CZU: 37.091.12-005.336.5:001.89 **https://doi.org/10.59295/sum5(195)2026_11**

EFFECTS OF EDUCATIONAL MANAGEMENT ON DEVELOPMENT OF TEACHERS' RESEARCH COMPETENCE

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This paper analyzes the role of educational management in developing research competence among teaching staff in pre-university education, highlighting its importance for ensuring the quality of the educational process and promoting pedagogical innovation. Based on theoretical foundations from the specialized literature and the results of an experimental study conducted in a school in the Republic of Moldova, the dimensions of research competence (cognitive, operational, and attitudinal) are identified, and effective managerial strategies are proposed for its development through continuous professional development programs. The study demonstrates that the systematic implementation of a structured, managerially coordinated training program leads to a significant improvement in teachers' research competence, contributing to the consolidation of an organizational culture grounded in reflection, inquiry, and evidence-based decision-making in diverse educational contexts. These findings support the design of institutional policies that foster sustainable professional learning and strengthen collaborative practices across schools and educational systems at the national level.

Keywords: *educational management, research competence, teaching staff, educational research, continuous professional development, usage of evidence, training programs.*

EFECTELE MANAGEMENTULUI EDUCAȚIONAL ASUPRA DEZVOLTĂRII COMPETENȚEI DE CERCETARE A CADRELOR DIDACTICE

Articolul analizează rolul managementului educațional în dezvoltarea competenței de cercetare la cadrele didactice din învățământul preuniversitar, evidențiind importanța acesteia pentru asigurarea calității procesului educațional și promovarea inovării pedagogice. Pe baza fundamentelor teoretice din literatura de specialitate și a rezultatelor unui demers experimental desfășurat într-o instituție școlară din Republica Moldova, sunt identificate dimensiunile competenței de cercetare (cognitivă, operațională și atitudinală) și sunt propuse strategii manageriale eficiente pentru dezvoltarea acesteia prin programe de formare continuă. Studiul demonstrează că aplicarea sistematică a unei programe de formare structurate, coordonate managerial, conduce la îmbunătățirea semnificativă a nivelului de competență de cercetare al cadrelor didactice, contribuind la consolidarea unei culturi organizaționale bazate pe reflecție, investigare și luarea deciziilor fundamentate pe date, în contexte educaționale diverse.

Cuvinte-cheie: *management educațional, competență de cercetare, cadre didactice, cercetare educațională, dezvoltare profesională continuă, utilizarea dovezilor, programe de formare.*

Introduction

In the current dynamics of educational reforms, the research competence of teachers is asserted as an essential dimension of professionalization and increase of the quality of instructional-educational process. D. A. Schön and L. Darling-Hammond propose the orientation towards an education based on evidence, pedagogical reflection and methodological innovation, which places the teacher not only in the role of mediator of knowledge, but also in that of a reflexive practitioner and researcher of his/her own teaching activity [21, 5].

J. Hattie and A. Hargreaves & M. Fullan highlight the fact that the involvement of teachers in educational research activities contributes significantly to the improvement of students' school performance and to the de-

velopment of an organizational culture based on collaboration and continuous professional learning [11, 10]. In this sense, S. Kemmis and R. McTaggart consider research-action a relevant methodological framework for the school environment, as it allows the systematic integration of planning, intervention, observation and reflection cycles in current pedagogical practice [12].

In the Romanian space and in the Republic of Moldova, S. Cristea and V. Guțu argue that the development of research competence is based both on theoretical approaches in educational sciences and on the normative framework of continuous professional development. From this perspective, research competence is conceived as an integrative construct, which brings together methodological knowledge, operational skills and reflexive attitudes, oriented towards optimizing the educational process and the scientific substantiation of pedagogical decisions [4, 9].

From a managerial perspective, M. Fullan and N. Petrovschi emphasize the decisive role of institutional leadership in creating favorable conditions for the development of this competence, highlighting the responsibility of educational management to design continuous training strategies, to ensure the necessary resources and to stimulate the participation of teachers in professional learning communities and in applied research projects [8, 20]. In the absence of a strategic vision and coherent institutional support, the development of research competence remains fragmented and dependent on individual initiatives.

At the international level, the OECD shows that schools that promote research as an integrated dimension of teachers' professional activity develop more innovative educational environments and better adapted to the needs of students [14]. Also, L. Darling-Hammond, M. E. Hyler and M. Gardner demonstrate that research-centered professional development programs contribute to improving pedagogical practices and increasing educational impact [6].

