

## AN INTERVENTION PROGRAM FOR THE DEVELOPMENT OF LEARNING TO LEARN COMPETENCY OF 11TH GRADE STUDENTS WITH LEARNING DIFFICULTIES IN STUDYING ROMANIAN LANGUAGE AND LITERATURE

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**ABSTRACT.** Education and training have to provide the learning environment for the development of learning to learn competency for all citizens, including those with fewer opportunities. The main purpose of the formative experiment proposed in this paper was to develop and implement a formative intervention program focused on developing an operational model of learning to learn competency on cognitive, metacognitive and non-cognitive dimensions for 11th grade students with learning difficulties at Romanian Language and Literature. The sample of subjects consisted in 106 students of 11th grade with learning difficulties from three technical high schools and colleges. Using critical reflection, metacognitive reflection, strategic decision making and training subjects in complex, analytical and creative learning situations with interdisciplinary links in an articulated intervention program proved to be efficient in activating and optimizing learning behavior and therefore, in decreasing the frequency learning difficulties. The statistically significant differences between pretest and posttest results in conjunction with developments, highlighted by quantitative and qualitative benchmarks, of subjects in the experimental group during the formative intervention allow us to appreciate that the assumption underlying the experimental study was validated.

**Keywords:** *intervention program, the learning to learn competency, learning difficulties, critical reflection, metacognitive reflection, strategic decision making.*

**Zusammenfassung.** Erziehung und Bildung sollen für alle Bürger, einschließlich jener, die geringere Möglichkeiten haben, das Lernumfeld für die Entwicklung von Lernkompetenz anbieten. Der Hauptzweck der formativen Experiment, das in

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diesem Beitrag vorgeschlagen wird, war ein formatives Interventionsprogramm zu entwickeln und durchzuführen. Das formative Interventionsprogramm konzentriert sich auf ein operatives Modell für die Lernkompetenzentwicklung in Bezug auf den kognitiven, metakognitiven, nicht-kognitiven Dimensionen bei den Schülern mit Lernschwierigkeiten in der rumänischen Sprache und Literatur in der elften Klasse. Die Teilnehmer an diesem Experiment sind 106 Schüler mit Lernschwierigkeiten. Sie sind in die elfte Klasse an drei Gymnasien und Fachhochschulen. Die Verwendung von kritischer, metakognitiver Reflexion, strategischer Entscheidungsfindung und der Einbindung der Teilnehmer in komplexen, analytischen, kreativen Lernsituationen, mit interdisziplinären Verbindungen im Rahmen von dem Interventionsprogramm, haben die formative Wirksamkeit bewiesen, indem das Lernverhalten aktiviert und optimiert wurde. Folglich, hat die Häufigkeit von den Lernschwierigkeiten abgenommen. Statistisch signifikante Unterschiede zwischen Pretest- und Posttestergebnissen im Zusammenhang mit den Entwicklungen, bei quantitativen und qualitativen Niveaus, den Personen in der Experimentalgruppe, während der formativen Intervention erlauben uns zu schätzen, dass die Hypothese der experimentellen Studie bestätigt wurde.

**Schlüsselwörter:** *Interventionsprogramm, Lernkompetenz, Lernschwierigkeiten, die kritische Reflexion, die metakognitive Reflexion, strategische Entscheidungsfindung*

## Introduction

In recent years the concern of educators and psychologists to address learning and knowledge in terms of active participation of subjects has greatly increased. The key feature for this is reflexivity, self-awareness, self-regulation. In this context, it is becoming increasingly necessary for young people to improve their potential through the formal educational system so that "learning to learn" along with building a better quality learning would transcend beyond the classroom and allow students to solve everyday situations.

Competency-based education is a learning process centered on the ability and the responsibility of each student, on the development of his autonomy and self-confidence. It aims essentially three main objectives (Roegiers 2004 apud Manolescu, M., 2010, p. 55):

1. To emphasize the skills that the student must master at the end of each school year and at the end of compulsory education.
2. To give meaning to learning, to show students what are the uses of what they learn in school.

3. To certify the student's acquisitions in terms of solving concrete situations and not in terms of a sum of knowledge and skills that the student will forget or will do not know how to use them in working life.

Competency-based learning is built on a system of teaching and learning that constantly develops the autonomy and the ability of learning to learn. Thus, students are real organizers of their own learning and therefore need motivation and supervision, as well as the development of cognitive strategies and cognitive goals that will help them learn and reflect on their learning. The advantages of competency-based learning within the school are summarized by B. Rey et al. (2012, p. 37) as follows:

- Avoids fragmentation of tasks and loss of meaning for students.
- Incites learning in an active state.
- Gives purpose and meaning of school knowledge.
- Helps learning to operate a deep transformation of the subject learners.
- Can help reduce the selectivity and "failure culture".

