Journal Plus Education, ISSN: 1842-077X, E-ISSN (online) 2068-1151 Vol XII A - SPECIAL ISSUE (2015), pp. 162 – 168

The role of metacognitive reflection in developing the learning to learn competency among students with learning difficulties from technical schools

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ABSTRACT

Along with concern of educators to address the issue of learning in terms of active participation of students, the key feature became reflexivity. The main aim of this research is to stimulate the development of learning to learn key-competency by implementing an intervention program to 11th grade students with learning difficulties in the study of Romanian Language and Literature, so that the learner reaches the authentic, reflexive and strategic learning. The sample of subjects includes 106 students from technical high schools and colleges whose limits are situated mainly in the direction of efficiently managing the cognitive, metacognitive, emotional and motivational resources. The reflection on learning in which students were engaged in each stage of the formative experiment, by means of open reflection journals, allowed us to discover the beliefs and opinions of learners upon their own learning process. In the context of metacognitive reflection exercising, there was a significant optimization on awareness of the personal metacognition and significant increase on incidence of planning, monitoring and evaluation of learning behaviors.

KEYWORDS: *metacognitive reflection, learning to learn competency, open reflection journal*

1. INTRODUCTION

”Learning to learn” competency has been identified in many contexts as being fundamental for achieving success in a knowledge based society [1]. 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 as well as through different learning contexts. In recent years the concern of educators and psychologists to address learning and knowledge in terms of active participation of subjects has greatly increase, the key feature for this being reflexivity. 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.

A constant concern of teachers should be to stimulate students to reflect on their learning process so that they become aware of their strengths, but also about their weaknesses, which they can compensate by personal ways to explore the information through personal management of information and knowledge, and thus effectively managing their knowledge. Reflection is a cognitive process through which students become aware of what took place during the learning process [2]. The authors state that there are two types of reflection activities: 1) the emphasis is on content issues as student believes that he needs to know about a specific task or area; 2) the focus is on the student's learning in general, such as, for example, if the student understands or

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not the task objectives. In the latter case, reflection on thinking and processes implies students thinking about thinking (metacognition), about actions and processes, as well as transfer of knowledge in new contexts and creating alternatives or opening new possibilities. Metacognitive reflection is ”a specific approach which allows students to analyze their own learning process in a systematic manner and to discover their personal hypothesis and constructions of what they are producing as a way for students to identify and question their own strategies” [3]. The metacognitive reflection is people's own beliefs and interpretations about their own cognitive activity. Reflection involves the following: looking back, pulling apart ideas, addressing omissions and ambiguities, drawing conclusions, unravelling questions, considering alternate perspectives, making connections, reasoning and making judgements and can lead to goal setting [4].

Reflection is a more general term than metacognition. “It is much more than “one-off” thinking during which the thinker casts their mind back to an event, situation, person, topic or thinks about anything” [4]. In reflecting, the student engages in an active, persistent and careful analysis of ideas in order to seek a deeper understanding, a broader and more reasoned perspective. Reflection and metacognition are terms that are often used interchangeably even though they are not synonymous. While reflection is required for one to be metacognitive, metacognition is not required for one to be reflective [4]. The relationship between reflection and metacognition is inherent in the definition of metacognition. To consider consciously our own knowledge and how regulation of this knowledge is controlled, reflection is necessary [5]. In the scientific literature, almost all strategies for improving the metacognition contain elements of reflection and also require a certain degree of introspection, self-awareness and self-knowledge [5].

Implicitly, reflection is an intense personal experience. The first major challenge is that some students considered the reflection an uncomfortable process. They prefer to work only in the cognitive domain that they would find less challenging. On the other hand, reflection is a difficult process because the student has to formulate judgments about their own learning, which means that it is possible to change their learning style. In this case, it seems safe not to reflect because the student does not want to change what is wrong and what he/she learned up to that point. While some students have difficulty recognizing discomfort and do not accept reflection, others are able to articulate and reflect beyond their initial discomfort and concerns. Because the metacognitive knowledge could be considered as a ”static” knowledge regarding the variables related to task, itself and strategies, reflection is considered to be a more active exploration and discovery [6].

2. REFLECTIVE LEARNING IN CONSTRUCTIVIST VISION

Reflective learning is closely related to reflective teaching. There is a generally considered opinion that a reflective teaching induce a reflective learning. Although reflective learning can be determined, stimulated, maintained by a reflective teaching, it may be delayed, despite satisfying all these conditions. Reflective learning 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” [7].