In this context, the issue of management of research competence development in teachers acquires a particular theoretical and applied relevance. The analysis of managerial strategies and their validation through experimental approaches can contribute to the substantiation of continuous training models adapted to the realities of pre-university education.

The purpose of this study is to analyze the role of educational management in the development of research competence in teachers and to highlight the efficiency of a structured training program, experimentally validated, in consolidating the cognitive, operational and attitudinal dimensions of this competence.

Conceptual Framework and Empirical Validation of Research Competence Development

Educational Research in Pre-University Context

In recent years, the OECD highlights that educational research in the pre-university environment has gained increased relevance, amid the acceleration of curricular changes, digitalization and lessons learned in the post-pandemic period, and the dominant direction of the literature in the last five years focuses on consolidating evidence-informed teaching practices and strengthening mechanisms for mobilizing knowledge between research, public policies and schools [15, 16].

In this framework, the OECD conceptualizes school-based research as applied investigation, integrated into the teacher's current professional activity, with the aim of improving the instructional-educational process and reducing learning gaps, emphasizing that the consistent use of research results depends on the existence of "systemic conditions" — educational leadership, institutional time allocated to reflection, data infrastructure, professional networks and partnerships with the academic environment — that support a culture of engagement in research at the school level [16].

From an educational policy perspective, the OECD shows that the emphasis is shifting from the simple dissemination of research results to the co-production of knowledge, in which teachers, school managers and academic researchers collaborate in defining problems and testing educational solutions, and initial and in-service training institutions are called upon to facilitate teachers' access to applied research methods and professional learning communities [17].

D. Parmigiani et al. highlight that action research represents a relevant methodological framework for the pre-university environment, as it allows the integration of the real needs of classroom with a rigorous

scientific approach and contributes to the improvement of teaching practices, especially in areas such as formative assessment, differentiation of instruction and the use of educational data in pedagogical decision-making, while also favoring the development of reflexive skills and professional autonomy of teachers [19].

UNESCO and the International Task Force on Teachers for Education 2030 emphasize that the development of a culture of research in schools is closely correlated with continuous professional development policies, with the recognition of professional status of the teacher and with the creation of institutional environments that support innovation and collaboration, educational research being viewed as a collective responsibility, integrated into the organizational mission of the school [22, 23].

Data provided by the OECD through the international TALIS 2024 study reveal the importance of managerial support and mentoring in the professional development of teachers, highlighting that teachers who benefit from collaborative contexts and participatory educational leadership are more likely to engage in reflection and research activities on their own practice, confirming the essential role of school management in facilitating and supporting investigative approaches [18].

Thus, in the literature of the last five years, educational research in the pre-university context is defined as an institutionalized and collaborative approach, oriented towards the use of evidence, improving pedagogical practices and strengthening the school's capacity to respond to the diverse needs of students. This approach justifies the need for the systematic development of research competence in teachers and its integration into educational management and continuous training strategies.

Dimensions and Levels of Research Competence

In the literature of recent years, C. Brown and T. Greany, as well as B. Levin, approach the research competence of teachers as a multidimensional construct, correlated with research engagement and evidence-informed teaching practices. In this perspective, research is not treated exclusively as a technical skill, but as an integrated combination of methodological knowledge, applicative skills and professional attitudes and values, which support the systematic investigation of one's own practice and the use of results to improve the educational process [3, 13].

N. Bîrnaz proposes a relevant operationalization of research competence, delimiting three fundamental dimensions – the cognitive dimension, the operational dimension and the attitudinal dimension – which reflect the internal structure of the competence and the interdependent relationships between knowledge, action and professional dispositions that guide the investigative behavior of the teacher [2, p. 48].

Starting from the graphical model of competence developed by N. Bîrnaz (Figure 1), a proprietary graphical model of research competence was built (Figure 2), which reflects its integrated structure and highlights the essential components necessary for the development and manifestation of competence in the context of professional activity in pre-university education [2].

