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DOCTORAL SCHOOL *EDUCATION, REFLECTION, DEVELOPMENT*

Summary of Doctorate Thesis

Independent activities in the study of high school pedagogy. Strategic learning perspective

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Section 1. THEORETICAL FOUNDATIONS ON STUDENTS' INDEPENDENT ACTIVITY AND STRATEGIC LEARNING

KEY WORDS AND SYNTAGMAS:

- **independent activity**
- **personal / collective reflection**
- **cognitive reflection / metacognitive reflection**
- **strategic learning**
- **learning / strategic learning competence**
- **metacognitive strategies**
- **curriculum of pedagogical disciplines**
- **school performances.**

The Doctoral Thesis **Independent activities in the study of high school pedagogy. The strategic learning perspective** is structured into two broad sections.

The first section, entitled *Theoretical Foundations on Students' Independent Activity and Strategic Learning*, includes the argument and three chapters in which the independent activity is analyzed in the context of active and interactive pedagogy, strategic learning is evaluated, the strategic learning competence is presented in a curricular, legislative context at both national and European level. There is also a curricular analysis of the pedagogical subjects studied at the highschool level, at the specialty teacher educator.

The second section, *Presentation of the experimental research on the theme "Educational implications of an educational program focused on independent activities on the strategic learning competence and on students' performance in the study of pedagogical subjects in school"*, contains six chapters. This part is the most consistent part of the paper and the following are highlighted: the general coordinates of the research, each stage of the psycho-pedagogical experiment is analyzed, the results obtained at each stage and the conclusions are evaluated. In the conclusion section, the paper presents bibliographic resources and annexes.

The Argument presents the motivation for choosing the theme, the perspective of its approach, as well as the motivation for choosing the class and the school subject for which the educational program was developed.

Chapter I. - The Independent Activity of Students – its represantation in the context of active and interactive pedagogy - is centered on the terminological and methodological delimitations in approaching independent activities in the context of active and interactive pedagogy. It started from the analysis of the *concept of active and interactive pedagogy* as an aspiration and educational reality as compared to traditional pedagogy. The concept of independent activity was analyzed. Thus, in the *Practical Dictionary of Pedagogy, volume I,* (2016, pp. 38-39), ***the term "independent activity"*** has the following definition: "Intellectual or psychomotor activity, individual or collective, based on the personal efforts of learners who are not supported by the teacher. Independent activities can be individual or collective / cooperative / grouped (when the form of organizing student activity is grouped). ***Independent activities*** involve self-empowerment, self-information, self-organization, self-learning, self-monitoring, self-management, self-management of the activity. Independent activities can be organized in order to achieve different educational objectives, namely fundamental objectives: discovery, consolidation, consolidation, deepening, essentialization, exemplification, application, recapitulation of knowledge, skills and intellectual and / or practical skills".

It was insisted on the idea that the concept of ***independent activity*** is not synonymous with that of ***individual activity***. Thus, according to the *Practical Dictionaries of Pedagogy, vol. I* (M.-D. Bocos, (coord.), 2016, p. 39), *individual activity* can be independent (conducted in the absence of teacher guidance / support) / supported by the teacher, while the *independent activity* can be individual or collective / cooperative / in group (the form of organizing student activity is by groups). In both cases, it involves self-empowerment, self-information, self-organization, self-learning, self-monitoring, self-management, self-management of activity (M. Bocos, 2016). Methods of independent activity have been defined, emphasizing their role in lifelong learning.

The following methods have been analyzed and described: independent study with manual and other curricular resources, systematic and independent observation, active (personal) reading, referral, project, portfolio, learning with workbooks. Reflection has been analyzed as a human action and as a method. Particular attention was paid to personal reflection, as independent activities make use of cognitive and metacognitive personal reflection.

Chapter II. - Strategic learning and modeling of strategic learning competence

In this chapter a synthesis of the definitions and approaches regarding the concept of learning was made. In line with the research theme, *active, interactive and autonomous learning* has been analyzed. In relation to this concept, learning styles such as student-centered learning, self-regulated learning, self-directed learning, reflection-based learning, and problem-based learning have been addressed. Modes of conceptualization and operationalization of *strategic learning* have been approached. For Strategic Learning, the following personal / work definition was developed: ***"Strategic learning is the type of learning in which the learner conscientiously participates in the learning process, is responsible in the act of learning and controls its efforts towards building, using and promoting strategies, developing specific cognitive techniques and tools, he gains independence, discovers how to learn independently and efficiently. "*** A subchapter was devoted to the analysis of the strategic learning competence in a curricular, national and European legislative context.

Learning to learn is one of the 8 key competences set out in the Recommendation on key competences for lifelong learning, a recommendation that constitutes the European reference framework in the field, adopted on 18 December 2006 by the The European Parliament and the Council of the European Union. The list of key competences in the version issued by the European Commission specifies the following **8 key competences**: Communication in the mother tongue, Communication in foreign languages, Mathematics

and science, ICT, Interpersonal, Intercultural, social and civic competences, Entrepreneurship education, Sensitization to culture, Learning to learn. This last competence has a transversal character and can be formed in parallel with other competencies.

A subchapter was dedicated to analyzing metacognitive strategies for strategic learning. In the pedagogical sense, metacognition deepens, explains what is supposed as a principle in education: the student becomes a real subject of education, going beyond the initial phase of its subject. It is natural for *metacognition* to evolve in parallel with the strategies, the procedures used in the development of metacognition, in the sense that with their deployment, once they are used in the activity of stimulating knowledge, the learning process becomes stated, analyzed, appreciated, corrected, also the image and representation on skills, abilities, capacities are formed (E. Joita, 2002, p. 180).

Chapter III. - Curricular analysis of the pedagogic disciplines studied at highshcool level - starts with a critical analysis of the curriculum of the pedagogical disciplines. The curriculum of the pedagogical disciplines has been elaborated in accordance with the ideal of the Romanian education and it implies the observance of the principles of psychology of learning, as well as of the age and individual peculiarities of the pupils. The curriculum aims to provide a scientific and operational knowledge of concepts and acquisitions in the field of education sciences. Curricular analysis of the curriculum for the following disciplines: *Introduction to pedagogy and curriculum theory and methodology - 9th grade, teacher-educator specialization, Theory and practice of training and evaluation - 10th grade, teacher-educator specialization, Education theory and management class of pupils - 11th grade, teacher-educator specialization, innovative didactics - 12th grade, teacher-educator specialization.* The obtained data led to a **SWOT analysis** of the curriculum of pedagogical and psychological disciplines and of the School Programs for the pedagogical and psychological disciplines:

Table nr. 1.

STRENGHTS:	WEAKNESSES:
✚ the curriculum of psycho-pedagogical disciplines has been elaborated in accordance with the educational ideal of the Romanian school, observing the principles of psychology of learning, as well as the age and individual peculiarities of the pupils; ✚ the curriculum of psycho-pedagogical disciplines was built in accordance with the paradigms of	✚ inconsistencies between the framework plan and school curricula; ✚ the number of hours from pedagogical subjects is too low; ✚ lack of textbooks that have not been edited since 1994; ✚ overloading school programs (eg, classroom management) ✚ cumbersome concepts, a high level of abstraction of specific knowledge,

curricular reform - a comprehensive and extremely important segment of the educational reform; - the *curriculum of psycho-pedagogical disciplines* is centered on the formation of complex, varied and higher educational competencies; - recent development of curriculum auxiliaries for 9th and 10th grades; - the large variety of specialized literature.	which often exceeds students' understanding possibilities; - the large amount of knowledge required to be acquired in a short time; - the accent falls on the informative aspect of the teaching at the expense of the formative one; - lack of a global, unitary vision of pedagogical disciplines; - some subjects were unjustifiably removed from the curriculum (Pre-school Pedagogy).
OPPORTUNITIES:	THREATS:
- emphasizing the potential of pedagogical disciplines that could empower students to communicate, make decisions and manifest autonomy in thinking; - flexibility in addressing content, which may favor the creation of learning situations in lessons that foster the formation of critical thinking, interpretation and assessment skills; - collaborating with other teachers teaching the same subjects and other specialty in the interest of students and school; - designing differentiated, pupil-centered educational strategies tailored to their personality traits, their interests and training needs; - assessing the performance of each student in relation to the objectives of the curriculum; - the use of: oral, written, practical evidence, alternative assessment methods; - the use of metacognitions in the knowledge process.	- the emphasis on teaching falls on the informative aspect to the detriment of the formative one; - overuse; - mechanical, superficial learning; - low motivation for learning; - inadequacy of the information explosion; - lack of a global vision on pedagogical disciplines. - the pupils of the pedagogical profile do not support evidence in baccalaureate from the pedagogical disciplines.

Chapter IV. - General Research Coordinates - presents research issues and highlights the design of research, referring to: purpose, objectives, research stages, research timetable, questions, and hypothesis and research variables.

The aim of our research was to test the effectiveness of an educational program focusing on independent work systems that valorizes the individual and collective, cognitive and metacognitive reflection of pupils in pedagogical highschools, in the discipline of Student Class Management, in the following directions:

- development of strategic learning skills;

- improving school performance.

In line with the goal, the research aims at achieving the following **objectives:**

General objective

To develop and apply to the pupils of the pedagogical highschools, in the discipline of the Student Class Management, an educational program focused on independent activities systems that valorize their individual and collective, cognitive and metacognitive reflection.

In the teleological vision, the whole pedagogical research strategy was subordinated to objectives that have constructive and evaluative value in research and, at the same time, with formative valences for the researcher:

1. **From a theoretical point of view:**

- Identifying fundamental theoretical aspects of independent activities;
- Identifying fundamental theoretical aspects regarding the capitalization of independent activities in high school pedagogy study, capitalizing the perspective of strategic learning;

2. **From an applicative point of view:**

- To develop and apply an educational program focused on independent activities systems that valorize their individual and collective, cognitive and metacognitive reflection to the pupils of the pedagogical highschools, in the discipline of the Student Class Management.

Experimental research of the ameliorative type covered the following stages: (preexperimental, experimental-formative and post-experimental and retesting). We present the experimental research calendar:

Table nr. 2.

