

Structural and Functional Model of Professional Reflection Development in Teachers in the System of Methodical Work

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Abstract: The article is dedicated to generalisation of information about development of professional reflection in teachers in the system of methodical work of a pedagogical college in the form of a model for its approbation. The purpose of the article is to analyse the contemporary literature on the research problem, experience of the real-world teachers, on the basis of which (the main goal) an effective relatively open model of professional reflection development in teachers of college or other higher education institutions should be built. Research methods: analysis of scientific and methodical literature; analysis of curricula and scientific-methodical support, method of system schematic structural-hierarchical modelling of professional reflection development in teachers in the system of methodical work. The article proves a hypothesis that on the basis of generally accepted principles in contemporary education theory and taking into account all didactic and psychological components of the educational process, it is possible to create a diagnostic and formative model of professional reflection development in teachers. A methodical centre of such a model is the author's course on reflection development: "Development of professional reflection in the system of methodical work at a pedagogical college". The model is of a framework type and it is relatively open, which allows to adjust it for the needs of a particular institution. The international significance of the article lies in the possibility of a framework application of the developed model of professional reflection in countries with transitional state of education system (developing countries).

Keywords: *Pedagogical modelling, neurophysiological mechanisms, principles of reflex-professional activity, model blocks, pedagogical principles.*

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Introduction

Professional development of teachers is acquisition of new competencies, knowledge, skills and abilities that they use or will use in their professional activities. Professional development of teachers is a systematically organized process of a continuous professional training of employees to prepare them to perform new educational functions, tasks and responsibilities, adapt to new conditions of educational establishments and increase the level of professional readiness to perform educational functions (Arutyunov et al., 2005; Gerasymova et al., 2019; Maksymchuk et al., 2020a; Maksymchuk et al., 2020b; Onishchuk et al., 2020). In Ukrainian pedagogy a systematic approach prevails. A systematic approach to professional development of employees is substantiated in the works of Semenov and Nabokov (2008) and Afonin et al. (2004); systematic approach to personnel development management of the organization – Kolomiets (2008); Pluhina (2013), etc. Thus, the natural phenomenon of reflection, inherent in each person as if automatically, and a priori, it is taken into account at formation and performing practical activity of the teacher.

The scientists note that in solving the problems of staff training one-time measures will not work. There should be a whole system aimed at development of personal needs: professional and career growth of specialists of an establishment (in our case, development of professional reflection in teachers in the system of methodical work of a pedagogical college). Thus, a systematic approach considers development of professional reflection in teachers in the system of methodical work of a pedagogical college as a holistic orderly complex of interdependent and interrelated activities and elements, which aims at quantitative and qualitative changes in the organism, thinking, psyche and behavior of teachers. Presently, more important is transition of individual employees, groups, pedagogical colleges as a whole to a new, higher quality level and achievement of personal, organizational and social efficiency. In the context of the chosen research topic, a systematic approach provides a relationship of components of professional reflection of teachers in the system of methodical work of a pedagogical college (purpose, objectives, types of professional reflection, forms of methodical work, methods of professional reflection development, etc.). However, there is a clear lack of separate research on such a powerful internal potential as reflection in the post-Soviet space.

However, neuroscientists have recently proved that “understanding the nature of reflection is derived from a profound determination of anthropological phenomena that necessarily have a social and

neurophysiological component” (Lieberman et al., 2002). This attests to the ambivalence of natural and social in any professional activity. This is especially true for the profession of a teacher, because they constantly use the intuitive, reflexive, introverted (on the one hand) and adaptive, projective, extroverted - on the other.

In our opinion, this indicates a permanent (explicit or implicit) competition in the soul of teachers between externally delegated resources and their own, aimed at self-realization of their personalities as teachers. Therefore, it is **relevant** and appropriate to create tools, methods and models for studying and forming the “hidden” didactic side of the teachers - their professional reflection.

Modelling of stages of educational process or its fragments is repeatedly and multimodally described in pedagogy, however there is no unambiguous attitude to methods of modelling not actually educational processes, but the accompanying psychological processes, such as: psychological environment in the group, readiness for activity, self-awareness, including motivation and reflection.

In this regard, **objective of the research** is a theoretical justification, schematic construction and clear explanation of the structural and functional model of development of professional reflection in teachers in the system of methodical work (for Ukraine). The secondary objective is to create a special course for teachers on the development of professional reflection and its incorporation in the model.