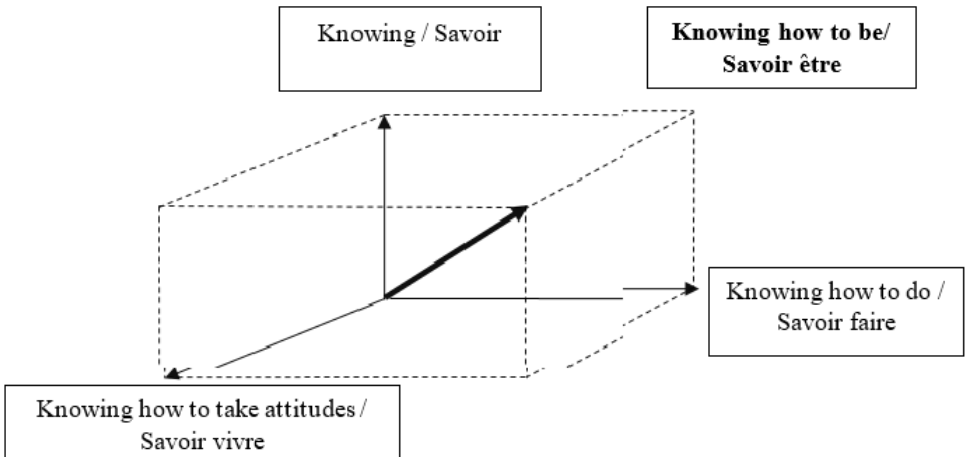

Figure 1. Graphical Model of Competence Components (Bîrnaz N.)

L. Darling-Hammond, together with A. Hargreaves and M. Fullan, emphasize that the research competence of teachers is not only a complementary dimension of the teaching activity, but a fundamental

element of continuous professional development, which contributes to the formation of a reflective, innovative teacher capable of constantly adapting to changes in the field of education [6, 10].

From the perspective of educational management, the OECD highlights that these dimensions become functional when they are supported by systemic conditions – leadership that values research, institutional time allocated to professional learning, access to resources and methodologies of investigation, as well as the existence of networks or partnerships with the academic environment. In this way, individual competence is amplified by the organizational capacity of the school to learn from data and evidence [15, 16, 17].

In relation to professional development, C. Brown and T. Greany, together with B. Levin, show that research competence can be described gradually, on operational levels, which reflect the transition from the assisted use of investigation tools to the autonomous integration of research into teaching practice. Recent models on *research engagement* and the development of professional expertise support the delineation of progressive trajectories of competence on levels. [3, 13].

Based on the models of *“research engagement”* and the development of professional expertise proposed by C. Brown and T. Greany, as well as the OECD guidelines on the use of evidence in schools, the following levels of research competence can be delineated:

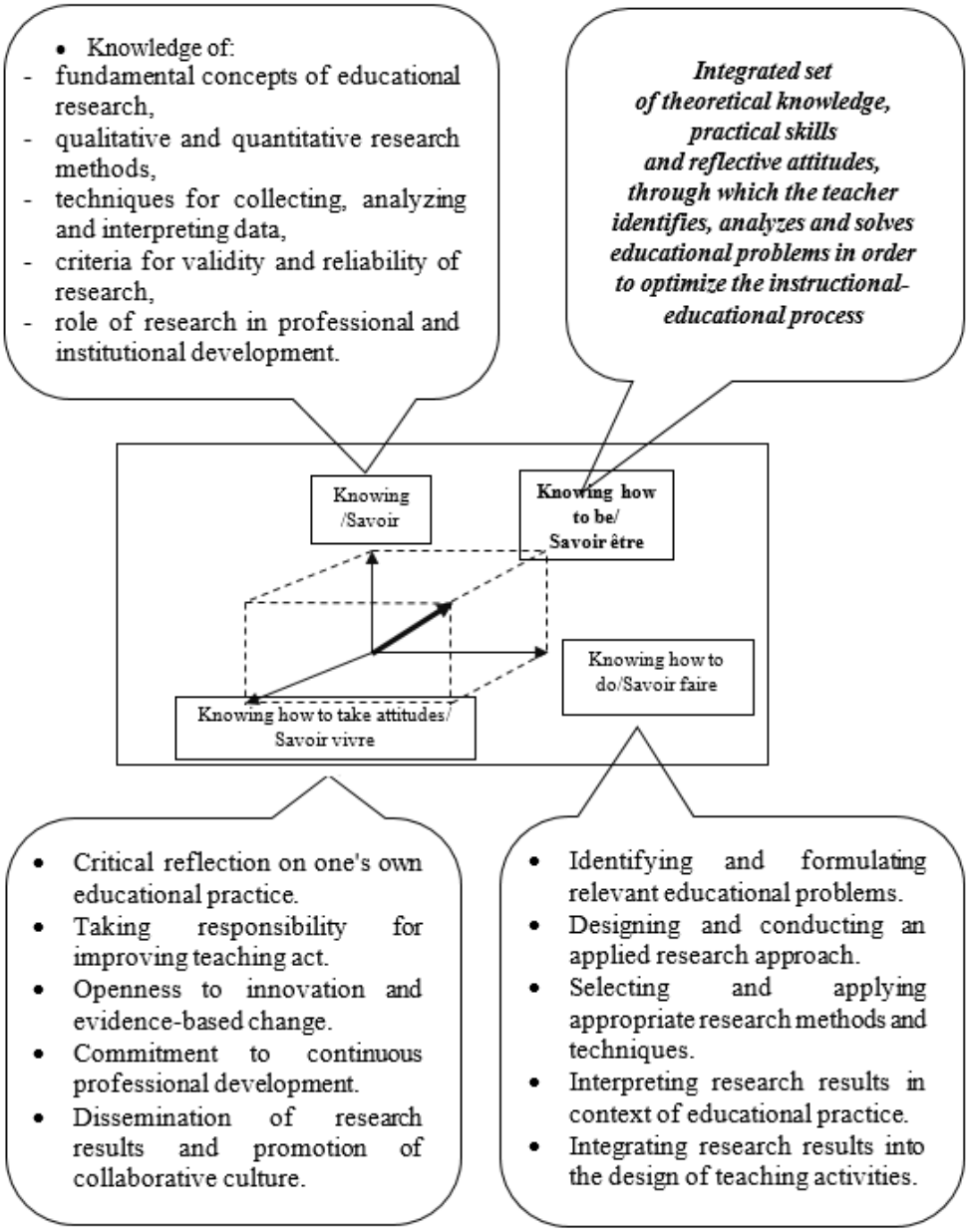

Figure 2. Graphical Model of Teachers’ Research Competence in Pre-University Education

Level 1 – *Initial (Fundamental):* the teacher shows interest in research, understands basic concepts and uses simple tools with guidance (e.g. short questionnaires, observation sheets), but has difficulties in interpreting data and formulating conclusions with applicative relevance [3, 17].

Level 2 – *Functional (Operational):* the teacher can design small-scale investigations (micro-research), apply data collection tools, interpret the results coherently and adjust his/her teaching strategies based on them with punctual methodological support (mentor, team, trainer) [3, 17].

Level 3 – *Advanced (Integrative):* the teacher integrates research into cycles of continuous improvement (research-action type), collaborates in professional teams and disseminates the results in learning communities and methodical activities, contributing to the development of an institutional culture oriented towards the use of evidence [17, 18].

Level 4 – *Expert (Research Leader/Change Agent):* the teacher coordinates research initiatives at institutional level or in professional networks, supports colleagues through mentoring, develops school-university partnerships and contributes to the mobilization of knowledge and the strengthening of organizational infrastructure for the systematic use of evidence [3, 17, 18].

From a managerial perspective, OECD and N. Petrovschi emphasize that the progression between these levels is facilitated by practice-centered training programs, especially research-action, mentoring and professional coaching, access to relevant data and analysis tools, as well as institutional recognition of research effort through time allocation, formal roles and professional incentives [16, 20].

Role of Educational Management in Research Competence Development

The development of research competence in teachers depends crucially on the quality of educational management, as school research requires not only individual initiative, but also organizational conditions (time, resources, structure and professional routines) and learning-oriented leadership. The OECD highlights that to build a culture of engagement in research education systems and schools need explicit interventions that include leadership, incentives, knowledge mobilization processes and training opportunities for the use of evidence [15, 16].

In the education policy literature, the OECD emphasizes that effective school leadership creates the institutional premises for the use of evidence and for the systematic investigation of practice, stating that a "culture of engagement in research" relies on systemic conditions, such as clarity of roles, professional capacity, data infrastructure, networks and partnerships, as well as leaders who model and facilitate the use of evidence in school decision-making processes [16]. In the same vein, the OECD highlights the role of research institutions and initial teacher education institutions in strengthening the links between research, policy and practice, through mechanisms for mobilizing knowledge, including institutional attributions, partnerships, impact evaluation and products accessible to practitioners [17].

At the European level, the European Commission emphasizes the function of the school leader to create professional learning contexts, including through evidence-based guidance for learning design and the institutional organization of the school, an orientation that explicitly legitimizes the use of evidence in decisions regarding curriculum, assessment and educational interventions [7].