Stage	**Actions involved**	**Deadline**
Establishing stage Pre-experimental stage	- the analysis of the specialized literature and the theoretical foundation of the educational program focused on independent activities; - carrying out the research to diagnose the current situation in which they learn in the pedagogical disciplines (designing the questionnaires and applying them); - applying the pretest; - chosing the experimental and control classes.	School Year 2014-2015 (2nd semester)
Experimental stage	- the development of the	**School Year 2015-2016**

	experiment itself	
Post-experimental stage	✚ the quantitative and qualitative analysis of the data obtained from the application of the questionnaires and tests during the experimental approach.	**School Year 2016-2017**
Retesting stage	✚ quantitative and qualitative analysis of the data obtained after retesting.	**School Year 2017-2018 (1st semester)**

In making pedagogical research we have formulated the following **hypothesis of research:**

In the study of pedagogy, the application to pupils in the 11th grade with pedagogical profile, in the discipline of the Student Class Management, of a systemically designed educational program, focused on independent systems of pupils' activities, which explicitly valorizes the individual and collective, cognitive reflection and metacognitive, contributes to the shaping of strategic learning competence and improves their school performance.

The variables of the research, derived from the hypothesis, were:

Independent Research Variable (VI):

The educational program was applied on pupils in the 11th grade, pedagogical profile, and it focused on systems of independent activities in the subject Student class management.

Dependent Research Variables (VDs):

V.D.1. the degree of development of strategic learning competence;

V.D.2. level of school results at pedagogical disciplines.

The sample of subjects was made up of teachers teaching in high schools / colleges and 11th grade pupils study at pedagogical hichshools in the country.

In the research undertaken, we proposed the involvement of a total population of **84 students in the pedagogical experiment** and a number of **165 pupils within the observational stage.** The students involved were selected using the class samples, pre-existing samples based on age criteria and random factors. Both the pupils involved in the pedagogical experiment and those involved in the observational stage learn in the pedagogical profile and come from high schools / colleges from Cluj-Napoca, Tirgu Mures, Deva, Blaj, Oradea and Abrud.

The experimental and control samples had the following structure:

Table nr. 3.

Sample	Highschool / College	Number of students
Experimental sample	National Pedagogical College „Regina Maria", Deva	29
	Vocational Highschool „Mihai Eminescu", Tîrgu Mureş	28
	„Horea, Cloşca şi Crişan" Highschool, Abrud	27
Total		**84**
Control sample	National College „Inochenţie Micu Clain", Blaj	26
	National College „Iosif Vîlcan", Oradea	25
	National Pedagogical College „Gheorghe Lazăr",Cluj-Napoca	30
Total		**81**

The sample of teachers involved in the research is presented as follows:

Table nr. 4.

Stage	Highschool / College	Number of teachers
Establishing stage	National Pedagogical College „Gheorghe Lazăr", Cluj-Napoca	2
	National Pedagogical College „Regina Maria", Deva	33
	„Horea, Cloşca şi Crişan" Highschool, Abrud	30
	Vocational Highschool „Mihai Eminescu", Tîrgu Mureş	20
	National College „Dimitrie Ţichindeal", Arad	3
	Liceul de muzică „Tudor Jarda", Bistriţa	12
Total		**100**
Experimental stage	National Pedagogical College „Regina Maria", Deva	1
	Vocational Highschool „Mihai Eminescu", Tîrgu Mureş	1
	Pedagogical Highschool „Horea, Cloşca şi Crişan", Abrud	1
Total		**103**

The content sample capitalized in the research included curricular content for the discipline ***Student class management*** in accordance with the curricula for the pedagogical and psychological disciplines, the vocational branch, the pedagogical profile, the teacher-educator specialization approved by the Order of the Minister of Education and Research no. 4875 of 6.11.2002. We present the thematic content of the program as well as the suggested intellectual work methods / techniques to be used for each theme:

Table nr. 5.

Thematic content (Established according to the curriculum in place)	**Intellectual work methods / techniques that facilitate strategic learning**
1. Class management - conceptual	- Interactive Classification for Intelligence for

delimitations (planning, organization, coordination, control, evaluation, decision, intervention, crisis situation	Reading and Thinking (SINELG)
2. The basic behaviors of the teaching staff in the educational activity with the group of children / class of students	
3. Classroom and discipline management	- SQ3R technique (adaptation by I. Neacsu, 2015, p. 133)
4. Dimensions of classroom management: ergonomic, psychological, social, normative, operational, innovative	- ***Think Technique - Work in Pairs - Communicate*** (Steele, Meredith, Temple, 1998) - Conceptual Map (Adaptation by C.-L. Oprea, 2006, p. 265) - Cornell system for taking notes, but also for processing and synthesizing information (S. Bernat, 2003, pp. 155-158) - Technique S-V-I-V-C (I know - I want to know - I learned - I want to know more - How can I learn more?) (M.-D. Bocos, 2013) - Technique based on SPIR exercises (adaptation after I. Neacsu, 2015, p. 132) - Reading technique through the RICAR model (adaptation after I. Neacsu, 2015, p. 132)
5. Types of psychosocial climat	- Predictive-evaluative learning through the PORPE strategy (adaptation after I. Neacsu, 2015, p. 135)
6. Methods of knowledge of school micro-groups	- The SINELG (Interactive Classification for Reading and Thinking Efficiency)
7. Situations of educational crisis in the class of students	- The Text Writing Technique (LRT) (adaptation by I. Neacsu, 2015, p. 136).

The experimental research was based on a system of methods consisting of: psychopedagogical experiment, questionnaire survey, observation, study of learning activities, method of research of curricular documents and other school documents, pedagogical knowledge tests, methods, techniques and quantitative and qualitative mathematical and statistical interpretation tools.

We synthesized a synthesis of the research tools used, specifying their type, as well as the stage they were used, as follows:

Table nr. 6.

Research instruments	**Tool Type**	**Establishing stage**	**Pre-experimental stage**	**Experimental stage**	**Post-experimental stage**	
		Report / Observation stage	**Pretesting stage**	**Testing stage**	**Post-testing stage**	**Re-testing stage**

Online questionnaire addressed to teachers in pedagogical high schools on effective teaching	- own design	X				
Questionnaire addressed to students on effective teaching	- own design	X				
The Reflective Thinking Questionnaire (QRT) (translated and adapted after Kember et al., 2000)	- translated and adapted	X				
Questionnaire for Student Metacognition Measurement APENDIX B (Jr-MAI) (translated and adapted after Sperling, R. A., Howard, B.C., Miller, L.A., & Murphy, C. 2002)	- translated and adapted	X				
Inventory of Independent Learning A (AILI) (translated and adapted after Elshout-Mohr, M. M. van Daalen-Kapteijns and J. Meijer, 2004)	- translated and adapted	X				
Notebooks, theses, knowledge tests, worksheets, other		X				

creations and student products						
Catalogs, Framework Plan for Psycho-Pedagogical Disciplines School Programs for Pedagogical and Psychological Disciplines for 9th and 12th Schools		X				
Observation and self-observation grid	- own design			X		
Reflection journals	- own design			X		
Tests and tests written in pedagogy class	- own design		X	X	X	X

Here below a synthesis of the research methods and tools used in the research is presented:

Table nr. 7.

Research method	Research tool
Experiment	Research project
Survey based on questionnaire	Questionnaire addressed to teachers on effective teaching
	Questionnaire addressed to students on effective teaching
	The Reflective Thinking Questionnaire (QRT) (translated and adapted after Kember et al., 2000)
	The Reflective Thinking Questionnaire (QRT) (translated and adapted after Kember et al., 2000)
	Questionnaire for Student Metacognition Measurement APENDIX B (Jr-MAI) (translated and adapted after Sperling, R. A., Howard, B.C., Miller, L.A., & Murphy, C. 2002)
Inventory	Inventory of Independent Learning A (AILI) (translated and adapted after Elshout-Mohr, M. M. van Daalen-Kapteijns and J. Meijer, 2004)
Study of the products of the activity	Notebooks, theses, knowledge tests, worksheets, other creations and student products
Systematic observation	Observation and self-observation grid

	Reflection logs
Analysis of school and curriculum documents	Catalogs, Framework plan for psycho-pedagogical disciplines, School curricula for the 9th-12th grade
Tests and other written evaluation evidence	Written documents in pedagogy class
Statistical methods for collecting and interpreting data	SPSS Statistics 20 software.

Chapter V. - Concluding research on the efficient teaching of pedagogical disciplines in high schools aimed to investigate and characterize the existing situation in teaching and learning at pedagogical disciplines. **The objectives** pursued by the research findings were:

- identifying the opinion of pupils in the 11th grade, pedagogical profile, teacher-educator specialization and teaching staff teaching at pedagogical highschools regarding effective teaching related to class hours;
- establishing the level of awareness and use of independent learning by pupils of the 11th grade, pedagogical profile, teacher-educator specialization;
- identifying the level of use of reflective thinking by pupils in the study of pedagogical disciplines;
- identifying the level of capitalization of metacognitive competence in the home and class study of pupils of the 11th grade pedagogical profile.

Determining the internal consistency of the research tools was done using the Cronbach's Alpha coefficient, as follows:

Table nr. 8.

Scale (subscale)	Cronbach's Alpha	Items number
Questionnaire on effective teaching	0,785	10
Inventory of Independent Learning A - A (AILI)	0,669	45
Metacognitive Knowledge Subscale	0,719	13
Metacognitive abilities	0,709	13
Subclass Metacognitive attitudes	0,735	10
Reflective thinking questionnaire – *Habitual action*	0,707	4
Reflective thinking questionnaire – *Understanding*	0,798	4
Reflective thinking questionnaire – *Reflection*	0,873	4
Reflective thinking questionnaire – *Critical reflection*	0,791	4
Questionnaire for student metacognition measurement Appendix B (Jr-MAI)	0,760	18

The alpha validity coefficient indicated a good and very good level of fidelity for the tools used. The presentation of the results obtained from the statistical analysis of the adapted and translated questionnaires and applied to the pupils follows a linear trajectory,

from simple to complex, from general to particular, from descriptive analysis to the consistency of the tools used in research, statistical tests and correlations.