Stimulation of metacognition is reflected in the selection and proposal of tasks that incite, invite and facilitate the questions, meaning any activities that require students, especially those with learning difficulties the opportunity to analyze, in a reflective manner, their own actions. The challenge of situations where students can reflect, requires them to reflect on their specific learning and understanding and to provide explanations regarding the use of strategies and the

mental structures guiding them to choose the strategies. But students, especially those who have learning difficulties, find it difficult to reach a higher level of reflection, query, metacognition, without an explicit model. Therefore, we believe that the role of the class teacher guiding student learning activities must be doubled by the practice of new competency - that of *reflective teacher*. The teacher should give students a model of reflection and action on the proposed tasks, when the student is asking. During their work, teachers can encourage a reflexive attitude towards learning, they help students to evaluate themselves and direct their own meanings. It is not just a work for the teacher, but also students' responsibility to assess and direct their own learning.

For teachers who conceive learning in constructivist vision, student reflection is vital because it helps them to build and develop acquisitions, knowledge and teachers organize their teaching offer. Also, for the practice of an active and interactive instruction, reflection represents a valuable indicator for evaluative approaches, moments of personal reflection constituting authentic evidence of formative assessment. 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. This implies that students are not only faced with repetitive situations that do not require initiative, but also with singular situation, with particular cases, exceptions to the rule, contexts in which transfers of acquisitions are necessary, requiring to practice cognitive strategies to grow their cognitive and metacognitive personal reflection" [8].

3. RESEARCH DESIGN

The main aim of this research is to stimulate the development of learning to learn key-competency 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. In the unique experimental group a sample of 106 students from 11th grade with learning difficulties from three technical high schools and colleges were included. Thus, the sample of subjects gathers students whose limits are situated mainly in the direction of efficiently managing the cognitive, metacognitive, emotional and motivational resources. Reflection on learning in which students were engaged in every stage of the experiment, as well as the ability of making decisions regarding learning strategies by means of open reflection journals, allowed us to discover the beliefs and opinions of those who study upon their own learning process.

So we carried out a qualitative analysis of reflections, which imposed synthesizing the large volume of information which we considered extremely useful for accurate interpretation of the picture of subjects evolution during the experiment evolution. The direction of data analysis was to identify the typology of the assertions contained in the diaries, which allowed us to structure the scheme of qualitative analysis of content. In conducting qualitative analysis of reflection journals were follow the steps below:

1. We lectured students learning logs in diaries completed (names of the students being encoded) in three different stages of the experiment formative.
2. We categorized each document in concepts and themes. Each category includes all materials from all data representing a theme or a concept.
3. Finally, we presented the findings in which the data from the three measurements were interpreted by comparison in the light of theories and literature used in this research.

4. INSTRUMENTS

The open reflection journal was created in a semi-structural manner, the subjects receiving four sets of questions proper to metacognitive awareness and metacognitive regulation (planning, monitoring and regulation of learning). These questions had the purpose to guide the subjects toward an open reflection upon their learning. Most students preferred to go through the list of questions and to respond to each of them in the journal. In order to get perspective on learning of students in relation to the tasks and activities in class, they were asked to complete a reflection journal at the end of the three activities in three different stages of the intervention program. In particular, students were invited to describe the learning objectives for the activity, connection between previous experience and the new task, perceived difficulty of activities, evaluating their performance, self-efficacy related to tasks and activities etc.

5. DATA ANALYSIS AND INTERPRETATION

In this research, reflection journal became a tool for students to demonstrate a better understanding of their own learning. We surprised the student frustrations of trying to cope with a different way of learning. It also demonstrates how students tried to rationalize learning situations and look for strategies to cope with change. In analyzing open reflection journals we identified several themes and sub-themes as follows in the table below:

Table 1. Types of metacognitive reflections present in reflection journals

Metacognitive reflections	Occurrences in reflection journals I	Occurrences in reflection journals II	Occurrences in reflection journals III
Metacognitive reflections on solving the learning task and the quality of its products	64	96	78
Total: 238			
Metacognitive reflections on their own learning	89	93	102
Total: 284			
Metacognitive reflections on the evaluation	54	38	35
Total: 127			

In an initial stage, the students' answers tend not to contain profound reflective elements and nor do they reflect their learning experience as future high school graduates. During the experiment, students have showed an awareness of misbalances in the learning process, as well as the necessity to face the cognitive conflicts they have encountered when dealing with this problem. This situation becomes essential in the learning process, as well as the identification of gaps within their own learning process is a start in taking measures.

As students progressed during the semester, their reflections showed an increased complexity of cognitive skills. Reflections change from simple declarations in the sentences/short phrases form about what they have learned to solve the task, sometimes without them, to laborious formulations on how they process information. There is an articulation of strategies to solve problems and to correct gaps in learning. This is evident in student language through the use of words such as "analyzed", which demonstrates the ability of students to be critical about the information received, to make a conscious effort to use critical thinking in order to argue a solution. There were even attempts in running the program to evaluate the ideas presented by their peers. Writing reflection journals revealed an increased degree of cognitive strategies awareness.