The managerial dimension is embodied in decisions regarding the allocation of time for project activities and professional learning communities by ensuring resources — such as access to databases, digital tools and methodological support – and by developing data infrastructure for collection, analysis and feedback mechanisms. The OECD shows that, in the absence of these conditions, the use of research remains episodic, and teachers face difficulties in transforming scientific information into evidence-based teaching practices [15, 16].

At the international level, the OECD, through the results of the TALIS study, indicates that institutional support, mentoring and professional collaboration enhance both the quality of professional development and the willingness of teachers to innovate and investigate their own practice [18]. At the same time, UNESCO and the Teacher Task Force emphasize the need for robust governance and support mechanisms to attract, train and retain teaching staff, as well as to connect continuous professional development to the real needs of the school and to improvement of student outcomes [23].

Based on the specialized literature and the guidelines promoted in recent educational policies, the following managerial strategies with an impact on the development of research competence can be systematized:

- *The institutionalization of inquiry cycles* involves introducing periodic routines for analyzing educational problems, formulating pedagogical hypotheses, testing interventions, and reflecting on results in the logic of research-action [16].

- *The development of capacity to use evidence* involves training focused on evaluation, data analysis, and interpretation of results, so that teachers can methodologically substantiate teaching decisions [15, 16].

- *School-university and research institute partnerships* facilitate access to methodological expertise, co-design of applied research, and dissemination of results, strengthening the link between research and practice [17].

- *The distributed leadership and professional learning communities* support reflection and research in schools through clear roles of facilitation, mentoring, and project coordination [18].

- *Governance and incentives for research* include recognition of investigative activities in professional evaluation, creation of internal micro-grants, spaces for presenting results and mechanisms for scaling up good practices [16].

- *The digitalization of research support* through the use of collaboration platforms and tools for collecting and analyzing educational data, is carried out in accordance with European guidelines on digital education and learning design [7].

Overall, the management of research competence development involves moving from individual initiatives to an institutional support system, based on evidence-based leadership, strategic allocation of resources and time, functional partnerships, investigation routines and mechanisms for disseminating the results.

Research Methodology

The methodology is presented from a procedural perspective, with emphasis on the description of the design, sample, instruments and analysis methods, in order to ensure transparency and replicability of the approach.

The research respected the ethical principles of educational investigation, including voluntary participation, prior information of participants, confidentiality and anonymization of data, as well as the use of results exclusively for scientific purposes, with aggregate reporting and the right of withdrawal without professional consequences.

S.B. Bierer emphasizes the need to combine practical relevance with methodological rigor in the evaluation of training interventions, by explicitly describing the context and procedures for data collection and analysis. At the same time, the author highlights the limitations of single-group pretest–posttest design and the threats to internal validity, recommending, when possible, the use of comparisons and methodological triangulation to strengthen the validity of conclusions [1].

In accordance with these guidelines, the present research was conducted through a unifactorial experimental design, with a single group of participants, using the within-subject model, based on measuring the level of research competence before and after the formative intervention. The approach included three correlated stages: the assessment stage (pretest), oriented towards establishing the initial level of research competence; the training stage, which consisted of implementing *a training program* dedicated to developing the cognitive, operational and attitudinal dimensions of competence; and the control stage (posttest), focused on re-evaluating the level of competence and identifying the progress recorded by the participants.

The research sample consisted of 18 teachers from pre-university education, from the Public Institution Codreanca Middle School, Straseni district, the selection being of a convenience and voluntary nature, justified by the application objective of the approach, namely the optimization of professional development at the institutional level. The main data collection tool was *the Research Competency Assessment Questionnaire,* applied in two rounds, pretest and posttest, to capture the dynamics of change on the three dimensions of competence.

The data analysis combined quantitative and qualitative procedures. From a quantitative perspective, score distributions and differences between initial and final values were calculated, in order to highlight the progress of participants and the changes in the structure of competence levels. From a qualitative perspective, observations on the activities carried out during the training sessions and the feedback of participants

were used, in order to interpret the pedagogical significance of the changes recorded and to correlate the numerical results with attitudinal and reflective developments.

