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BARBAROS CLAVA

THE DEVELOPMENT OF RESEARCH COMPETENCE IN GENERAL EDUCATION TEACHERS

531.01 - General Theory of Education

SUMMARY

of the Doctoral Thesis in Educational Sciences

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The doctoral thesis was elaborated within the Doctoral School of Education Sciences, "Ion Creangă" State Pedagogical University of Chișinău, Republic of Moldova

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The doctoral thesis and its abstract can be found in the Scientific Library of the "Ion Creangă" State Pedagogical University of Chisinau (ww.upsc.md), the National Library and on the ANACEC website (www.anacec.md)

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LIST OF ABBREVIATIONS

MEC - Ministry of Education and Research

IȘE - Institute of Educational Sciences

DGETS - Directorate General, Education, Youth and Sports

CA - Action Research

CE - Education Code

EC - Control Sample

EE - Experimental Sample

IPLT - Public Institution Theoretical High School

RM - Republic of Moldova

CONCEPTUAL POINTS OF RESEARCH

Relevance and Importance of the Research Topic. Modern education is based on the paradigm of lifelong learning, recognized by experts as a fundamental model for the development of contemporary society. The characteristics of the concept of lifelong education were elucidated by *R. Dawe* in the work *"Fundamentals of Lifelong Education"* (1991) [23]. In the *Memorandum on Lifelong Learning* (European Commission, Lifelong Learning Strategy and its Principles) it is defined as a purposeful learning activity, carried out continuously with the aim of improving knowledge, skills and competences. „The European Union priorities for improving the quality of teachers and their training, defined in the conclusions of the Education Councils, highlighted the need to update teachers' skills, as well as to promote professional values and attitudes, putting forward the following requirements for teachers:

- ⇨ in-depth knowledge in the field of the taught subject;
- ⇨ pedagogical skills, which include the following:

a) teaching in heterogeneous classes;
b) use of ICT;
c) development of transversal skills;
d) creation of an attractive and safe school;
e) cultures/attitudes of reflective practice, research, innovation, collaboration, autonomous learning" [27, p. 12].

In accordance with the Bologna Declaration on the "European Higher Education Area" (1999), the Lisbon Strategy *"Education and Training 2010"* and other documents adopted by various institutions of the European Union, an active process of restructuring the system of continuous teacher training has been launched in the Republic of Moldova. *The Standards for Continuous Training of Teachers in General Education* [9], the Strategy *"Education 2020"* [63], the Strategy *"Education-2030"* [62] were developed and approved, which highlight the importance of training and developing the professional competencies of teachers. In 2018, the Ministry of Education of the Republic of Moldova approved *the Standards for Professional Competence of Teachers in General Education*, which aim to: "strengthen the European dimension in the field of education and continuous development of teachers; motivate teachers for lifelong learning" [27, p. 2].

On 22.05.2018, the Council of the European Union issued *a new Recommendation on key competences for lifelong learning*, and *the 2006 Recommendation* was revised and updated. According to the latest document, 8 key competences are established: literacy competences; linguistic competences; competences in science, technology, engineering and mathematics; digital competences; personal, social and learning competences, civic competences; entrepreneurial competences; cultural awareness and expression competences [68, pp. 7-8]. It is specified that competences in science "include the understanding of science as a process of investigation through specific methodologies, including observation and controlled experiments, the ability to use logic and rational thinking to verify a hypothesis, as well as the ability to abandon one's own beliefs when they are in contradiction with new experimental findings" [68, p. 9].

Therefore, competence in science or ***research competence*** is a priority also at the European level.

Description of the situation in the field of research and identification of the research problem. The development of research competence of teachers is a subject of study for scholars: *J. Dewey* [24, 26], *G. De Landsheere* [38], *S. Cristea* [19, 20], *C. Enăchescu* [28], *I. Nicola, D. Farcaș* [41], *C. Ulrich* [66], *I. Jinga* [34], *V. Pop* [54], *E. Păun, D. Potolea* [46], *A. Peretti* [48], *A. Nedelcu* [40]. Researchers from the Republic of Moldova have also been concerned with this problem: *V. Gh. Cojocaru* [13,14], *V. Cojocaru* [12], *Vl. Guțu* [29],*Vl. Guțu,O. Dandara, E. Muraru* [30], *L. Pogolșa* [49], *I. Botgros, L. Franțuzan* [6,7], *D. Patrașcu, L. Patrașcu, A. Mocrac* [44], *T. Cartaleanu, O. Cosovan, V.*

Goraș-Postică, L. Sclifos [10], *A. Silistraru, S. Golubițchii* [61], *A. Gugiuman, E. Zetu, E. Codreanca* [31], *V. Țapoc* [64] etc.

J. Dewey [24] emphasizes the power of the human intellect, the fact that the research teacher will be oriented towards "making the lesson interesting". According to other scholars: *A. Gugiuman, E Zetu, E. Codreanca*, „the defining note of research is the search for knowledge" [31, p. 22]. According to *L. Sclifos*, "research competence refers to an integrated set of competencies specific to the research process and mental operations activated during research, practiced in different situations, mobilizing, reorganizing internal and external resources to achieve clearly defined objectives" [59, p. 35]. And *Vl. Guțu* believes that scientific research activity is an intellectual activity that correlates with the practical one [29]. *L. Pogolșa* claims that "scientific research competence goes through four successive stages (from fundamental knowledge to functional knowledge, from functional knowledge to internalized knowledge and from internalized knowledge to externalized knowledge) that must be taken into account in the process of didactic design and the implementation of scientific education in biology, chemistry and physics classes [49]. *T. Cartaleanu, O. Cosovan, V. Goraș-Postică, L. Sclifos* highlighted the factors that determine research behavior, as well as the development of research competence through interactive teaching strategies [10]. In the view of *I. Botgros*, "investigation competence (also called scientific research competence in the field of didactics) contributes to the development of solutions to the problems that the educational process reveals, taking into account the personal needs of the teacher and the student." [7, p. 3]. *C. Enachescu* [28], *D. Patrașcu, L. Patrașcu, A. Mocrac* [44] consider that pedagogical research begins when a theoretical or practical problem arises that requires to be solved in a systemic way until some conclusions are formulated. *F. Orțan* claims that, "the meaning of research approaches that of investigation, aiming at discovery, that is, the transition from what is unknown, uncertain, to what can be expressed in scientific terms or can be accepted by the community of scientists" [43, p. 21]. *S. Cristea* considers that pedagogical research is guided by a management at the level of the education system and process, in order to improve the situation in the field of education, more specifically, of the principles and methods of teaching. This would have positive consequences in identifying "optimal solutions to solve problems that arise at the level of the education system and process" [17, p. 38]. He believes that pedagogical research, being scientific, aims to "define and argue the laws and principles that order the action of designing and implementing education at the system and process level" [ibidem, p. 44]. *S. Cristea* developed the stages of pedagogical research and pedagogical research methods [17]. *I. Jinga* claims that psychopedagogical scientific research offers us several investigation themes: "didactic design, evaluation of school performance and of the activity of teaching staff, optimization of collective management processes of educational units" [34, pp. 192-193], suggesting to us the idea of the need for research projects in educational institutions and the involvement of all teachers in such scientific research projects. *G. De Landsheere* called pedagogical research and action research, mentioning that: "teachers will not bring their contributions to research and development in education closer together unless they have participated in the construction of science and the tools to be used, or at least, have reconstructed them" [38, p. 261]. He comes up with the hypothesis that action research is when the teaching staff participates in the process of changing the realities in the field of education. Today we relate the notion of pedagogical research to its equivalent of action research, because both aim at major changes in the field of education. *Kurt Lewin*, the founder of the concept of action research, highlights the role of the teacher as an agent of change and initiator of school improvement processes - the main source of reforms [40]. Scholars *A. Nedelcu* [40], *C. Ulrich* [66], V. Pop [54], *R. Bezede* [8], *L. Sclifos* [60] were also concerned with *action research*. *Andre De Peretti* also tells us about the role of the modern teaching staff as a researcher, for whom the teaching staff appears in the role of ***experimentalist*** (experimenter): creator of learning situations; didactician; observer. His second role is that of clinician: director of programs; analyst of practices; information analyst [48]. Research competence radically changes the status of the modern teacher, adding to the traditional status of practitioner that of researcher. "Thus, it is considered that the

main qualities of the scientist-researcher are: good memory, the ability to concentrate and internalize, scientific fantasy, intellectual independence/independence of thought, passion, obsession with science, insistence, accuracy, love of creation, love of science and the chosen profession, consistency in scientific activity, thorough knowledge of the foundations of science, the tendency to improve, restraint, patience in doing routine things, the ability to accumulate facts, sacrifice for creation and science, etc." [44, p. 218].

The study of sources with reference to the topic of the doctoral thesis shows that the development of research competence of teachers is still too little studied, and the lack of theoretical works on the topic in question convinces us that it remains not only current, but also absolutely necessary.

Regarding the training and development of research competence of teachers, we highlight the following **contradictions** determined by: *the resistance to change of some teachers in the context of the educational reform; the increasing demands of contemporary society regarding the development of research competence of teachers and the lack of motivation for self-improvement; the initial training of teachers in the context of insufficient psycho-pedagogical preparation of future teachers regarding the development of research/investigation competence*.

The identified contradictions generated the **research problem:** *What are the theoretical and methodological premises of the development of research competence of general education teachers?*

Research object: the process of development of research competence of general education teachers.

The purpose of the research is *to determine the theoretical and methodological premises of the development of research competence of teachers and the theoretical and methodological substantiation of* ***the Pedagogical Model for the Development of Research Competence of General Education Teachers***.