We say that learning is strategic when the learner is aware of the learning process and controls his efforts in using particular skills and strategies. These learning features are well defined through the concept of strategic learning (Paris, S., Lipson M. and Wixson, K. 1983 apud Vianin, P., 2011). On the other hand, reflective learning, closely related to reflective teaching is above all "assumed learning, self-determined, having as main features the following: it is active (even interactive), assisted, self-regulated (self-monitored, self-assessed), constructive, meaningful" (Ezechil, L., 2010, p. 250). Reflective learning is more than just helpful, it is necessary in the study of all school subjects as "it helps students' thinking that reflect cognitively and metacognitively for future activities, they anticipate and manage their work and their whole activity, as the possibilities to solve a task or problem are multiple (Bocoş, M.-D., 2013, p. 163).

"Learning to learn" competency has been identified in many contexts as being fundamental for achieving success in a knowledge based society (European Council, 2006). Candy (1990 apud Hofmann, 2008, p. 175) describes learning to learn as a competency that allows people to become more efficient, flexible and self-organized learners in a variety of contexts. The learning to learn competency is understood as a meta-competence (Hofmann, 2008, p. 175), because it has an impact on the selection, implication and acquisition of other competencies for XXI century. In this paper we choose the definition of the European Union (European Commission, 2006), which supports the existence of three structural dimensions of learning to learn competency: cognitive, metacognitive and emotional and motivational dimensions combined with socio-cultural learning environment. Thus, according to Hoskins and Fredriksoon (2008), the concept of learning to learn is studied to consider an European framework and to test measuring the expression "learning to learn".

Education and training have to secure the learning environment in order for this competency to be developed for every citizen, including individuals that are part of a disadvantaged group (those with special needs, dropping out of school etc.) as well as through different learning contexts (formal, non-formal and informal). In any school, any student may have learning difficulties at a specific moment, at a specific object of education, in a certain activity or more. Learning difficulties may be present for a short period of time or can mark all the school years. The contemporary school is a school of great individual diversity, which tends to be a school for all - an inclusive school and categorization of the learning difficulties should reflect this diversity as well as the diversity of educational support that students need. Learning difficulties are temporary obstacles in the learning activity that affect the input of information, their processing and the output process, both in terms of cognitive and metacognitive perspective, in the case of persons who hold full basic intellectual capacities both structurally and functionally. Therefore, the development of learning competency at students with learning difficulties is an important pedagogical stake.

We believe that an explanation regarding the poor performance of students in school is related to the fact that there is not a sufficiently strong connection between the general education curriculum and the new educational paradigm of social realities, a competency-based curriculum. By organizing learning and through its optimal design, the differences between students should not widen. Teaching strategy should be designed and implemented to ensure the full development of each student's capacity. The Romanian school should become a school of innovative learning and deep learning (Chiş V., 2005), a school of competencies training and development.

Pedagogy, therefore, that aims to develop the competencies, increases also student's efforts for meaningful experiences by focussing on purpose, active, authentic and collaborative tasks (Jonassen et al., 2008). Teaching methods that are, therefore necessary to develop key competencies, should be oriented towards interdisciplinary and cross-curricular teaching and learning oriented towards teamwork combined with individual approaches and project-based work (Gordon, Halasz, Krawczyk et al., 2009).

Being a transversal type of competency, learning to learn competency could not be attached strictly to just one discipline from the curriculum at the pre-university level. Thus, learning to learn competency could be developed either by a self-standing approach, based on learning the techniques, the methods and learning strategies, independent from the traditional disciplines or by means of infusion in disciplinary or inter-disciplinary approaches, therefore contributing to the development of other key-competencies and becoming a result of the latter.

The study of Romanian Language and Literature cannot ignore the fields covering transversal skills, knowledge and attitudes, that this discipline envisaged by default. During secondary education, students must train their communication skills necessary to perform any activities in society, but also the learning to learn competency. The latter should become a reality in our schools for all students. They should develop a competency of the utmost importance for the future, that of knowing how to educate themselves lifelong using their own intellectual resources.

## **Research Design**

### ***Research objectives***

The main aim of this research is to stimulate the development of learning to learn key-competence by means of implementing an intervention program to 11th grade students with learning difficulties in studying Romanian Language and Literature, so that the learner reaches the authentic, reflexive and strategic, efficient, autonomous/independent learning based on comprehension.