We present the obtained statistical data on students' opinions on effective teaching:

Table nr. 9.

QUESTIONS	**To a great extent**	**Largely**	**To a lesser extent**	**To a very small extent**	**Not at all**
1. To what extent do teachers clearly state the aims and objectives to be achieved during the course hours?	22 (13.3%)	**9 (55.8%)**	38 (23%)	12 (7.3%)	1 (0.6%)
2. To what extent do teachers demonstrate advanced discipline-related knowledge and use them to support you in learning?	47 (28.5%)	**101 (61.2%)**	17 (10.3%)		
3. To what extent do teachers use appropriate teaching strategies and techniques that encourage learning?	27 (16.1%)	**76 (46.1%)**	46 (27.9%)	15 (9.1%)	1 (0.6%)
4. To what extent do teachers have personal characteristics that engage, stimulate, encourage, and inspire you in your learning activities?	19 (11.5%)	**71 (43%)**	61 (37%)	13 (7.9%)	1 (0.6%)
5. To what extent do teachers periodically test your knowledge and adapt teaching strategies to help you further develop your thinking?	33 (20%)	**91 (55.2%)**	32 (19.4%)	7 (4.2%)	2 (1.2%)
6. To what extent do teachers encourage you to reflect and share what you have learned about a topic and how it relates to other new areas of knowledge?	17 (10.3%)	**86 (52.1%)**	43 (26.1%)	15 (9.1%)	4 (2.4%)
7. To what extent do teachers organize learning and assessment activities in a structured and coherent manner?	30 (18.2%)	**109 (66.1%)**	19 (11.5%)	7 (4.2%)	
8. To what extent do teachers effectively use the available learning environments (temperature, light, noise, etc.) to improve your learning experiences?	48 (29.1%)	**54 (32.7%)**	50 (30.3%)	11 (6.7%)	2 (1.2%)
9. To what extent do teachers use materials and teaching tools (videoprojector, worksheets, etc.) in an appropriate way that supports learning?	40 (24.2%)	**69 (41.8%)**	38 (23%)	17 (10.3%)	1 (0.6%)
10. To what extent do teachers demonstrate a scientific approach to teaching, seeking to improve their teaching performance?	25 (15.2%)	**84 (50.9%)**	48 (29.1%)	6 (3.6%)	2 (1.2%)
	308 (186.4%)	**750 (454.5%)**	392 (237.6%)	103 (62.4%)	14 (8.4%)

According to the results presented, there is a significantly increased frequency for the left options of the scale, options corresponding to the variants "to a large extent", respectively "to a great extent". For the questionnaire on students' views on effective teaching, all 10 questions were included in a single analysis, thus forming a single construct used in more complex analyzes.

Item 11 of the questionnaire was introduced to give students the opportunity to comment, give suggestions, and reflect on increasing the efficiency of teaching during classroom classes.

Table nr. 10.

What other comments / suggestions do you have about the effectiveness of teaching during class hours?	Absolute frequency	Percent	Percent validity	Cumulative percentage
No answer	**114**	69.1	69.1	69.1
Teachers use only traditional teaching methods	1	.6	.6	69.7
Strictly what is necessary	4	2.4	2.4	72.1
Teaching is correct	**8**	4.8	4.8	77.0
More ways to evaluate	2	1.2	1.2	78.2
Modern means and methods	**10**	6.1	6.1	84.2
Outline lesson with explanations	2	1.2	1.2	85.5
Teaching in a friendly language for students	3	1.8	1.8	87.3
Interactive teaching	**10**	6.1	6.1	93.3
Large amount of information	1	.6	.6	93.9
Teacher-student interaction much more open	3	1.8	1.8	95.8
Examples of concrete situations	3	1.8	1.8	97.6
More explanations	1	.6	.6	98.2
Respecting students' point of view	1	.6	.6	98.8
Interdisciplinary teaching	1	.6	.6	99.4
More repetitions	1	.6	.6	100.0
Total	165	100.0	100.0	

As an open question, the responses were grouped according to the central idea transmitted, so that the highest values of the absolute and relative frequencies were obtained by the "unanswered" variants with 114 references, the "interactive teaching" and the use of "means and modern methods "that record every 10 bids, and last but not least, support the statement of" correct teaching "with 8 recorded answers. All the other answers were mentioned by up to 4 people so we can not talk about statistically significant variants.

In the following table, some descriptive elements, such as average, standard deviation, and standard error from the average in the case of effective teaching can be traced, in the students' opinion.

Table nr. 11.

Descriptive statistics					
Group		N	Average	Standard deviation	Std. Error Mean
Efficient teaching	Experimental group	84	22.42	4.795	.523
	Control group	81	21.59	4.847	.539

We present the results of the questionnaire that analyzes teaching from the point of view of teachers. This questionnaire was published on www.sondaje.ro, giving teachers the opportunity to respond online.

We present the absolute and relative frequencies reported to teachers' answers:

Table nr. 12.

Descriptive statistics						
	Validated data					
		Absolute frequency	Largely	In less extent	In small extent	Not at all
1) In your opinion, efficient teaching implies a clear indication of the goals and objectives to be achieved during the course hours	Frequency	64	30		1	3
	Percent	64.0	30.0	2.0	1.0	3-0
2) In teaching, use appropriate teaching strategies and techniques that encourage learning	Frequency	57	36	4	1	2
	Percent	57.0	36.0	4.0	1.0	2.0
3) Engage, stimulate, encourage learners in learning activities	Frequency	71	26	2		1
	Percent	71.0	26,0	2,0		1.0
4) Use independent activities to promote student learning	Frequency	44	41	14	1	
	Percent	44.0	41.0	14.0	1.0	
5) Periodically test students' knowledge and adapt / adopt teaching strategies to help them further develop their thinking	Frequency	47	44	7	1	1
	Percent	47,.	44.0	7,0	1.0	1.0
6) Encourage students to reflect and share what they have learned about a topic and how they relate to other new areas of knowledge	Frequency	49	41	8	1	1
	Percent	49.0	41.0	8.0	1.0	1.0
7) Organize learning and evaluation activities in a structured and coherent manner	Frequency	53	40	6		1
	Percent	53.0	40.0	6.0		1.0
8) Effectively use the available learning environment (temperature, light, noise level, etc.) to improve students' learning experiences	Frequency	3	48	8		1
	Percent	43.0	48.0	8.0		1.0
9) Use materials and teaching tools (videoprojector, worksheets, etc.) in an appropriate way that supports learning	Frequency	5	39	8	2	
	Percent	51,0	39,0	8,0	2,0	
10) Try to improve your performance in teaching at all times	Frequency	72	24	4		
	Percent	72.0	24.0	4.0		

Taking into account the absolute and relative frequencies presented in the previous table, 8 out of the 10 questions record the highest values obtained by the "very much"

option, and the other two statements record values offered by the "largely" option. In other words, the two options located on the left side of the scale record the highest values.

Depending on the answers of the teachers participating in the study, we have drawn up a ranking of the effective teaching characteristics. Thus, the most important in the opinion of the teachers were the continuous improvement of the teaching performance; engaging, stimulating, and encouraging students in learning activities, as well as clearly stating goals and objectives to be achieved during classroom sessions

Less important than previously announced were: effective use of the learning environment's available features (temperature, light, noise level, etc.) to improve students' learning experiences; using independent activities to foster student learning and encouraging students to reflect on and share what they have learned about a subject and how it relates to other new areas of knowledge.

We wanted to find out whether a statistically significant relationship can be established between the variable length of service and the variable use of materials and teaching aids. Thus, according to the research methodology, because p = 0.004 <0.05, the research hypothesis is accepted according to which there are statistically significant relationships between the two variables: length of service and use of materials and teaching aids. Under these circumstances, teachers with longer average work experience (38.5 years) use to a small extent materials and teaching aids to support learning, while staff with a lower average age (18 years) use video projector, by adapting and interacting with students.

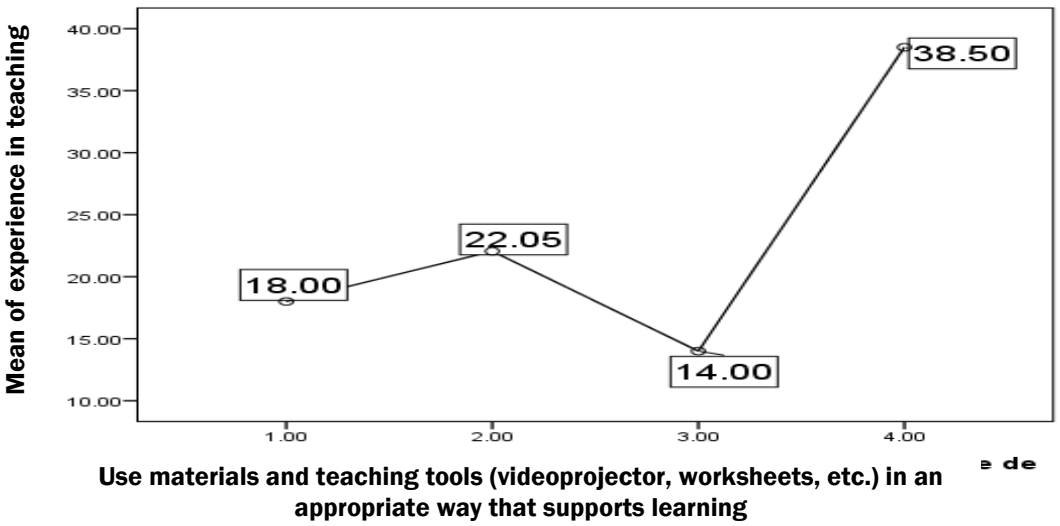

Figure nr. 1 Influence of teachers' seniority on the use of materials and teaching materials

We also wanted to find out if a statistically significant relationship can be established between the age variable and the variable use of teaching materials and resources. Because p = 0.012 <0.05, there is a confirmation of the hypothesis that the age of the respondents directly influences the mode and frequency of use of materials and teaching aids. Thus, those under the age of 45 are more open to using new technologies than teachers with an average age of 60.5 years who are more reluctant and less clumsy with more advanced technological equipment.