Research hypothesis: The research competence of general education teachers will be developed by implementing in educational practice *the Pedagogical Model for the Development of Research Competence of General Education Teachers* and *the Methodology for the Development of Research Competence*, both within the framework of continuous professional training and within their professional activities.

Research objectives:

1. Analysis of the theoretical benchmarks of the concept of the *development of research competence as a metacognitive competence of teachers.*
2. Establishing reference areas for the research competence of teachers.
3. Developing *the Pedagogical Model for the Development of Research Competence of Teachers in General Education.*
4. Methodological substantiation of the development of research competence of teachers.
5. Experimental validation of *the Pedagogical Model for the Development of Research Competence of Teachers in General Education* and *the developed Methodology*.

Research methodology. In order to carry out the investigation, the following were applied: *theoretical methods*: scientific documentation, context analysis, synthesis, theoretical modeling, abstraction and exemplification, systematization and generalization, comparison; *praxiological methods*: conversation, questioning, pedagogical experiment, problematization, case study; *statistical methods*: quantitative and qualitative data analysis, experimental data processing, interpretation of the results obtained from the pedagogical experiment.

The scientific novelty and originality of the research consists in: conceptualizing the development of research competence of teachers in general education, establishing reference areas for research competence of teachers, defining the concept of research *competence of teachers, developing the Pedagogical Model for the development of research competence of teachers in general education and the Methodology for the exploitation of the developed model.*

The solved scientific problem consists in the theoretical and methodological substantiation of

the development of the research competence of teaching staff and the elaboration of the *Pedagogical Model for the development of the research competence of general education teachers.* The implementation of the Model will effectively contribute to the development of the research competence of general education teachers.

Theoretical significance of the research: psychopedagogical substantiation of the development of research competence of teachers in general education; development of the system of principles of the development of research competence of teachers and substantiation of the system of principles of conducting research; identification of the system of tools and indicators for diagnosing and evaluating the research competence of teachers in general education.

The applied value of the work lies in: development of the methodology for the development of research competence of teachers based on *the Pedagogical Model for the development of research competence of teachers;* development of *the Curriculum "Development of research competence of teachers in general education"; conceptualization of the Modular Program for continuous training "Development of research competence of teachers in general education".*

Main scientific results submitted for support:

- ☑ *Psychopedagogical and managerial benchmarks for the development of research competence of teachers in general education;*
- ☑ *The system of principles for the development of research competence of teachers;*
- ☑ *The pedagogical model for the development of research competence of teachers in general education and the Methodology for implementing the developed model;*
- ☑ *The training program for teachers on the development of research competence;*
- ☑ *The curriculum for the development of research competence of teachers in general education.*

Implementation of scientific results. The theoretical and methodological results were implemented by presenting them at conferences and publishing them in specialized scientific journals, within the framework of continuous training courses for teachers (2021-2022).

Approval of the research results. The fundamental theses, the results and the conclusions formulated are reflected in scientific articles and presented at scientific conferences: National scientific-didactic conference with international participation *"Current problems of real science didactics"*, Tiraspol State University, Chisinau, May 11-12, 2018; International Scientific Conference *"School Curriculum: Challenges and Opportunities for Development"*, Institute of Educational Sciences, Chisinau, December 7-8, 2018; Republican Conference of Teachers, Tiraspol State University, Chisinau, March 1-2, 2019; International Scientific Conference *"Teaching Staff-Promoter of Educational Policies"*, Institute of Educational Sciences, Chisinau, October 11-12, 2019; International Moldovan-Polish-Romanian Scientific Congress *"Education-Politics-Society"*, Tiraspol State University, Chisinau, April 1-4, 2019; National Scientific-Practical Conference with International Participation, 3rd Edition *"Axiological Orientations of Constructivism in Modern Education"*, Tiraspol State University, IPLT "Orizont", Chisinau, January 31 - February 1, 2020.

Publications on the topic of the thesis: the author has 19 scientific works: 10 articles in specialized journals, 5 articles in the materials of international conferences, 3 articles in the materials of national conferences, 1 article in the Materials of the International Moldovan-Polish-Romanian Congress, 1 guide (co-author).

Thesis volume and structure: the thesis includes annotations (in Romanian, English and Russian), list of abbreviations, introduction, three chapters, general conclusions and recommendations. The thesis is presented in 187 pages, the main part is reflected in 140 pages, the bibliography from 208 sources, 21 tables, 30 figures, 10 annexes were developed.

Keywords: *competence, principles, professional competence, research competence, metacognitive competence, lifelong learning, professional competence standards, action research, participatory research, participatory-action research.*

THESIS CONTENT

The thesis consists of 3 chapters. **In chapter 1**. **Theoretical approaches to the development of research competence of teachers in general education**, the concepts *of competence, professional competence* and *research competence* are scientifically substantiated. The notion of ***"research competence"*** is elucidated from the point of view of different authors, the three types of research are identified: *action research, participatory research, participatory-action research*, research premises, research stages. The concept of *professional competence of teachers* is treated differently in the specialized literature. Some researchers consider ***professional competence of teachers*** as an acquisition consisting of knowledge accumulated as a result of practical and theoretical experience. Thus, *V. Gh. Cojocaru* refers to *the National Framework of Qualifications in Higher Education*, which defines *professional competence* as "the proven ability to select, combine and use knowledge, skills, values and attitudes appropriately, in order to successfully resolve a certain category of work or learning situations, circumscribed to the respective profession, under conditions of effectiveness and efficiency." Professional competences include all the knowledge and skills that professional standards require [13, pp. 32-33]. In the work *"Teachers' competences: European approaches"*, *R. Dumbrăveanu* considers that these include cognitive and meta-cognitive skills, also having 4 fundamental characteristics: "*to* ***learn to think***, to **know**, ***to feel*** and **to act as a teacher**" [27, pp. 24-25].

The analysis of bibliographical sources with reference to the notion of ***research*** highlights the fact that at the moment there is no universally accepted definition of it. For example, in the view of scholars: *A. Gugiuman, E. Zetu, E. Codreanca* [31] "the defining note of research is *the search for knowledge*." This involves an action of accumulating already existing information and facts, elucidating hypotheses, and evaluating, in order to obtain the answer to what we have researched. The same authors pay increased attention to "the degree of organization and systematization of the problem", considering "pedagogical research as a strategy designed and carried out in order to capture new relationships and facts between the components of the educational action and to develop, on this basis, optimal solutions for the problems of the educational process" [31, p. 22]. In the work *„From pedagogy to the sciences of education", F. Orțan* seeks to find a plausible answer with direct reference to the term research. The researcher argues that "the meaning of research is close to that of investigation, aiming at discovery, that is, the transition from what is unknown, uncertain, to what can be expressed in scientific terms or accepted by the community of scientists" [43, p. 211]. Unlike existential activities, oriented towards satisfying vital needs, "research aims at analyzing information, comparing on a relatively autonomous level, conceptual structuring, but especially at scientifically confirmed discovery, including those of the invention and innovation type" [ibidem]. According to De Landsheere's statements, "*pedagogical research* represents a special type of scientific research engaged in the level of educational activity. The proposed investigation, achievable in intra, inter, and transdisciplinarity conditions, is located at the intersection between fundamental research and applied research, normative research and operational research, philosophical research and action research, prospective research and retrospective research" [38, pp. 254-259]. And, as *L. Sclifos* indicates, in the work "*Formation of research competence*", "research competence aims at an integrated set of competences specific to the research process and mental operations activated during research, practiced in different situations, mobilizing, reorganizing internal and external resources to achieve clearly defined objectives. Research competence is located at the point of tangency between the didactic field (with reference to curricular subjects), the socioeconomic field (with reference to the preparation of specialists for the labor market) and the field of knowledge, achieved in school through an object of study" [10, p. 135].

In the same vein, the notion of research is also presented in the work "*Integration of science and higher education. Concepts, orientations, strategies*", authors *Vl. Guțu* et.al: "scientific research activity is a specialized type of intellectual and practical activity, in which both aspects correlate with each other" [29, p. 49]. *S. Cristea* claims that pedagogical research, being scientific, aims to "define and argue the

laws and principles that order the action of designing and implementing education at the system and process level" [16, p. 44]. It has a scientific character and respects all the rigors of an authentic investigation. As a result of studying various information sources, we have established that the premises of research are *ideas* and *action*. We also consider the concept of "reflexive practitioner", which *A. Nedelcu* described in the work "*Research-action in education*" [40], plausible. The scholar is convinced that there is a big difference between experienced teachers and those at the beginning of their professional careers:

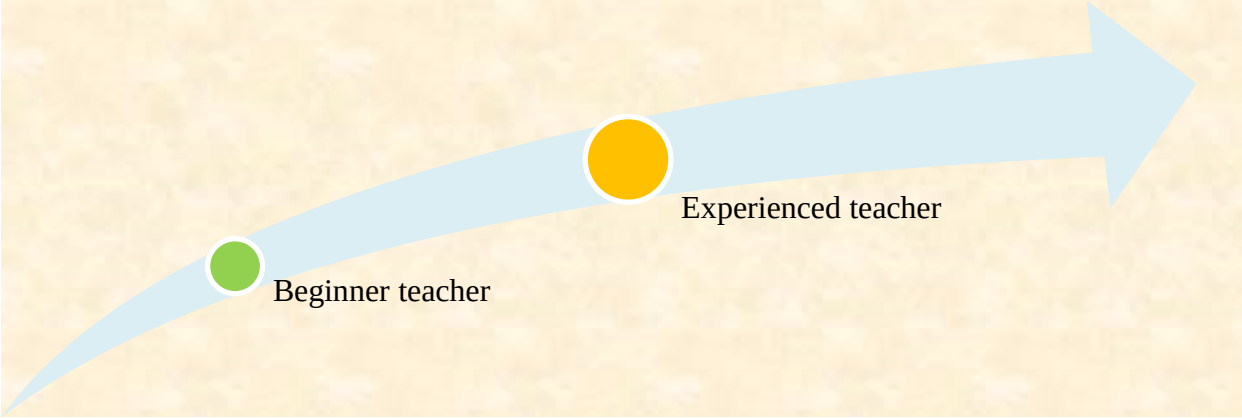

Fig.1. Development of reflective practices (after *A. Nedelcu*, [40, p. 18])

The basic difference is that the teacher with a longer work experience possesses more developed metacognitive skills, that is, he can correctly assess his cognitive level, having a strategic vision regarding the achievement of performances and a more efficient arsenal of solutions in case of difficulties. He is not only a designer of the didactic approach, observer and mentor of pedagogical practice, but also a critical analyst of specialized literature, scientific coordinator in the research activities of students, through the joint effort with them and members of the administration, drawing up strategic objectives in his own continuous professional training path. Therefore, the teacher has the following opportunities for involvement in research activity:

- *action research* (a way of studying what is happening in school);
- *participatory* research (collaboration with different people outside the school);
- *participatory-action research* (searching for ways to solve the problems that have arisen).