The research methods are: analysis of scientific and methodological literature, international scientific publications of the main scientometric databases; thematic and subject analysis of the curricula, scientific and methodological support in order to find the content elements that form professional reflection. The main method is the method of systematic schematic structural-hierarchical modelling of the development of professional reflection in teachers in the system of methodical work.

Data saturation took place with the help of the following tools: a) scrutinising the content of education, basic teaching methods and self-presentation of teachers in a selected college; b) scrutinising psychological and pedagogical means of introducing reflection procedures into the structure of various forms of methodical work (according to the content of educational programs, teaching and methodical materials (presented in the model in detail); c) personal experience of the authors, which was summarized in the relevant special course (the article presents only the title and modules).

Research ethics. The article examines experience and psychological climate among the college staff, who gave their voluntary consent. Also, with the consent of the authors of educational programs and with the permission of the college administration, we used software and scientific and methodological support in order to find psychological and pedagogical means of introducing reflective procedures. The procedures and methods that were lacking were modelled by us on the basis of our own experience and by scrutinising relevant literature.

The hypothesis of the research lies in the fact that for transitional forms of reformed education (for example, in Ukraine) it is possible, taking into account all relevant factors, to create a relatively complete model of formation and evaluation of professional reflection of the teacher.

Current understanding of teacher reflection and attempts to model it

Teacher professional reflection is a tool for self-identification and realization of cognitive and personal needs. Combination of these two aspects, according to scientists, allows to use in synergy one's own resource as well (knowledge, experience, emotions) and the resource of the educational environment (teaching aids, subject, topic, etc.). Interestingly, educators and psychologists previously considered these resources separately (Calderhead, 1989). Now scientists consider them not just in synergy, but they do not even believe that there are unequivocally negative and unequivocally positive phenomena of teacher reflection: a human being is arranged in such a way that all products of reflection (negative or positive emotions) are a source of change, development, finding a better solution - transformativity and performativity in a broad sense (Messmann & Mulder, 2015).

Although there are no universal tools for studying professional reflection, let alone universal models for studying it, scientists have realized: it is not necessary to study all aspects of reflection: there is no practical benefits in it. The main thing is to record the subject's awareness of positive and negative feelings (Mälkki, 2011, p. 3). These feelings include those that can affect the quality of work and the subjective quality of job satisfaction: negative (doubt, fear, caution, expectations of failure, uncertainty) and positive (satisfaction, expectations of a positive result, success, sense of perspective). The main thing is that the source of these feelings was "the natural and professional "self" (Mälkki, 2011, p. 3).

Measurement of the reflection in future teachers under experimental conditions has already been carried out by Chamoso. A group of researchers measured subjective readiness for learning and future teaching. Pre-

professional reflection turned out to be more factual and symptomatic about the prospects and difficulties of students-pedagogues. Students better understood themselves, felt prospects and difficulties, and at the same time destructive feelings – diffidence before starting a professional activity, excessive focus on themselves rather than on the objects of future influence and transformation (Chamoso et al., 2012).

On the other hand, measuring reflection in experienced teachers does not give such a wide discrepancy in the emotional range, but they revealed hidden anxieties and desires for changes that even experienced teachers are wary of expressing explicitly.

An analysis of articles from the leading scientometric databases over the last decade has revealed that there is no holistic study that would offer a concrete and relatively complete model of reflection. This only proves once again the relevance of our article. However, we found a number of publications that outline ways and means of modelling teacher reflection. Thus, Hickson as a social worker constructs his model of critical reflection, which is based on self-understanding. He proposes to use the approach of Phuc and Gardner according to the scheme sensation - observation - research - deconstruction (Hickson, 2011, p. 829). The author believes that it is possible to create a model of reflection *ex post facto* on the basis of one's own or someone else's experience, using not only factual and rational data, but also stereotypes, assumptions, attitudes and other influences. It is clear that such modelling can be obvious, but not methodologically significant.

Researchers in the field of medicine and medical education offer doctors and medical students to develop a transformational model of professional identity formation. It is now possible to create one's own reflective model thanks to group technological and rational platforms of "reflective practice", where the subject actually uses the only tool - positioning. Phillips, Fawns, and others summarize: "positioning is one such appropriate tool in which individuals metaphorically find themselves within discursive action in everyday conversations related to personal positioning, institutional practice, and social rhetoric" (Phillips et al., 2002). From this we notice that such reflective modelling is personality-oriented, so it is not suitable for mass use in a group of students. In addition, it is basically postmodern, thus it still has the right to exist.