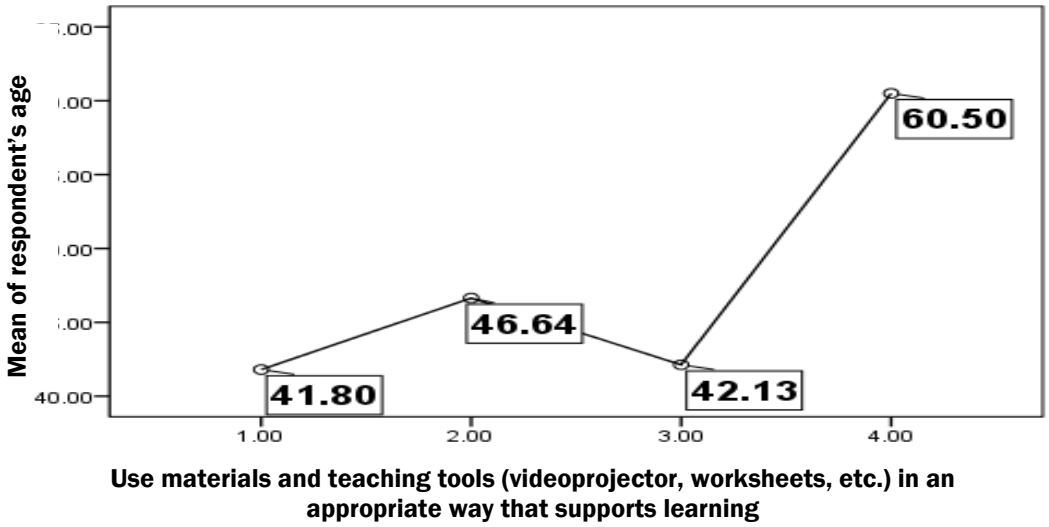

Figure nr. 2*: Influence of teacher's age on the materials and teaching materials used*

Using the Spearman rho coefficient, we made a series of correlations between the answers received to the items of the questionnaire addressed to the teachers, which we summarize in the following table:

Table nr. 13.

Correlations											
		1		3	4	5	6	7	8	9	10
Spearman's rho	1	1.000	**.257****	.177	**.275****	**.353****	**.206***	**.286****	.135	.137	**.219***
	2		1.000	**.461****	.071	**.199***	**.205***	**.304****	.126	**.245***	**.267****
	3			1.000	**.255***	**.335****	**.297****	**.412****	**.380****	**.309****	.163
	4				1.000	**.270****	.106	.155	**.244***	.091	.169
	5					1.000	.150	**.507****	**.398****	.185	**.261****
	6						1.000	**.233***	**.211***	.179	.148
	7							1.000	**.325****	**.222***	**.341****
	8								1.000	**.331****	.116
	9									1.000	**.221***
	10										1.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

According to the correlations presented above, a statistic relationship to the significance threshold of 0.001, 0.01 and 0.05 respectively is observed at the values mentioned with ***, **, *.

The way in which a variable influences the other will be presented below.

Teachers who clearly state the purpose and objectives of a lesson use teaching strategies and techniques that encourage learning (p = 0.257).

Teachers using teaching strategies and techniques appropriate to learning encouragement are oriented towards hiring, stimulating and encouraging students in pedagogical activities (p = 0.461).

Teachers utilizing independent learning activities clearly state the goals and objectives for which they are learning (p = 0.275) and also engage, stimulate and encourage learners in learning (p = 0.255).

Periodic testing of pupils' knowledge to adapt the teaching strategies used by teachers is based on a clear indication of the goals and objectives proposed (p = 0.353), the use of appropriate teaching strategies and techniques (p = 0.199), the employment, stimulating and encouraging pupils in learning activities (p = 0.335), but also on the use of independent activities to encourage the pedagogical process (p = 0.270).

Teachers encouraging students to reflect on and share new knowledge clearly outline the goals and objectives of the lessons (p = 0.206), use appropriate teaching strategies and techniques (p = 0.205) and also engage, stimulate and encourage learners in learning activities = 0.297).

Teachers who organize learning and assessment activities in a structured manner clearly specify goals and objectives of lessons (p = 0.286), use appropriate teaching strategies and techniques (p = 0.304), employ, stimulate and encourage students in learning activities (p = 0.412), periodically test pupils' knowledge to adapt their teaching strategies (p = 0.507) and encourage students to share their experiences and knowledge with other students (p = 0.233).

Teachers use effectively the available learning environments, engage, stimulate and encourage students in learning activities (p = 0.380), use independent activities to foster student learning (p = 0.244), periodically test students' knowledge and adapt teaching strategies (p = 0.398), encourage pupils to reflect and share the lessons learned on a particular topic (p = 0.211) and also organize learning and evaluation activities in a structured and coherent manner (p = 0.325).

Teachers using materials and teaching to support the learning process (p = 0.245), use appropriate teaching strategies and techniques, engage, stimulate, encourage learners in

learning activities (p = 0.309), organize learning activities and assessment in a structured and coherent manner (p = 0.222), but at the same time they effectively use the available learning environment features (p = 0.331).

Teachers seeking to improve their teaching performance clearly set goals and objectives (p = 0.219), use learning strategies and techniques that encourage learning (p = 0.267), periodically test students' knowledge and adapt teaching strategies (p = 0.261), organize learning and evaluation activities in a structured and coherent manner (p = 0.341) and use materials and teaching resources in a way to stimulate learning (p = 0.221).

When we applied the questionnaire on the Inventory of Independent Learning Awareness out of the total of 45 questions, 3 subscales were formed: **metacognitive knowledge** composed of 13 questions, **metacognitive abilities** with 13 questions and **metacognitive attitudes** with 10 questions. The choice of the questions included in each subscale was made by resembling the main ideas, including the questions containing the negation.

The absolute and relative frequencies of *cognitive knowledge* are synthesized as follows:

Table nr. 14.

AFIRMATIONS	**Not true at all**	**Mostly false**	**More false than true**	**Neutral / I do not know**	**More true than false**	**Mostly true**	**Very true**
1. I know what kind of learning tasks are required for students to work really systematically.		5 (3%)	14 (8.5%)	22 (13.3%)	**40 (24.2%)**	**68 (41.2%)**	16 (9.7 %)
2. I think it takes conscious effort to work systematically when you study.		1 (0.6%)	2 .2%)	4 (2.4%)	**17 (10.3%)**	6 (38.8%)	**77 (46.7 %)**
11. I do not think it is necessary to make a conscious effort to understand when studying.	**96 (58.2%)**	**38 (23%)**	12 (7.3%)	6 (3.6%	8 (4.8%)	4 (2.4%)	1 (0.6 %)
13. When colleagues find it difficult to understand the material to be studied, I know how to solve this.	9 (5.5%)	9 (5.5%)	21 (12.7%)	30 (18.2%)	**49 (29.2%)**	**34 (20.6%)**	13 (7.9 %)
16. I think it is important to have personal goals on learning tasks.	4 (2.4%)	1 (0.6%)	5 (3%)	11 (6.7%)	31 (18%)	**55 (33.3%)**	**58 (35.2 %)**

21. When cooperation between colleagues proves to be unproductive, I do not know other ways to solve this situation.	27 (16.4%)	**47 (28.5%)**	**31 (18.8%)**	28 (17%)	22 (13.3%)	8 (4.8%)	2 (1.2%)
23. I can not appreciate if a study material will attract students.	**43 (26.1%)**	**39 (23.6%)**	20 (12.1%)	32 (19.4%)	21 (12.7%)	8 (4.8%)	2 (1.2%)
27. I can not appreciate from a material how much effort will it take to colleagues to understand it.	**25 (15.2%)**	**40 (24.2)**	23 (13.9%)	4 (20.6%)	17 (10.3%)	20 (12.1%)	6 (3.6%)
30. I think it is important for students to learn from each other while studying.	4 (2.4%)	7 (4.2%)	6 (3.6%)	3 (1 8%)	13 (7. %)	**49 (29.7%)**	**83 (50.3%)**
32. I know different ways in which colleagues can increase their chances of getting involved in the material to be studied.	2 (1.2%)	7 (4.2%)	21 (12.7%)	36 (21.8%)	**49 (29.7%)**	**3 (20.6%)**	16 (9.7%)
37. When colleagues do not work systematically, they do not know other ways to resolve this situation.	**27 (16.4%)**	**38 (23%)**	25 (15.2%)	31 (18.8%)	24 (14.5%)	14 (8.5%)	6 (3.6%)
40. I can appreciate if a task corresponds to students' learning objectives.	3 (1.8%)	5 (3%)	9 (5.5%)	22 (13.3%)	**46 (27.9%)**	**56 (33.9%)**	24 (14.5%)
45. I know what kinds of learning tasks are required for students to learn more from colleagues through cooperative work.	3 (1.8%)	11 (6.7%)	21 (12.7%)	**43 (26.1%)**	36 (21.8%)	**37 (22.4%)**	14 (8.5%)
	243 (147.4%)	248 (150.1%)	210 (127.2%)	302 (183%)	**373 (225.4%)**	**451 (273.1%)**	318 (192.7%)

On an evaluation of the 13 questions, the higher absolute and relative frequency results are placed on the right-hand side of the positive and left-hand scale for negative affirmations. Because from the 13 questions we have built a construct that we will later use

in complex analyzes, we refered to absolute frequencies, so that the highest values 451 (273.1%) and 373 (225.4) respectively were recorded by the options "in much true "or" more true than false ", which means that much of the answers provided by the students have been found in these options. The results obtained from the analysis entitle us to affirm that the questioned students have pedagogical knowledge about cognitive tasks and strategic pedagogical knowledge about how knowledge becomes effective.

Absolute and relative frequencies on *metacognitive abilities* are synthesized as follows:

Table nr. 15.