Action research is determined by an atypical situation, by the feeling that something is not right, that something should essentially be changed. However, in these situations the strategy of *intuitive search works* and for this reason there are no clear ends in the initial research action. The teacher has the role of an experienced researcher, who helps students identify actions for change, without engaging in them. R. Bezede claims that *action research* was implemented in education with the aim of including scientists, but also practicing teachers in carrying out investigations in the school environment. *Action research* can be defined as a set of investigation methodologies that promote both action and research equally and at the same time" [8, p. 6.] The same author believes that through the *action research* method we could investigate everything related to the field of the educational system. "The development of the curriculum at the school's decision, the methods used, the ways of interaction in the classroom, school or community, alternative assessment systems, one's own professional training, all of them, along with many other elements, can be addressed for ameliorative purposes through the action research methodology" [ibidem]. In the work "*Action research in education*", *A. Nedelcu* talks about the fields of investigation through action research [40, pp. 42-43]:

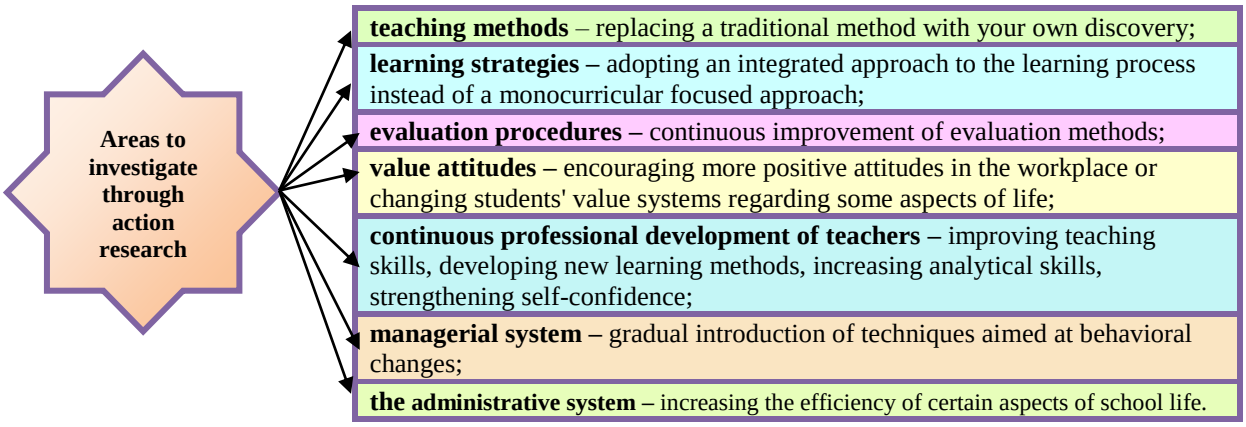

Fig. 2. Fields of investigation through action research (*A. Nedelcu*, after *Cohen & Manion*)

We emphasize that *action research* offers us the opportunity to make major changes in educational institutions by improving the administrative, managerial system and teaching methods and techniques. It gives the teacher more freedom in applying a unique teaching style with greater chances for professional growth and can be treated from several points of view, with possibilities for development or achievement in the near future. It can be carried out at the level of a class, several classes or at the level of the institution. *Action research* has a beneficial impact on all the people involved by the very fact that the experience of the participants extends outside the educational institution, with the establishment of lasting partnerships and important restructurings in the school.

Participatory research differs from action research, because in this case the teacher-researcher selects the group of interested people and collaborates with them to study social reality. It unites people different in terms of training, age, occupation around a problem of common interest. Its objective is to capitalize on personal and other people's experience through critical reflection on the results. In participatory research, the systematic search strategy is applied, because it is more complex, emphasizing monitoring the research process and involving intuition and reason equally. Teacher researchers-guides possess the skills to organize their own activity in such a way as to stimulate cooperation. The participatory approach can be extended beyond the walls of the school, including parents and other members of the local community. We also learn about participatory research from *G. De Landscheere*'s work "*The Universal History of Experimental Pedagogy"*[38]. It aims to make the group members involved in the investigation process as active as possible, and the concern for "social action takes precedence over all others".

Another modern concept refers to ***participatory-action research***. It usually has clear objectives and unites people who are affected by a problem. Students, parents, teachers participate in the planning, analysis and application of research results of common interest, create special situations, solving real problems, involving team spirit and creativity. Through *participatory-action research*, a rapprochement, a fusion of theoretical and practical research takes place, influencing each other. Each of the three types of research - *action research, participatory research* and *participatory-action research* - can be carried out based on the research competence of teachers.

In the context of the development of theoretical benchmarks, we propose a new definition of the concept of research competence of teachers, a competence that should be formed at the stage of initial professional training at the faculty, and developed - within the framework of continuous professional training:

The research competence of teachers is an integrated system of knowledge, skills, attitudes and values, which allows the possessor to carry out the pedagogical research process, mobilizing internal and external resources to achieve expected educational objectives.

The research competence of the teacher is based on the following specific competences:

- *competence to design pedagogical research;*
- *competence to carry out pedagogical research;*
- *competence to evaluate pedagogical research.*

The system of units of competence of the research competence of the teacher includes:

- Analysis of the educational situation in the context of carrying out pedagogical research.
- Formulation of the research problem.
- Determination of the purpose and objectives of the research.
- Development and implementation of the action plan.
- Collection and systematization of data in the context of the research problem.
- Presentation of the result obtained within the pedagogical research carried out.
- Evaluation and synthesis of the research carried out.
- Dissemination and implementation of the results obtained within the pedagogical research carried out.

So, the development of research competence of general education teachers will be directed towards the development of the mentioned specific competences and the acquisition of acquisitions determined by the formulated units of competence.

In **Chapter 2. Methodology for the development of research competence of general education teachers**, the general principles of continuous professional training, the principles of conducting research, the principles of developing research competence of general education teachers are described, the methods of developing research competence of teachers and the competence structure of the modern teacher are elucidated, the assessment grid of the level of development of research competence is developed. Emphasis is placed on methodological activities at the workplace of teachers, which would considerably facilitate the development of research competence of teachers: *scientific and practical seminars, meetings of methodological commissions, school of advanced experience, meetings of the scientific and methodological council, inter-assistances, scientific conferences, demonstration classes*. Examples are given from the experience of the socio-humanistic methodological commission of the "Ginta Latina" High School in the municipality of Chisinau. Pedagogical partnership (supervision, tutoring) would be of real use in helping and guiding young teachers.

The pedagogical model for developing the research competence of teachers in general education was developed based on a critical analysis of the specialized literature, the general objectives and principles of continuing professional training, the study of pedagogical theories and the professional experience accumulated in the field of education. *The Recommendation of the Council of the European Union (2018), the Education Code of the Republic of Moldova (2014), the Education Development Strategy "Education-2030" (2023), the Standards for Continuous Training of Teachers (2007), the Standards of Professional Competence of Teachers in General Education (2018), the Standards of Learning Efficiency (2012), the Modernized National Curriculum for Romanian and Universal History for High School (2010), the National Curriculum for History for High School, 2019 edition*, represent a set of regulatory acts that guide teachers in their professional activity, including in pedagogical research activity.

We note that already in the *Standards for Continuing Education of Teachers in General Education*, developed in 2007, it is stipulated "encouraging teachers to assume and build their own continuous education path", because research is motivated by the factor of "increasing the personal responsibility of each teacher for the success of their own teaching career" [9, p. 5]. In other words, teachers are obliged both morally and through educational policy documents to be concerned with research throughout their entire professional career.

