sup>4</sup>,  
Oleksandr MESHKO<sup>5</sup>,  
Yuliia BOIKO-BUZYL<sup>6</sup>

<sup>1</sup> Kremenchuk Teachers' Training College named after A. Makarenko Ukraine, [denha\\_n@ukr.net](mailto:denha_n@ukr.net)

<sup>2</sup> Municipal Establishment "Kharkiv Humanitarian-Pedagogical Academy" of the Kharkiv Regional Council, Ukraine, [tanya020365@ukr.net](mailto:tanya020365@ukr.net)

<sup>3</sup> State Higher Educational Institution "Donbas State Pedagogical University", Ukraine, [svetlana.sayapina65@gmail.com](mailto:svetlana.sayapina65@gmail.com)

<sup>4</sup> Hetman Petro Sahaidachnyi National Army Academy, Ukraine, [lashta.ruslan87@gmail.com](mailto:lashta.ruslan87@gmail.com), ORCID iD: <https://orcid.org/0000-0003-3585-8325>

<sup>5</sup> Ternopil Volodymyr Hnatiuk National Pedagogical University, Ukraine, [meshko\\_o@ukr.net](mailto:meshko_o@ukr.net)

<sup>6</sup> Kharkiv National University of Internal Affairs, [b-byy@ukr.net](mailto:b-byy@ukr.net), ORCID iD: <https://orcid.org/0000-0002-1715-4327>

**Abstract:** *The article analyzes the problem of developing professional reflection in Ukrainian and foreign psycho-pedagogical literature. It shows that such definitions as "reflection", "professional reflection" and "teacher's professional reflection" are interconnected in the context of general, special and specific features. A detailed review of current neurocognitive approaches has made it possible to determine the main aspects of biological mechanisms of reflection. One can see that Ukrainian psycho-pedagogical discourse does not consider neurophysiological aspects of shaping and developing professional reflection. Given the views of Ukrainian researchers on the matter, teacher's professional reflection is seen as the correlation of their capabilities with the requirements of the teaching profession; a set of internal conditions for reaching a new level of professional performance; a certain technology of objective analysis and organization of one's experience, as well as understanding and use of others' experience. Together, they determine a values-based attitude towards the teaching profession. However, Ukrainian methodology employs diagnostic tools which partially rely on the lateral features of the actors in the educational process and, thus, neuroscientific insights.*

**Keywords:** *Teacher's professional reflection, diagnostic tools, systematization of reflection types, generalization of definitions, teacher's attitude towards the profession, organization of one's experience, use of others' experience.*

**How to cite:** Denha, N., Bakumenkon, T., Saiapina, S., Lashta, R., Meshko, O., & Boiko-Buzyl, Y. (2022). The Concept of Professional Reflection in Ukrainian Psycho-Pedagogical Literature: Regard or Disregard for Neurophysiological Factors?. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 13(2), 59-75. <https://doi.org/10.18662/brain/13.2/332>

## 1. Introduction

Current education reforms require the promotion of teachers' personal and professional development and the introduction of new technologies to optimize their professional psycho-pedagogical resources. In this regard, it is crucial to study professional reflection as a mechanism for revealing teachers' personal and professional potential (Gerasymova et al., 2019; Onishchuk et al., 2020; Maksymchuk et al., 2020a; Maksymchuk et al., 2020b; Melnyk et al., 2019; Palamarchuk et al., 2020).

A problem of reflection is fundamentally psychological, as well as complex, interdisciplinary and generally scientific. Today, many of its key aspects remain insufficiently studied (the content of the reflection concept; its classification and typology; its diagnostic tools; its ways of development).

In the philosophical context, reflection (from Latin "reflexio") is viewed as an act of cognition. In turn, cognition can be studied based on the results, namely, the change of scientific ideas or theories (an objective method) or the "cognition/reflection interaction" (Shinkaruk, 1986).

The explanatory dictionary of the Ukrainian language defines reflection as self-analysis, one's thoughts on one's state of mind (Bilodid, 1977). In general, many researchers attempted to formulate the reflection concept (Lobodin, 1997; Hatton & Smith, 1995).

**Table 1.** Different definitions of the reflection concept

---

No	Author	Definition
1.	Shinkaruk (1986)	Reflection (from Latin "reflexio") is viewed as an act of cognition. In turn, cognition can be studied based on the results, namely, the change of scientific ideas or theories (an objective method) or the "cognition/reflection interaction"
2.	Bilodid (1977)	Reflection is seen as self-analysis, one's thoughts on one's state of mind.
3.	Lobodin (1997)	Reflection is one's awareness of mental processes taking place in one's mind.
5.	Vazina (1994)	Reflection is one's ability to be aware of one's activities, recognize and correct mistakes, nurture cultural values, find one's place in the world, assess one's capabilities adequately.

---

---

7.	Hatton & Smith (1995)	Reflection is a cognitive process that involves a sequence of interconnected ideas that rely on basic knowledge and achievements.
8.	Richards (1990)	Reflection implies learning from experience, in which self-analysis is seen as a key component of one's development.