AFIRMATIONS	**Not true at all**	**Mostly false**	**More false than true**	**Neutral/I do not know**	**More true than false**	**Mostly true**	**Very true**
6. When I solve a learning task, I pay attention to solving all its parts.		4 (2.4%)	8 (4.8%)	11 (6.7%	32 (19.4 %)	**63 (38.2%)**	**47 (2.5%)**
7. While solving a learning task, I take into account my learning objectives.	1 (0.6%)	6 (3.6%)	16 (9.7%	9 (5.5%)	**40 (24.2 %)**	**69 (41.8%)**	24 (14.5%)
8. When I have finished a workload, I do not check whether I worked systematically enough.	27 (16.4%)	**48 (29.1%)**	**28 (17%)**	11 (6.7%)	23 (13.9 %)	18 (10.9%)	10 (6.1%)
17. When I deal with other colleagues with a learning task, I do not think if cooperation was useful to me.	**35 (21.2%)**	**37 (22.4%)**	21 (2.7%)	25 (15.2%)	1 (10.9 %)	14 (8.5%)	15 (9.1%)
20. When studying information, I do not pay too much attention to how well I understand them.	**56 (33.9%)**	**37 (22.4%)**	20 (12.1%)	8 (4.8%)	17 (10.3 %)	18 (10.9%)	9 (5.5%)

22. When I start studying, I first wonder why I will need to study it completely.	5 (3%)	13 (7.9%)	11 (6.7%)	17 (10.3%)	8 (17%)	**56 (33.9%)**	**35 (21.2%)**
24. When working with other colleagues, I regularly think about what I learn from them.	10 (61%)	22 (13.3%)	21 (12.7%)	21 (12.7%)	**52 (31.5 %)**	**29 (17.6%)**	10 (6.1%)
25. Before I start a task, I do not have a clear idea of what I want to learn from it.	17 (10.3%)	**34 (20.6%)**	23 (13.9%)	19 (11.5%)	**41 (24.8 %)**	20 (12.1%)	11 (0.7%)
29. When I have finished a learning task, I do not consider the usefulness of solving it for me.	**53 (32.1%)**	**35 (21.2%)**	21 (12.7%)	26 (15.8%)	21 (12.7 %)	7 (4.2%)	2 (1.2%)
33. Before starting a learning task, I do not wonder if I will learn more from it working with my other colleagues.	27 (16.4%)	**32 (19.4%)**	**34 (20.6%)**	21 (12.7%)	25 (15.2)	20 (12.1%)	6 (3.6%)
41. When I have finished the information to be studied, I check whether I have dealt with them sufficiently and in depth.	4 (2.4%)	8 (4.8%)	16 (9.7%)	15 (9.1%)	29 (17.6 %)	**59 (35.8%)**	**34 (20.6%)**
42. When I studied the compulsory material, I wonder if my interest was awakening.	6 (3.6%)	14 (8.5%)	13 (7.9%)	8 (4.8%)	**49 (29.7 %)**	**52 (31.5%)**	23 (1 .9%)
43. When I have to study information, I try to find out what I find interesting about	5 (3%)	6 (3.6%)	6 (3.6%)	16 (9.7%)	**47 (28.5)**	**50 (30.3%)**	35 (21.2%)

them.							
	246 149%	296 179.2%	238 144.1%	207 125.5%	**422 255.7 %**	**475 287.8%**	261 152.1%

The absolute and relative frequencies that record high values correspond to the "more true than false" or "mostly true" options for positive and "largely false" or "more false" than "true" options for negative affirmations. The results for the entire construct of the 13 questions focus on two "more true than false" or "mostly true" options, with scores of 422 and 475 points respectively. Analyzing the data we can conclude that the questioned students are able to describe how they learn, identify the key activities that are essential for learning. Metacognitive skills enable students to adjust their thinking and become independent in learning, which can improve their learning experiences at school and in life.

Absolute and relative frequencies on *metacognitive attitudes* have been synthesized as follows:

Table nr.16.

AFIRMATIONS	**Not true at all**	**Mostly false**	**More false than true**	**Neutral / I do not know**	**More true than false**	**Mostly true**	**Very true**
5. Ignore feedback from teachers about how I work.	**89 (53.9%)**	**35 (21.2%)**	19 (11.5%)	4 (2.4%)	9 (5.75%)	5 (5.5%)	4 (2.4%)
15. If I consider a task as unnecessary, I try to find out why this happens.		3 (1.8%)	2 (1.2%)	3 (1.8%)	29 (17.6%)	**96 (58.2%)**	**32 (19.4%)**
26. I think feedback on my learning goals is useless.	**79 (47.9%)**	**28 (17%)**	15 (9.1%)	22 (13.3%)	(4.8%)	7 (4.2%)	6 (3.6%)
28. I see no reason to talk to other colleagues about the usefulness of collaborative work in our studies.	**58 (35.2%)**	**44 (26%)**	20 (12.1%)	19 (11.5%)	13 (7.9%)	7 (4.2%)	4 (2 4%)
31. When my personal involvement in the study material is to be questioned, I think about it.	6 (3.6%)	6 (3.6%	7 (4.2%)	21 (12.7%)	33 (20%)	**57 (34.5%)**	**35 (21.2%)**

35. I do not care why I have an aversion to some of the materials to be studied.	**40 (24.2%)**	**37 (22.4%)**	24 (14.5%)	38 (23%)	18 (10%)	4 (2.4%)	4 (2.4%)
36. When I can not establish any organization in a learning task, I try to find out why this happens.	7 (4.2%)	15 (9.1%)	22 (13.3%)	8 (4.8%)	**39 (23.6%)**	**42 (25.5%)**	32 (19.4%)
38. If I find the information difficult to understand, I do not try to find a deeper reason for doing so.	**46 (27.9%)**	**38 (23%)**	27 (1 .4%)	14 (8. %)	21 (12.7%)	13 (7.9%)	6 (3.6%)
39. I think it is useful to talk to other colleagues about how to understand the materials given to be studied.	5 (3%)	7 (4.2%)	8 (4.8%)	13 (7.9%)	31 (18. %)	**51 (30.9%)**	**50 (30.3%)**
44. Before I start a workload, I do not think about how I will organize it.	**38 (23%)**	**32 (19.4%)**	23 (13.9%)	15 (9.1%)	19 (11.5%)	19 (11.5%)	19 (11.5%)
	368 (222.9 %)	245 (148.4%)	167 (101%)	57 (95%)	22 (133.3%)	**301 (184.8 %)**	192 (116.2%)

If in *metacognitive knowledge and skills* most of the frequencies were placed on the right side of the scale, in *metacognitive attitudes* most statements are formulated in a negative sense, which means that the higher scores will be found on the left side of the scale. For the entire construct, the highest result 368 is recorded by the "no true" option, followed by the "largely true" option with the 301 score.

The analysis of the metacognitive attitudes of students entitles us to affirm that students have the predisposition to learn how to learn, that they have the motivation and confidence to continue and succeed in learning, that they have the ability to support their own learning process. Students are willing to work collectively, they show the desire to capitalize on learning experiences and to apply acquisitions in different ways within hours and other life situations.

As far as the independent learning and its subscales are concerned, we have focused on the following statistical data:

Table nr. 17.

Group Statistics					
Group		N	Average	Standard deviation	Standard error
Independent learning	**Experimental group**	**84**	**5.2730**	.60300	.06579
	Control group	81	4.9888	.56792	.06310
Metacognitive knowledge	**Experimental group**	**84**	**5.2958**	.75000	.08212
	Control group	81	5.1538	.65056	.07228
Metacognitive abilities	**Experimental group**	**84**	**5.1896**	.75255	.08647
	Control group	81	4.7293	.79301	.08811
Metacognitive attitudes	**Experimental group**	**84**	**5.4738**	.75236	.08209
	Control group	1	5.1815	.76110	.08457

The average response rate for the entire research tool for the experimental group is 5.27, which means that the most frequent answers were composed of the option "more true than false" or "largely true", whereas for the group the media control is 4.98, the majority of the response being "more true than false," some of which being identified with the "more false than true" option.

In the case of the three subscales, for the experimental group the value of the recorded media is above 5, while for the control group the average value also reaches 4.72. For both the experimental group and the control group, metacognitive skills are less developed in relation to metacognitive knowledge and attitudes.

We can conclude that the students have metacognitive knowledge, they exhibit metacognitive attitudes, but it is necessary to create situations that allow students to practice their metacognitive skills.

In order to determine the relationships between the different variables studied in this research *(metacognitive knowledge, metacognitive abilities and metacognitive attitudes),* we verified the normality of the distribution of these variables.

For this we used the Kolmogorov-Smirnov and Shapiro-Wilk tests. Since the analyzed sample has only 84 subjects, the Shapiro-Wilk test is more suitable for analyzing the distribution normality, so I read the results obtained from this test from the following table.

If the significance level p is less than 0.05 we can say that those variables are not normally distributed. The values were thus synthesized:

Table nr. 18.

Testing the distribution normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Value	Df	P	Value	Df	P
Metacognitive knowledge	,075	165	,026	,979	165	,013
Metacognitive abilities	,064	165	,095	,985	165	,063
Metacognitive attitudes	,063	165	,200*	,979	165	,012

In order to determine the relationship between *metacognitive knowledge*, *metacognitive abilities and metacognitive attitudes*, we used the Spearman correlation coefficient, since, as we have seen from the analysis of normality of the distribution of variables, all conditions for using the Pearson correlation coefficient are not met.

To measure the relationship between the above variables we started from two hypotheses, namely:

Hypothesis H0: There is no significant relationship between the variables

Hypothesis H1: There is a significant link between the variables

Bivariate correlation analysis based on the Spearman correlation coefficient revealed the presence of statistically significant positive correlations between the three medium and high intensity variables.

A high level of any variable is accompanied by a high level of other variables.

Table nr. 19.

Corelations

			Metacognitive knowledge	Metacognitive abilities	Metacognitive attitudes
Spearman's rho	Metacognitive knowledge	Coefficient of correlation	1,000	,586**	,562**
		Significance threshold p		,000	,000
		N	165	165	165
	Metacognitive abilities	Coefficient of correlation		1,000	,721**
		Significance threshold p			,000
		N		165	165

	Metacognitive attitudes	Coefficient of correlation			1000
		Significance threshold p			.
		N			165
**. Corelation is significant for a threshold of 0,01					

Based on the results obtained, the following correlations were determined, at a significance threshold of 99%:

• Metacognitive knowledge and abilities, respectively metacognitive attitudes, are statistically significant, positive and directly proportional (p = 0.586 and 0.562 respectively). Thus, if the value of metacognitive knowledge grows, metacognitive abilities and metacognitive attitudes will also increase.

