BABEŞ-BOLYAI UNIVERSITY CLUJ-NAPOCA
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PHD THESIS SUMMARY

Building up professional competence in pedagogical high school education students through literacy strategies in specialised subjects

PhD Supervisor:
Prof. Univ. Ion Albulescu PhD

Doctoral Candidate:
Lehene (Meseșan) C.
Nicoleta-Eugenia

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INTRODUCTION

In a world of permanent change, the field of education is on an endless quest and upgrade to meet today's challenges, particularly complex for both teachers and students.

Building on the reality of today's school, when students have to prove, at the end of their studies, certain competence in order to integrate from a social and professional standpoint, and need to take several steps in order to reach the level of *competence* in a particular area, there is a pressing need to change the way learning is perceived. It is noted that both the acquisition of knowledge and the building of learning techniques have been increasingly taken light, some students often go no further than the elementary, basic reading stage, specific to surface learning (Chiș, 2005), learning being superimposable with the mechanical memorisation technique and updating information memorised, without making connections with previously assimilated information.

Research in pedagogy has proven the effectiveness of the strategies placing the student at the heart of teaching. In order for students to reach the stage of key competences at the end of compulsory schooling and professional competences for labor market integration, an important step would be to activate them in the learning process aimed at developing their learning skills.

Literacy strategies are a key element in achieving the *learning to learn* goal, they provide teachers and students with methodological resources for the in-depth study of scientific texts, for the transfer and operationalisation of the concepts acquired.

Through literacy strategies, learning becomes effective as the student is aware of the usefulness of his/her cognitive actions. The transition from cognition to metacognition is thus achieved, reaching a higher level of information processing.

In the contemporary, technology-dominated world, students need to be prepared 'to search for information using both printed materials and technological resources (...). With the Internet as the focal point of these activities, students need to separate the correct data from the incorrect and essential data from the least relevant data' (Conley, 2019, p. 35). Literacy strategies find, therefore, their applicability in the context of computer use in education and everyday life as well.

Literacy strategies are also a key working tool in building up the skill to learn, a key element in self-education and lifelong learning.

Individual study and the ability to learn are, for the exhaustive training of future teachers, key elements, starting points in the preparation for the teaching profession. Literacy strategies give

the student the opportunity to form individual learning skills concurrently to skills for interpreting any scientific or literary text, transferring information to and from different fields, applying information studied, knowing when and how to use information assimilated, all of these skills required in teaching and beyond. 'The role of the teacher is to teach the student to train himself/herself by reviewing the information resources, selecting and integrating the information acquired in his/her own cognitive system' (Albulescu 2008, p. 63).

This thesis is structured in two parts: a theoretical part and an investigation and experimental part. The first part is backed up by reviews and studies of contemporary pedagogy defining the core concepts of this research: *competence* and *literacy*. Concepts ranging from wider scope notions to details of how they can become operational are depicted. The second fundamental notion, i.e. *literacy*, has been reviewed from several perspectives, bearing in mind the high degree of novelty in educational theory and practice in our country. The consequences of the lack of literacy skills in students, materialised in functional illiteracy, have been presented, which is not intended to be a descriptive element of the young generation in our country, and more. An inventory of literacy strategies that can be applied in school practice for the study of scientific texts, in this case for pedagogical texts, was also carried out in order to build on specific skills as core elements of the primary education teacher's professional competence.

Part two includes the presentation of an experimental approach. It started from studying teachers' and students' perceptions on literacy strategies. From the teachers' perspective, the application of literacy strategies in school practice, their importance, but also the need to improve the teaching process to prevent functional illiteracy were analysed. Students were asked for their opinion on the techniques they use in studying literary and scientific texts. Starting from these considerations, a teaching activity program was structured based on the application of literacy strategies in specialised classes, in pedagogical subjects. Consequently, it was checked whether the constant application of these strategies contributes to the building the study skills of scientific texts, supports learning through the interconnection of concepts and increases the applicability of the notions studied.

The novelty of this research is highlighted in the following aspects:

a) **Application of literacy strategies in pedagogical subjects**, i.e. by using texts Scientific, aiming at building skills specific to the teacher's professional competence for the primary level, skills stated in the curricular documents (*Curricula for pedagogical and*

psychological subjects, approved by Order of the Minister of Education No. 4875/ November 6, 2002). These skills are: '*knowledge and understanding skills* of the specific notions of pedagogical and psychological subjects, *skills for explaining and interpreting* ideas, projects, educational processes, as well as of the theoretical and practical contents of psychological and pedagogical subjects, *critical thinking skills* of educational ideas, projects and processes and *applicative skills* highlighted by the design, management and assessment of learning activities; the use of specific methods, techniques and tools'. Studies in this field are very few in the literature since the application of literacy strategies on scientific texts is relatively new in educational practice in our country.

b) Another novelty aspect of the research is the fact that a **correlation has been made between literacy** and **the area of the teacher's professional competence** for the primary level.

c) The third aspect of novelty is that the primary education teacher's professional competence in our country can be certified after graduating a specialised high school, which is less common at European level, this research **aiming at building up the teacher's professional competence for the pedagogical high school students.**

d) The working strategies presented in this research also constitute **good practice suggestions** for education in general, for high school education in particular. They can be successfully harnessed in the teaching activity and extended to different study subjects.

Thus, this thesis aims at a niche field, which can be further exploited on other levels, with major impact at the level of society: the quality of the competences built in the pedagogical high school graduates will be the decisive factor for the quality of the teaching activity they will carry out in the future. This is, in fact, the main argument, expressed synthetically, of this paper.

Part I. THEORETICAL SUBSTANTIATION

CHAPTER I. COMPETENCE. CONCEPTUAL DELIMITATIONS

In Chapter I, attention was paid to the notion of **competence**, defined according to the European Centre for the Vocational Development as 'the ability to apply learning outcomes appropriately in a defined context'. Competence was further analysed on the basis of three structural elements: knowledge, skills and attitudes.

The working definition of the term competence has been developed in this chapter as well. 'Competence includes four dimensions :*knowing* -knowledge pool, cognitive dimension, *knowing how to do* - translating information into practical situations, this being the action-oriented dimension, *knowing how to be* - the strategic dimension, selecting and applying the necessary information depending on the context, *becoming* - a reflective-innovative dimension, translating information and skills into new situations in order to achieve, both efficiently and innovatively, certain job tasks or solve problems.

In line with current international policies, key competences have been defined at European level: a set of skills to be trained to all graduates at the end of compulsory schooling for lifelong learning. These competences are transversal and are necessary for every citizen for social and professional integration. There are eight key competences: 1) literacy competence, 2) multilingual competence, 3) mathematical competence and competence in science, technology and engineering; 4) digital competence; 5) personal, social and learning to learn competence; 6) citizenship competence; 7) entrepreneurship competences; 8) cultural awareness and expression competence (as *recommended by the European Parliament and the Council, May 2018 on key competences for lifelong learning, https://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX:32018H0604(01)&from=LT*).

Key competences are important and very necessary, but not sufficient for the vocational training of young people. New jobs will be based on creativity, innovation and in-depth specialisation. Therefore, there is a need for a change of perspective from both institutions providing educational services and trainees.