---

Numerous studies aim to elaborate a typology of reflective acts. For example, there are retrospective, situational and anticipatory types of reflection.

Shinkaruk (1986) pays considerable attention to a retrospective type of reflection. He believes that reflection implies self-analysis which allows one to reveal the specifics of one's spiritual growth (Shinkaruk, 1986). Andreeva (2009) and Vazina (1994) consider reflection to be a mechanism of self-development, a professional resource, as well as a condition for ensuring professionalism.

Many scholars study professional reflection concerning other problems: structural aspects (Lushpayeva, 1989); reflection mechanisms (Anisimov, 1994; Isaev et al., 2000).

Berestenko (2013) and Bodalev (1983) analyze professional reflection in the context of one's professional communication. Kelly (2020) states that teacher's reflection is a key component of his or her professional growth and, therefore, should be part of every teacher's career. Farrell (1998) identifies the following three types of teacher's professional reflection: reflection and performance, reflection and activity, reflection and action.

As noted by Berestenko (2013), professional reflection is a means of professional development, as well as a criterion for effective professional training. In both cases, professional reflection implies the ratio of one's capabilities with professional requirements.

A detailed analysis of the definitions available in Ukrainian discourse allows the following generalizations:

- a) Reflection can change one's attitude towards past experience.
- b) Reflection is a tool for criticizing existing knowledge. In this regard, both knowledge and experience become dynamic and act as ways of acquiring new knowledge and experience.
- c) Reflection is the main link between one's experience and situations to be analyzed. Reflection is revealed in the form of various fixations, such as understanding, problematization, adjustment of activity and development of inventive and innovative thinking.

At the same time, the above-mentioned views of Ukrainian methodologists follow the classical paradigm. According to it, the natural sciences do not interact with the humanities. Therefore, neurophysiological mechanisms of reflection are virtually ignored or mentioned as temporary. In the West-European discourse, the concepts of subjectivity, reflection and self-reflection are considered interdisciplinary, and neurosciences, being seen as complementary, have much in common with the humanities.

The article aims to identify problematic aspects, prospects and origins of neuroscientific interpretation of professional reflection in Ukrainian psycho-pedagogical discourse and summarize the expediency of diagnostic criteria of professional reflection, available in Ukrainian science.

Research methods are mostly theoretical in order to analyze neurophysiological and neuropsychological intentions that emerge in the still traditional post-totalitarian scientific discourse of Ukraine.

## **2. Neurophysiological Aspects of Professional Reflection in the West-European Discourse**

Given both positivist experience and postmodern deconstruction, European researchers address the issue of reflection and reflectivity in the context of recognizing the profound determination of anthropological phenomena. Lieberman et al. (2002) claim that reflection is two-fold, namely, social and neurophysiological (cognitive). This approach distinguishes two systems of a reflective function of the psyche: actually reflective (externally oriented at building a model of the world) and reflexive (internal, phenomenological and neurocognitive, aimed at irrational interpretation of the self within the model of the outside world).

Professional aspects of reflection are most clearly manifested in neurophysiological mechanisms of professional decision-making. According to the classical paradigm, the latter follows a rational model of applying competencies, as well as routine ways of solving professional problems. As noted by MacFadden & Schoech (2010), the human brain naturally includes unconscious emotions and conscious cognition of mental processes, and professional decision-making combines these rational and emotional systems. This fact forces one to reconsider the aspects of student training and the basics of professional deontology (Karasiievych et al., 2021; Berbets et al., 2021; Sarancha et al., 2021; Demchenko et al., 2021; Prots et al., 2021; Kosholap et al., 2021). Besides, it is clear that professional reflection in its neurophysiological basis does not differ from social reflection: it is simply surrounded by ethical, professional and volitional limitations of the employee.

In an experimental context, neurophysiology most effectively considers reflection in pathology or based on borderline personality disorders. In this case, it is easier to diagnose areas of excitation of a particular neural chain. At the same time, test diagnostics of productivity of social and affective functions reveals sharp neurophysiological markers (Philippi & Koenigs, 2014). Medical and neurophysiological data can be used to develop a new comprehensive model for measuring the quality and intensity of reflection in both normal and pathological conditions.

Luria (1970) connects reflection with the highest manifestation of evolution with the increasing corticalization of information analysis and synthesis. Thus, reflection and self-reflection constitute the synergistic activity of three groups of neurons. The process itself is much more complex than the processing of signals from sensory analyzers. Accordingly, the brain operates on an equal footing with external signals, internal images and attitudes. First of all, it refers to self-image and self-concept as an irrational-rational vision of oneself in typical social contexts.

Professional use of neurophysiological mechanisms of reflection is most associated with the educational process (for those who teach and learn). Reflective practices gradually displace rational teaching methods, which is especially true of the humanities. However, Boud & Walker (1998) believe that excessive adherence to the patterns of reflective activity can lead to over-technologicalization of production, unethical practices and prevailing psychophysiological determination of social and other processes. They claim that reflective activity should rely on the following patterns: high dependence on the context of the production process; the importance of social and cultural aspects of reflection; the availability of mechanisms to stimulate or weaken reflection.