• There is a positive, direct and statistically significant relationship between metacognitive abilities and metacognitive attitudes, an increase in the value of one variable automatically leads to the growth of the other variable.

We have concluded that: Metacognitive training can improve students' attitudes to school tasks and perhaps even to school. The development of metacognitive knowledge and skills is the result of the learner's activity. An important role is played by teachers who should encourage metacognition, to be concerned about establishing a metacognitive training environment to act as a model for metacognitive behavior in students; of the deliberate formation of metacognitive strategies.

For a detailed and complex statistical analysis, the Reflective Thinking Questionnaire was divided into four subscales: *Habitual action, Understanding, Reflection, and Critical Reflection (Common Action, Understanding, Reflection, Critical Reflection),* each of which had 4 questions, ideas that had ideas like centers, selection and inclusion in the four constructs is presented in the following table:

Table nr. 20.

	AFIRMATIONS	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Habitual action	1. When I'm working on some learning tasks, I can do it without thinking about what I'm doing.	78 (47%)	**266 (161%)**	**158 (96%)**	124 (75%)	34 (21%)
	5. In pedagogy class, we solve learning tasks so many times that I started to realize them without thinking.					
	9. As long as I remember the matter for the evaluation tests, I do not have to think too much.					

	13. If I respect what teachers say, I should not think too much about themes.					
Understanding	2. Pedagogical disciplines require us to understand the concepts taught by the teacher. 6. To promote pedagogy I need to understand their content. 10. I need to understand the content taught by the teacher to accomplish my practical tasks. 14. In these disciplines, I must continually think about the matter taught to me.	**221 (134%)**	**325 (197%)**	74 (45%)	34 (21%)	6 (4%)
Reflection	3. Sometimes I wonder if other colleagues do the learning task and try to think of a better way to solve it.. 7. I like to reflect on what I have done and to think about alternative ways of solving it. 11. I often reflect on my actions to see if I can improve what I've done. 15. I often reassess my experience in such a way that I can learn from it and improve my performance.	**142 (86%)**	**333 (202%)**	129 (78%)	50 (30%)	6 (4%)
Critical reflection	4. As a result of these disciplines, I have changed my way of perceiving myself. 8. Pedagogy has changed some of my firmly held ideas. 12. As a result of this discipline, I changed my usual way of fulfilling my work tasks. 16. During these hours, I discovered mistakes in what I previously believed to be right.8. Pedagogia mi-a schimbat unele dintre ideile mele ferm deținute.	**150 (90.9%)**	**298 (180.7%)**	121 (137%)	8 (47.3%)	13 (7. %)

By analyzing the absolute frequencies obtained in the four constructs, we can see large and representative values for three of them, namely Understanding, Reflection and Critical Reflection, these being the "strong agreement" and "agreement" options. Only with the Habitual action construct the answers provided by students focus more on the options "agreement" and "undecided".

The descriptive statistical data on metacognition, as well as the four subchannels of the Reflective Thinking Questionnaire, I synthesized as follows:

Table nr. 21.

Group Statistics					
	Group	N	Average	Standard deviation	Standard error
Metacognition	Experimental group	84	69.45	7.270	.789
	Control group	81	68.32	8.350	.928
Habitual action	Experimental group	84	10.60	2.556	.279
	Control group	81	10.60	2.079	.244
Understanding	Experimental group	84	7.40	1.837	.200
	Control group	81	7.86	1.998	.222
Reflection	Experimental group	84	8.33	2.325	.254
	Control group	81	8.95	2.247	.250
Critical reflection	Experimental group	84	8.61	3.139	.343
	Control group	81	9.42	3.049	.339

Regarding the answers to the metacognition questionnaire, a minor difference was observed between the experimental group, 69.45 and the control group, 68.32, due to the different number of students enrolled in the study.

With respect to the four constructs of the reflection questionnaire, the highest value of 10.60 is recorded in the habitual action construct, followed by "critical reflection" with an average value above 8.61, the construct " reflection "with an average of over 8.30 and" understanding "that does not exceed the value of 7.86.

In other words, during the pedagogy classes, most students have said they are acting out of their habit. In terms of reflective thinking or reflection, fewer students mentioned that they are thinking about, or reflecting on their actions, before putting them into practice. Regarding the understanding of pedagogical concepts, the pupils underlined the difficulties and the weight of the full understanding of certain concepts specific to the pedagogical disciplines.

We checked the normality of the distribution of *habitual action, understanding, reflection and critical reflection variables* that we present in the following table:

Table nr. 22.

Testing the normality distribution

	Kolmogorov -Smirnov			Shapiro-Walk		
	Value	Df	P	Value	Df	p
Habitual action	,095	165	,001	,977	165	,008
Understanding	,200	165	,000	,927	165	,000
Reflection	,116	165	,000	,967	165	,001
Critical reflection	,136	165	,000	,954	165	,000

Since the significance level p is in all cases less than 0.05, we can say that these variables are not normally distributed. In this case, the next step is to identify the presence of correlations between the constructions of the Reflective Thinking Questionnaire.

Table nr. 23.

Corelations						
			Habitual action	Understanding	Reflection	Critical reflection
Spearman's rho	Habitual action	Correlation coefficient	1,000	,026	,140	,344**
		Significance treshold p	.	,742	,073	,000
		N	165	165	165	165
	Understanding	Correlation coefficient		1,000	,372**	,290**
		Significance treshold		.	,000	,000
		N		165	165	165
	Reflection	Correlation coefficient			1,000	,426**
		Significance treshold			.	,000
		N			165	165
	Critical reflection	Correlation coefficient				1,000
		Significance treshold				
		N				165
**. Corelation is significant for a threshold of 0,01						

The presence of positive and statistically significant correlations between *critical reflection* on the one hand and *habitual action* (rho = 0.344, n = 165, p <0.001), *understanding* (rho = 0.290, n = 165, p <0.001) *reflection* (rho = 0.426, n = 165, p <0.001), on the other hand.

Therefore, as the *critical reflection* increases, higher values of *habitual action, understanding and reflection* are found.

Also, a positive correlation of moderate intensity is found between *understanding and reflection* (rho = 0.372, n = 165, p <0.001).

Regarding the relations between habitual action, on the one hand, and *understanding and reflection*, on the other hand, there are no statistically significant correlations between them.

The purpose of the pre-experimental stage of the research was to identify, within both the experimental and the control sample, the initial level of knowledge, the analytical, synthesis and argumentation capacities.

In relation to this goal, the pre-experimental stage aimed at both the experimental and the control sample the following **objectives:**

- identifying the initial level of the theoretical and practical knowledge accumulated in the pedagogical disciplines;
- Identifying skill levels:

  - knowledge and understanding of the notions specific to the pedagogical disciplines studied during the first semester of the XIth grade and in the 9th and 10th grades;

  - explaining and interpreting the theoretical and practical contents of the pedagogical disciplines studied during the first semester of the XIth grade and in the 9th and 10th grades.

In order to track the purpose and objectives of the pre-experimental stage, the test method was used both in the experimental group and the control group.

In developing the initial test, which includes objective, semi-objective and subjective items, I chose the content that is studied in the 9th, 10th and 10th grades at the Introduction to Pedagogy and Curriculum Theory and Methodology, Theory and Practice of Training evaluation and education theory. The pretest has helped us to determine the composition of the two samples (experimental and control) that we will work with during the research.

The descriptive statistical analyzes for the answers provided by the pupils in the initial testing stage were summarized as follows:

Table nr. 24.

Descriptive statistics			
Initial test note			
Experimental sample	N	Validated data	84
		Missing data	0
	Average		4,2119
	Median		4,1000
	Module (modal value)		4,1
	Standard deviation		,88142
	Skewness Coefficient of asymmetry		,996
	Kurtosis Coefficient of vaulting		302
	Minimum		2,30
	Maximum		8,00
Control sample	N	Validated data	81
		Missing data	0
	Average		4,1914
	Median		4,2000

	Module (modal value)	3,6
	Standard deviation	,9628
	Skewness Coefficient of asymmetry	,293
	Kurtosis Coefficient of vaulting	,540
	Minimum	2,20
	Maximum	6,60

In terms of the averages obtained by each of the 4.2119 and 4.1914 samples, there is an insignificant difference between the experimental sample and the control sample.

To compare the mean score values in the initial testing between the two student samples (experimental and control), we used the t test for independent samples.

We started this step by testing the variants of the two samples using the Levene test.

Levene assumptions:

H0 (null hypothesis) = The mean variations of the two samples are homogeneous.

H1 = The mean variations of the two samples are heterogeneous.

Since p> α (0,05), the H0 hypothesis (the variants are equal) is accepted and the results from the first row of the t test table are read.

T Test assumptions :

H0: There is no significant difference between the two samples with respect to the average score of the initial testing.

H1: There is a significant difference between the two samples with respect to the average score of the initial testing.

Table nr. 25.

T Test results for independent samples

		Levene Test for Equality of Variants		T Test for equality of averages						
			P	T	Df	P	Average difference	Standard error difference	95% Trust interval of difference	
									minimum	maximum
Initial testing note	Assume variance equality	,398	,123	,143	163	,886	,02055	,14362	-,26305	,30415
	Assume variance inequality			143	160,510	,887	,02055	,14385	-,26354	,30464

Since p> α (0.05), the hypothesis H0 is accepted, meaning there are no significant differences between the two samples in terms of averages notes initial testing.

Thus, the mean values of the initial test scores for pupils in the experimental sample (M = 4.21) and for the pupils in the control sample were found to be close (M = 4.19).

Chapter VI - Experimental stage was the development and implementation support curriculum focused on systems employed who value individual and collective reflection, cognitive and metacognitive students of class XI discipline Classroom Management. *Curriculum support pedagogical high schools* was implemented in the experimental samples during the semester II, the 2016-2017 school year (M.-I. Anca M.-D. Bocoş, 2017). Educational intervention programs developed by us aims to provide students learning techniques independent exercises solved techniques self which value individual reflection and collective cognitive and metacognitive and help students create learning strategies independent / self-directed and effective evaluation / self-evaluation.