Kreber analyses two models of reflection: Mezirov's theory of transformative learning and the self-regulated learning of Zimmerman and Schunk. At the beginning of the third millennium, the scientist warns against excessive use of the concept of "reflection", describes the "framework intersection" of these two models and notes: the positive aspects of both

types of introspection (reflection) include avoidance of excessive theorizing, high validity of results, their quality (Kreber, 2004). If we were able to transform the educational process in Ukraine (where the research is conducted), we could probably use one of these models. However, our task is to partially abstract from the educational process, not to modify it and at the same time to provide a model, scheme, algorithm and tools for teacher (student) reflection.

Scientists who are looking for valid and universal models of professional reflection, which should take into account (and therefore depend on) many subjects of the educational and extracurricular process. When it comes to raising and educating junior schoolchildren and even pre-schoolers, the main stimulus for their activities is positive emotions. Therefore, critical professional reflection is nothing more than a permanent working discussion of the staff, parents, teachers and children about emotional experience, its nature and dynamics (Elfer, 2012). Elfer once conducted an experiment to implement such a working reflection during 9 discussions, in which he even involved psychoanalysts and administration of preschool institutions. The experiment yielded positive results, especially in terms of managing education and its adult subjects, but a long-term positive emotional background was not achieved.

This proved once again that oral working discussion as a model of critical professional reflection is a constant process, fused with the educational one.

Principles of reflex-professional activity of the teacher, which formed the basis of the model

In this section, we briefly outline the principles that we consider relevant for building a model of reflex-professional activity of a teacher.

In a number of works on reflection (Sytnykov, 1995) special attention is paid to the motivational side of activity, personality qualities, style of thinking, especially important indicators of professional skill are positive attitude to the profession, there is a connection between procedural (technological) and motivational components of professional activity (the higher the professional skills and professional achievements, the more adequate, more stable the professional motivation is and vice versa). The personality-motivational approach is aimed at revealing the influence of integral factors of personality on increasing the level of professional reflection in teachers of mathematical disciplines in the system of methodical work. Application of a personal-motivational approach to the study of the problem in question ensures the interest of teachers in the development of

their own professional reflection, which should lead to an increase in professional skills in particular, and competitiveness on the labour market in general.

In addition to motivation, there are other significant factors that affect a professional development of an individual, depending on the chosen field of activity, specifically: psychophysiological (eyesight, hearing, weight, physical disorders, etc.); psychological (level of development of cognitive abilities, memory, intelligence, concentration; socio-professional responsibility, which is expressed in the ability to assess one's behaviour and actions as harmful or beneficial to society, team or an individual), socio-professional (stereotyping of activities that have both positive and negative effects on psychological barriers, and emotional burnout), socio-economic (changes in the labour market, lack of material and moral incentives, random events and adverse circumstances) (Zeer & Syimanyuk, 2005).

Application of the component-target approach to the analysis of the professional activity of a teacher allowed to determine that the content of disciplines, methods and techniques of mastering knowledge, skills and abilities used by teachers influence formation and development of professional reflection. In particular, to single out the following reflexive-professional actions of the teacher: to assess correctness of the formulated goals, objectives and their adequacy to the conditions; to assess the compliance of the content of students' activities with the set tasks, to monitor effectiveness of methods, techniques and tools of pedagogical activity; to assess compliance of the organizational forms used, to the age characteristics of students, their level of development, the content of educational material, to determine the causes of success, failures, mistakes.

The principle of determinism, which determines the need to take into account various factors influencing such development. One such factor is motivation. It is well known that development of personality is motivated by both internal motivation – the motive of self-development, achieving significant goals, and external – under the influence of education, communication, authoritative personalities, team, through the requirements objectively presented to a person by life. In accordance with the logic of personal development, professional development is carried out under the influence of motivation “outside” and “inside”. The following factors of professional motivation development are singled out: satisfaction with the process of activity; direct result of activity (created product, acquired knowledge, etc.); rewards for activities (salary, promotion, fame, etc.); the desire to avoid sanctions that threaten in the event of evasion from the

activity or its dishonest performance; fear of punishment; probability of success (Gurov, 2005).

The principle of active personality, which determines that, being under the influence of various factors and the influence of the professional environment, a teacher of a pedagogical college develops professional reflection in the active methodological activity, which further contributes to transformation of this environment.