Recently, self-awareness (reflection) and continuous self-criticism (critical reflection) have been seen as crucial in acquiring professional competencies, particularly in the case of professions with high levels of personal responsibility (e.g. physicians) (Williams, 2001). At the same time, repeated supervised practice should develop competencies under the protocol of production situations. Such situations themselves are an incentive to include professional reflection, which is manifested in the automatic and rapid mobilization of competencies, rather than irrational decisions. Thus, the neurophysiological response is important only as a “trigger” for using specialized knowledge and skills. In the case of specialists with higher responsibilities, critical reflection and competency-based training play a decisive role. Therefore, it is essential to monitor how critical reflection and self-reflection are being developed using situational analysis,

surveys, observation of reactions to spontaneous educational and industrial challenges and future specialists' resources (motivation, needs, autonomy).

Numerous studies are proving that the main resource for practical training of teacher-researchers and teacher-inventors is the centrality of mechanisms of reflection (a natural immanent process of cognition and improvement) and the confrontation of this process with external intellectual, emotional and practical challenges (Day, 1993). Consequently, the so-called "reflective practices" are being increasingly used in pedagogy. Unfortunately, education policies of many countries ignore the need to stimulate reflection, followed by the confrontation of social roles and challenges. The main solution is to civilize such confrontation, organize partnerships and coalitions to support different types of reflection. Eventually, it will lead to the creation of a teacher's neuropsychological portrait as a compulsory component of his or her professional identity.

In the early 2000s, a series of experiments were conducted to confirm the central neurophysiological nature of the neurocognitive processes underlying reflection. Some volunteers were scanned with echo-planar imaging (EPI) while making basic decisions that required a conscious choice of "yes" or "no". Magnetic resonance imaging (MRI) of auditory comprehension, attentional demands, decision-making and the motoric response indicated consistent anterior medial prefrontal and posterior cingulate activation (Johnson et al., 2002). Thus, one can observe the joint neurophysiological activity of specific brain areas while applying self-reflection mechanisms.

On the other hand, Jenkins & Mitchell (2011) identified the common features of neurophysiological mechanisms of reflection and self-reflection and their activity in the medial prefrontal cortex. Furthermore, this activity is the same regardless of self-assessment or observation of one's intellectual properties or emotional state (Jenkins & Mitchell, 2011). It follows that the multiplicity of self-referentiality relies on the common neurophysiological process.

Besides, the theory of cultural and social conditionality of human reflection was neurophysiologically confirmed. In particular, the representatives of Western culture are prone to self-reflection and self-improvement regardless of the social context, whereas those of Eastern cultures are more dependent on others' perceptions of them within strong cultural traditions. Experimental studies on self-reflection show that Europeans tend towards its greater activation in the medial prefrontal cortex and East Asians in the temporal-parietal junction (Ma et al, 2014). Therefore, one can conclude that the social context, which systematically influences the

nature of reflection from generation to generation, has already affected neurophysiological mechanisms.

Emphasis should be placed on the nature of reflection, depending on the profession, professional duties and involvement (empathy, personal values). For example, professional training of speech therapists and social educators is much focused on developing professional self-reflection from the first years of study. It must be noted, however, that rational components of competencies develop slower than empathy and the ability to share experiences (Bubnys, 2019). It means that the ability to recognize, assess and meet special educational needs of students is developed through the initial experience of such interaction with reflection on one's needs, emotions, attitudes, self-identity.

An even greater manifestation of the so-called "reflection space", which is crucial for effective practice, is characteristic of those specialists who deal with risks (healthcare, police). The requirement for clear accountability by health care and social care institutions only increases the level of professional reflection. In this regard, researchers suggest modifying the production context by replacing the "control area" with the "reflection space" of self-control.

Owing to a comparative analysis, the specified neuroscientific principles of professional reflection allow one to identify the origins of this approach in Ukrainian discourse or highlight the scarcity of neuroscientific achievements.

### **3. Types of Reflection in the Ukrainian Methodological Discourse**

Linking the above-mentioned generalization with the Ukrainian psycho-pedagogical discourse, one can single out the following types of reflection in a structural model of one's social experience: values-based (axiological), emotional, cognitive, behavioural (regulatory), communicative and situational.

Values-based (axiological) reflection is, first of all, a form of one's attitude towards one's values, attitudes, needs, and orientations. Despite correlating with the neuropsychological category of subjectivity, it cannot be a natural and, therefore, neurophysiological concept. In the context of values-based reflection, the object of the action is the system of personal values of the actor and all forms of manifestation of these values, both in external and internal relations. As a rule, knowledge about social values, or more precisely, about those universal values which, in the view of the majority, most adequately characterize the desired future acts as a cultural tool in axiological terms. Besides, this knowledge performs the function of a

standard, concerning which the available values are considered (Khudyakova, 2010).