The development of research competence of teachers in general education can be effectively achieved based on the implementation of the model presented in Fig. 3:

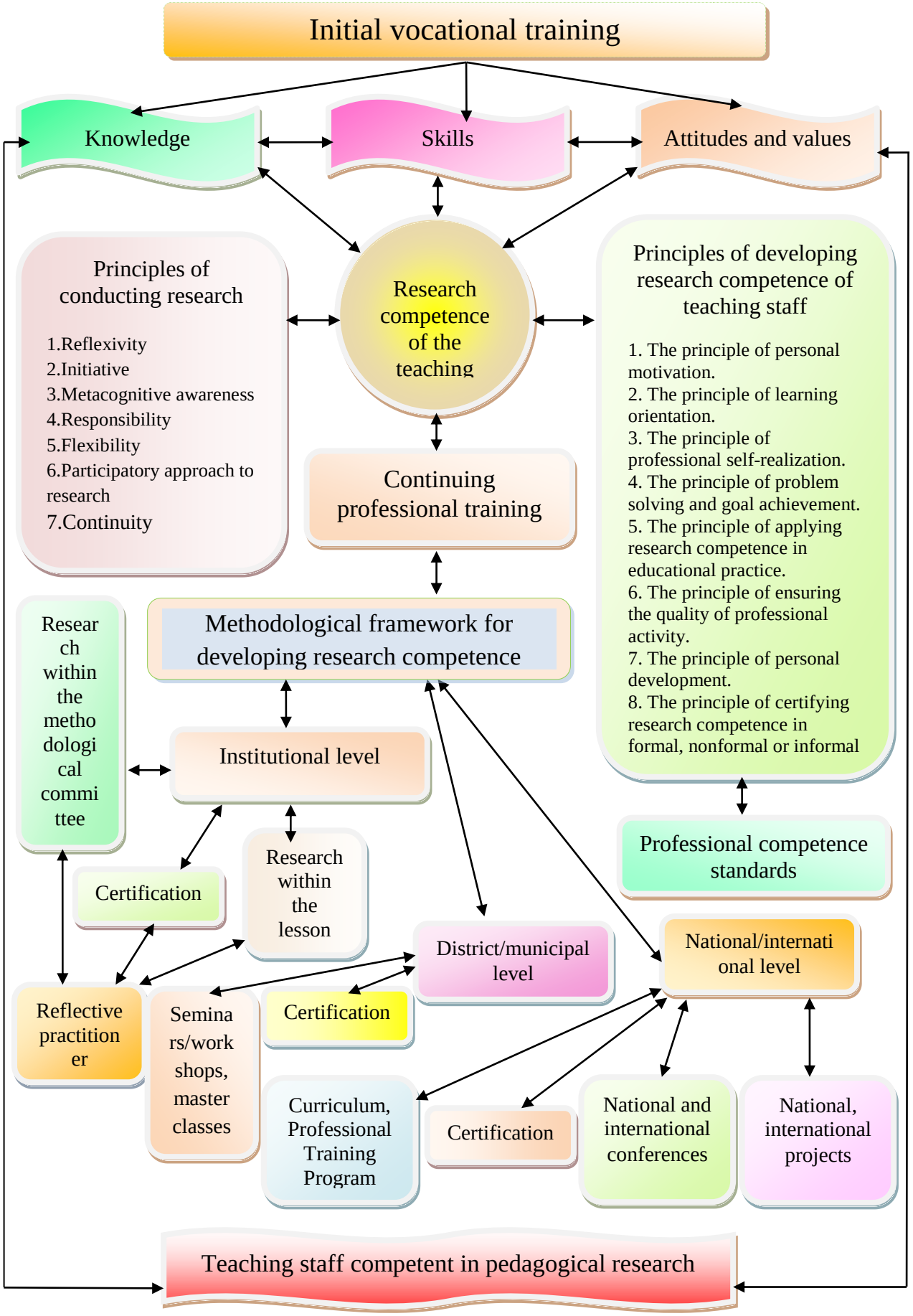

Fig. 3. The pedagogical model for developing research competence of general education teachers

This model was developed based on constructivist theory (*J. Dewey* [24, 26], *J. Piaget* [52, 53], *E. Joiță* [35, 36], *M. Bocoș* [4, 5]) and ***the principles*** *of developing the research competence of teachers in general education:*

- The principle of personal motivation. This principle assumes the intrinsic, but also extrinsic desire for personal and professional development. This offers the possibility of advancing to a higher level in the professional career. Such a teacher could also be a mentor of pedagogical practice, his professional experience being reflected in a guide for other colleagues in the profession. At the same time, he could be better remunerated from a material point of view, which would stimulate his further professional development.

- The principle of orientation towards learning. The development strategy "Education 2030" is the basic document of the educational policy of the Republic of Moldova, which stipulates the creation of optimal conditions for the development of knowledge, skills, competencies of people throughout their lives, for the realization of their personal and professional potential. The connection to international policies in the field of education provides for the realization of key competencies regarding Lifelong Learning (*EU Council Recommendation, 2018*), key competencies of the 21st century, for sustainable development, as well as the competence framework promoted by UNESCO.

- The principle of professional self-realization - professional self-realization is important not only for the teaching staff, but also for the school community. However, only a competent teacher can be a promoter of innovative teaching methods, a coordinator of students' research activities, an active participant in various projects.

- The principle of solving problems and achieving the goal - the modern teacher is a reflective practitioner, one who identifies ways to solve the problems that arise. Here, *the Regulation for the Certification of Teaching Staff* (2020) would serve as an argument, namely: *Annex 10 - Practical test*, which envisages the presentation of one's own models for solving a didactic problem, pedagogical research, applied research.

- The principle of applying research competence in educational practice - we can observe it:

1. *in the certification process* (presentation of public lessons, of an extracurricular activity, presentation of a product/project from educational practice;
2. *Research within the methodological commission* (studying an individual topic in the pedagogical field);
3. *Research within the lesson* (implementation of the didactic project of the lesson - identifying the problem, defining objectives, etc.).

- The principle of ensuring quality in professional activity - the educational system of the Republic of Moldova is becoming increasingly connected to the international educational system. At the 70th Session of the United Nations General Assembly in 2015, emphasis was placed on *17 general objectives in the educational field*, and *objective no. 4* specifically aims at quality education. The education reform in the Republic of Moldova provides for continuous professional training, training of teachers in *various national and international projects, including the promotion of STEM projects*.

- The principle of personal development – signifies the fact of multilateral development of the teaching staff; the teacher applies the principle of transdisciplinarity, own strategies and methods, which improve the teaching process. In this sense, the illustrious scholar *Galileo Galilei* mentioned that "*a good researcher must have three qualities: to be a generator of ideas, an erudite and a good critic*" [7, p.3].

- The principle of certification of research competence in formal, non-formal or informal contexts: non-formal training involves an individual activity of self-improvement, which the teacher can carry out outside of specialized institutions. Lately, they have been complementing each other and beneficially influencing the learning process. The role of non-formal learning, but also of informal learning will increase (teachers will have the opportunity to develop their professional skills at work). The

"*Education 2030" development strategy* provides for an increase in the number of providers of adult education services.

The implementation of pedagogical research is based on the following **principles:**

1. The principle of reflexivity. *J. Dewey* [24, 25], *M. Bocoș* [5], *E. Păun, D. Potolea* [46], *I. Botgros* [7], *V. Gh. Cojocaru* [14], *V. Cojocaru* [12], *R. Dumbrăveanu* [27], *L. Papuc, I. Negură, V. Pâslaru* [45] wrote about reflexive practice in education. Practice shows us that reflexive teachers are more flexible and have better success in working with students. Externally oriented action involves the interaction of the teacher with students, the community, and internally oriented action is nothing more than action for the development of one's own professional career. Action and reflection are determinants in continuous professional development.

2. The principle of initiative. It involves the teacher's actions to undertake something, to be the first to bring about a change:

- in teaching methods;
- learning strategies;
- assessment procedures;
- prevention of school failure;
- professional development;
- managerial system;
- administrative system. This principle is a complex one and includes several roles of the teaching staff.

3. The principle of metacognitive awareness. The following scholars were concerned with metacognition: *I. Botgros, L. Franțuzan* [6], *C. Cucoș* [21, 22], *R. Dumbrăveanu* [27], *E. Joiță* [36], V. *Pop* [54], *D. Sălăvăstru* [57, 58]. In the view of the local authors *I. Botgros* and *L. Franțuzan* [6], "metacognition" means the set of knowledge that the individual has in possession of his own cognition, but also the control processes that direct his cognitive activities." In other words, the teacher is the one who self-evaluates, self-analyzes, self-corrects, in order to meet the requirements put forward by the authorities and the community.

4. The principle of responsibility. This principle seems to be one of the most important. It is found in a number of national and European regulatory acts. Namely: *Education Code*, art. 53 [11, pp. 3-6], *Professional Competence Standards* [70], *Continuing Education Standards*, authors: *A. Cara, Vl. Guțu, R. Solovei* [9], *Education Development Strategy for 2030* "*Education 2030*" [62]. Reflections on this principle can also be observed in the works of scholars *I. Botgros* [7], *R. Dumbrăveanu* [27], *I. Jinga* [33, 34], etc.

5. The principle of flexibility. It refers to the ability of the teaching staff to easily adapt to the surrounding changes, to make decisions based on the concrete situation and professional practice. We can follow this principle in the work "*Designing the standards of initial training*", authors: *Vl. Guțu, E. Muraru, O. Dandara* [30], in which the competence of continuing professional training implies openness to changes in the field of activity.

6. The principle of participatory research approach. Action research was the focus of attention of well-known scholars: *G. De Landsheere* [38], *A. Nedelcu* [40], *C. Ulrich* [65,66*], R. Bezede* [8], *L. Sclifos* [60]. This type of research aims to involve a larger number of people: teachers, students, parents and other members of the community, who could become beneficiaries of the research project. In this way, not only students have to learn, but also adults who learn on the go, based on cases related to everyday life.

7. The principle of continuity. Lifelong learning implies assiduous continuity in the exercise of the research function - an indispensable condition for the professional achievement of teachers. This is stipulated in all educational policy documents and in specialized literature.

The developed methodological framework highlights the acceptable ways of developing research competence at:

1. Institutional level:

a) **Research within the methodological commission.** Lifelong learning is also mentioned in Article 123, paragraph 1.2 of *the Education Code of the Republic of Moldova* [11, p. 47] and in the *Education Development Strategy for 2014-2020* "*Education-2020*" [63, pp. 36-37], *Education Development Strategy "Education-2030"*[62].