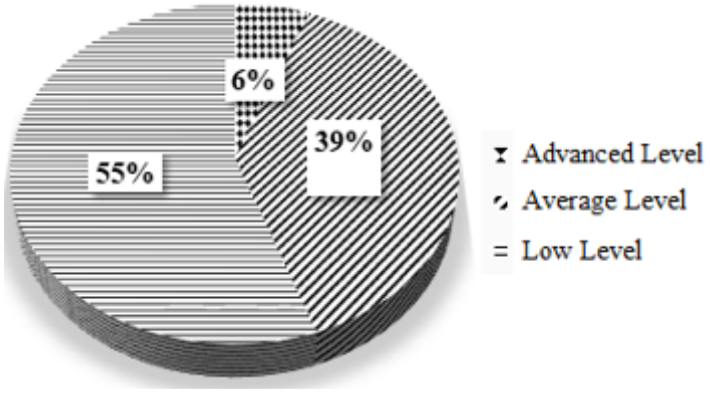

Figure 3. Level of Research Competence Development Among Teachers at Identification Stage

At the observation stage, the distribution of participants by levels of research competence highlighted a predominance of the low level, which indicates a limited familiarity with investigative approaches and the systematic use of research methods in teaching practice. Thus, 10 teachers (55%) were at a low level of research competence, 7 teachers (39%) demonstrated an average level, and only one teacher (6%) reached the advanced level (Figure 3).

The analysis of these results reveals a significant variability in the levels of competence within the investigated group. Most participants obtained scores that reflect a low level of knowledge and application of research methods, suggesting a sporadic and non-formalized use of investigative tools. The segment corresponding to the average level indicates the existence of a basic understanding of methodological concepts, but with an inconsistent application in the current teaching activity. The marginal representation of the advanced level confirms the incipient nature of the research culture at the institutional level and emphasizes the need for a systematic training intervention.

Based on these findings, *a training program* oriented towards the development of research competence was designed and implemented, structured in sessions and activities that aimed at identifying relevant educational problems, formulating research objectives and hypotheses, selecting appropriate methods and tools, collecting and analyzing data, interpreting the results and capitalizing on them in optimizing teaching practice.

In line with recent recommendations on the evaluation of educational interventions, the methodological approach aimed to ensure comparability of the conditions for applying the questionnaire at the pretest and posttest, a coherent description of the intervention in terms of themes, duration and types of activities, as well as compliance with the principles of confidentiality and information of participants regarding the purpose of research.

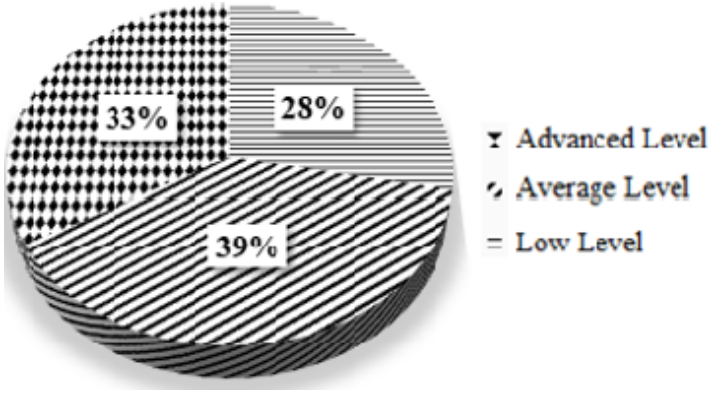

Figure 4. Level of Research Competence Development in Teachers at Control Stage

The data collected at the final stage (posttest) highlighted a visible and significant improvement in the level of research competence. The distribution of participants showed that 5 teachers (28%) were classified as low level, 7 teachers (39%) remained at average level, and 6 teachers (33%) reached the advanced level (Figure 4).

The comparison of the initial and final results indicates a significant redistribution of participants between the competence levels. The low level registered a decrease of 27 percentage points, while the advanced level increased by 27 percentage points, which suggests a real and quantifiable effectiveness of the training intervention. Maintaining the constant share of the average level (39%) can be interpreted both as a consolidation of existing competences and as a potential for further progress towards the advanced level, under the conditions of differentiated training strategies.

The validation of the training program was carried out by comparative analysis of the data collected in the observation phase and in the control phase, using the same research instrument – the research com-

petence questionnaire – and by examining the differences between the initial and final scores, in order to highlight the progress made by the participants (Figure 5).