The following types of reflection are associated with neurocognitive mechanisms. At the same time, Ukrainian researchers analyze them by using interdisciplinary terms in the framework of psycho-pedagogical sciences:

**a)** Emotional reflection is one's awareness and attitude towards one's emotions and feelings.

**b)** Cognitive reflection is one's ability to understand one's thoughts and knowledge. Concerning the psychology of thinking, it is a fundamental mechanism of self-cognition based on formed concepts, ideas, judgments, beliefs (Karpov, 2003).

**c)** Behavioural (regulatory) reflection is one's awareness of one's behaviour (all reactions, skills, abilities and forms of practical activity) and its causes.

**d)** Communicative reflection includes one's ability to analyze social interaction or adapt to changes in the social environment.

Concerning reflexive assessment within the communicative act, one can distinguish between personal reflection, mutual reflection, group reflection. These types represent the deep archetypes of the collective unconscious. However, they are analyzed regardless of the nature of origin.

Lushpayeva (1989) claims that personal reflection is "an internal psychological factor in the integration of one's self and creative activity in situations of choice and decision. Owing to personal reflection, one can independently describe the processes affecting one's thinking and behaviour. One analyzes the sequence and content of mental operations, errors, difficulties, stereotypes, new ideas, as well as the grounds, motives and goals of one's actions.

Mutual reflection acts as reflexive recreation by actors (observers) of internal states and behaviour of each other. It is a system of psychological mechanisms that ensure the links between the actor and the environment by identifying oneself with others. Thus, mutual reflection is one's ability to perceive and evaluate the basic parameters of one's relations with other members of the group.

Group reflection facilitates communication. Concerning the thinking process, as noted by Naidenov (1989), it aims to overcome problems and conflicts, specific to group creativity, and encourage group members to solve the existing problem creatively. It follows that group reflection appears as one's ability to identify and understand group actions to further coordinate them.



Situational reflection is seen as a set of motives and self-assessment. It ensures the actor's direct involvement in the situation, helps him or her understand and analyze it "here and now". Also, situational reflection implies one's ability to coordinate and control one's actions under changing conditions. This type of reflection can be viewed in the framework of the elementary neurophysiological response. Still, one can observe the avoidance of the transition to the natural paradigm of analysis.

In this regard, Semychenko (2004) claims that comprehensive development is possible only if one adequately evaluates one's experience and is capable of self-analysis.

Anticipatory reflection allows one to predict a possible course of actions and their consequences in terms of goals. Concerning professional development, this means one's ability to act consciously. In practice, people often agree to a type of training offered by the employer.

At the same time, they can predict learning outcomes. However, an active position in choosing a development path allows one to realize the benefits of particular training for professional growth. In turn, this increases one's motivation towards learning and gaining new experience.

Besides, reflection can be seen as a mechanism of learning new ways of working and acquiring new abilities. Therefore, the activity itself must become an object of special research. In other words, it is essential to ensure reflection on the original activity pattern.

Table 2 shows the types of reflection under the specified factors.

**Table 2.** Types of reflection

<b>Classification features</b>	<b>Type</b>
Relation to time The role in one's social experience	retrospective, situational, anticipatory values-based (axiological), emotional, cognitive, behavioural (regulatory), com- municative and situational
Reflexive assessment within the communicative act (by the number of participants)	personal, mutual, group

In Ukrainian scientific discourse, professional reflection is one's awareness of principles and characteristics of certain features or motives of professional activity, rather than one's voluntary or involuntary awareness of them. Professional reflection encompasses the following phenomenological characteristics: motivation towards self-improvement; awareness of reflexive processes; objectivity, i.e., focus on a certain ideal object of consciousness (memory, thinking, knowledge, style of activity).

Table 2 describes professionally-oriented reflection. In particular, professional reflection is seen as the correlation of one's capabilities with the requirements of the chosen profession. It is a mechanism for revealing one's personal and professional potential. As part of professional development, professional reflection changes experience stereotypes that serve as internal conditions for reaching a new level of professional performance. There are different types of professional reflection depending on certain classification features: relation to time - retrospective, situational, anticipatory; the role in one's social experience - values-based (axiological), emotional, cognitive, behavioural (regulatory), communicative and situational; reflexive assessment within the communicative act (by the number of participants) - personal, mutual, group. Thus, professional reflection helps one to formulate the obtained results, determine the goals of further activities and adjust career path.

#### **4. Means of diagnosis and development of professional reflection**

Given that it is possible to develop professional reflection, it is essential to analyze the most effective ways to do so.

Karpov (2003) developed methods for identifying reflexivity levels based on existing views on its concept. These methods rely on theoretical material which specifies content-related and other important characteristics of the concept. According to them, the obtained results can be differentiated into three main categories: high, average and low levels of reflexivity. Methods proposed by Anisimov (1994) allow one to determine reflection at the following levels: low, below average, average, above average, high. Rukavishnikova (2007) developed a questionnaire to identify levels of pedagogical reflection and, consequently, personal reflection.