From the above, it is clear that the teaching staff is already engaged in a continuous process of developing their professional skills, including research skills. Each teacher chooses a research topic, on which they work for several years. This offers them the opportunity to advance to a higher level in their professional career, making them feel more fulfilled and appreciated in society. Such a teacher could also be a mentor of pedagogical practice, their professional experience being reflected in a guide for other colleagues in the profession. At the same time, they could be better remunerated in material terms, which would stimulate their further professional development.

b) **Effective means for developing the research skills of teaching staff:**

- conferences;
- theoretical and practical seminars;
- *methodological consultation;*
- *thematic training courses;*
- *exchange of experience with teachers from other educational institutions;*
- *summer/spring schools;*
- *involvement in various local and international STEAM educational projects* (example: local project: *"Education for community development"*, international project with a historical theme "We are looking for heroes in our locality"). In some of these activities, teachers successfully involve their students, which makes the act of research truly a community one.

c) **Certification.** Teachers are responsible for the personal path of professional development and continuous training over 5 years or 2 years, in the case of young specialists, and for the accumulation of professional credits. Teachers apply and disseminate effective experiences from training courses. In this way, *the trainee*, over time, becomes a *local trainer*, and with the accumulation of greater experience in the field, he becomes a *trainer at the municipal and national levels*. This fact shows us that the experienced teacher is both a researcher of his professional activity, and a mentor for other colleagues. The results of the certification process at the institutional level are examined within the *Pedagogical Council of the institution*.

d) **Research within the lesson.** "The teacher's activity can be considered a pedagogical micro-research, because the implementation of a didactic project of the lesson goes through all the stages of a pedagogical research:

I - organizational stage - development of the lesson project,

II - implementation stage - represents the lesson scenario, which includes the achievement of the objectives set through student training activities, using appropriate methods, procedures, teaching materials;

III- finishing stage - includes the evaluation of the activities carried out within the lesson in order to determine their efficiency in forming the student's personality" [7].

e) **Implementing the concept of reflective practitioner promoted by the authors:** *J. Dewey* [25, 26], *D. Landsheere* [38], *M. Bocoș* [4, 5], *E. Păun, D. Potolea* [46], *A. Nedelcu* [40], *I. Neacșu* [39]. The concept of reflective practitioner implies a continuous reflection of the teacher on his/her own experience in the professional field. Reflective teachers monitor and review their classroom activity regularly, the process of reflective teaching being cyclical, in the form of a spiral. As an example and argument, the scheme would be - *"Reflective Teaching":*

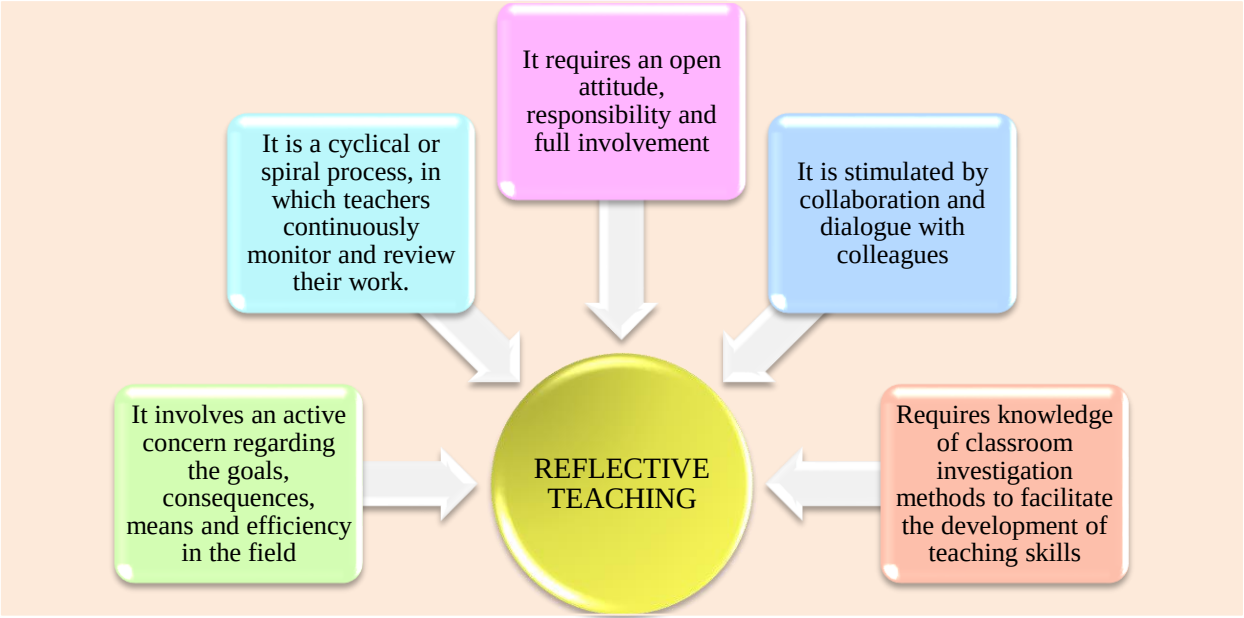

Fig. 4. Reflective teaching (*A. Nedelcu, adapted from Pollard and Tann* [40])

***f)* Learning through action** (according to scholars *J. Dewey* [25, 26] and *C. Ulrich* [65, 66]) implies a well-thought-out activity, with the involvement of several educational actors, interested in changing for the better a situation detected in the classroom, but which could also have beneficial effects at the level of the educational institution. "It is an approach consisting of several phases, applied in the form of a spiral: planning, action, observation, reflection, review, improvement" [66, p. 129]:

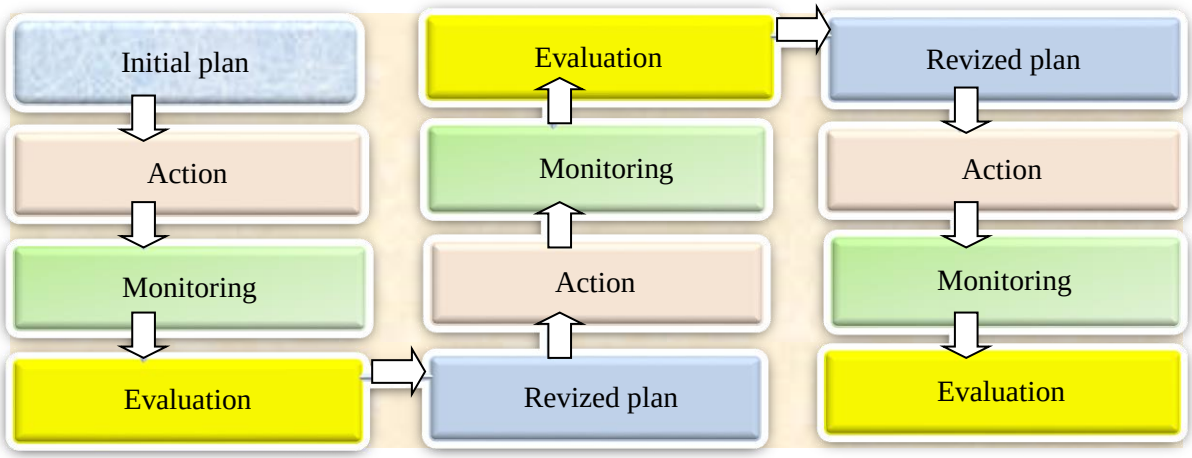

Fig 5. Action research phases (*Adapted from C. Ulrih et al.* [66])

g)* Development of metacognitive skills:** reflection sheet, research journal. The teaching staff is obliged to always be looking for solutions to improve the educational process. Otherwise, how could we develop the research competence of students, starting with the primary stage and ending with that high school. Only a reflective teacher will manage to achieve the expected result, through the intellectual effort made, creativity and actions taken. And on this path it would be appropriate to ask ourselves questions: what is not good, what could we do, so that students can cope more easily, learning with pleasure. In the process of developing research competence, psycho-pedagogical landmarks will be taken into account. And here the ***reflection sheet, which is divided into two compartments, would be of great use:

Table 1. Reflection sheet

Competency descriptors (what the teacher achieves)	*The activity or situation* when the behavior occurred

This sheet is completed during the academic year and can serve as an indicator of research activity: *what we have succeeded in and what still needs to be done to achieve the expected result.* The same goes for the ***Research Journal*** - support, in which all stages of action research are recorded, starting from identifying the problem, setting objectives, identifying solutions and ending with the conclusions drawn based on the research.

2. District/municipal level:

a) As in the case of the institutional level, the teaching staff is trained in various seminars, conferences, workshops, STEM projects and other forms provided for by normative acts, depending on the training needs.

b) In the certification process, the teaching staff will support the *practical test* with the presentation of a product from the educational experience. This is the second argument, that the teacher possesses the characteristics of a scientific researcher, capable of identifying and presenting his own model of solving the problem in the context of the proposed situation. Also, *public lessons* are an indicator of developed research competence. *The Regulation on the certification of teachers in general, vocational and technical education and within psycho-pedagogical assistance services* approved in 2020 would serve as evidence.

In section 4 (*Procedure for conferring teaching degrees*) it is stipulated that "the second teaching degree is conferred as a result of the examination of:

a) the materials related to the certification process;

b) *the presentation of 2 public hours/psycho-pedagogical assistance activities* (individual or group for teachers within psycho-pedagogical assistance structures)/*methodical activities* (for methodologists), rated "good" or "very good" (in the year of certification);

c) *the presentation of an extracurricular activity* rated "good" or "very good" (during 5 years of activity/2 years of activity in the case of young specialists);

d) the results of the evaluation of the activities carried out based on the *Credit Map* and the methodology for quantifying, accumulating and recognizing professional credits (during 5 years of activity/2 years of activity in the case of young specialists);

e) the results of the *public defense* of the ***Case Study*** *test* before the district/municipal Attestation Commission" [69, pp. 9-10].