Attention was paid to the competence of *learning to learn*, detailing the components and methods of training this competence as it was considered an integrative competence. '*Learning to learn* is the ability to pursue and persist in learning, to organise one's own learning, including through effective management of time and information, both individually and in groups' (*http://data.europa.eu/eli/reco/2006/962/oj*).

CHAPTER II. BUILDING UP TEACHER'S PROFESSIONAL COMPETENCE IN PEDAGOGICAL HIGH SCHOOL EDUCATION

Chapter 2 presents elements related to building up the teacher's professional competence

in pedagogical high school education. The term of professional competence was defined according to the legislation in forceas 'the ability to perform the activities required at the workplace at the quality level set forth in the occupational standard' (*http://www.anc.edu.ro*).

The teacher's professional competence has been defined from the perspective of educational research, several definitions are : 'a set of cognitive, motivational and managerial capacities, which interact with the personality traits of the educator, providing him/her with the qualities necessary to deliver a didactic performance that ensures the achievement of the objectives designed for most students, and the performances should be close to the maximum level of the intellectual potential of each individual' (Jinga, 1998); 'a matrix in which the elements function in full, at the same time, in a prototype situation' (Păun, 2017); it involves a set of core competences: 'interactivity, sociability, communication, alternative strategies' (Chiș, 2014).

At the 2013 Education Congress, S. Toma and D. Potolea presented a structured form of professional competence of the teacher. It includes three categories of competences: specialised, addressing aspects related to information and skills in the specialised field, professional competences addressing aspects related to the organisation of the teaching approach, and transversal competences refer to the areas of institutional development and professional development.

New perspectives have been highlighted in this chapter in the training of the teacher, called for by current developments in education and society: global competence, adaptation to new; activities with students with special needs; ICT skills, skills in individualised and interdisciplinary learning.

Building and accrediting the primary education teacher's professional competence
primary education is provided in legislative documents, both for the graduates of higher education and for the graduates of the Pedagogical High School.

Working definition of the teacher's professional competence has been developed on the basis of all studies presented. At conceptual level, the term *professional competence* will be used, and at structural and functional level, stratification by levels of competence will be achieved. The teacher's professional competence is the set of the teacher's abilities to transpose theoretical information into practical and applicative situations, in order to effectively coordinate the educational activity, to manage correctly and creatively situations from the educational practice, consisting of:

(1) general professional competence;

(2) specific professional competence;

(3) transversal competence;

Each dimension consists of: knowledge, skills and attitudes.

Curricular milestones have been presented in this chapter in building up the professional competence in pedagogical high school education by conducting comparative studies of framework plans and differentiated curriculum over the last approximately 20 years. The curricula in specialised subjects were analysed, as well as the importance of school textbooks in these subjects.

Greater importance is attached to teaching practice in building professional competence in Pedagogical High School. This is done in different forms during schooling and is regulated by legislative documents.

Building up teacher's professional competence in pedagogical high school education is not a smooth process, noting some difficulties that may create syncope. These relate to the difficult assessment of students' attitudes, the excessive burden on students through the number of classes in the framework curriculum, the age of adolescence, some patterns of teachers not adapted to current educational needs, mono-disciplinary structured curricula (in high school), and they are organised inter-disciplinarily at the primary level. Another difficulty would be the preparation of test classes.

Attention was paid to functional illiteracy as it is a serious barrier to the building of any professional competence, all the more so in forming the teacher's professional competence. Several solutions have been proposed in order to prevent functional illiteracy that include aspects of literacy. A direct correlation can be said to exist between functional illiteracy and literacy.

CHAPTER III. LITERACY STRATEGIES AND THEIR USE IN BUILDING TEACHER'S PROFESSIONAL COMPETENCE

Chapter three is dedicated to literacy strategies and using them in building up teacher's professional competence.

The concept of literacy has been defined, taking as reference points both international studies and documents developed by organisations with educational impact. Literacy is 'the ability to understand and employ printed information in daily activities, at home, at work and in the community to achieve one's goals, and to develop one's knowledge and potential'. (OECD, 2000). UNESCO (2015) also defines literacy as: 'the ability to read and write, identify, understand, interpret, create, communicate and compute, using printed and written materials, and the ability to solve problems in an increasingly technology- and information-rich environment'.

The working definition has been developed, literacy being: the ability to read and write, to correlate read information with other information and apply it in new contexts, both orally and in writing.

A distinction is made, at the level of school subjects, between two types of literacy in education systems in other countries: literacy belonging to the subject area, building on elementary literacy skills and literacy at the subject level, which includes highly specialised study skills.

Four of the types of literacy that are constantly being aimed in the international education have been described. Emerging literacy is the child's contact with text before formal education, functional literacy is the ability to understand and use information from the written text, digital literacy can be defined as the ability to use IT resources in daily life and information literacy. This type of literacy is more complex. It includes other types of literacy, being indispensable in a knowledge-based society. I considered this type of literacy to be essential for a teacher, which is why a comparative study has been carried out between the standards of informational literacy in pupils and students.

The role of literacy strategies in the context of building the teacher's professional competence was analysed from the perspective of the need for change in the school learning approach, highlighting training strategies for active learning.

In recent years, researchers have taken important steps in identifying training strategies that influence how the brain acquires and stores information. Pomerance et al., (2016) presents six strategies recommended for active learning.

The first two help students *discover new information*:

1. *Pairing graphics with words* - learning efficiency increases when teachers convey information through two main paths - words and graphics or images, representations.

2. *Linking abstract concepts with concrete representations* - Teachers should present examples illustrating concepts and explaining examples concurrently.

The following two strategies ensure that students *connect information* to deepen understanding:

3. *Possibility to ask questions* - students are asked to pose questions such as *why*, *how* and *how do you know*. The questions help the student clarify his/her ideas and connect the key notions.
4. *Repeatedly alternating problems with the solutions provided* and problems that students must solve. The explanations accompanying the problems solved help students to understand the principles underlying them.

The last two categories help students *to update* what they have learned:

5. *Distributing practice* - students should repeat and use assimilated materials several times after learning them, each practice or review being spread over several weeks or even months.
6. *Assessment to stimulate retention* - beyond the value of formative evaluation (to help a teacher decide what to teach) and summative assessment (to determine what students have learned), assessments that require students to update material information to apply it in practical activities are also important.

Next, correlations were made between literacy and holistic learning, between literacy and metacognition.

Graphic organisers were presented as methods to structure information, this being essential in literacy. Mind Maps and Concept Maps were presented among the graphic organisers.

Graphical representations of concepts are intended to graphically render the relationships between ideas, data, information, and concepts in a visual map or diagram. The manner in which the information will be represented will depend on the type of information, the field of learning, the age of the students. Cognitive Maps and Mind Maps are essential elements in both learning and teaching and assessment, and are important in the training and development of key competences for lifelong learning. They are also of major relevance in building up the teacher's professional competence both in terms of assimilating theoretical knowledge and in forming the specific skills and attitudes of the teacher's profession.