Fetiskin et al. (2002) elaborated diagnostic tools for identifying levels of ontogenetic reflection. These tools involve analyzing past mistakes, successful and unsuccessful life experiences. Such diagnostics may show the following results: the lack of reflection on past experience; reflection with the “-” sign; the fear of making new mistakes; reflection with the “+” sign.

The authors of the article believe that these methods can be effectively applied to identify levels of reflexivity (including ontogenetic) and reflection. Methods for identifying levels of self-development and motivation towards it, self-assessment self-actualization and values-based orientations can be used as complementary.

One should pay particular attention to a 15-question survey proposed by Fetiskin et al. (2002) to determine the levels of motivation towards self-development. Choosing from the one-to-five scale, the

respondents need to indicate whether the statement is completely true; more true than false; both true and false; more false than true; completely false. The results may be as follows: high motivation towards self-development; rather average motivation towards self-development; lack of motivation towards self-development.

Besides, Fetiskin et al. (2002) developed a rapid diagnostic of one's self-assessment levels (high (inadequate and adequate); average; low (inadequate and adequate)). It is based on the method of Budassi (2006) aimed at studying and evaluating self-perception (Khutorskoi, 2001).

Emphasis should be placed on methods of identifying the self-actualization style proposed by Semychenko (2004). According to it, there are three styles: a style of personality striving for self-actualization; a style of a conservative personality; a style of a dominant personality.

Leontiev (2000) offers certain methods which make it possible to identify the source of the meaning of life. The latter can be found in the future (goals), the present (the process), the past (the result) or in all three components of life.

A brief description of the above-mentioned methods highlights the diversity of diagnostic technologies, as well as their types, mechanisms and results. However, it is vital to develop effective technologies for identifying levels of professional reflection, in particular, considering both neurophysiological mechanisms and the lateral profile of the actor. Unfortunately, the analyzed methods do not allow one to determine one's inclination for reflection; values-based orientation towards enhancing professional reflection and motivation, understanding the content, classifications, structure, techniques and means of reflection and mastering forms of methodical work.

## **5. Conclusions**

Any profession requires constant improvement of professional and personal qualities, including professional reflection. Ukrainian researchers mostly use the following pedagogical tools for developing professional reflection: exercises (debates, consultations, interviews, classes, discussions); reflexive tutorials and games; support programmes for monitoring one's actions or those of colleagues in professionally important situations; keeping diaries of professional activity with further analysis; keeping reflection diaries. In doing so, neurophysiological mechanisms are practically ignored, while interdisciplinary links between the humanities and the natural sciences are only fragmental.

A detailed analysis of existing definitions and scientific approaches has allowed one to interpret such concepts as “reflection”, “professional reflection” and “teacher’s professional reflection”. In this regard, the authors of the article understand *reflection* as self-analysis; awareness and acquisition of means and methods of activity; self-cognition; transformation of stereotypes from the acquired experience. At the same time, professional reflection is a purposeful cognitive-mental process of understanding essential characteristics and motives of professional activity in order to clarify their links with professional excellence.

In Ukrainian science, the concepts of reflection, professional reflection and teacher’s professional reflection are interconnected in the context of general, special and specific features. Thus, teacher’s professional reflection is seen as the correlation of neurophysiological capabilities with the requirements of the teaching profession; a set of internal conditions for reaching a new level of professional performance; a certain technology of objective analysis and organization of one’s experience, as well as understanding and use of others’ experience. Together, they determine a values-based attitude towards the teaching profession.

Methods of professional reflection include analysis, self-analysis, and professional intuition. The following aspects are of particular importance: communication (interpersonal perception of partners while performing professional actions); cooperation (predicting and analyzing collective activity, taking into account the need to coordinate professional positions and group roles of the actors); personal manifestations (constructing new self-images as a result of communication with colleagues); intellectual activity (analysis and correlation of one’s actions with a professional situation). They help one to identify the level of professionalism, set further goals, adjust and improve one’s professional path. Nevertheless, one is likely to reinforce psycho-pedagogical tools and consider the natural basis for acquiring professional reflection based on advanced neuroscientific achievements.

---

## References

---

- Andreeva, G. (2009). *Sotsialnaya psikhologiya segodnya: poiski i razmyshleniya* [Social psychology today: searching and reflecting]. Moscow Psychological and Social University. <https://www.livelib.ru/book/1000402280-sotsialnaya-psihologiya-segodnya-poiski-i-razmyshleniya-andreeva-gm-sbornik-andreeva-gm>
- Anisimov, O. S. (1994). *Akmeologicheskiye osnovy reflektivnoy samoorganizatsii pedagoga: tvorchestvo i kultura myshleniya* [Acmeological principles of teacher’s reflexive self-organization: the creativity and culture of thinking] [Unpublished