3. National/international level:

a) Certification;

b) At *this level*, teachers are also involved in various *national and international conferences* with communications based on the results of investigations. Teachers often act as coordinators of student groups, which indicates the presence of research competence.

c) In order to facilitate the process of continuous professional training, we have developed and propose for implementation the Curriculum *"Development of research competence of teachers in general education"* which could be implemented in adult education centers and general education institutions. The

Continuous professional training module provides a total of 64 hours (*16 hours - direct contact, 48 hours - individual activity).* The *Curriculum* highlights the following aspects: Training methods: explanation, training, lecture, heuristic conversation, debate, problematization, case study, starburst, brainstorming, role play, situation simulation, project method, working with course material, bibliographic documentation, demonstration, etc. Competence units, expected within the **Module**:

1. *Analysis of the notions of competence, professional competence, research competence;*
2. *Identification of general and specific principles for the development of research competence;*
3. *Theoretical-applicative argumentation of the three concepts of research: action research, participatory research, participatory-action research;*
4. *Application of strategies for the development of research competence;*
5. *Highlighting the indicators of research competence.* Based on it, the *Training Program "Development of Research Competence of General Education Teachers"* was developed, which includes the following activities: formative instructional seminar, instructional-methodological seminar; workshops; round table.

Chapter 2 also presents ***the methodology for assessing the level of research competency development:***

In order to assess the development of research competency as efficiently as possible, a ***grid*** for assessing the level of research competency of teaching staff is developed (*with a system of competency indicators and impact indicators, Table 2.*):

Table 2. Research competency level assessment grid

Domain	*Competence indicators*	*Impact indicators*	*Levels*	*Descriptors*
Developing research competence	Improving teaching skills	Visible changes in teaching practice	Level I	The teacher is making significant progress in teaching practice
		Fewer changes	Level II	The teacher has made some progress in teaching
		Changes in perspective	Level III	The teacher is a novice teacher, working on this topic
	Applying the principles of transdisciplinarity	Integrated teaching (most classes)	Level I	Manages to successfully implement integrated teaching
		Partially integrated teaching (some classes)	Level II	Integrated teaching is done partially
		Integrated teaching in perspective	Level III	It is in the process of achieving integrated teaching
	Implementation of innovative methods	Innovative teacher (application of innovative or own methods)	Level I	Implements innovation methods (is a local, national, international trainer)
		Blended teaching (traditional + innovative methods)	Level II	Combines traditional methods with innovative ones
		Implementation attempts	Level III	Try to implement innovative methods
	Increasing analytical skills, self-confidence	Reflective teaching	Level I	He is a reflective practitioner, seeking solutions to improve the educational process
		Traditional teaching, with elements of reflexivity	Level II	He is a practitioner less concerned with improving the educational act
		Teacher who learns to be reflective	Level III	He is a novice teacher who is concerned with professional development

	Involvement in various individual and student research projects (STEAM)	Professor-researcher, successfully trains students (national, international projects)	Level I	Is engaged in the research process over a long period of time
		Professor-selective in research activity (participates in some projects)	Level II	He is involved with students in some research projects.
		Beginning Professor, involved in some research activities	Level III	He is at the beginning of his career and is not involved in research projects (he may participate in some competitions, olympiads)
	Participation in various training courses	Active participant (with communications, at national and international conferences, seminars, faculty councils)	Level I	Involved in various trainings, intrinsically motivated (courses, summer/spring schools, seminars, national and international conferences)
		Fewer participations	Level II	Rarely involved
		Passive participant in seminars, conferences, etc.	Level III	Gets involved through imposition (extrinsically motivated)

The research competence of teachers develops in parallel with the research competence of students, the teacher being the coordinator of their self-realization activity. It offers the opportunity to reduce functional illiteracy in students, prevent school failure, motivate them to achieve better learning results, implement innovative teaching methods, engage students in various research projects starting with middle school classes and ending with high school ones, including (STEAM) projects. Moreover, research competence is an indispensable part of the system of key competencies, which we will develop:

- ✓ *throughout our lives;*
- ✓ *in the process of continuous professional training;*
- ✓ *at work;*
- ✓ *in adult education centers or other specialized institutions*.

Chapter 3. ***Experimental validation of the Pedagogical Model for the development of research competence of teachers in general education*** includes the experimental part of the investigation, by analyzing, comparing and evaluating the data obtained as a result of organizing and carrying out the pedagogical experiment of *observation*, *training* and *validation*. **The aim was:** to highlight the importance and necessity of developing research competence by implementing and capitalizing on the *Pedagogical Model for the development of research competence of teachers in general education*. We developed a *Curriculum for the development of research competence of teachers*, and based on it, within the training experiment, we developed and implemented a *Program for the development of research competence of teachers in general education.* At the final stage of the experiment, the validation stage, following the application of a questionnaire to assess the level of research competence, we found that the ES (experimental sample) from the "Ginta Latina" High School presented much better results compared to the other samples. This fact shows us that training activities are beneficial to all respondents, offering them the opportunity for professional growth.

The observation experiment had the following objectives:

1. Analysis of normative and legislative documents of the Republic of Moldova, which are relevant to the given topic;

2. Determination of the level of training of research competence of teachers based on the questionnaire: *"Opportunity for the development of research competence of teachers in general education";*

3. Identification of the problems faced by teachers regarding the development of research competence;

4. Determination of the level of training of research competence of teachers in general education by administering a questionnaire.

At the stage of the **observation experiment**, the questionnaire *"Opportunity for the development of research competence of teachers in general education"* was also used. It was designed and applied in November 2020 on a *sample of 112 subjects*, including: *52 teachers - the experimental sample from the "Ginta Latina" High School* and *60 teachers - the control sample from the "Lucian Blaga" High School*, and "*Gheorghe Ghimpu" High School*, with the aim of identifying the level of training of research competence of teachers in general education, the opinions of teachers regarding the need and importance of developing research competence of teachers, the obstacles they face in their professional activity. It is commendable that most of the participants in the experiment completed the questionnaire, demonstrating a responsible attitude and good training in the field of pedagogy.

Next, we will present some sequences from the observation experiment, through which we will highlight the most significant results of the investigated subject. ***Item no. 1*** *"What does the expression: research competence mean to you?"*, requires a broad explanation of the concept of research competence. The results are presented in Table 3:

Table 3. The results of the experimental subjects' opinion on the item "What does the expression: research competence mean to you?"

INSTITUTION	*Number of subjects*	*Answer options*					
		Variant A		*Variant B*		*Variant C*	
		No.	*%*	*No.*	*%*	*No.*	*%*
„Ginta Latina” HS	52	15	28.8	23	44.2	14	26.9
„Lucian Blaga” HS	29	5	17.2	13	44.8	11	37.9
„Gheorghe Ghimpu” HS	31	16	51.6	7	22.5	8	25.8
Total	112	36	32.5	43	37.1	33	30.2

Respondents had to tick one of the options: A - research competence refers to competences specific to the research process and mental operations activated during research, practiced in different situations, mobilizing, reorganizing internal and external resources to achieve clearly defined objectives; ***B*** - scientific research activity is a specialized type of intellectual and practical activity, in which both aspects are correlated with each other; ***C*** - research competence would be an increased intellectual effort in order to solve unknown problems/situations.

The analysis of the participants' responses and the distribution of the results presented in Table 3 shows that 43 teachers ticked option ***B***, which constitutes 37.1% of the total number of experimental subjects. 36 teachers opted for option ***A***, which constitutes 32.5%, and 33 people opted for option ***C***, i.e. 30.2%. A group of teachers from "Lucian Blaga" High School were not offered any answer options to the question. Here are the suggestions expressed:

Table 4. The opinion of the experimental subjects on the item "What does the expression: research competence mean to you?"

Summary of opinions expressed
- research competence represents an activity related to solving creative tasks, with a preventively unknown result; - research competence is an ability to analyze an emerging problem; - research competence is the ability to study various types of information, to select essential ideas and to synthesize them into a common information; - implies a person's abilities to conduct a study, a deep research in a certain field (for example: in pedagogy, etc.); - research competence implies the search for knowledge; - research competence is a source of solving problems that arise in professional activity; - research competence means continuity in education, continuous psycho-pedagogical training; - research competence is the ability to identify a scientific problem, study it and search for solutions; - is a person's ability to analyze a subject and implement it in practice; - represents the transition from something that is unknown to what can be expressed in scientific terms.

Item 6, *"Check 2-3 indicators of research competence that you consider most important"*, aimed to identify indicators of research competence. The results are presented in Table 5:

Table 5. Findings of the experimental subjects' opinion on item 6, "Check 2-3 indicators of research competence that you consider most important:
a) improving teaching skills; b) applying the principles of transdisciplinarity; c) implementing innovative methods; d) increasing analytical skills, self-confidence; e) involvement in various individual research projects and with students; f) participation in training courses (courses, seminars, conferences)"

INSTITUTION	*Number of subjects*	*Answer options*							
		3 indicators		*2 indicators*		*1 indicator*		*none*	
		No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
„Ginta Latina" HS	52	14	26.9	17	32.6	21	40.3	0	0
„Lucian Blaga" HS	29	3	10.3	9	31	16	55.1	1	3.44
„Gh. Ghimpu" HS	31	19	61.2	10	32.2	2	6.45	0	0
Total	112	36	32.8	36	31.9	39	33.9	1	1.14

Examining the answers to item 6, we deduced that some respondents found it more difficult to tick the research competence indicators, because it was something new for them. From the data presented above, 33.9% (39 respondents) ticked one indicator; 32.8% (36 respondents) ticked three indicators; 31.9% (another 36 respondents) ticked two indicators; 1.14% (1 respondent) did not tick any indicator.