A sub-chapter has been assigned to the inventory and presentation of literacy strategies in literature with the potential in building up the primary education teacher's professional

competence. The strategies were grouped into three broad categories, each strategy being detailed by stages of application in the teaching activity. These strategies were selected as they were deemed to be useful in studying scientific texts, pedagogical texts, are adapted to the age of the students and include both elements specific to the literacy and the teacher's professional competence related to skills. The categories in which the analysed strategies were grouped are: a) Strategies that focus on predictions and information discovery through text analysis; b) Strategies based on information systematisation through graphic organisers; c) Strategies that leverage learning through reflection.

The increased diversity of literacy strategies in the pedagogical literature actually reflects the importance of building this skill among students, as well as the concerns among specialists to diversify and streamline the ways in which functional literacy can be formed among students. This skill is necessary in the training of professional skills in all areas of activity. All the more so, the importance of this ability in building the teacher's professional competence, a profession through which future students' learning skills need to be further built up.

PART II. EXPERIMENTAL PEDAGOGICAL RESEARCH: BUILDING PROFESSIONAL COMPETENCE IN PEDAGOGICAL HIGH SCHOOL STUDENTS BY USING LITERACY STRATEGIES

CHAPTER IV. RESEARCH DESIGN

The dynamics of today's society call for rapid changes in the field of training the young generation for effective adaptation to social and professional requirements. Therefore, the training of teachers, in general, and primary education teachers, in particular, with a high level of competence, is a must. The preparation of future generations depends on the way teachers are trained.

Research design covers several aspects relevant to the experimental approach. Thus, the professional competence of the teacher has been defined from several perspectives: that of the specialists in the educational field and from a legislative perspective, and literacy, and conceptual delimitations have been made between different interpretations of the term.

The premises and context of the research highlight the need to deal with modern education, the prevention of functional illiteracy and the importance of having graduates with literacy skills

as study strategies for lifelong learning, the need of these young people for personal and professional valorisation. Building on these realities, I considered it appropriate to highlight the role of literacy skills in building the primary education teacher's professional competence.

An investigative approach was proposed to highlight the implications of applying literacy strategies in the teacher's activity for building the primary education teacher's professional competence in the pedagogical high school students.

The students' school evolution in building the teacher's professional competence, in particular the general professional competence has also been addresses, but also aspects of the specific and transversal professional competence. The knowledge, skills and attitudes pursued are consistent with the provisions of the curriculum in the Differentiated Curriculum, in pedagogical subjects. The dynamism and modernisation of educational strategies applied in pedagogical high school education and students' awareness of the importance of the essentialisation, structuring of information and transfer of knowledge in practical and applicative situations for the training of future teachers were elements that have been taken into account in the development of the investigative approach.

For the investigative approach, it was established: the purpose of the research, the objectives of the research and the research questions.

Research purpose: structuring and implementing an intervention program *leading to the improvement of the performance of pedagogical high school students by applying literacy strategies (disciplinary literacy) in specialised subjects in order to develop professional competence.*

The research objectives were**:**

1. Preparing an intervention programme to develop professional competence in pedagogical high school students through the systematic application of literacy strategies.
2. Checking the extent to which increasing the school performance of high school students through the application of literacy strategies is reflected in the functional character of knowledge.
3. Introducing metacognitive awareness sequences within the intervention program of the usefulness of literacy strategies in the study of specialised texts.

4. Establishing a correlation between the specific literacy strategies used and the development of knowledge and application skills of specialised concepts.
5. Emphasising, within the intervention programme, activities leading to the development of the critical and creative analysis capacity of pedagogical concepts studied in scientific texts.

This research aims to answer the following **questions**:

1. To what extent can professional competence be formed and developed through literacy strategies in pedagogical high school students?
2. What are the components of the teacher's professional competence that can be built mainly through literacy strategies?
3. What are the needs in the field of literacy at the level of pedagogical high school education to which insufficient responses were given?
4. What are the training needs of students in the field of literacy?
5. What are literacy strategies with the potential to optimise professional competence building in pedagogical high school students?
6. What are the enabling factors in building up professional competence in pedagogical high school students through literacy strategies?

Research assumptions were drawn up for conducting the experimental approach: general assumption and specific assumptions.

General assumption:

The systematic use of literacy strategies in teaching specialised subjects, in pedagogical high school students, in school teacher/kindergarten teacher specialisation (ninth and tenth grade) contributes significantly to building up professional competence.

b. Specific assumptions

Starting from the general assumption, two specific assumptions have been drawn up, which customise it.

I1. *The systematic use of literacy strategies in teaching pedagogical subjects, in pedagogical high school students, contributes significantly to increasing school performance highlighted by the level of applicability of theoretical knowledge.*

I2. *There is a significant correlation between the use of literacy strategies in the study of specialised texts and the building of the teacher's professional competence, detailed in: skills of*

knowledge and understanding of pedagogical concepts, skills of explanation and interpretation, skills of critical thinking and applicative skills.

Independent and dependent variables have been identified and substantiated

The independent variable was an intervention program containing literacy strategies applied in teaching and learning specialised pedagogical subjects in pedagogical high school students, school teacher/kindergarten teacher specialisation, ninth and tenth grade.

Dependent variables will be influenced by the independent variable and should be established from the initial level of the investigative approach. These were:

- ✓ The assimilation degree of pedagogical concepts as core elements in building up professional competence in pedagogical high school students;
- ✓ The level of teacher's professional competence building in pedagogical high school students, competence translated into knowledge, skills, attitudes;
- ✓ The level of training knowledge and understanding skills of pedagogical and critical thinking concepts for the ninth and tenth grade students;
- ✓ The level of training knowledge and understanding skills of pedagogical concepts, explanation, interpretation and critical thinking for the tenth grade students;
- ✓ The level of development of skills in applying pedagogical concepts, for both the ninth and tenth graders, as essential elements of vocational competence training.

Place of research

The research was conducted in two national pedagogical high schools: 'Gheorghe Lazăr' National Pedagogical High School of Cluj-Napoca and 'Andrei Șaguna' National Pedagogical High School of Sibiu. The experimental group consisted of students of 'Gheorghe Lazăr' National High School of Cluj-Napoca, and the control group included students from the Pedagogical High School of Sibiu.

Research period:

The research was conducted over several school years, as follows: 2017-2018 school year - second part of the second term - pretest application; 2018-2019 school year - first term and part of the second term - experimental intervention stage; 2018-2019 school year - end of the second term - post-test application; 2019-2020 school year - first term - retest application.

Investigated population

The investigated population included both students and teachers in the pre-experimental stage and only students in later stages. The research activity in all stages of the experimental approach was carried out on the population of pedagogical vocational high school students, the school teacher-kindergarten teacher specialisation. The groups of students selected to be part of this research represent the research samples. The criteria that underpinned the setting up of the research group were:

- high school students, upper secondary education, lower secondary school: ninth and tenth grade;
- high school field: vocational;
- profile: pedagogical;
- specialisation: school teacher-kindergarten teacher.

I opted for the ninth and tenth grade because they are lower secondary education grades, compulsory education, and the Differentiated Curriculum targets fewer school subjects with a direct impact on building up professional competence.