The general research question from which the research started was as follows: Is it possible to stimulate the learning to learn key-competence to 11th grade students with learning difficulties by implementing an intervention program in studying Romanian Language and Literature? From this general question derive the following specific research questions:

- Is it possible that the high school students, respectively 11th graders to become more competent in learning to learn and, thus, become independent learners?
- Under what conditions and in what ways the Romanian Language and Literature teachers are able to develop the learning competency of high school students and, therefore “learning to learn”?
- How do we know if the educational interventions on the students are effective?

Further, we intend to answer these questions, although we are aware of the complexity of learning to learn competency, of the difficulties posed by the processes of conceptualization and experimental study of this competency.

The main aim of the formative experiment presented in this paper relies in the elaboration and applying a formative intervention program centered on an operational model of development of learning to learn competence at the metacognitive, cognitive and non-cognitive level to 11th grade students with learning difficulties in studying Romanian Language and Literature.

### ***Research hypothesis***

Starting from the identified problems in the analysis of the school results of 11th grade students, of their learning difficulties, we have elaborated the following general hypothesis of the research:

- The implementation of an educational intervention program to 11th grade students in order to value entirely, in personalized manner and in a socio-constructivist framework the critical reflection, the metacognitive reflection and the strategic decisions making, will diminish the frequency of learning difficulties in studying Romanian Language and Literature.

Taking into consideration the general hypothesis, the following specific hypothesis have been resulted:

- If the learning situations are organized and displayed according to our personal model of learning to learn competence development, then the students with learning difficulties will improve their critical reflection, their originality and cognitive flexibility;
- If the learning situations are organized and displayed according to our personal model of learning to learn competence development, then the students with learning difficulties will intensify the degree of metacognitive awareness and regulation of learning;
- If the learning situations are organized and displayed according to our personal model of learning to learn competence development, then the students with learning difficulties will optimize the practice of learning strategies related to problem solving in reading texts.

### ***Research variables***

According to the general hypothesis, we deduce the independent variable (I.V.) in our research as being the following:

I.V.: The implementation to 11th grades of the educational intervention program which values entirely, in personalized manner and in socio-constructivist framework:

- critical reflection;
- metacognitive reflection;
- strategic decisions making.

The dependent variable (D.V.) meaning effects, expectations, school results regards the frequency of manifestation of learning difficulties in studying Romanian Language and Literature to 11th grade students, a variable represented by:

D.V.1. the level of the process of critical reflection operationalized by means of behaviors frequency using critical thinking skills in Romanian Language and Literature discipline;

D.V.2. the degree of awareness and the incidence of behaviors' metacognitive regulation in learning;

D.V.3. the level of practice of learning strategies related to problem solving in reading texts.

### ***Procedure***

The qualitative **sample of subjects** was based on using the unique group of students sample type. This is a group constituted by age and grade criterion, existing before research. The unique group technique is based on "the using a single group, to whom independent variable or variables are applied, aiming and quantifying their effect at different stages" (Bocoş, M., 2003, p. 66). The advantage of such sampling consists in the development of the research in the natural, ordinary environment, in natural organization of the educational process.

In this research we focused on the 11th grade of high school which is part of post-compulsory and upper secondary education of the deepening curricular cycle. From the results of the national tests, particularly results of the simulation for the baccalaureate exam of the 11th grade, we can get a vision on the level of skill acquisitions at a certain time and we can identify their gaps in time to be remedied during the school year. Furthermore we can identify the learning difficulties specific to a subject or the general learning difficulties, specific to more subjects. On the other hand, we must keep in mind that the 11th grade student is 17-18 years old, that is in his adolescence stage, which poses a number of socio-emotional, attitudinal or character problems. These problems can reflect upon the quality of school performance also.

After coding the names of students, followed by the interpretation of the pretest results and the analysis of the academic achievement in Romanian Language and Literature subject (grade means at the end of the first semester of 2013-2014 school year between grades 4 and 6) a number 106 students of 11th grade with learning difficulties were included in the sample. They belonged to three technical high schools and colleges in Cluj-Napoca. Therefore, the group of subjects includes students whose main limitations are mostly located at the level of efficient management of cognitive, metacognitive, motivational and affective resources. The formative experiment was attended by 11th grade students aged between 17 and 18 years old, 59 boys and 47 girls, 55 students from urban area and 51 students from rural area. We also ensured that there was a relative homogeneity of the experimental group composition in relation to these variables.