The statements contained in the category of ***metacognitive reflections on the learning task and its products*** have been those relating to the specific requirements and task objectives, use of information sources, product quality of expected learning, acquisitions that they have accumulated throughout solving task, organizing time and management of personal resources. The number of assertions regarding the task and learning products significantly increases from a series of open reflection journals to another, as shown in Table 1. If the number of assertions in the first instance on how they are used sources of information increases from the first (64) to the second series of tasks (96) in relation to the third series subjects make fewer references to this issue (78).

The initial increase may be due to task's originality requirements, various documentary sources, being an indicator of subjects' concern to overcome possible difficulties regarding that requirement.

- *"I tried to figure out what I did not know and tried to look for other resources." (S., 1st serie journal)*
- *"I read carefully the text, so I can work on it and to meet the requirements." (D., 2nd serie journal)*
- *"During solving task, I try to always check so that what they read to be in accordance with the task theme." (E., 2nd serie journal)*

The most common reflections present in the open journals completed during solving tasks were ***assertions about their own learning***. As regards this type of reflections, a constant recommendation throughout the projects development was that students try more and more developed, specific, personalized and contextualised metacognitive reflections.

Increasing the number of assertions from 89 in the first set to 93 journals in the second series and 102 in the third is an indicator for increasing the depth and personalization of metacognitive reflections. This conclusion is supported by important developments in the incidence of assertions about their cognitive approaches and their implications for the quality of learning.

The statements on this group of reflections comprise either their own judgments involved in learning or the awareness of personal characteristics about their own learning activity or practicing cognitive strategies:

- *"I've been thinking about learning strategies they've used before and I chose the one that I thought would be best to learn this subject." (N., 3nd serie journal)*
- *"If I have some knowledge about this subject that I will learn, this will motivate me because the link between old and new knowledge will help me to learn easier." (R., 2nd serie journal)*
- *"I reflected a long time on the theme, managing to understand the message sent by text; I divided the text, I used different colors to mark ideas according to their importance; I am informed from many sources." (S., 2nd serie journal)*

Metacognitive reflections on the assessment have referred to both the quality characteristics of products produced and personal characteristics through self-evaluation reflections type. The decrease of occurrences in journals from 54 assertions in 1st series journals to 35 in 2nd series entitles us to claim that, although initially the announcement in advance of evaluation criteria has an impact on initiation of metacognitive monitoring and control, the reference points provided by lists of assessment criteria are gradually replaced by other reference points.

- *"I am pleased with how to resolve the demands received, I do not think I will change*

anything in the way I work." (C., 2nd serie journal)

- *"The task seemed a little difficult because the material I will have to read it is almost not hardly known, but the idea of achieving a brochure seems interesting." (M., 3nd serie journal)*
- *"When I'm capable to do my task, I feel good because I'm proud that I succeeded to handle it." (D., 2nd serie journal)*

A constant tendency of evolution can be found on assertions regarding the products quality of learning in order to increase subjects' concerns to ensure the efficiency of learning. Examples of statements to that effect:

- *"Regarding the objectives of the task, I can say it was a difficult task because the information was very bushy for a simple brochure, a lot of data related to the subject and very difficult to select them. But with the help of colleagues, we managed to get purely the main ideas." (D., 3nd serie journal)*
- *"By consulting with colleagues in the team, we concluded that the brochure should contain as many as possible schemes, summarizing the information and comprehensible vocabulary." (A., 3nd serie journal)*

In analyzing qualitative data contained in the open journals, we considered useful to investigate a particular aspect, namely the accuracy of reflections on task difficulty. If in the 1st serie journals set completed regarding the perception of task difficulty the percentage is very high (63%), it drops gradually, reaching 25% in the 3nd serie journals. The initial high percentage may be due to the novelty effect of the whole intervention program proposed to students. Although they mostly stated they had been involved in solving such tasks, they found that the task types proposed in our intervention are distinguished by complexity and contextualization of learning.

6. CONCLUSIONS

In the course of formative experiment, during practicing metacognitive reflection and integrating formative feedback provided by teachers and fellow students, we noticed a more accurate prediction of the quality of learning outcomes. The higher the incidence of self-regulated learning behaviors is the greater the importance given of subjects to such behaviors involved in ensuring effective learning. Qualitative analysis contained in reflection journals and concerns of subjects to increase learning efficiency allows us to find optimization based on metacognitive reflection training, on subjects' attitude towards their learning, towards involvement in the proposed learning situations and increasing availability for metacognitive reflection.

Acknowledgements

This work was possible due to the financial support of the Sectorial Operational Program for Human Resources Development 2007-2013, co-financed by the European Social Fund, under the project number POSDRU/159/1.5/S/132400 with the title „*Young successful researchers – professional development in an international and interdisciplinary environment****".***

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