The teachers selected to be part of this research represent the research group for the pre-experimental phase. A questionnaire was applied to this group. The application analysed the degree of knowledge and application of literacy strategies in teaching and the impact on building up professional competence in pedagogical high school students, school teacher-kindergarten teacher specialisation. The criteria that underpinned the setting up of the teachers' group were:

- classification into upper secondary education: ninth and tenth grade, high school field: vocational, profile: pedagogical, specialisation: school teacher-kindergarten teacher;
- the teaching activity carried out in the selected classes of students in the group of students;
- specialisation and seniority were not criteria to be taken into account in the setting up of the teachers' group.

Teachers from pedagogical high schools were chosen because the graduates of these high schools will become teachers for primary or preschool education, and the literacy strategies used in the teaching-learning activity will be a support for students in building the functional literacy, but also a role model for the future teaching career.

In the pre-experimental phase, the research group consisted of 235 students and the teacher group consisted of 30 subjects.

The research group, in the following stages of the research, consisted of 211 students, distributed as follows:

ninth grade	tenth grade
experimental group: two classes of students, 57 subjects;	experimental group: two classes of students, 54 subjects;
control group: two classes of students, 61 subjects;	control group: two classes of students, 57 subjects.

Intervention programme

The intervention programme involved the application of subject literacy strategies in pedagogical subjects, with a frequency of one hour per week, lasting approximately two terms, in ninth and tenth grade. The evolution of the skills composing the primary education teacher's professional competence was monitored, skills laid down in the curricular documents. The skills monitored in the intervention program were: knowledge and understanding of pedagogical concepts and subjects, application and interpretation skills for the ninth grade and knowledge and understanding skills, explanation and interpretation skills, critical thinking skills, applicative skills, for the tenth grade. Therefore, two skill categories were followed for the ninth grade, and four for the tenth grade.

The pedagogical subjects addressed were different from one grade to another and changed as the experimental approach progressed, according to the Differentiated Curriculum. Thus, for the ninth grade, the specialised subjects were: *Introduction to pedagogy and curriculum theory and methodology, Theory and practice of training* and assessment and *Student class management.* For the tenth grade, the specialised subjects were: *Training and assessment theory and practice*, *Student class management* and *Innovative teaching methods*, depending on the stages of the research.

The content samples were selected in accordance with curricula and schools, teachers' calendar schedules and the structure of the school year. The resources used for the content samples were the specialised handbooks in two of the subjects and other specialised bibliographic resources: M. Bocoș, D. Jucan (2010), *Fundamentele pedagogiei și teoria și metodologia*

curriculumului- repere și instrumente didactice pentru pregătirea profesorilor [Fundamentals of Pedagogy and Curriculum Theory and Methodology - Milestones and Teaching Tools for Teacher Training], Paralela 45 Publishing House, Pitești; M. Bocoș, D. Jucan (2017), *Teoria și metodologia instruirii. Teoria și metodologia evaluării. Repere și instrumente didactice pentru formarea profesorilor [Training Theory and Methodology. Assessment Theory and Methodology. Teacher Training Benchmarks and Teaching Tools]*, 3rd edition, Paralela 45 Publishing House, Pitești; R. Iucu (2006), *Managementul clasei de elevi [Student Class Management]*, Polirom Publishing House, Iași; C. Ceobanu, A. Gherguț et al. (2010), *Introducere în managementul clasei de elevi [Introduction to Student Class Management]*, Universității Al. I. Cuza Publishing House, Iași; E. Stan (2005), *Managementul clasei [Class Management]*, Aramis Publishing House, Bucharest.

Literacy strategies in the intervention programme were highlighted by diversity, had specific elements to follow in activities for scientific texts, were tailored to the age of children. All strategies applied aimed at skills specific to the primary education teacher's professional competence.

Research methods:

The research methods were grouped into three categories:

1) *Methods for data collection*: pedagogical experiment method, questionnaire survey method, observation method, class conversation method, analysis method of curricular and other school documents, method of tests and other written exams.
2) *Methods for organising, processing and presenting research data*

Statistical analysis was applied both for the pilot and validation phase, and for the application phase of the research tools. Excel, Windows and SPSS version 22.0 tools were used for statistical analysis of the results obtained from the investigative approach.

The statistical indicators used were: Alpha Cronbach value, Main Component Analysis as well as the establishment of construct variables for pretest and post-test instruments for the ninth and tenth grade.

The data obtained were *reviewed* through the following indices: establishing the central trend by mean, median and mode; form of dispersion by standard deviation, minimum and maximum value; regression indices.

3. *Methods of verifying the assumptions*: analysis of the correlation between variables-construct by

Pearson correlation coefficient for quantitative variables; t tests, by which the significance of the differences obtained was determined.

Research tools

The research tools were: teacher questionnaire, student questionnaire, metacognitive learning tools: self-assessment sheets of learning activity - *Reflective journal*, team activity *inter-assessment sheets*; *Exit ticket* and tests for the ninth and tenth grade, for each stage: pretest, post-test and retest.

Both the applied questionnaires and the tests for the ninth and tenth grade, the pretest and post-test stages, were new tools requiring validation. For questionnaires applied to both teachers and students, the following steps were taken: pilot, review, validation, application and interpretation. Validation was performed by calculating Alpfa Chronbach, the values were as follows: teacher questionnaire: 0.811 (14 items); student questionnaire: 0.672 (9 items).

The following steps were followed for the validation of the tests: pilot, review, validation by: calculation of Cronbach Alpha, Analysis of Main Components and Determination of Construct Variables; application and analysis of data by using SPSS software, version 22.0.

Research stages

Stages covered: pre-experimental phase, formative experiment phase, post-intervention phase, retest phase. In the pre-experimental stage, in addition to organisational aspects, the opinions of teachers and students were investigated on the usefulness of literacy strategies in learning and in building the primary education teacher's professional competence. The level of training the skills specific to the teaching profession in the research group students was also assessed by applying the test (pretest). The formative experiment phase included the deployment of the intervention programme and the application of metacognitive learning tools. The post-intervention phase was assigned to the application of tests (post-test) to verify the acquisitions and skills built, and tests were applied in the retest phase to highlight the persistence over time of the purchases and skills built in the formative experiment phase.

Chapter V. RESEARCH RESULTS

V.1. Research results in the pre-intervention stage

Teachers questionnaire

Results from the application of the questionnaire to the teachers' group highlighted certain aspects: most of the teachers, subjects in this research, are at an early stage in terms of information and methodological training in the field of literacy. There is a reluctant attitude of the subjects in using literacy strategies in the teacher's activity, this being to the detriment of the students who will in turn become teachers for the primary and preschool education. Most of the teachers surveyed disagree that literacy strategies contribute to building professional competence for pedagogical high school students. The results of the survey, even if they cannot be generalised to the entire teaching staff in our country, reflect a reality through which functional illiteracy of students can be explained.

Students questionnaire

The following issues arise from the students questionnaire in terms of knowledge of textual and learning techniques: students are familiar with text-specific study strategies (~80%), know study strategies for a scientific text about 50%, consider these strategies to be important over 80% of the students surveyed. Strategies to be improved would be: selecting key notions, substantiating key ideas, and communicating new ideas. Listed barriers in the study of the text were: difficult terms, numerous terms, intricate expression, too long texts**.** The teacher's explanations and the theory-practice correlations are very important to overcome these barriers. Most students surveyed consider that a scientific text requires specific study techniques.