The principle of subjectivity, which determines the transformative nature of an individual, aimed at developing his or her abilities. According to Underhill (1992), a teacher's professional development can be seen as a movement from "unconscious incompetence" (a teacher sees no difficulties, unaware of doing something wrong) to "unconscious / automatic competence" (a teacher is so competent that, without thinking, easily and successfully copes with professional tasks).

In order to desire to achieve a high level of professionalism, the teacher must be aware of the problem, specifically the lack of their own knowledge, skills, abilities, and take measures to solve it.

The results of students' success, study of normative documents, reading of methodical literature, questionnaires of assessment of difficulties of own activity, questionnaires of assessment of activity of the teacher by students, attendance of classes of colleagues, scientific and methodical seminars and conferences can help in understanding of the need of change of professional activity of the teacher. This fully applies to development of the professional-reflective action.

To take into account peculiarities of the heterogeneous composition of teachers (different age, gender, personality traits, work experience and level of professional training) in the process of development of professional reflection in the system of methodical work allows differential-typological approach (Andryushchenko, 2008). However, we are more impressed with the andragogical approach, which in the context of the researched problem takes into account age specifics of teachers and peculiarities of the acquired professional experience. The principle of gained experience is the most important and accumulative of all the previous ones. It promotes professional and at the same time natural creation of an educational-reflective environment at all levels of interaction of teachers in the system of methodical work (self-reflection in the analysis and mutual analysis of classes, group reflection during meetings of subject-cycle commissions and reflective environment in the system of methodical work of a pedagogical college), which promotes effective self-realization and development of both teachers and students. This principle is accompanied by formation of

feedback in the development of professional reflection in teachers of a pedagogical college. Timely information in the form of assessment, feedback or documents that record the results of the teacher activity, allows to determine correctness or fallacy of actions, to compare one's successes with the success of one's colleagues. In case of complications, feedback helps to understand the nature and causes of their occurrence, thus providing an opportunity to avoid similar difficulties in future.

Feedback performs two main functions: semantic and emotional. Semantic determines achievement of certain results in accordance with specified criteria. Emotional makes it possible to determine the mood of the participants in the learning process and, if necessary, adjust the negative trends in the development of relationships.

The considered principles of professional development in the teacher of a pedagogical college in the system of methodical work can be supplemented and detailed at the description of features of activity of teachers. There is a general understanding that development of professional reflection is a multifaceted process that is accompanied by changes in the entire internal sphere of an individual, affecting professional self-awareness and formation of the image of a professional.

Structural and functional model of development of professional reflection in teachers in the system of methodical work

Modelling in pedagogy and professional training area is necessitated due to the search for ways to improve training of specialists. In line with the research, the task is set to summarize information on development of professional reflection in teachers of mathematical disciplines in the system of methodical work of a pedagogical college in the form of a model for its approbation. The purpose of implementation of the structural and functional model is development of professional reflection in teachers in the system of methodical work of a pedagogical college.

The structural and functional model of development of professional reflection in teachers in the system of methodical work of a pedagogical college is presented in the set of conceptual-target, semantic-procedural and control-diagnostic blocks (fig. 1).

The conceptual-target block provides unity of the purpose, scientific approaches (*personal, system, competence, andragogic, structural-functional, activity, etc.*) and principles (*scientificality, systematicity, sequence and accessibility, fundamentality, structure, integrity*) of development of professional reflection in teachers of a pedagogical college.

The content-procedural block reflects the structure of professional reflection of a teacher of mathematical disciplines, which consists of four components (*motivational, cognitive, activity* and *personal*). We propose to ensure development of professional reflection of teachers of mathematical disciplines during such forms of methodical work as self- and mutual analysis of classes, meetings of subject-cycle commissions, attestation of teachers, integrating reflection procedures, individual and collective means of professional reflection development, active learning methods, special technologies of group reflection.