- doctoral dissertation]. The Russian Academy of Management.  
[http://irbis.gnpbu.ru/Aref\\_1994/Anisimov\\_O\\_S\\_1994.pdf](http://irbis.gnpbu.ru/Aref_1994/Anisimov_O_S_1994.pdf)
- Berbets, T., Berbets, V., Babii, I., Chyrva, O., Malykhin, A., Sushentseva, L., Medynskii, S., Riaboshapka, O., Matviichuk, T., Solovyov, V., Maksymchuk, I., & Maksymchuk, B. (2021). Developing Independent Creativity in Pupils: Neuroscientific Discourse and Ukraine's Experience. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 314-328.  
<https://doi.org/10.18662/brain/12.4/252>
- Berestenko, O. H. (2013). Kultura profesiynoho spilkuvannya yak rezultat vdoskonalennya individualnykh tvorchykh zdibnostey osobystosti [Culture of professional communication as a result of improving one's creative achievements]. *Visnyk Lubanskoho natsionalnogo universytetu imeni Tarasa Shevchenka. Pedagogichni nauky* [Journal of Taras Shevchenko National University of Luhansk. Pedagogical Sciences], 3, 57-64.  
[http://nbuv.gov.ua/UJRN/vlup\\_2013\\_3\\_10](http://nbuv.gov.ua/UJRN/vlup_2013_3_10)
- Bilodid, I. K. (1977). *Slovnnyk ukraïynskoyi movy v 11 tomakh* [The dictionary of the Ukrainian language in 11 volumes]. Naukova dumka.  
[http://ukrlit.org/slovnnyk/slovnnyk\\_ukraïnskoi\\_movy\\_v\\_11\\_tomakh](http://ukrlit.org/slovnnyk/slovnnyk_ukraïnskoi_movy_v_11_tomakh)
- Bodalev, A. A. (1983). *Lichnost i obshcheniye. Izbrannyye trudy* [Personality and communication. Selected works]. Pedagogika.  
[http://www.alib.ru/5\\_bodalev\\_a\\_a\\_lichnostnmn\\_i\\_obwenie\\_izbrannyye\\_trudy\\_w1t17990483f0f17606fe47050aaf9d42ee1b38.html](http://www.alib.ru/5_bodalev_a_a_lichnostnmn_i_obwenie_izbrannyye_trudy_w1t17990483f0f17606fe47050aaf9d42ee1b38.html)
- Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in higher education*, 23(2), 191-206.  
<https://doi.org/10.1080/03075079812331380384>
- Bubnys, R. (2019). A journey of self-reflection in students' perception of practice and roles in the profession. *Sustainability*, 11(1), Article 194.  
<https://doi.org/10.3390/su11010194>
- Budassi, S. A. (2006). *Metodika issledovaniya samoottenki lichnosti* [Methods for studying self-assessment]. Testoteka. <http://testoteka.narod.ru/lichn/1/27.html>
- Day, C. (1993). Reflection: A necessary but not sufficient condition for professional development. *British Educational Research Journal*, 19(1), 83-93.  
<https://doi.org/10.1080/0141192930190107>
- Demchenko, I., Maksymchuk, B., Bilan, V., Maksymchuk, I., & Kalynovska, I. (2021). Training Future Physical Education Teachers for Professional Activities under the Conditions of Inclusive Education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 191-213.  
<https://doi.org/10.18662/brain/12.3/227>
- Farrell, T. (1998). Reflective teaching: The principles and practices. *Forum*, 36(4), 10-18. <https://eric.ed.gov/?id=EJ599374>

- Fetiskin, N. P., Kozlov, V. V., & Manuylov, G. M. (2002). *Sotsialno-psikhologicheskaya diagnostika razvitiya lichnosti i malykh grupp* [Socio-psychological diagnostic of personality and small groups development]. Publishing House of the Institute of Psychotherapy.
- Gerasymova, I., Maksymchuk, B., Bilozero, M., Chernetska, Yu., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2019). Forming professional mobility in future agricultural specialists: the sociohistorical context. *Revista Romaneasca pentru Educatie Multidimensionala*, 11(4), 345-361.  
<https://doi.org/10.18662/rrem/195>
- Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching Education*, 11(1), 33-39.  
<https://www.semanticscholar.org/paper/Reflection-in-teacher-education%3A-Towards-definition-Hatton-Smith/39b1eba3849a84e0fd76a4b3928bf17cb76a8d5b>
- Isaev, E. I., Kosaretsky, S. G., & Slobodchikov, V. I. (2000). Stanovleniye i razvitiye professionalnogo soznaniya budushchego pedagoga [Forming and developing professional awareness in future teachers]. *Voprosy psikhologii* [Issues of Psychology], 3, 57–66. <https://hr-portal.ru/article/stanovlenie-i-razvitiye-professionalnogo-soznaniya-budushchego-pedagoga>
- Jenkins, A. C., & Mitchell, J. P. (2011). Medial prefrontal cortex subserves diverse forms of self-reflection. *Social Neuroscience*, 6(3), 211-218.  
<https://doi.org/10.1080/17470919.2010.507948>
- Johnson, S. C., Baxter, L. C., Wilder, L. S., Pipe, J. G., Heiserman, J. E., & Prigatano, G. P. (2002). Neural correlates of self-reflection. *Brain*, 125(8), 1808-1814. <https://doi.org/10.1093/brain/awf181>
- Karasievych, S., Maksymchuk, B., Kuzmenko, V., Slyusarenko, N., Romanyshyna, O., Syvokhop, E., Kolomiitseva, O., Romanishyna, L., Marionda, I., Vykhrushch, V., Oliinyk, M., Kovalchuk, A., Halaidiuk, M., & Maksymchuk, I. (2021). Training Future Physical Education Teachers for Physical and Sports Activities: Neuropedagogical Approach. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 543-564.  
<https://doi.org/10.18662/brain/12.4/264>
- Karpov, A. V. (2003). Refleksivnost kak psikhicheskoye svoystvo i metodika yeyo díagnostiki [Reflexivity as a mental property and methods of its diagnostics]. *Psikhologicheskij zhurnal* [Psychological Journal], 5, 45-57.  
<https://psystat.at.ua/publ/2-1-0-22>
- Kelly, M. (2020). *Importance of teacher reflection*. ThoughtCo.  
<https://www.thoughtco.com/importance-of-teacher-reflection-8322>
- Khudyakova, N. L. (2010). *Aksiologicheskíye osnovy povedeniya cheloveka* [Axiological principles of human behaviour]. Chelyabinsk State University Press.