Item 8 *"Name the most effective forms of research competency development: conferences, round tables, thematic refresher courses, seminars, trainings, summer/spring schools, etc."*

Table 6. Distribution of the ascertaining results of the experimental subjects' opinion on item 8 "Name the most effective forms of developing research competence: conferences, round tables, thematic refresher courses, seminars, trainings, summer/spring schools, etc."

INSTITUTION	*Number of subjects*	*Ansver options*							
		Thematic courses, seminars, conferences		*Summer/spring schools, trainings, round tables*		*Elaboration of articles, professional readings*		*Other*	
		No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
„Ginta Latina" HS	52	23	44.2	28	53.8	0	-	1	1.92
„Lucian Blaga" HS	29	14	48.2	13	44.8	1	3.44	1	3.44
„Gh. Ghimpu" HS	31	17	54.8	14	45.1	0	-	0	-
Total	112	54	49.06	55	47.9	1	1.14	2	1.78

The comparative analysis of the ascertaining results in *Table 6* shows that 54 subjects (49.06%) opted for *thematic courses, conferences, seminars;* 55 subjects (47.9%) opted for *trainings, round tables, summer/spring schools;* 1 subject (1.14%) believes that the *development of articles and professional readings contribute to the development of research competence*; the last 2 subjects (1.78%) indicated the *studies done at the doctoral school and the defense of the doctoral thesis in pedagogy.*

The experimental results obtained on the research sample following the application of the questionnaire *"Opportunity for training research competence"* created the premises and conditions for conducting the training experiment.

The purpose of the training experiment consisted in the implementation and valorization of the *Pedagogical Model for the development of research competence of teachers in general education* through the implementation of the *Training Program*, which aims to develop the aforementioned competence.

The training experiment had the following objectives:

- *applying the Pedagogical Model for the Development of Research Competencies of General Education Teachers;*
- *developing and implementing the Program for the Development of Research Competencies of General Education Teachers;*
- *developing the research competence of teachers in the experimental sample.*

The training activities were organized and carried out during the years 2019-2022 based on ***the experimental sample***, consisting of 52 teachers from the "Ginta Latina" High School. To carry out the experiment, we developed and implemented the *Program for the Development of Research Competencies of General Education Teachers* and the *Curriculum "Development of Research Competencies of General Education Teachers".* When developing it, the principles of continuous professional training were taken into account, which facilitated the activity and gave it a dynamic and constructive character.

The training activities had various ways of being carried out: from frontal activity, individual work, to group work, with the beneficial impact of efficient teamwork, through collaboration and cooperation between all participants of the training program, a period in which the teachers in the experimental sample showed responsibility, involvement and openness in implementing *the Pedagogical Model for the Development of Research Competence of Teachers in General Education. By applying the Training Program, we capitalized on the Pedagogical Model for the Development of Research*

Competence of Teachers in General Education, by organizing and carrying out theoretical and practical activities, drawing on the personal and professional experience of the participants of the experimental sample from the "Ginta Latina" High School, in which we organized the training seminars.

At **the final stage** of the research, namely - *The organization and implementation of the validation experiment*, we assessed the level of development of the research competence of teachers in general education institutions. The control experiment was carried out between December 2020 and January 2021, with 112 teachers being trained, also involved in the observation experiment. The participants included in the validation experiment were divided into two groups:

1. Experimental sample (ES) - consisting of 52 teachers from the "Ginta Latina" High School, being the natural sample for the proposed investigation.

2. Control sample (CS) - consisting of 60 teachers from "Lucian Blaga" High School, "Gheorghe Ghimpu" High School.

The validation experiment was focused on the following objectives:

- ✓ assessing the level of development of the research competence of teachers in general education institutions, through the implementation of the *Training Program*;
- ✓ evaluation, comparison and generalization of the results of the experiment. In order to compare the results obtained in the control experiment phase, we applied the **questionnaire *"Level of development of research competence of teachers in general education institutions".***

As a ***result of administering the questionnaire***, we found that: *in "Ginta Latina" High School, where we conducted the training experiment, the results are much betterthan in the institutions "Lucian Blaga" and "Gheorghe Ghimpu", which were control samples.* In this context, we mention that the answers provided by the teachers from "Ginta Latina" High School (ES) were much more detailed, profound and well-structured. The teachers demonstrated knowledge, research skills and easily answered the items of the questionnaire. For example, to ***item 3:*** *"Formulate a pedagogical research topic according to your interests/professional development needs",* the following answers were given:

- ☑ Capitalizing on interdisciplinarity within mathematics lessons;
- ☑ Effective integration of information and communication technologies in the English language educational process;
- ☑ Increasing the level of digital literacy of teachers and students;
- ☑ Metacognition - a way of controlling and evaluating cognition;
- ☑ Problematization - an effective method of learning history;
- ☑ Training the necessary skills for students' personal affirmation and growth in extracurricular activities;
- ☑ Methodological aspects of the evaluation process in mathematics classes;
- ☑ Training the communication skills of middle school students through interactive teaching strategies;
- ☑ Utilizing the case study in arguing the importance of protecting the environment;
- ☑ Monitoring the implementation of the curriculum in optional subjects;
- ☑ School absenteeism - a determining factor in achieving school performance.

To ***item 4:*** *"Based on the formulated topic, deduce the research problem"*, the following answers were provided:

- Analysis of existing problems in the field of absenteeism and finding methods to reduce it;
- Formation of the competence of receiving a message through literary text;
- The low level of digital literacy competence and the need to develop it among teachers and students.

At the same time, we noticed that some novice teachers have difficulties in identifying the research problem and in correctly indicating the purpose and objectives of the pedagogical research. It is

commendable that the teachers from the "Ginta Latina" High School carefully completed all the sections of the questionnaire, including the sections: *"Develop your own plan for conducting the research according to the stated theme" and "Formulate the purpose and objectives of the experiment, the possible criteria that represent the object of the research".*

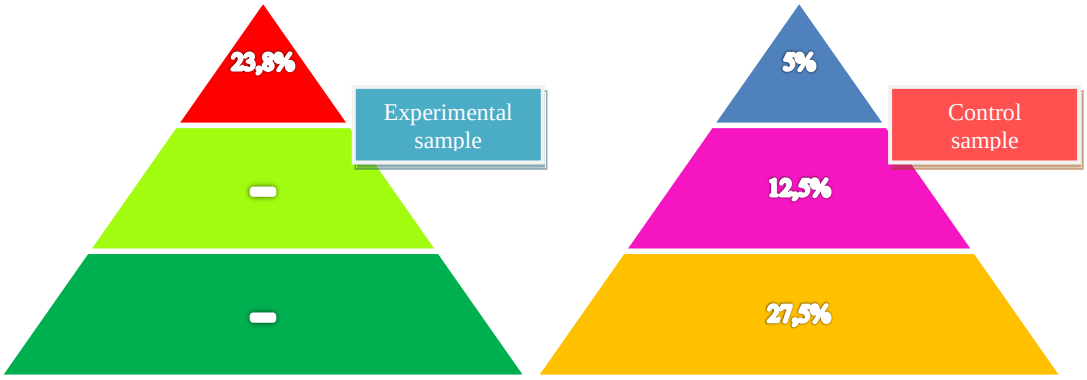

Fig.4. Results of the control group and the experimental group on item 7

For ***item 7:*** "Develop your own plan for conducting research according to the previously stated theme", the answers were as follows: **ES** (experimental sample) - provided a partial answer - 5 people (23.8%); **CS** (control sample) - partial answer - 11 people (27.5%); no answer - 5 people (12.5%); don't know - 2 people (5%).

Item 13*: "Name the system of values necessary for the pedagogical research process"* was the last, to which the teachers answered that "the system of values must be very broad: commitment, self-discipline, positive attitude, initiative, fairness, creativity, trust, self-esteem".

Thus, analyzing the results obtained in the control experiment and those recorded at the validation stage, we observed an increase in the level of research competence of the teachers in the *experimental sample, from "Ginta Latina" High School,* compared to the subjects *in the control sample, from "Lucian Blaga" High School and "Gheorghe Ghimpu" High School.* This is due to the activities planned and carried out within the *Training Program*, which contributed to the acquisition of knowledge, the development of skills, the formation of attitudes and values necessary in the research process:

Attitudes: desire for change, thirst for knowledge, responsibility, active involvement in continuous training at the workplace, the tendency to solve emerging problems.

Skills: formulating the pedagogical research topic, the research problem, the purpose and objectives according to the interests/needs of professional development, deducing the system of qualitative and quantitative research methods of the identified problem, developing an own plan for conducting the research, characterizing the requirements for formulating the research conclusions.

Knowledge: general theory of education, general theory of curriculum, general principles of conducting research, specific principles of developing research competence, indicators of research competence, specific competences of research competence, respective competence units.