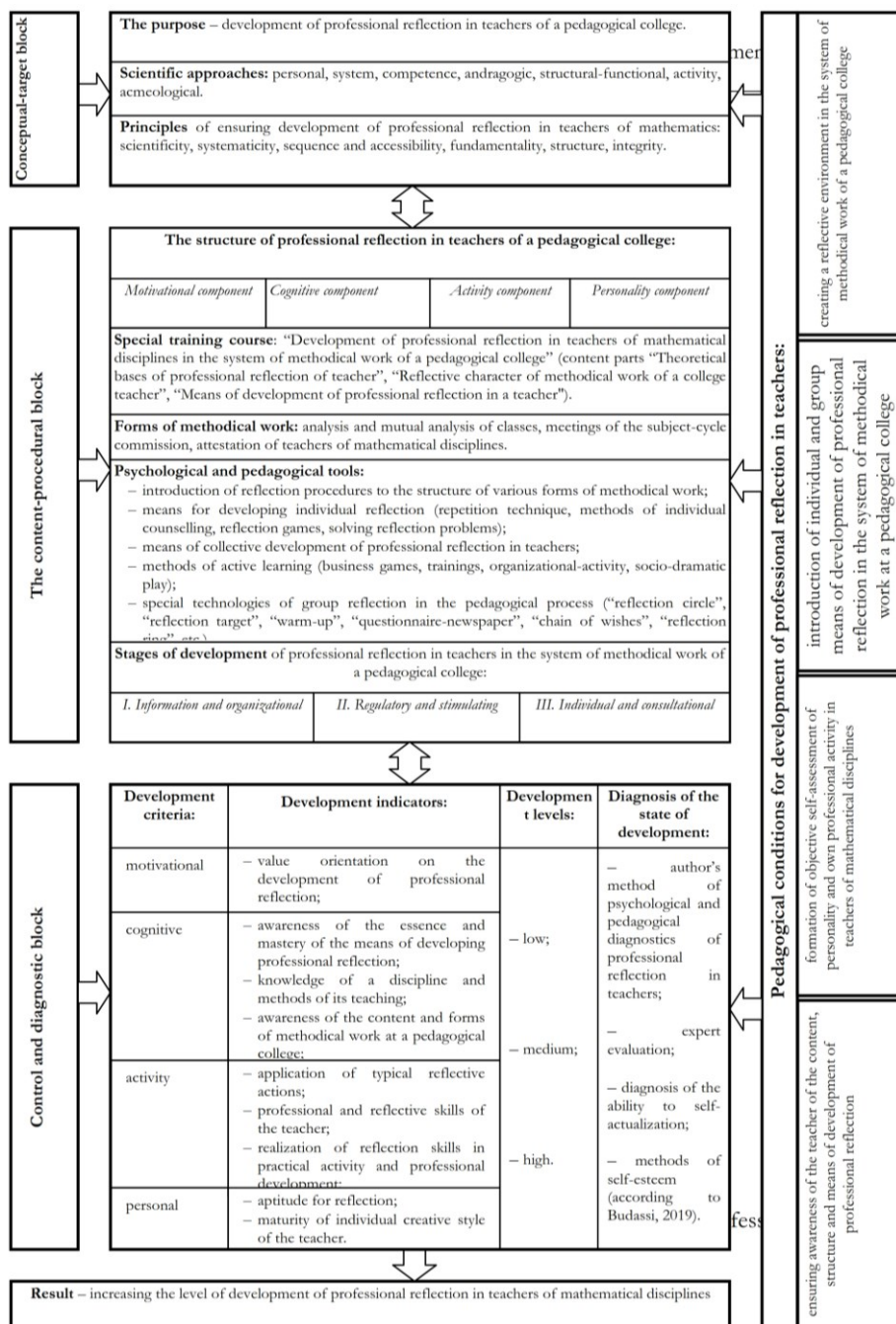


Fig. 1. Structural and functional model of development of professional reflection in teachers in the system of methodical work at a pedagogical college

To ensure a successful implementation of a sound model a special training course was developed and integrated into the system of methodical work of higher pedagogical educational establishment of I-II levels of accreditation “Development of professional reflection in teachers in the system of methodical work at a pedagogical college”. A special training course (STC) is structured according to the three semantic modules: “Theoretical bases for professional reflection of the teacher”, “Reflective character of methodical work of the teacher of a college”, “Means of development of professional reflection in the teacher”. The subject of STC study is the theoretical foundations, organizational conditions and psychological and pedagogical tools for development of professional reflection in teachers of mathematical disciplines.

We determined the stages of development of professional reflection in teachers of mathematical disciplines in the system of methodical work of a pedagogical college: information and organizational, regulatory and stimulating, individual and consultational.