- Khutorskoi, A. V. (2001). *Sovremennaya didaktika* [Didactic today]. Piter.  
[https://khutorskoy.ru/books/2001/sov\\_didaktika/index.htm](https://khutorskoy.ru/books/2001/sov_didaktika/index.htm)
- Kosholap, A., Maksymchuk, B., Branitska, T., Martynets, L., Boichenko, A., Stoliarenko, O., Matsuk, L., Surovov, O., Stoliarenko, O., & Maksymchuk, I. (2021). Neuropsychological Bases of Self-Improvement of Own Physical Health of Future Teachers in the Course of University Education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 171-190.  
<https://doi.org/10.18662/brain/12.3/226>
- Leontiev, D. A. (2000). *Test smyslozhiznennykh oriyentatsiy* [Testing life-meaning orientations]. Smysl. <http://publishing.smysl.ru/book/sgo/ManSGO.pdf>
- Lieberman, M. D., Gaunt, R., Gilbert, D. T., & Trope, Y. (2002). Reflexion and reflection: A social cognitive neuroscience approach to attributional inference. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 199–249). Academic Press. [https://doi.org/10.1016/S0065-2601\(02\)80006-5](https://doi.org/10.1016/S0065-2601(02)80006-5)
- Lobodin, V. T. (1997). *Trudnoye schastye sovershenstva* [Difficult happiness of perfection]. Komplekt. <https://ua1lib.org/book/591000/ea8e2a>
- Luria, A. R. (1970). The process of reflection under the light of modern neuropsychology. *Psychologia: An International Journal of Psychology in the Orient*, 13(2-3), 61–74. <https://psycnet.apa.org/record/1971-30255-001>
- Lushpayeva, E. V. (1989). *Razvitiye refleksii v obshchenii sredstvami sotsialno-psikhologicheskogo treninga* [Developing reflection in communication using socio-psychological training] [Unpublished doctoral dissertation]. Moscow State University. <https://www.dissercat.com/content/razvitiye-refleksii-v-obshchenii-sredstvami-sotsialno-psikhologicheskogo-treninga>
- Ma, Y., Bang, D., Wang, C., Allen, M., Frith, C., Roepstorff, A., & Han, S. (2014). Sociocultural patterning of neural activity during self-reflection. *Social Cognitive and Affective Neuroscience*, 9(1), 73-80.  
<https://doi.org/10.1093/scan/nss103>
- MacFadden, R. J., & Schoech, D. (2010). Neuroscience, the unconscious and professional decision making: Implications for ICT. *Journal of Technology in Human Services*, 28(4), 282-294.  
<https://doi.org/10.1080/15228835.2011.562636>
- Maksymchuk, B., Gurevych, R., Matviichuk, T., Surovov, O., Stepanchenko, N., Opushko, N., Sitovskiy, A., Kosynskiy, E., Bogdanyuk, A., Vakoliuk, A., Solovyov, V., & Maksymchuk, I. (2020a). Training future teachers to organize school sport. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(4), 310-327. <https://doi.org/10.18662/rrem/12.4/347>