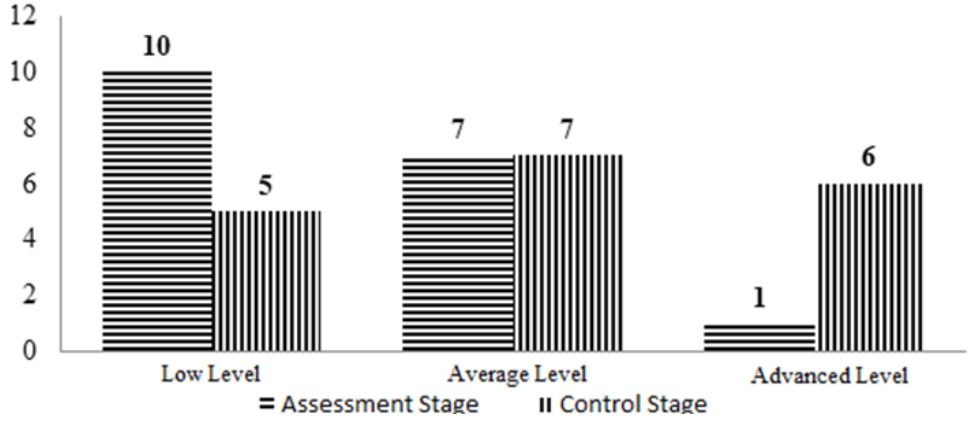

Figure 5. Comparative Aspects of Research Competence Level in Teachers at Assessment Stage and at Control Stage

The graphic analysis highlights a substantial progress of teachers following the implementation of training program, reflected by the significant reduction in the share of participants at a low level and the considerable increase in those who reached the advanced level. This dynamic demonstrates the impact of the intervention not only on the development of basic competences, but also on the formation of certain superior competences, relevant for the initiation and coordination of educational research efforts.

In addition, the analysis of activities carried out within the training sessions and the feedback of participants indicate an increase in confidence in their own ability to apply educational research methods, a deeper understanding of the methodological stages of the investigation and an increased availability for initiating research projects at the institutional level.

Results and Discussions

The results of experimental approach highlight a significant improvement in the research competence of teachers on the three analyzed dimensions – cognitive, operational and attitudinal. After completing the managerially coordinated training program, participants demonstrated an increased capacity to identify and formulate research questions relevant to teaching practice, a more appropriate use of investigation methods and tools, as well as an increased level of pedagogical reflection, manifested by the integration of research results in the planning of teaching and assessment activities. The comparative pre-test–post-test analysis indicates consistent progress at the individual and group levels, confirming the hypothesis of the effectiveness of the training intervention.

The Organization for Economic Cooperation and Development (OECD) highlights that managerial support and institutional frameworks favorable to the use of research results increase the ability of teachers to integrate data and evidence into decision-making and learning design, strengthening the culture of using evidence in schools [18; 19]. Similarly, UNESCO emphasizes, in recent analyses on research-action and continuous professional development, that training programs focused on systematic cycles of inquiry contribute to the development of professional competences and to the strengthening of collaboration and reflection in the school environment [22].

From a managerial perspective, these findings support the importance of allocating time for investigative activities, access to methodological resources, mentoring, and recognition of research activities in professional evaluation, as essential factors for ensuring the continuity and impact of interventions on educational practice.

At the same time, UNESCO and R. Upsher draw attention to the methodological limitations of studies with small samples and single-group designs, recommending sample expansion, the use of comparison groups, and the inclusion of quantitative effect indicators to strengthen the external validity and replicability of the results [23; 24].

Conclusions

The results of study confirm that the development of research competence of teachers is essential for increasing the quality of educational process and for consolidation of an institutional culture oriented towards the use of evidence, reflection and pedagogical innovation. Research competence is emerging as an integrative professional construct, which brings together cognitive, operational and attitudinal dimensions.

The implementation of a structured and managerially coordinated training program leads to significant improvements in the capacity of teachers to formulate relevant problems, to use appropriate research methods and tools and to integrate empirical data into the didactic decision-making process, supporting the positive impact of managerial strategies based on collaborative professional learning.

From a managerial perspective, the results emphasize the importance of evidence-based leadership, strategic allocation of time and resources, development of data infrastructure and strengthening school-university partnerships and professional learning communities for the sustainability of applied research initiatives.

At the same time, methodological limitations require the expansion of future research by including comparison groups and quantitative effect indicators, in order to strengthen the external validity and transferability of the results.

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Presented: 26.01.2026
Reviewed: 30.04.2026
Accepted for publication: 20.05.2026