In formal educational contexts, namely in psycho-pedagogical counseling, **the sample content** included scientific contents according to the compulsory curriculum for 11th grade students, through the intervention program displayed

within the formal activities of counseling and orientation. One of the first directions of sample content formation was the identification of the themes and contents that were to be included in the experimental approach according to the specific program from the curricular area Counseling and Orientation for 11th grade. The themes that we proposed in our intervention program were studied during the second semester of the 2013-2014 school year. The activities were based on the use of bibliographic materials, of a modern logistics base and was mainly an applicative character. Thus, the intervention program included themes and curriculum contents using the non-literary texts. Thematic units representing the investigation framework were organized so that teaching curriculum content selected to provide a foundation for the development of learning to learn competency for engaging and carrying out the reflexive and strategic activities. A second direction of sample content formation was the decision regarding the strategic and reflexive processes and behavior that were to be practiced during the intervention.

### ***Instruments***

Critical reflection was measured by Motivational Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia and McKeachie, in 1991. For the purpose of our research from the cognitive and metacognitive strategies scale, we selected the critical thinking sub-scale with a Cronbach alpha coefficient of 0.80 obtained by the authors. Because this questionnaire is applied specifying the name of the discipline or course, we opted for the Romanian Language and Literature subject and the reason for this is that the critical thinking skills are developed more frequently and systematically in this discipline than in other disciplines of educational framework plan.

From the repertoire of methods for assessing of the metacognition within school learning in the existing literature, we selected a scale developed by G. Schraw and R.S. Dennison (1994) and named by the authors the Metacognition Awareness Inventory (MAI). We decided to use this tool (translated and adapted by A. Glava, 2007) in the pretest and posttest phases of this investigative approach.

Another instrument used to measure strategic decision making, awareness and use of learning strategies was the Metacognitive Awareness of Reading Strategies Inventory (MARSII) designed by Mokhtari and Reichard (2002) from which we selected the problem solving strategies sub-scale in reading situations.

Both the psychometric qualities obtained by the instruments translated and adapted for Romanian school population with the consent of the authors and significant correlations obtained between the variables studied were the focus of the tools' pilot study. The values of Cronbach alpha coefficients of internal consistency



for each scale applied showed a high degree of reliability. The interpretation of the collected data allowed reaching favorable conclusions for further research on a larger scale.

### ***A theoretical model of development of learning to learn competency at students with learning difficulties***

The variety of theoretical contributions within the scientific literature dedicated to the learning to learn competency has led us to try to structure a development model of this competency in an integrative and original manner, which should reflect our understanding of the theme. Benchmarks offered by this model were the basis for structuring our own experimental approaches.

The theoretical development model of learning to learn competency (original model) articulates systemically the combination of knowledge, abilities and attitudes necessary for the development of this competency according to the levels of learning taxonomies; it values entirely the processes of critical reflection, of metacognitive reflection and strategic decision making within a socio-constructivist context. Between these internal structural components there is an inter-dependency relation thus one emphasizes the other reciprocally.

For an instructive strategy to be efficient, for students with learning difficulties, it is necessary to focus on the cognitive, metacognitive and non-cognitive (motivational, emotional and contextual) processes, following a coherent model of action. Many of these approaches are oriented toward some of the above mentioned aspects, but not toward all of them. The challenge that we introduce is to apply a model as complete as possible.

We have intended that theoretical-applicative model structured by us and experienced during the formative intervention to be characterized by:

- structural relevance, ensured, on the one hand, by the introduction within the model of the cognitive, metacognitive and non-cognitive dimensions, which are intrinsic and complementary in every learning process, and, on the other hand, by the introduction of the main components of the competency (knowledge, abilities, attitudes), considered as fundamental in the scientific literature;
- functional relevance, through the identification of the conditions and practical approaches so that to support the development of learning to learn competency.

We considered that the key elements for this are:

- designing learning tasks so that they can be characterized by a certain complexity and integrate barriers, socio-cognitive conflicts with inherent formative potential;

- shaping the learning environment so that it may contribute to providing benchmarks for critical reflection, complex metacognitive reflection and strategic decision making;
- the use of implicit and explicit teaching practices of metacognition.

### ***Description of the psycho-pedagogical intervention program***

Many researchers claim that the inefficiency of efforts for students with learning difficulties should be linked to a type of metacognitive deficiency more than a cognitive one. They have knowledge and competencies acquired more or less, but do not know how to use them, nor to transfer them. This inefficiency is attributed primarily to the fact that these students do not know what they know. Being aware of this reality and based on the data interpretation that we gathered within the observational stage of the research, we can introduce the following premises of the research:

- In the school context the main learning difficulties identified within the context of studying Romanian Language and Literature are the ones regarding metacognition, which need to be analyzed together with the cognitive and non-cognitive difficulties, without diminishing their value.