Implementation was carried out by the teaching staff teaching the Classroom Management to pupils in the experimental samples. For the optimal development of the formative experiment, a close and permanent collaboration was proposed involvoing the teachers. The collaboration aimed at explaining the purpose, the objectives and the conditions for the effective implementation of the educational program focused on self-employed learning systems that value individual and group reflection, cognitive and metacognitive, emphasizing the importance of pursuing each of the fundamental structural components of this time schedule.

The specific objectives that contributed to ensuring the teleological coherence of the educational program and research as a whole were as follows:

- developing an operational learning development program for teachers and students for strategic learning competence (own design model);
- structuring an intervention program containing a system of self-employment;
- designing, deploying and coordinating a learning situation system that capitalizes on the individual and collective, cognitive and metacognitive reflection of students;
- the use of appropriate techniques and tools to objectively determine the progress of learners in the use of cognitive and metacognitive strategies;
- analyzing the relationship between the variables involved in the experiment by quantitative and qualitative interpretation of pupils' learning outcomes.

In the experimental phase of our approach, the main objective was to apply to the pupils in the 11th grade with a pedagogical profile of a systemically designed educational program focused on systems of independent activities of the students, which explicitly valorizes the individual reflection and collective, cognitive and metacognitive.

The sampling of the content involved the identification of the themes and contents of the experimental approach in accordance with the curriculum for the pedagogical and

psychological disciplines, the pedagogical profile, the vocational education and training approved by the Order of the Minister of Education and Research no. 4875 of 6.11.2002. to the discipline of Student Class Management. Each topic addressed consists of a thematic content that includes terminological delimitations, classifications, definitions, exemplifications, didactic illustrations. Thematic content is passed through the use of a selected system of intellectual work methods / techniques to encourage individual and collective, cognitive and metacognitive reflection. The key words / phrases that can be completed by the pupils are then specified. Key words and phrases have the role of facilitating understanding of the concepts specific to the discipline Students Class Management. The exercises are designed to help establish and systematize the theoretical part of each subject.

The proposed independent working methods / techniques involve using the following steps: *Analyze! / Practice! / Reflect and Self-assess! (APR).* The program also includes useful applications for pupils to better define concepts to reflect individually and collectively, cognitively and metacognitively (the content sample was presented in **Chapter IV**)

We resume the composition of the experimental sample, capitalized in the experimental phase:

Table nr. 26.

Sample	**Highschool / college**	**Number of students**
Experimental sample	National Pedagogical College „Regina Maria", Deva	29
	Vocational Highschool „Mihai Eminescu", Tîrgu Mureş	28
	„Horea, Cloşca şi Crişan" Highschool, Abrud	27
Total		**84**

Chapter VII - Post-experimental stage implied the use of the same methodology as in the pretesting phase. At the end of the formative phase the posttest was administered to both the experimental sample and the control sample pupils.

The data presented and analyzed in this chapter refer to the results quantified in the notes obtained by the students in the experimental sample and in the control sample. We aimed at identifying the functionality and impact of the self-directed educational program that values individual and group, cognitive and metacognitive reflection by undertaking the following steps

- Measuring the results obtained by the students in the experimental sample and the pupils in the control sample in solving the written test comprising the same categories of items: objective, semi-objective and subjective;
- Comparative analysis of the results obtained by the pupils in the experimental sample and of the results obtained by the pupils in the control sample.

In the case of posttest research, students received scores ranging from 1 to 10, the average of the experimental sample was 7.3345, while in the case of the sample control the average was only 5.9210. Under these conditions, we can say that the scores obtained in the posttest stage evolved much more in the case of the experimental sample compared to the control sample.

Table nr. 27.

Descriptive statistics
Posttest note

Experimental sample	N	Validated data	84
		Missing data	0
	Average		7,3345
	Median		7,0000
	Module (modal value)		6,00
	Standard deviation		1,52153
	Skewness Coefficient of asymmetry		,087
	Kurtosis Coefficient of vaulting		-1,299
	Minimum		4,70
	Maximum		10,00
Control sample	N	Validated data	81
		Missing data	0
	Average		5,9210
	Median		6,0000
	Module (modal value)		5,00
	Standard deviation		0,94243
	Skewness Coefficient of asymmetry		1,124
	Kurtosis Coefficient of vaulting		1,444
	Minimum		4,50
	Maximum		9,00

If, in the case of the experimental sample, the marks obtained in the posttest phase start at 4.70 and reach the maximum mark of 10, in the case of the control sample, the notes start at 4.50 and go only to note 9. In other words, in the case of the experimental sample, this stage is high than for the control sample.

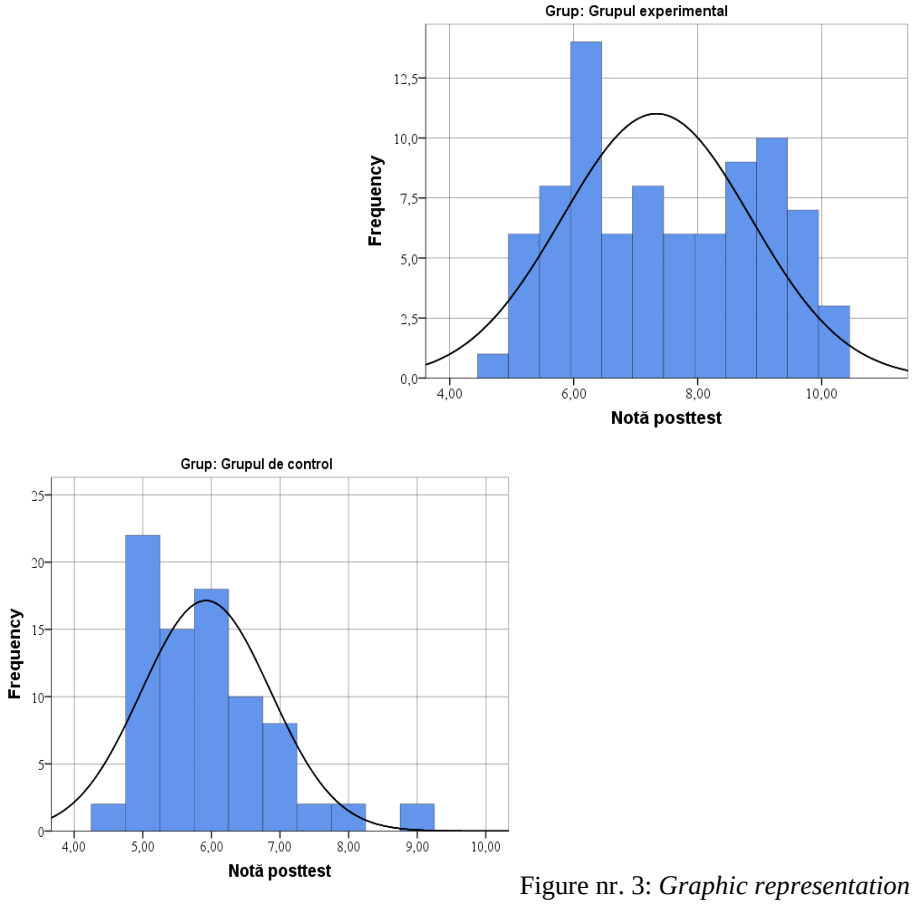

Figure nr. 3: *Graphic representation of experimental sample and control sample scores comparability in posttest*

From a graphical point of view, even if for the experimental group the maximum score is higher, the notes are more dispersed than in the control group. In this case, the distribution does not follow a normal data dissemination curve, in other words the difference between the marks obtained is significantly higher.

The test t result for independent samples showed that the average of posttest scores for pupils in the experimental sample differs statistically significantly from the posttest scores for control group pupils ($t = 7.122$; $df = 138,305$; $p < 0.001$).

Therefore, we can say that the implementation of the educational program focused on self-employed systems that valorizes the individual and group, cognitive and metacognitive reflection of the pupils was much more effective for improving school performance compared to classical methods.

To compare the scores from the initial test with posttest scores, we have recourse to the t test for dependent samples (pairs).

The average score for initial testing was 4.21 for the students in the experimental sample and 4.19 for the pupils in the control sample.

At the posttest, the students in the experimental sample obtained an average of 7.33, while the pupils in the control sample obtained an average of 5.92.

We have considered the following hypotheses:

H0: The average of the initial test scores and average posttest scores does not differ significantly

H1: The average of the initial test scores and average posttest scores differs significantly

Table nr. 28.

Descriptive statistics for pair samples						
Sample			Average	N	Standard deviation	Standard error average
Experimental sample	Pair 1	Initial testing note	4,2119	84	,88142	,09617
		Posttest note	7,3345	84	1,52153	,16601
Control sample	Pair 1	Initial testing note	4,1914	81	,96283	,10698
		Posttest note	5,9210	81	,94243	,10471

The results show that there has been a significant improvement in school performance in both the experimental sample and the control sample. It is noted that the average score of the two tests differs significantly in both experimental and control samples.

Using the t test for the pair samples, it is found that the mean scores of the two tests differs significantly in the case of the experimental sample ($t = -19.716$; $df = 83$; $p < 0.001$) and in the control sample ($t = -14.401$; $df = 80$; $p < 0.001$).