In conclusion, students know and appreciate elements specific to literacy skills, are aware of certain learning difficulties based on the study of texts, difficulties also noticed by teachers through the answers given to the questions in the questionnaire. However, by becoming aware that they have text learning skills, they are prepared for the competence of *learning to learn*.

Results in the pretest stage

Ninth grade

The results of the experimental research are analysed statistically, differentiated, by study classes and groups of subjects. The results are grouped according to the intervention stage (pretest, post-test and retest). In order to fully understand the samples, I worked with, I applied descriptive analyses involving the calculation of the estimators of the central trend (mean, median, modal), form of distribution (coefficient of symmetry and vaulting), dispersion (standard deviation, minimum value and maximum value). I also applied analysis of the correlation between variables - construct (Pearson correlation coefficient for quantitative variables) and t tests. Using the Pearson

linear correlation coefficient, it was determined whether there is a significant statistical link between the variables - construct and measures its direction and intensity in relation to a variable considered to be dependent.

By applying a test, both in the experimental group and in the control group, the level of performance of the students from the two groups, specific to the skills tested, skills laid down in the curricular documents that underlie the teacher's professional competence, was monitored.

The performance of each group involved in the experimental research was analysed, as well as the comparison of the results of the experimental and control groups, the performance of the two groups was compared, as well as the statistical significance of the differences recorded.

In this step, the experimental group recorded different performances for the skills tested. Scores show relatively low performance, better performance in terms of *applicative and critical thinking skills*. The review of the performance of the control group in the pretest stage shows scores relatively similar to the results obtained by the experimental group. Regarding the possible links between the variables analysed, the Pearson correlation coefficients in the experimental group are statistically insignificant, no statistical links were detected between the two variables.

Tenth grade

For the tenth grade, the performance of the experimental group, in the pretest stage, differs from one skill to another, with higher scores being observed in *the knowledge and understanding skills* of pedagogical subjects, and the lowest being recorded in *the critical thinking skills.* The performance of the control group is different. High scores are recorded in *the knowledge and understanding skills*, and the lowest score is recorded in *the critical thinking skills.*

Pearson correlation coefficients in the experimental group are statistically significant, significant direct links of average intensity have been confirmed between the following pairs of variables: Applicative skills and Skills of explanation and interpretation – direct link, medium intensity; Applicative skills and Skills of critical thinking - direct link, medium intensity. If the scores of the explanatory and interpretive skills increase, so will the scores of the applicative and critical thinking skills.

Comparative analysis between experimental group and control group, pretest stage

Upon comparing the results obtained for the ninth grade, between the control group and the experimental group, in the pretest stage, there are statistically significant differences between

the knowledge and understanding skills of pedagogical subjects and statistically insignificant differences between the applicative and critical thinking skills.

Under graphical representation, the results are as follows:

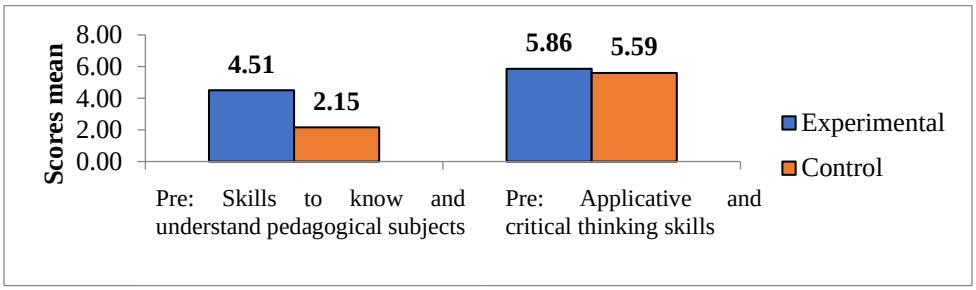

Figure No. 1. Comparison between results, ninth grade, pretest, experimental group and control group

In tenth grade, statistically significant differences were found in all skills tested. Increased performance for both groups was recorded in the knowledge and understanding skills of pedagogical concepts and applicative skills. Less developed skills were: analytical and interpretive skills and critical thinking skills.

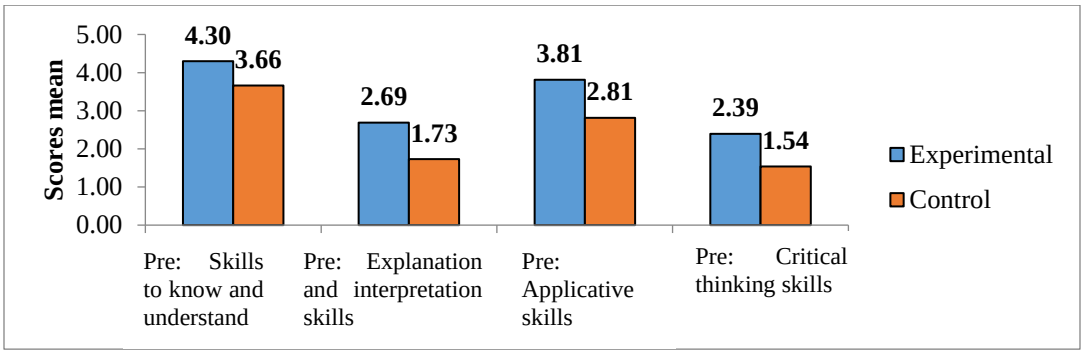

Figure No. 2. Comparison between grades results, tenth grade, pretest, experimental group and control group

I monitored whether the results obtained by the students from the two groups, in the pretest stage, line up with the opinions of the teachers obtained following the questionnaire. Teachers pointed out some difficulties recorded by students in learning: substantiating key ideas, establishing connections between notions, integrating notions into their own value system, etc. These difficulties are found in the lower scores obtained foe different skills presented as pretest construct variables, such as explanatory or critical thinking skills. Teachers also denied the importance of literacy strategies in building the teacher's professional competence. It should be noted that the skills presented as construct variables are essential elements in building the stated

competence, and the results recorded by the students from all groups tested are modest. Therefore, the methods suggested by teachers to be important in building up professional competence (demonstration, personal model, observing the work of some teachers, etc.) have not proven their effectiveness for the ninth and tenth grade students as evidenced by the low performance recorded in all the skills mentioned.

- **Research results in the post-intervention stage**
- **Results obtained and post-test-pretest comparative analysis in the ninth grade**

After the formative intervention stage, a test was applied, both for the ninth and tenth grade, to highlight the level of acquisitions and skills built up.

In the ninth grade, the experimental group, there is an increase in performance for the skills tested. The ninth grade students, the experimental group, significantly improved *their applicative and critical thinking skills* following the experimental intervention.

In the control group, the skills that scored higher were *applicative and critical thinking skills*, but with much lower values than in the control group.

Results obtained in the experimental group in the pretest - post-test stage were compared by statistical analysis using the T test. The results of the experimental group differ depending on the ability pursued. For *the knowledge and understanding skills*, the performance recorded in the pretest is 4.48, and in the post-test stage the score increased to 5.40, the difference between the two stages of the test being close to one point. A notable performance was recorded for *applicative and critical thinking skills*: 6.20 in the pretest stage at 10.02 in the post-test stage. This high score is due to the application of literacy strategies in teaching activities, in pedagogical subjects.