Assuming the mentioned premise, we propose, from a pragmatic perspective, to design and implement an educational intervention program for 11th grade students with learning difficulties. From an operational perspective, for the implementation of this program, we have developed an operational tool that is educational intervention plan to lower school difficulties frequencies to 11th grade students.

Analyzed from the structural perspective, our educational intervention program refers to the following relevant components: program curriculum; the contents used; the human resources (teachers, counselors, teachers of Romanian Language and Literature, class teachers); material resources (equipment, instruments); time resources; procedural resources (official and unofficial curricular documents).

From the functional operational and pragmatic perspective, our educational intervention program values the theoretical model of development of learning to learn competence. This model emphasizes the following components, relevant from educational perspective and especially from the psycho-pedagogical perspective that we have investigated:

- ☐ Critical reflection (cognitive dimension) – referring to activation of knowledge and existent cognitive ability and their practice in new situations, the analysis, evaluation, opinion formulation and conflictual interpretation;
- ☐ Metacognitive reflection (metacognitive dimension) – emphasizing the awareness and regulation of their own thinking processes;

☐ Strategic decision making (non-cognitive dimension) – regarding the management of behavior in alternative problem-solving situations, the selecting, adaptation, practice etc. of learning strategies, students making a decision or a succession of decisions about the optimal or at least convenient option.

The diversity and complexity of variables encountered imply the use of the concept “process” in relation to the development of learning to learn competence for diminishing the 11th grade students’ difficulties. In the context of our research, the development of this competence reveals a specific process, being structured into three main stages, timely organized:

1. *The initial stage* – the teacher, in this case the researcher, plans and anticipates the teaching and learning sequences, the didactic and counseling situations as well as the intervention strategies;

2. *The development stage* – the researcher places the students in meaningful contexts regarding the learning object, stimulates the reflective behavior regarding the content as well as the metacognitive processes;

3. *The consolidation stage* – the researcher analyzes the effects of the intervention performed within the formal context of counseling and studying Romanian Language and Literature, both for students and for himself.

The activities were displayed in an interactive atmosphere, by means of team work, open talk and each student having access to the informational support necessary for the activity. The methods used in the formative experiment stage were primarily active and interactive. Thus, we mention several methods and procedures used in this stage, also mentioned in the suggested intervention program: methods and techniques of developing the critical attitude (the mosaic method, techniques such as: “I know - I want to know - I have learnt”, “Think - Pairs – Share”, “Anticipate, Survey, Think” etc.); methods and techniques of individual activities (SINELG method, the active learning, techniques: “Question and Answer”, “Post-it notes” - Memorizing etc.); methods and techniques of reflection (personal reflection, techniques: “Talking to yourself” - Thinking out loud, “I know - I think, I learn - I am thinking” - Before and After, “Writing what you are thinking about” - Reflection journal etc.); methods and techniques based on problem-solving (case studies, techniques: “Difficult and Easy Questions” - Superior Questions, “I anticipate - I survey - I am thinking”, “The Transfer of Discussion” -The Bridge etc.); methods and techniques of graphically collecting and organizing information (techniques: mind mapping, SWOT Analysis, POWW, Thinking Hats etc.). We mention that these active and interactive methods and techniques have been adapted in application based on circumstances, objectives, specific educational situation. It appealed to different combinations between these methods and other traditional active and interactive methods.

Given the fact that one of the essential premises underlying the structure of the formative investigation was that involving learners in solving learning tasks involving critical processing of information, has the potential to initiate and support the metacognitive reflection and self-regulation of learning, we consider relevant that most of the proposed learning tasks are organized analytically and creatively. In addition, most of the tasks to be performed are complex, establishing interdisciplinary links. It is interesting that in solving the tasks most of the school knowledge and techniques are evident from the start to students as elements of competency to action. Not only these tasks are a key motivation for learning, but also what is taught in this context becomes the image of a tool for students to understand the reality and act on it. In fact, what we want is that the procedures which are taught at school should not remain some school rituals that the student will not integrate them in any way in his view of the world. If we want these procedures to be dynamic, applied responsibly and part of the vision the student will have about reality, than it may be useful that these procedures and learning strategies are acquired, developed during learning tasks/mini-projects that the student has mastered. Solving tasks favors the development of learning to learn competency because the students are familiarized to see the strategies learned in school as some tools used to achieve goals that they can perceive and that are important to them.