I have also represented in a graph the comparison of the results obtained by the students in the experimental sample and the pupils in the control sample to the initial and posttest tests, as follows:

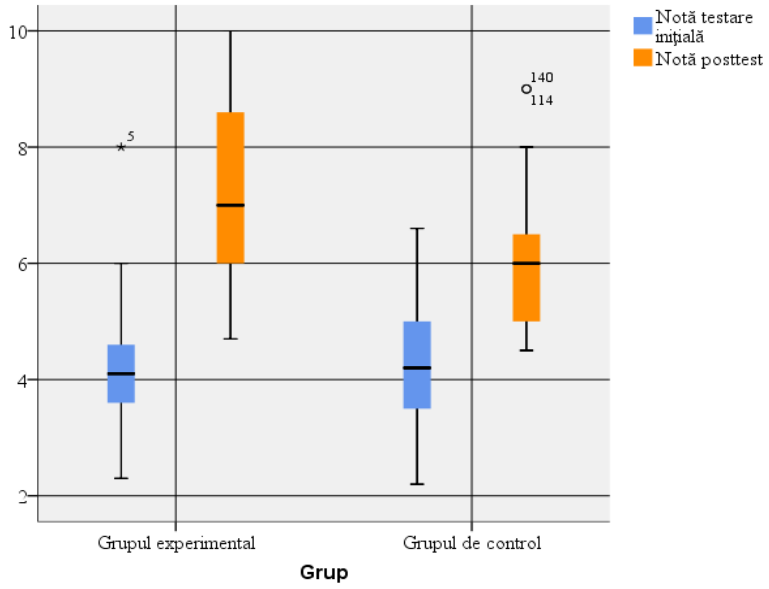

Figure nr. 4*: Graphical representation of the experimental sample and control sample scores comparability for initial testing and posttest scores*

The differences between the marks obtained by the students in the initial testing and the grades in the posttest test as well as the differences between the two groups analyzed, the experimental group and the control group are also observed graphically.

The average of posttest scores obtained by pupils in the experimental group higher than the average score of the pupils in the control group is due to the program focused on self-employed systems through which students were able to navigate independently, reflect individually or together with colleague / colleagues, to solve a series of exercises that facilitate the fixation and systematization of the ones that have been acquired. Reflective journals have created opportunities for cognitive and metacognitive reflection. Thus, pupils were able to develop their strategic learning skills, but also to improve their school performance.

Chapter VIII - Retesting stage involved applying a test that exploits strategic learning skills to verify the stability of knowledge over time after completing the experiment.

In fact, our aim was to verify whether a link can be established between an independent learning system curriculum that capitalizes the individual and collective, cognitive and metacognitive reflection of pupils in pedagogical high schools on the development of strategic learning skills, and sustainability / strength of knowledge.

The results obtained in the retest stage, after the posttest stage, we present them synthesized as follows:

Tabelul nr. 29.

Descriptive statistics

Retest note

Experimental stage	N	Validated data	84
		Missing data	0
	Average		7,6357
	Median		7,6000
	Module (modal value)		6,00
	Standard deviation		1,42944
	Skewness Coefficient of asymmetry		,062
	Kurtosis Coefficient of vaulting		-1,162
	Minimum		5,00
	Maximum		10,00

In this phase, the average of the marks in the retesting of the students in the experimental sample is 7.63, with scores ranging from 5 to 10.

Analyzing the distribution of the notes, it is noted that they deviate from the average in plus or minus by 1.42.

For a clearer view of the differences between the initial test stage and the retest stage, we performed a comparative analysis of the results obtained in the two stages.

Table nr. 30.

Descriptive statistics for pair samples						
Sample			Average	N	Standard deviation	Standard error average
Experimental sample	Pair 1	Initial testing note	4,2119	84	,88142	,09617
		Retest note	7,6357	84	1,42944	,15596
Control sample	Pair 1	Initial testing note	.	0[a]	.	.
		Retest note	.	0[a]	.	.

We used the t test for pair samples to compare scores obtained by the students with the initial test and the marks obtained by the pupils at the retest for the pupils in the experimental sample.

From the comparative analysis of the scores from the initial and the retest tests for the students in the experimental sample, a significant difference is observed ($t = -22.778$; $df = 83$; $p < 0.001$). The data obtained also represented graphically as follows:

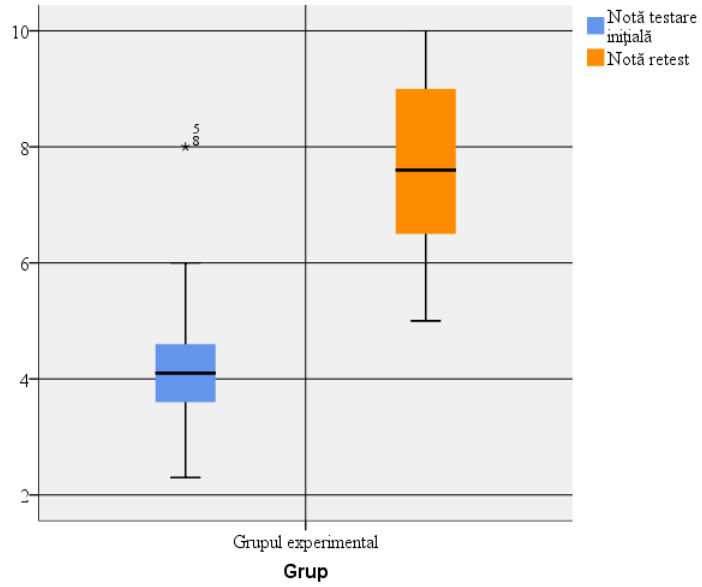

Figure nr. 5: *Graphic representation of the comparability of the scores from the initial and the retest tests for the students of the experimental sample*

The graph shows the evolution of students' grades in the retest stage compared to the scores obtained in the test stage, following the activities that took place at the level of the experimental group. Due to significant differences, we can say that the activities carried out with the students in the experimental group had a positive impact on the learning process.

To compare the posttest scores with the retest scores, I also used the t test for dependent samples (pairs).

At the posttest, the students in the experimental group had an average of 7.33, while at the retest they had an average of 7.63.

We have considered the following hypotheses:

H0: The average of the posttest scores and average retest scores does not differ significantly

H1: The average of the posttest scores and average retest scores differs significantly

Table nr. 31.

Descriptive statistics for pair samples

Sample			Average	N	Standard deviation	Standard error average
Experimental sample	Pair 1	Posttest note	7,3345	84	1,52153	,16601
		Retest note	7,6357	84	1,42944	,15596
Control sample	Pair 1	Posttest note	.	0[a]	.	.

		Retest note	.	0[a]	.	.				

The results show that there has been a significant improvement in school performance in students in the experimental group.

Table nr. 32.

T Test t for pair samples

Sample			Differences between pair samples					t	df	p
			Average	Standard deviation	Standard error average	95% Confidence interval of difference				
						minimum	maximum			
Experimental sample	Pair 1	Posttest note-Retest note	-,30119	,76874	,08388	-,46802	-,13436	-3,591	83	,001

It is found that the mean scores of the two tests differ significantly (t = -3.591; df = 83; p = 0.001).

The graphical representation of the comparability of the posttest scores and the retest scores obtained by the students of the experimental sample is as follows:

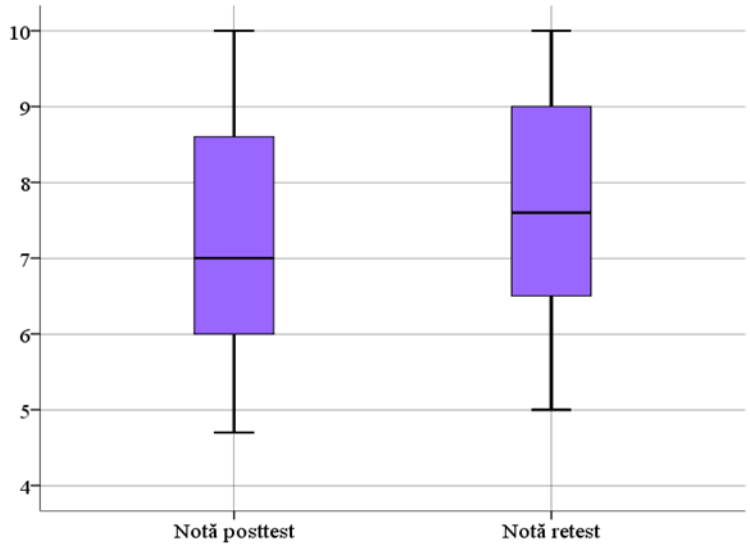

Figure nr. 6: *Graphic representation of comparability posttest scores and retest scores obtained by students in the experimental sample*

From the previous graph we can see a visible difference between the averages obtained in the two stages, the posttest stage (7.33), the retest stage (7.63) and the minimum values obtained in the posttest stage (4.7), and in the retest stage (5). Thus, the marks obtained by the students in the retest stage are significantly higher than in the posttest stage.

Analyzing the obtained data, we found the existence of a stability in time after the experimental completion of the intellectual activity strategies in the student's individual study and the existence of a link between the system of independent activities and the duration / validity of the knowledge. We considered ***the general hypothesis of our work to be valid: in the study of pedagogy, the application to the pupils of the 11th grade with a pedagogical profile of a systemically designed educational program focused on independent student activities, which explicitly valorizes individual reflection and cognitive and metacognitive, contribute to the shaping of strategic learning competence and improve their school performance.***

Chapter IX - Conclusions and educational implications - is divided into five subchapters. The first subchapter presents a series of conclusions regarding the research undertaken, focusing on conclusions on the impact of independent activities on the level of school results at pedagogical disciplines, but also on the impact of independent activities on the level of development of strategic learning competence. Also in this chapter are synthetically presented a series of statistical conclusions. Also, the conclusions of case studies illustrating the effectiveness of the self-employed educational program are presented.

As **future research directions** we have proposed:

- extending the curriculum to the 12th grade in order to prepare students for the future teaching career;
- providing pupils and other independent learning methods / techniques;
- creating together with the pupils in the pedagogical high schools new training situations that would valorize individual and group reflection, cognitive and metacognitive.

As the practical implications of the research, we propose as general recommendations the following: redesigning the curriculum of the pedagogical disciplines taking into account the requirements of the current reform of the education;

- achieving compatibility of curricula and curricula;
- achieving a global vision of pedagogical disciplines studied in grades IX-XII;
- designing new school curricula;
- designing alternative and auxiliary teaching manuals for pedagogical disciplines at national level;
- introducing obligatory and / or optional pedagogical disciplines into the curriculum of initial and continuous teacher training in Romania to foster the

design, implementation and evaluation of educational approaches that facilitate the formation of strategic learning competence;

- ❖ activities that value the individual and collective, cognitive and metacognitive reflection;
- ❖ reintroduction of pedagogical disciplines as a compulsory proof of the pedagogical profile.

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