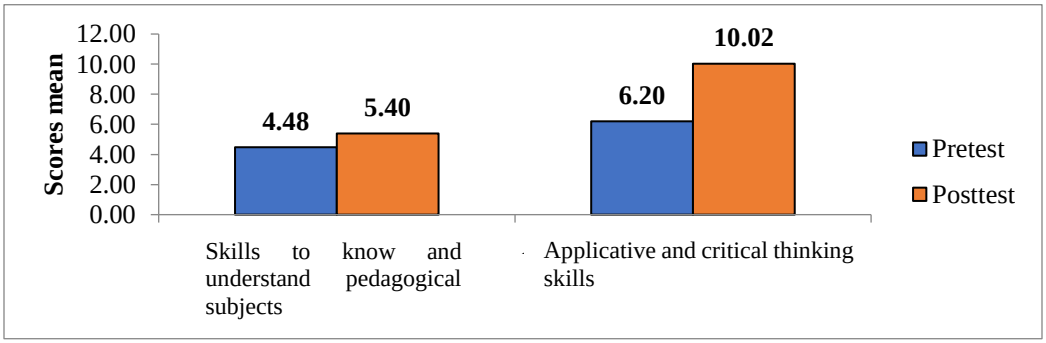

Figure No. 3. Comparative analysis - pretest – post-test results - ninth grade - experimental group

Statistical analysis using Pearson correlation coefficients was used to identify possible links between the variables in the post-test phase. No statistical links were detected between the

two variables tested. Therefore, the development of skills, for the ninth grade, is achieved independently of each other, with the help of literacy strategies.

- **Results obtained and post-test-pretest comparative analysis in the tenth grade**

Post-test stage results recorded in research groups for the tenth grade are different in the experimental group and control group. For the experimental group, the skills with the highest score are the applicative ones, followed by the knowledge and understanding skills. The lowest score in this step was recorded for the critical thinking skills compared to the other skills. The results of the control group record relatively low performance for each of the four skills tested. The best performance is recorded in the knowledge and understanding skills of pedagogical subjects (4.70 points), and the lowest performance is recorded in the upper level skills, in the critical analysis skills. A comparative analysis was performed for the results obtained by the experimental group in the pretest and post-test stages. Different, higher performance for the post-test stage is recorded between the results of the two stages. In order to determine whether the differences found in the second stage are statistically significant, the data were subjected to statistical analysis and interpreted by the T test, with statistically significant differences for each of the skills tested.

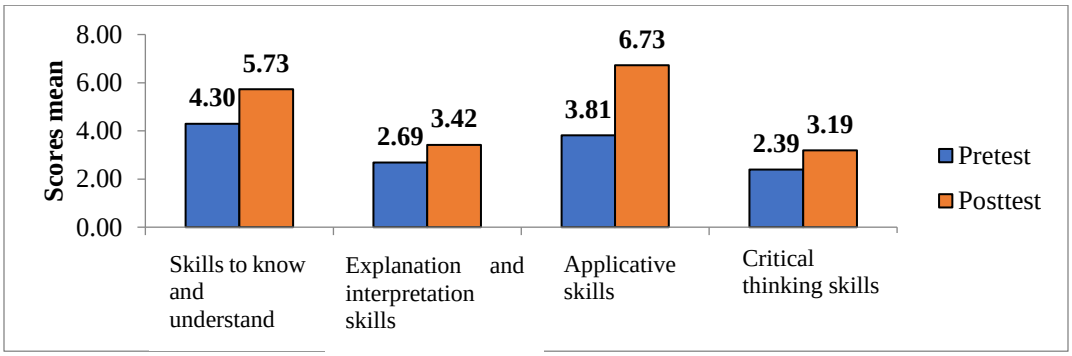

Figure No. 4. Comparative analysis - pretest – post-test - tenth grade - experimental group

Pearson correlation coefficients will be calculated to highlight the links between the variables included in the research and whether they are statistically valid. For the experimental group, significant direct links (positive coefficients) of medium intensity have been confirmed between the following pairs of variables: *Applied skills* and *Explanation and interpretation skills* and *Critical thinking skills* and *Applied skills* direct link, of medium intensity. If the scores of the explanatory and interpretive skills increase, so will the scores of the applied and critical thinking skills.

- **Comparative analysis between experimental group and control group**
- **Ninth grade**

For the experimental group, post-test stage, knowledge and understanding skills of pedagogical subjects record an average value of 5.4 points, higher than the average value of the same variable within the control group, of 4.56 points. For the ninth grade, post-test stage, the control group performs weaker than the experimental one. The average scores in the post-test stage are significantly higher than the pretest stage for the experimental group, indicating a direct, immediate effect on the ninth grade students of the applied literacy strategies.

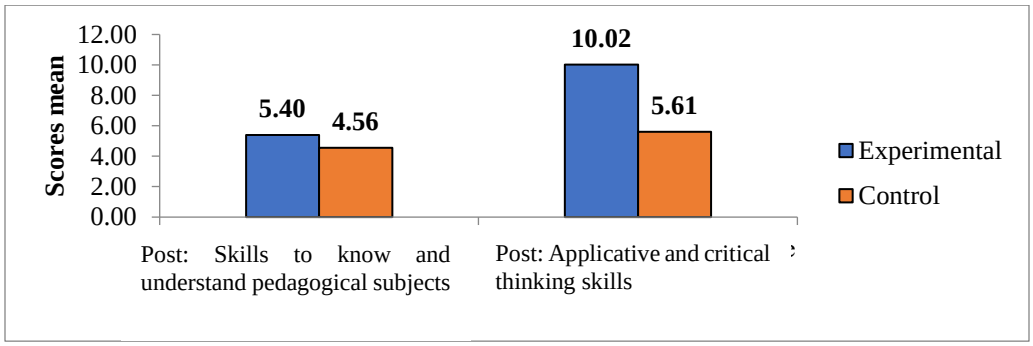

Figure No. 5. Comparison between means, ninth grade, post-test, experimental group - control group

For the ninth grade, in the post-test stage, the experimental group is the group with the higher average scores. In addition, the skills that have significantly improved are the complex ones, i.e. *applicative* and *critical thinking* skills.

Upon analysing the skill categories for the ninth grade, there is a significant increase in the performance of the experimental group compared to the pretest stage, but also compared to the control group.

For the ninth grade, the specific assumption I1 is confirmed, with the applicative skills recording a significant increase. *The specific assessment I2 is also* confirmed. In view of the above, we can state that for the experimental group of the ninth grade the general assumption is confirmed.

- **Tenth grade**

Knowledge and understanding skills of pedagogical subjects, post-test stage, record an average value of 5.73 points, higher than the average value of the same variable within the control group, of 4.70 points. For *the explanatory and interpretation skills*, in the experimental group, the average value is 3.42 points, higher than the average value within the control group, of 1.94 points. *Applicative skills*, for the experimental group, record the average value of 6.73

points, almost 3 points higher than the average value within the control group, of 3.68 points. *Critical thinking skills*, for the experimental group, record the average value of 3.19 points, higher than the average value of 1.86 points within the control group.