### **Data Analysis and Interpretation**

To identify the existence of differences in the experimental group between the three variables, we used the t test for comparison of means, for two paired samples.

Average scores obtained for the **critical reflection** variable in the pretest and the posttest phase, as well as the calculated values of Paired-Samples T Test (option exists in SPSS software package version 17.0) shows that the average level of development of critical reflection of the subjects involved in research is 4.12 in pretest and 5.02 in posttest. Also, observing the two standard deviations (0.67 and 0.73), we see that they are very similar, which is an advantage. We also observe a significant ( $p < 0.001$ ) and strong correlation (0.75) between pretest and posttest data.

Table no. 1 shows the value for t (-18.52) which, with 105 degrees of freedom, is significant at 0.00 for the bidirectional level. Therefore, as the level of significance is less than 0.005, scores of subjects for the development of critical reflection during postexperimental stage are significantly higher than scores obtained during the preexperimental one.

**Table no.1.** The results of test t for the experimental group regarding the critical reflection during the pretesting and posttesting stages

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
CR_pretest & CR_posttest	-0,90000	,50010	,04857	-0,99631	-0,80369	-18,529	105	,000

The average level of the critical reflection development during the post-experimental stage ( $M = 5.02$ ,  $AS = 0.73$ ) is significantly higher ( $t = -18.52$ ,  $df = 105$ ,  $p$  bidirectional  $< 0,005$ ) as opposed to the average level of the critical reflection development during the preexperimental stage ( $M = 4.12$ ,  $AS = 0.67$ ).

Test t data shows that there is a significant difference between the average scores obtained by the subjects during the pretesting and posttesting stages. In order to identify the degree of impact of this difference we have calculated Cohen's coefficient  $d$  based on test t value for pair samples (having dependent scores). After calculating  $d$  Cohen<sup>3</sup> ( $d$  Cohen = 5.79,  $r = 0.94$ ) we can conclude that there is a strong effect of our intervention regarding the development of critical reflection during the postexperimental stage as opposed to the preexperimental stage.

The results obtained after the analysis of the intra-subjects design allow us to confirm that ***the specific hypothesis no. 1 of the experiment is being confirmed***. Thus, the intervention program proved its efficiency regarding the improvement degree of critical reflection.

The statistical data shows that the average level of development of **metacognitive reflection** of the subjects involved in research is 3.02 in pretest and 4.05 in posttest. Also, following the two standard deviations (0.45 and 0.44), we see that they are very similar, which is an advantage.

<sup>3</sup> For calculation the effect size based on Cohen's coefficient  $d$ , it used the website:

<http://www.polyu.edu.hk/mm/effectsizefaqs/calculator/calculator.html>

$r =$  aprox. 0,2 – weak correlation

$r =$  aprox. 0,5 – medium correlation

$r =$  aprox. 0,8 – strong correlation

The extent to which the two sets of scores from the pretest and posttest of metacognitive reflection correlate is clear from the significant ( $p < 0.001$ ) and the strong correlation (0.89).

Table no. 2 shows the value for  $t$  (-51.21) which, with 105 degrees of freedom, is significant at 0.00 for the bidirectional level. Therefore, with the significance level being below 0.005, the scores for the development of metacognitive reflection during postexperimental stage are significantly higher than scores obtained during the preexperimental one.

**Table no. 2.** The results of test  $t$  for the experimental group regarding the metacognitive reflection during the pretesting and posttesting stages

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
MR_pretest & MR_posttest	-1,02094	,20523	,01993	-1,06047	-,98142	-51,217	105	,000

The average level of the metacognitive reflection development during the postexperimental stage ( $M = 4.05$ ,  $AS = 0.44$ ) is significantly higher ( $t = -51.21$ ,  $df = 105$ ,  $p$  bidirectional  $< 0,005$ ) as opposed to the average level of metacognitive reflection development during the preexperimental stage ( $M = 3.02$ ,  $AS = 0.45$ ).

In what concerns the increase of the effect size regarding metacognitive reflection, Cohen's coefficient  $d = 7.03$ , meaning for a  $r = 0.96$  represents a powerful effect of our intervention.

**The specific hypothesis no. 2 is being confirmed**, all the subjects appreciating as positive the relation between the formative program that we have suggested and the increase of the efficiency in learning.

The average level of the development of **strategic decision-making** process of the subjects involved in research is 3.10 in pretest and 4.21 in posttest. Taking into consideration the two standard deviations (0.56 and 0.47), we see that they are very close in value, which is an advantage in this case also.

Regarding the scores obtained for strategic decision making in pretest and posttest there is a significant ( $p < 0.001$ ) and strong correlation (0.84) between the two sets of scores.