The information-organizational stage provides acquaintance of heads of methodical councils, heads of subject-cycle commissions and teachers of pedagogical colleges with the basic provisions of the theory (essence, scientific approaches and principles, potential possibilities of the system of methodical work of a pedagogical establishment in development of professional reflection) and methodical bases (individual and collective means of developing professional reflection in the teacher (repetition technique, counselling, reflective games, debates, reflex interviews, programs of observation of actions in professional situations, reflective training, etc.)) development of professional reflection in teachers.

A separate task of the developed STC is to reveal specifics of application of psychological and pedagogical tools for development of professional reflection in teachers of mathematical disciplines in the system of methodical work. In this regard, we provide preliminary instruction and advice to the heads of subject-cycle commissions on the nature, content and methods of using reflection tools, the validity of their choice in accordance with the forms of methodological work, differentiation and individualization of reflection tools according to the levels of professional reflection of teachers, their application taking into account peculiarities of the profession.

During the second, regulatory and stimulating stage we provide integration of reflection procedures, individual and collective psychological and pedagogical means of professional reflection development, methods of practicing its skills in the structure of various forms of methodical work (first of all self- and mutual analysis of classes, subject-cycle commission meetings,

teacher attestation), enabling self-research and self-correction of socio-professional and psychological resources of the individual and contributing to the internal need of teachers of mathematical disciplines for professional reflection.

The individual-consultation stage is aimed at providing personalized psychological and pedagogical support and pedagogical support of pre-differentiated according to the results of diagnosis (individual traits and personal qualities, degree of objectivity of self-assessment, level of reflection and self-actualization, etc.) groups of teachers with unified tasks of professional pedagogical reflection development.

At this stage, we envisage application of individual psychological and pedagogical means of reflection (counselling, individual reflection games, introspection, self-actualization, self-observation, etc.) with further summarizing effectiveness of their use for development of their own professional pedagogical reflection by teachers of mathematical disciplines independently or with involvement of expert-consultants.

The control - diagnostic block contains criteria (motivational, cognitive, activity and personal), indicators and means of psychological and pedagogical diagnostics of development of professional reflection in teachers of mathematical disciplines at pedagogical colleges.

The structural and functional model of development of professional reflection in teachers of mathematical disciplines in the system of methodical work of a pedagogical college pictured in fig. 1 is described above by constituent blocks: theoretical and methodological, target, content-procedural, control and diagnostic, result.

The blocks are mutually agreed with each other, which, in our opinion, enables to ensure development of professional reflection in teachers in the system of methodical work of a pedagogical college.

Conclusions

The structural and functional model is built as a depiction of the real process of professional reflection development according to a clear algorithm with observance of certain pedagogical principles and conditions of development (ensuring the teacher's understanding of the content, structure and the means of professional reflection development; formation of an objective self-assessment of personality and own professional activity of teachers; introduction of individual and group means of development of professional reflection in the system of methodical work of a pedagogical college; creation of a reflective environment in the system of methodical

work of a pedagogical establishment on the basis of providing purposeful action on the teacher's personality of certain factors that enable self-research and self-correction of socio-professional and psychological resources and contribute to the internal need for reflection).

The model is not only diagnostic, but also partially formative, as it includes the author's course on reflection development: "Development of professional reflection in the system of methodical work of a pedagogical college" (content parts "Theoretical bases of professional reflection of a teacher", "Reflective nature of the methodical work of a college teacher", "Means of professional reflection development", offers a set of targeted psychological and pedagogical tools (introduction of reflective procedures in the structure of various forms of methodical work; tools for development of individual reflection, etc.). Also, positive features of the model are its relative openness, which takes into account development of professional reflection in teachers through active work. It is carried out in two directions: professional and personal. Professional growth is a quantitative characteristic that implies development of the reflective skills, including decision-making, planning, algorithms for solving problem situations, i.e., everything that leads to high results in professional activities. Personal growth is a qualitative characteristic of a teacher as an agent of professional activity, which involves development of such professionally significant qualities as motivation, creativity, value system, etc. In the process of applying the model, one can get quantitative and qualitative, objective and subjective data on the dynamics of professional reflection.

Research limitations. The model is still theoretical and recommendatory in nature. It is time to reveal the experimental work to test effectiveness of the developed functional model for development of professional reflection in teachers in the system of methodical work of a pedagogical college, which will be done in future researches.

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professional activity of the teacher, which formed the basis of the model, Oleksii LYSTOPAD managed to reduce all theoretical developments into a visual scheme (a model), and Anatolii MAKSYMENKO completed verification of the article in accordance with the requirements.

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