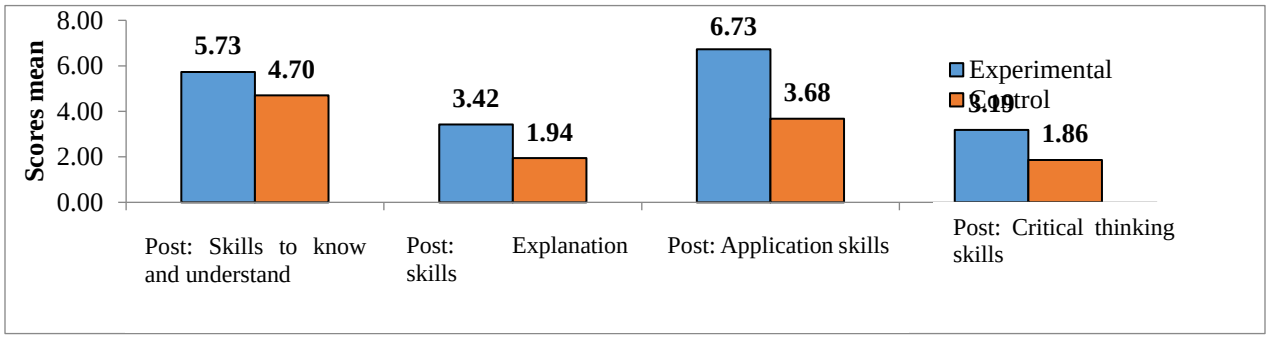

Figure No. 6. Comparison between results, tenth grade, post-test, experimental group and control group

The differences between the control group and the experimental group are statistically significant for all skills tested. The performance of tenth grade students, post-test stage, in the two groups is different. The experimental group scored higher than the control group for all skills tested.

Upon analysing the results obtained in the post-test stage by the experimental group for the tenth grade, it can be stated that: the performance recorded for the applicative skills in the post-test stage is higher than the pretest stage, but also compared to the results obtained by the control group, the differences being statistically significant. Therefore, specific assumption 1 is confirmed. Moreover, the performance recorded for all skill categories is higher in the post-test stage compared to the pretest stage and compared to the scores recorded by the control group, in the post-test stage, for the experimental group. Therefore, specific assumption 2 is confirmed.

After the post-test stage, for the tenth grade, it can be stated that the general assumption is fully confirmed.

- **Research results in the retesting stage**
- **Ninth grade**

Upon analysing the scores recorded in *the knowledge and understanding skills* of pedagogical subjects for the experimental group, ninth grade, it is found that the values are close: 5.40 in the post-test compared to 5.21 in the retest stage. For this ability, there is a stability of acquisitions during the experimental formative approach. *Applicative and critical thinking skills*

have different values, in an upward direction: they have changed from 10.02 in the post-test stage to 10.13 in the retest stage.

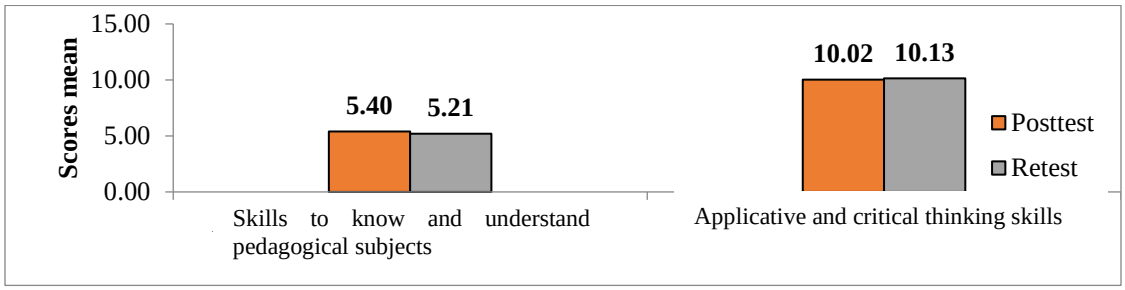

Figure No. 7. Comparative post-test - retest results, ninth grade, experimental group

Therefore, for the ninth grade, the skills built up during the intervention program proved stability: some remained at approximately equal value to the post-test stage, others strengthened, there was an increase in performance.

Confirmation of specific assumptions and general assumptions achieved after the post-test stage is maintained, with acquisitions proving their stability.

- **Tenth grade**

By examining comparatively the results obtained in the two stages of the research, post-test and retest, for the tenth grade, the experimental group, there is a preservation or enhancement of the performance recorded in the post-test stage. For *the knowledge and understanding skills*, 5.73 points were recorded in the post-test stage and 5.55 in the retest stage, a slightly lower score, but close to the score in the post-test stage. *Explanation and interpretation skills* recorded 3.42 points in the post-test stage and 3.36 in the retest stage, with a difference of 0.08 points. The score recorded in the post-test stage for *the applicative skills* was 6.73, and in the retest stage it was 7.11, recording a performance enhancement for this skill. *Critical thinking skills* had 3.19 points in the post-test stage and 3.21 points in the retest stage. Therefore, for this ability there is an increase in performance in the retest stage.

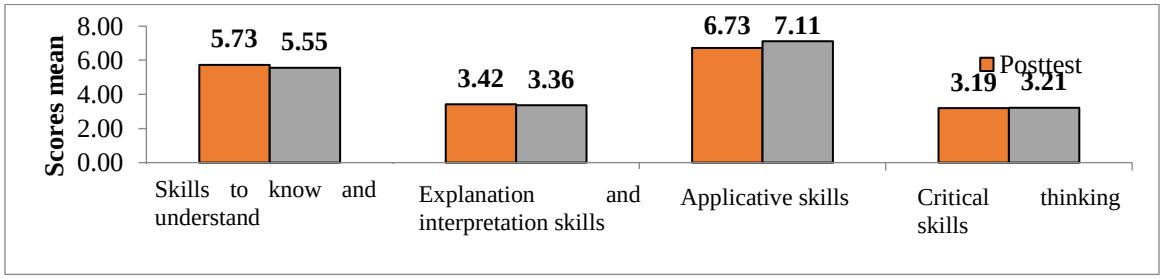

Figure No. 8. Comparative post-test - retest results, ninth grade, experimental group

This aspect underlines the consistency and stability of acquisitions under the intervention programme and found at the post-test stage.

- **Comparative analysis between experimental group and control group, retest stage**

The performance of tenth grade students, retest stage, in the two groups is different. For both the ninth and tenth grades in the retest phase, the experimental group scored higher than the control group for all skills tested.

In addition, the average scores in the retest stage are similar to those in the post-test, indicating a preservation and sedimentation over time of the complex skills built up during the formative intervention, with the help of literacy strategies.