Table no. 3 gives the value for  $t$  (-37.95) which, with 105 degrees of freedom, is significant at 0.00 for the bidirectional level. Therefore, observing that the significance level is smaller than 0.005, the scores of subjects for the development of strategic decision-making process during postexperimental stage are significantly higher than scores obtained during the pre-experimental one.

**Table no. 3.** The results of test  $t$  for the experimental group regarding the variable of strategic decisions making during the pretesting and posttesting stages

Paired Samples Test								
	Paired Differences					$t$	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
SDM_pretest & SDM_posttest	-1,10877	,30074	,02921	-1,16669	-1,05085	-37,958	105	,000

The average level of the strategic decisions making process development during the postexperimental stage ( $M = 4.21$ ,  $AS = 0.48$ ) is significantly higher ( $t = -37.95$ ,  $df = 105$ ,  $p$  bidirectional  $< 0,005$ ) as opposed to the average level of the strategic decisions making process development during the preexperimental stage ( $M = 3.10$ ,  $AS = 0.56$ ).

We also mention that in the case of the strategic decisions making development, our intervention had a strongly significant effect ( $d$  Cohen = 5.10,  $r = 0.93$ ).

The results obtained allow us to sustain that ***hypothesis no. 3 is being confirmed***. The intervention program has had a positive effect upon the quality of learning strategies, facilitating the development of several attitudes of strategic decisions making in problem-solving situations regarding reading texts.

All these results demonstrate that during the experimental approach, practicing critical reflection, metacognitive reflection and strategic decision making in complex learning situations, there has been a significant increase in the incidence of learning behavior on cognitive, metacognitive, non-cognitive dimensions and an optimization of awareness, planning, monitoring and regulating learning level.

In the pretesting stage we were interested in analyzing in what way these three variables correlate. According to Pearson's coefficient correlation analysis we note that there is a statistically significant correlation between the degree of

development of critical reflection abilities and the degree of metacognitive reflection abilities established at  $r = 0,424$ . Moreover, there is a positive correlation between the critical reflection abilities and the ability of strategic decisions making ( $r = 0,510$ ). Between the degree of metacognitive reflection capacities and that of decisions making there is no strong correlation ( $r = 0,499$ ). In this way we can argue that there are significant but not strong correlations ( $p < 0,001$ ) between the three processes that contribute to the development of learning to learn competency.

Intending to identify the degree of correlation between the three variables regarding the development of learning to learn competency during the posttesting period, we have used Pearson's correlation coefficients (table no. 4).

**Table no. 4.** Correlations obtained between the three variables in the posttest phase

		Critical reflection	Metacognitive reflection	Strategic decision-making
Critical reflection	Pearson Correlation	1	,786**	,809**
	Sig. (2-tailed)		,000	,000
	N	106	106	106
Metacognitive reflection	Pearson Correlation	,786**	1	,760**
	Sig. (2-tailed)	,000		,000
	N	106	106	106
Strategic decision-making	Pearson Correlation	,809**	,760**	1
	Sig. (2-tailed)	,000	,000	
	N	106	106	106
**. Correlation is significant at the 0.01 level (2-tailed).				

After the data analysis we can notice that between the three processes contributing to the development of learning to learn competence, there are significant positive correlations ( $p < 0,001$ ). Therefore, the level of development of critical reflection positively correlates with the level of metacognitive reflection at a  $r = 0.78$  and with that of strategic decisions making at a  $r = 0.80$ . Also, the level of the development of metacognitive reflection positively correlates with the level of strategic decisions making at a  $r = 0.76$ .

In other words, the average values in the applied inventories are significantly higher in posttest for each of the three variables that contribute to the development of learning to learn competency, than the values obtained in applying the same inventories in the pretest phase. In the same vein, the correlations between the three variables are kept positive and become significantly stronger in posttest.



In conclusion, we can mention the following arguments regarding the three processes intended by us through implementing the model of development of learning to learn competence:

- students with a high level of critical reflection have also a high level of metacognitive reflection;
- students with a high level of critical reflection have also a high level of strategic decisions making;
- students with a high level of strategic decisions making have also a high level of metacognitive reflection.

Examining the scatter diagrams regarding the relations between critical reflection and metacognitive reflection, between critical reflection and strategic decision-making and between metacognitive reflection and strategic decision-making, it can be said that there is no evidence of a curvilinear relationship or an unwanted influence of anomalous variables.