- Maksymchuk, B., Matviichuk, T., Solovyov, V., Davydenko, H., Soichuk, R., Khurtenko, O., Groshovenko, O., Stepanchenko, N., Andriychuk, Y., Grygorenko, T., Duka, T., Pidlypniak, I., Gurevych, R., Kuzmenko, V., & Maksymchuk, I. (2020b). Developing healthcare competency in future teachers. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(3), 24-43. <https://doi.org/10.18662/rrem/12.3/307>
- Melnyk, N., Bidyuk, N., Kalenskyi, A., Maksymchuk, B., Bakhmat, N., Matviienko, O., Matviichuk, T., Solovyov, V., Golub, N., & Maksymchuk, I. (2019). Modely y orhanyzatsiyone osobyne profesyonalne obuke vaspytacha u pojedynym zemlyama Evropske Unyje y u Ukrayiny [Models and organizational characteristics of preschool teachers' professional training in some EU countries and Ukraine]. *Zbornik Instituta za pedagogska istrazivanja*, 51(1), 46–93. <https://doi.org/10.2298/ZIPI1901046M>
- Naidenov, M. I. (1989). *Grupponaya refleksiya v reshenii tvorcheskikh zadach pri razlichnoy stepeni gotovnosti k intellektual'nomu trudu* [Group reflection in solving creative problems with various degrees of readiness for intellectual work] [Unpublished doctoral dissertation]. Kostiuk Institute of Psychology of the National Academy of Psychological Sciences of Ukraine. <http://iris-psy.org.ua/publ/000-163.pdf>
- Onishchuk, I., Ikonnikova, M., Antonenko, T., Kharchenko, I., Shestakova, S., Kuzmenko, N., & Maksymchuk, B. (2020). Characteristics of foreign language education in foreign countries and ways of applying foreign experience in pedagogical universities of Ukraine. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(3), 44-65. <https://doi.org/10.18662/rrem/12.3/308>
- Palamarchuk, O., Gurevych, R., Maksymchuk, B., Gerasymova, I., Fushtey, O., Logutina, N., Kalashnik, N., Kylyvnyk, A., Haba, I., Matviichuk, T., Solovyov, V., & Maksymchuk, I. (2020). Studying innovation as the factor in professional self-development of specialists in physical education and sport. *Revista Romaneasca Pentru Educatie Multidimensionala*, 12(4), 118-136. <https://doi.org/10.18662/rrem/12.4/337>
- Philippi, C. L., & Koenigs, M. (2014). The neuropsychology of self-reflection in psychiatric illness. *Journal of Psychiatric Research*, 54, 55-63. <https://doi.org/10.1016/j.jpsychires.2014.03.004>
- Prots, R., Yakovliv, V., Medynskyi, S., Kharchenko, R., Hryb, T., Klymenchenko, T., Ihnatenko, S., Buzhyna, I., & Maksymchuk, B. (2021). Psychophysical Training of Young People for Homeland Defence Using means of Physical Culture and Sports. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(3), 149-171. <https://doi.org/10.18662/brain/12.3/225>



- Richards, J. (1990). Beyond training: Approaches to teacher education in language teaching. *Language Teacher*, 14(2), 3-8.  
<https://markandrews.edublogs.org/files/2010/05/training-v-development-11.pdf?cfchlcaptcha tk =.qKQiHQC2q6dxzxY8yBV.cPAbjPyCGaC6GqdnvKbnX4-1640612172-0-gaNycGzNCOU>
- Rukavishnikova, E. E. (2007). *Formirovaniye professionalnoy refleksii u studentov meditsinskogo kolledzha* [Developing professional reflection in students from medical colleges] [Unpublished doctoral dissertation]. North-Caucasus State Technical University  
<https://www.dissercat.com/content/formirovanie-professionalnoi-refleksii-u-studentov-meditsinskogo-kolledzha>
- Sarancha, I., Maksymchuk, B., Gordiichuk, G., Berbets, T., Berbets, V., Chepurna, L., Golub, V., Chernichenko, L., Behas, L., Roienko, S., Bezliudna, N., Rasskazova, O., & Maksymchuk, I. (2021). Neuroscientific Principles in Labour Adaptation of People with Musculoskeletal Disorders. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(4), 206-223.  
<https://doi.org/10.18662/brain/12.4/245>
- Semychenko, V. A. (2004). *Pykholohiya pedahohichnoyi diyalnosti* [The psychology of pedagogical activity]. Vyscha shkola.  
<https://sociology.knu.ua/uk/library/psihologiya-pedagogichnoyi-diyalnosti-navch-posib>
- Shinkaruk, V. I. (1986) *Filosofskyy slovnyk* [The philosophical dictionary]. Publishing House of the Academy of Sciences of UkrSSR.  
<https://petrovkabook.zakupka.com/p/185624292-filosofskiy-slovník-za-red-v-i-shinkaruka/>
- Vazina, K. Ya. (1994). Model samorazvitiya cheloveka [A model of self-development]. *Samorazvitiye i nauka* [Self-development and Science], 3(15), 181-190.  
[https://elar.rsvpu.ru/bitstream/123456789/37620/1/edscience\\_2002\\_03\\_020.pdf](https://elar.rsvpu.ru/bitstream/123456789/37620/1/edscience_2002_03_020.pdf)
- Williams, B. (2001). Developing critical reflection for professional practice through problem-based learning. *Journal of Advanced Nursing*, 34(1), 27-34.  
<https://doi.org/10.1046/j.1365-2648.2001.3411737.x>