Values: responsibility, desire for continuous learning, self-discipline, fairness. An argument would also be the research competence level assessment grid from which we deduce that the competence and impact indicators in the *Experimental Sample* are higher than those in the *Control Sample.*

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The study undertaken and the results obtained within the investigation carried out allow us to make the following ***conclusions:***

1. Through the analytical-synthetic study, the theoretical benchmarks *of the concept of developing research competence as a metacognitive competence of teachers were established.* We have found and scientifically substantiated that *the teacher is a reflective practitioner, scholar, expert in the field of education, coordinator of the personal self-realization of students.*

2. According to the proposed definition, we consider that ***the research competence of the teacher is an integrated system of knowledge, skills, attitudes and values, which allows the possessor to carry out the pedagogical research process, mobilizing internal and external resources to achieve expected educational objectives.***

3. As a result of the investigation, the theoretical foundations of the development of research competence and the principles of conducting research were determined: *the principle of reflexivity, initiative, metacognitive awareness, responsibility, flexibility, participatory approach to research, continuity*. The principles of research competence development are substantiated: *the principle of personal motivation, the principle of orientation towards learning, the principle of professional self-realization, the principle of problem solving and goal achievement, the principle of applying research competence in educational practice, the principle of ensuring the quality of professional activity, the principle of personal development, the principle of certifying research competence in a formal, non-formal or informal context*, these constituting the theoretical dimension of ***the Pedagogical Model for developing research competence of teachers in general education.***

4. In the application plan, the methodology for developing research competence of teachers in general education was developed, at the institutional, *district/municipal* and *national/international* levels, the system of instruments and indicators for diagnosing and evaluating the research competence of teachers is identified, having as a reference *the Standards of Professional Competence (2018), the Regulations for certifying teachers in general education (2020).* The effectiveness of *the Pedagogical Model for developing the research competence of general education teachers*, including the proposed strategies and technologies for developing the research competence of general education teachers, was experimentally argued. We argued that the research competence of teachers can be developed by applying ***the Curriculum*** and ***Training Program*** developed within the investigation in the educational institution.

5. Based on the theoretical and praxiological values produced as a result of the investigation carried out, **the important scientific problem** solved lies in the theoretical and methodological substantiation of the development of research competence of teachers and the development of *the Pedagogical Model for the development of research competence of teachers in general education*. The *hypothesis put forward* was confirmed: ***the research competence*** of teachers in general education will be developed by implementing *the developed* ***Pedagogical Model*** and the methodology for the development of research competence in educational practice, both within the framework of continuous professional training and within their professional activities.

The investigation defines its scientific identity through:

a) *Theoretical benchmarks regarding the development of research competence of teachers in general education, including the updated definition of the concept of* ***teacher research competence****;*

b) ***The pedagogical Model*** *for the development of research competence of teachers in general education*;

c) ***The curricular construct*** *for the training of teachers in the field of "Development of research competence"*;

d) *The continuous professional training program for teachers focused on* ***the Curriculum "Development of research competence"***;

e) *Experimental validation of the* ***pedagogical Model*** *for the development of research competence of teachers in general education*.

RECOMMENDATIONS

Based on the scientific research conducted and the conclusions highlighted, we consider the following ***recommendations*** appropriate:

- ✓ amplifying the initial professional training of teachers by studying a university course aimed at developing the research competence of teachers in general education;
- ✓ designing the development of the research competence of teachers in general education as a continuous process that contributes to optimizing the quality of education;
- ✓ personalizing the responsibilities of teachers regarding professional development by correlating the provisions of *the Education Code of the Republic of Moldova (2014)* with *the Recommendations of the European Commission*, indicating as a priority the development of the research competence of teachers.

Identified problems:

- ☑ An intervention is required within the continuous professional training process regarding *the need for training/development of research competence in the workplace of teachers and/or in adult education centers.*
- ☑ *Development of methodological tools* for assessing the level of training/development of research competence of teachers in general education.
- ☑ *Conducting a study with reference to the impact* of *teachers' research competence* in the formation of research competence in students, including in the context of implementing STEM Education.
- ☑ Implementing *educational partnerships between the pedagogical university and the general education institution* in order to create *joint research laboratories* on the training/development of research competence of teachers and students.

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ANNOTATION

Clava Barbaroș

Developing the research competence of general education teachers

Doctoral thesis in Educational Sciences,
"Ion Creangă" State Pedagogical University, Chisinau, 2025

The volume and structure of the thesis. The thesis includes: introduction, three chapters, general conclusions and recommendations, basic text 140 pages, bibliography - 208 sources, 21 tables, 24 figures and 10 appendices.

Publications on the topic of the thesis: the obtained results are published in 19 scientific papers.

Key words: competence, professional competence, research competence, metacognitive competence, continuing education, continuing professional training, standards of professional competence, scientific research, action research, participatory research, participatory action research.

Field of study: General theory of education.

The object of the research: The process of developing the research competence of general education teachers.

Purpose: Determining the theoretical and methodological premises of the development of the research competence of teaching staff and the theoretical-methodological substantiation of the Pedagogical Model for the development of the research competence of general education teachers.

The objectives of the research: *analysis of the theoretical milestones of the concept-development of research competence as a metacognitive competence of teaching staff, establishing reference areas for the research competence of teaching staff; the development of the Pedagogical Model for the development of the research competence of general education teachers, the methodological foundation of the development of research competence, the experimental validation of the Pedagogical Model for the development of the research competence of general education teachers and the developed Methodology.*

The scientific novelty and originality of the research resides in: the conceptualization of development the research competence of general education teachers, the establishment of the reference fields for the research competence of teachers, the elaboration of the *Pedagogical Model for the development of the research competence of general education teacher*s and the *Methodology for capitalizing on the developed model.*

The solved scientific problem consists in the theoretical and methodological substantiation of the development of the research competence of teaching staff and the elaboration of the *Pedagogical Model for the development of the research competence of general education teachers.* The implementation of the Model will effectively contribute to the development of the research competence of general education teachers.

The theoretical significance resides in: the psychopedagogical foundation of the reconceptualization of the development of the research competence of general education teachers; the development of the system of principles for the development of the research competence of teaching staff; identifying the system of diagnostic tools and indicators and evaluating the research competence of teaching staff.

The applicative value of the work resides in the development of the methodology for reconceptualizing the development of the research competence of teaching staff based on th*e Pedagogical Model for the development of the research competence of teaching staff*, the development of the *Curriculum "Development of the research competence of general education teachers"*, the conceptualization of the *Program Continuous training module "Development of teaching staff's research competence".*

Implementation of the scientific results: the theoretical-methodological results of the research were implemented by presenting them at conferences and publishing them in specialized scientific magazines, in the framework of continuous teacher training courses (2021-2022).

ADNOTARE

Clava Barbaroș

Dezvoltarea competenței de cercetare a cadrelor didactice din învățământul general

Teză de doctor în Științe ale Educației, Universitatea Pedagogică de Stat „ Ion Creangă”, Chișinău, 2025

Volumul și structura tezei. Teza include: introducere, trei capitole, concluzii generale și recomandări, text de bază 140 pagini, bibliografie - 208 surse, 21tabele, 24 figuri și 10 anexe.

Publicații la tema tezei: rezultatele obținute sunt publicate în 19 lucrări științifice.

Cuvintele-cheie: competență, competență profesională, competență de cercetare, competență metacognitivă, educație permanentă, formare profesională continuă, standarde de competență profesională, cercetare științifică, cercetare-acțiune, cercetare participativă, cercetare participativ-acțională.

Domeniul de studiu: Teoria generală a educației.

Obiectul cercetării: Procesul de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general.

Scopul: Determinarea premiselor teoretice și metodologice ale dezvoltării competenței de cercetare a cadrelor didactice și fundamentarea teoretico-metodologică a *Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general.*

Obiectivele cercetării: *analiza reperelor teoretice a conceptului-dezvoltarea competenței de cercetare ca competență metacognitivă a cadrelor didactice, stabilirea domeniilor de referință pentru competența de cercetare a cadrelor didactice; elaborarea Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general, fundamentarea metodologică a dezvoltării competenței de cercetare, validarea experimentală a Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general* și a *Metodologiei elaborate.*

Noutatea și originalitatea științifică a cercetării rezidă în**:** conceptualizarea dezvoltării competenței de cercetare a cadrelor didactice din învățământul general, *stabilirea domeniilor de referință pentru competența de cercetare a cadrelor didactice*, elaborarea *Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general și a Metodologiei de valorificare a modelului elaborat.*

Problema științifică soluționată constă în fundamentarea teoretică și metodologică a dezvoltării competenței de cercetare a cadrelor didactice și elaborarea *Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice din învățământul general.* Implementarea modelului va contribui eficient la dezvoltarea competenței de cercetare a cadrelor didactice din învățământul general.

Semnificația teoretică rezidă în fundamentarea științifică a dezvoltării competenței de cercetare a cadrelor didactice din învățământul general; elaborarea sistemului de principii ale dezvoltării competenței de cercetare a cadrelor didactice; identificarea sistemului de instrumente și indicatori de diagnosticare și evaluare a competenței de cercetare a cadrelor didactice.

Valoarea aplicativă a lucrării rezidă în: elaborarea metodologiei de dezvoltare a competenței de cercetare a cadrelor diactice în baza *Modelului pedagogic de dezvoltare a competenței de cercetare a cadrelor didactice*, elaborarea *Curriculumului „Dezvoltarea competenței de cercetare a cadrelor didactice din învățământul general”,* conceptualizarea *Programului Modular de formare continuă „Dezvoltarea competenței de cercetare a cadrelor didactice”.*

Implementarea rezultatelor științifice: rezultatele teoretico-metodologice ale cercetării au fost implementate prin prezentarea acestora în cadrul conferințelor și publicarea în revistele științifice de specialitate, în cadrul cursurilor de formare continuă a cadrelor didactice (2021-2022).

BARBAROȘ CLAVA

DEVELOPING THE RESEARCH COMPETENCE OF GENERAL EDUCATION TEACHERS

531.01. – GENERAL THEORY OF EDUCATION

Summary

of the doctoral thesis in Educational Sciences

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