We mention that although the correlation coefficients do not have an equal value with 1, although they do not indicate a perfect correlation between the variables, these correlations are significant. Moreover, the development of a competence and its structural components happens in time therefore we expected an unequal correlation between critical reflection, metacognitive reflection and the process of strategic decisions making. Thus, the existence of certain significant correlations between these components, although not perfect, intends to complete the rest of the statistical data and emphasizes the efficiency and functionality of our model of development of learning to learn competency.

To assess the extent to which the introduction into the educational program of various learning situations meant to values integrative critical reflection, metacognitive reflection and strategic decisions making induces positive effects on the learning behaviors level, determining the decrease in frequency of learning difficulties, we also analyzed qualitatively the evolution scores of open reflection diaries, the main tool used for metacognitive reflection.

The statistically significant differences between pretest and posttest results in conjunction with developments, highlighted by quantitative and qualitative benchmarks, of subjects in the experimental group during the formative intervention allow us to appreciate that the assumption underlying the experimental study was validated. Using critical reflection, metacognitive reflection, strategic decision making and training subjects in complex, analytical and creative learning situations with interdisciplinary links in an articulated intervention program proved to be efficient in activating and optimizing learning behavior and therefore, in decreasing the frequency learning difficulties facing the 11th grade students.

## Discussions and Conclusions

Intending to increase the quality of reflection in learning, we tried to create authentic learning situations in which students' self-assumed cognitive efforts that cooperated to overcome their difficulties of learning to blend and go hand in hand with those of colleagues in formal educational contexts.

Our intervention reveals an increase at the level of critical reflection in the posttest phase compared to the pretest. This increase was always associated with the activation of existing knowledge and skills and applying them in new situations, along with the search for alternative solutions to choose the best one based on evidence, with evaluating alternatives and adopting a reasoned position. The educational intervention plan to decrease the frequency of learning difficulties for 11th graders was a strategic operational tool that allowed each student with learning difficulties, but also to the group itself to evolve in terms of orientation of cognitive interests, of search for answers to complex questions, of analysis and synthesis of information and opinions, of ensuring understanding new things and learning in a broad sense. It is an approach that applies beyond the school and classroom space, in the context of life situations of students with learning difficulties.

During the experimental approach, practicing metacognitive reflection and using metacognitions to monitor and control metacognitively learning, there was a significant optimization of awareness in personal metacognition and a significant increase in the incidence of planning, monitoring and evaluation of learning behavior. Metacognitive reflection has provided the context for students to use their decision-making skills when they analyze their own performance as well as their peers' performance, questioning what has been learned and deciding what other alternatives for the same problems are possible. Reflection improves learning because it gives students an opportunity to review previous actions and decisions before continuing and enables them to make appropriate decisions afterwards.

For our experiment, the solutions that we proposed, tested, implemented and validated statistically emphasized the strategic and reflective learning underlying the development of learning to learn competency. The educational school practice has proved the efficiency of the proposed independent variable. Thus, regarding the students on the experimental group we are able to appreciate that:

- All students were encouraged to get involved in solving tasks and issues, because we worked on different tasks with different degrees of complexity.

- Knowing that the students learn by building meaning, they were encouraged to explore different information, to ask questions, to reflect on what they have learned, to examine the implications of using learning strategies and to apply them in a useful manner, to change their understanding about a particular topic.
- The active and interactive involvement of students increased everyone's responsibility in solving tasks.
- The frequency of learning difficulties on cognitive, metacognitive and non-cognitive dimensions diminished and implicitly the school performance in Romanian Language and Literature subject has grown significantly.
- The decrease of learning difficulties was also due to a good knowledge of their own learning, to a more a rigorous and objective self-assessment. Identifying their own limits, gaps and difficulties was often the most important step in eliminating them.
- The improvement of metacognitive strategies led to a more efficient learning management (management of cognitive and non-cognitive resources, time management, motivation dosage management etc.).
- There was an increase in situation of solving learning tasks and problems by repeated attempts, by various approaches, decreasing the risk of task avoidance, of lack of motivation or of abandonment.
- The relationships between students and between teacher and students have improved considerably and they materialized in a better, more effective communication.

The psycho-pedagogical program, suggested and evaluated within this paper, allows the structuring of coherent manner of action, in order to improve the results of 11th grade students. Whatever the nature of learning difficulties the students experience, this program shows a great advantage, which is the focus on what the student can do to help himself. This is the reason why we emphasize the necessity within the Romanian educational system, to promote a nuanced and coherent ensemble of educational practices to determine the existence of formative learning experiences to students, by means of actively and interactively engaging them in studying the school disciplines, as well as supporting them to become capable of learning to learn.

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