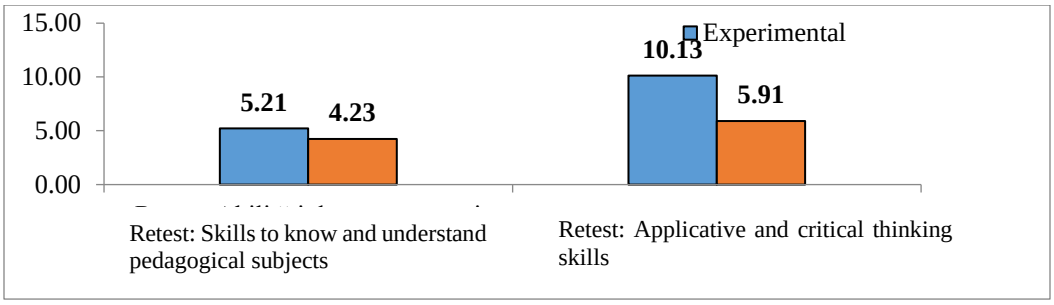

Figure No. 9. Comparison between grades means, ninth grade, retest, experimental group - control group

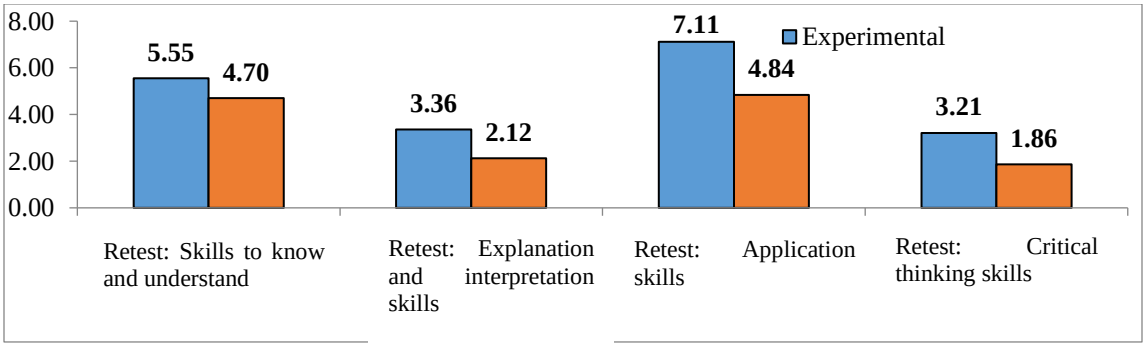

Figure No. 10. Comparison between results on components, tenth grade, retest, experimental group and control group

Simple, multiple and origin linear regression analysis

For the precise quantification of the link between the variables-construct, we estimated simple and multiple linear regression patterns. A regression basically explains how much of the behaviour of the dependent variable is explained by factors. We estimated one regression pattern per stage, for each of the two classes of students, separately, and where correlations allowed, we developed patterns on experimental groups.

CONCLUSIONS

The field of building the primary education teacher's professional competence was and is an area open to research since we are living a period with increased dynamism in all the life compartments. Therefore, there is a need for changes in the scope of education to help educational action actors cope successfully with contemporary demands.

Several steps have been taken in this thesis, from the theoretical definition of the key concepts of the research (competences and literacy) to the presentation of the results of an experimental research on the impact of the literacy strategies applied to pedagogical subjects in the teacher's activity carried out in the pedagogical high school students, in building up the primary education teacher's professional competence.

Investigative approach value

The value of the investigative approach results from the novelty of the teacher's approach to the pedagogical high school students: a modern approach, which aims to contribute both to building the primary education teacher's professional competence, as well as to the training and personal development of each student involved in the experimental approach.

Teachers' opinion was polled on the difficulties encountered by students in studying scientific texts and perception on the importance of using literacy strategies in teaching in order to make this activity more efficient, but also from the perspective of building up professional competence in pedagogical high school students.

Literacy strategies are valued in education systems worldwide as they are fundamental elements in creating well-functioning literacy adults. Therefore, structuring an intervention programme for pedagogical high school students on literacy strategies specific to scientific texts is both important and valuable for the pedagogical research.

The value of this research also results from the fact that the primary level teacher's professional competence was built in the high school students, Romania being among the few countries where the foundations for building this professional competence are established since the high school education. Building up the teacher's professional competence, in general, and of the primary education teacher, in particular, was addressed in research and specialised studies (Peacock, 2017, Potolea et al, 2017, Toma, 2013) and stating the competences specific to the teacher's profession (Chiș, 2005, Bocoș et al, 2017, Panişoara, 2017), but the level of the initial

training was addressed less, starting with the training of the students in the pedagogical high school.

Furthermore, the value of the experimental approach can be analysed in the light of the novelty of research tools, questionnaires and tests used in the pretest and post-test stages. Since this a new area of research, specific tools had to be built and validated.

The association of elements of literacy with elements specific to the teacher's professional competence is also an element of novelty. The skills specific to the primary education teacher's professional competence are mentioned in the curricular documents in our country (*Curricula for pedagogical and psychological subjects* – approved by Order of the Minister No. 4875/ November 6, 2002).

With all these specifications, research remains open, and the education system must cope successfully with the novelties in an era of major changes in all areas of activity.

Limits and difficulties of research

The investigative approach involved solving some difficulties, some being anticipated, others arising during the research activity. As such:

- There was a need for a good synchronisation of the activities carried out in the two schools (Cluj-Sibiu), in the activity of teaching staff teaching in the relevant classes, so the availability of teachers and the pace of teaching were factors requiring attention throughout the application of research tools;
- For the introduction of the independent variable, difficulties have been found both in terms of students' attitude, making it difficult to change their working style in class, to build up new skills;
- Structuring and summarising information or transferring information from one lesson to another or to and from different subjects were major difficulties in building a learning approach based on literacy strategies;
- Content samples, the complexity of scientific texts, difficult and diverse specialist vocabulary are elements requiring increased attention in the formative experiment phase;
- Design and validation of research instruments was a difficult issue. Several variables that statistically prevented this operation were discarded;

These issues are not intended to deny or diminish the value of the activities carried out but, on the contrary, underline the importance and need for rigour in an experimental approach.

Results

Upon reviewing the results obtained, it is found that the elements specific to the literacy (the ability to read a text, understand the text, make connections, substantiate, in writing or orally, a view on the text read, apply the information discovered in new contexts), contribute significantly to building the skills specific to the primary education teacher's professional competence (ability to know and understand, explain and interpret, critical thinking and applicative skills).

The general hypothesis and the two specific hypotheses were confirmed for all variables pursued in the investigative approach, in both ninth and tenth grade, for all skill categories analysed. Literacy-specific elements contribute significantly to building up the teacher's professional competence specific skills.

In students there was a development of the critical and creative analysis capacity of pedagogical concepts studied in scientific texts.

A structured programme has been proposed and followed, that can be applied in educational activity.

Literacy strategies for scientific texts have been valorised through a specific intervention programme for pedagogical subjects.

Building on the investigative approach

The results obtained from conducting the investigative approach carried out and presented can be built on in the long term by: training effective study skills in students through literacy strategies; transferring the learning skills built up to other school subjects; applying and grasping, in primary level students, through specialised practice activities carried out by pedagogical high school students, literacy strategies studied for the complex development of skills specific to professional competence.

The investigative approach can be harnessed in several directions. Some of these would be: applying the questionnaire addressed to students on larger samples; combining *disciplinary literacy* strategies with *content area literacy strategies* for other subjects in the Differentiated Curriculum in order to build key competences; extending literacy strategies to subjects in the core curriculum; building on the subject in an Erasmus project for exchanging experience in applying literacy strategies on scientific texts, but also for building the primary education teacher's professional competence .

The research topic is topical and useful, at the same time, to both students and teachers, by building study strategies that aim to improve the performance in the educational activity in order to build the primary education teacher's professional competence from the very initial training period.

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