Metacognition and learning styles

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Abstract – This paper intends to study the impact of the students learning styles to the quality of the higher education, which requires the necessity of organizing a stimulating learning environment where the students participate to the process of their own education. Metacognition, as a "learning to learn" technique, has to habilitate the students with the important skills and capacities. To become able to practice autonomous quality learning, the students have to benefit by a continuous feedback from the teacher, beginning from a systematic knowledge of the learning styles and adapting the didactic strategies.

Key-words – metacognition, learning styles, teaching styles, quality learning, learning environment, didactic strategies, quality culture

1 Introduction

Discovering that "the maintenance of high quality and standards in education has became a major concern for the higher education institutions" (Campbell, Rozsnyai, 2002, 15) and one of the most important criterion term estimate the quality of a "product" is the beneficiary satisfaction, we believe that organize a good learning environment, where the meta-cognitive strategies are central, will generate as an effect a qualitative learning.

This study starts from the assumption that the reporting to the needs and expectations of the beneficiaries of the higher education requires a quality teaching, but meanwhile a permanent monitoring of the learning process quality and the optimizing of the learning styles through creating and practicing the meta-cognitive competences of the students. The reflection through the academics quality can not be dissociated by a severe analysis of the learning environment and of the learning activity itself.

The didactic demarche has to be conceive so that the student be in the centre, not the teacher. The role of the teacher remains a main one, but the teachers have to renounce to the old educational practices. Only in this way, the teacher would be an organizer of a learning environment adapted to the characteristics, needs and learning styles of the students, facilitating the learning process and the developing the metacognitive competences of the students.

The teacher's perception about the students has to register a major transformation: the image of the student as an passive receiver of information, "prefabricated" knowledge must be replace with the image of an active student, motivated to practice an authentic learning, to attain specific competences in information processing, to generate new information and knowledge, to apply these in different situation. The accent must be placed on the way that the assimilated information are processed, structured and used in different situation, the way that the knowledge and the metacognitive strategies can be used by the students in practicing an efficient learning.

2 Problem formulation

The quality culture must not remain the attribute of the teachers. It must be diffused through the students. To approach the quality culture, to become capable to practice a quality self learning, the students must benefit by a continuous feedback from the teachers. For giving an objective feedback, it is necessary that the teachers know the students' learning styles and build appropriate teaching strategies.

It is clear that the students learn differently. Facing this reality, most of the teachers choose to ignore it or simply deny it. Even they observe that some of their students are hostile, idle, indifferent, they have a reduce frequency at the seminar, only few teachers try to adjust their steps, or to ask themselves if these attitudes have any links with their teaching methods. Most of them resign themselves, considering that it is impossible to create and process didactic demarches that satisfy the real necessities and the different students` learning styles. These establishments determine us to begin a pedagogical micro-research that proposes to demonstrate the necessity of correlation between learning styles and teaching strategies.

In our demarche, we start from the premise that satisfying the needs, the interests of all the students, matching the didactic strategies to their styles of learning represents the challenges and also the obligations for the higher education teachers. Also, we consider that the capacity of learning how to learn must be an objective for all teachers when most of the students are untrained in this problem.

Different authors showed, during the time, that beyond the releasing the students different complex information models, it is very important to develop them the capacity of learning efficiently (Bruner, 1983; Reboul, 1980; Rogers, 1976).

Rogers affirmed that "the only formed person is that who learned how to learn, how to adapt and how to change, is that who observe that any knowledge is not certain and only the capacity to attain knowledge could conduct to a certain assuredness" (1976, 102).

Teaching students how to learn efficiently involve constant actions of the teachers for making students responsible, making conscience themselves about their forces and their limits, about their cognitive, affective, action resources and their own learning styles. In this way, the teachers have to use various educational practice and different methodologies; witch has to include many metacognitive strategies. The concept of metacognition is frequently used by the cognitive psychology theoreticians, but also by the educational practitioners.

Flavell, considered the "father" of this concept, agreed the following meaning: "Metacognition relates to the knowledge that we have about our own cognitive process, about their products and about all which relates with those, for example the pertinent proprieties for learning information and dates. Metacognition relates to the active evaluation, to the adjusting and organizing these processes according to the cognitive objectives or dates that these assume, usually serving an aim"(Flavell, l976, 232). From this definition results two basic aspects circumscribed the metacognition concept:: knowing by the students the own cognitive processes and their products (metacognitive knowledge); adjusting their own cognitive processes (metacognitive strategies and abilities) (Brown, 1987).

Because it includes "the knowledge that the subject has about the function of his own cognitive system and could optimize its function" (Mic1ea, 1999, 323), the metacognition, as a part of self cognition, could represent the way of an efficient learning.

Using adequate didactic strategies, including here the metacognitive strategies, too, the teachers must develop at the students, beyond the cognitive, instrumental - applicative, attitudinal competences, also metacognitive competences. Those permit them to evaluate permanently their own knowledge, the way of function of the cognitive processes, their own abilities and

capacities; to operate the transfer of knowledge and to use the acquisitions in various situations; to optimally select the techniques, methods of learning reporting to the proposal/self proposal objectives.

Having this set of metacognitive competences improves the process of learning, optimizing the learning styles, adjusting the actions according to the obtained metacognitive knowledge.

In the specialty literature, metacognition is direct or indirect related with the concept as: self-knowledge, self-identity, self-adjusting, self-education, self-evaluation, self-reflection, introspection etc..

Chrobak (1998, 3) specify that, in the last years, according to the research results about metacognition, methods and strategies on the essential aspects implied in the learning process have been developed. Their aim was to achieve the improvement of the theory and practice of instruction. Tunmer and Chapman (1996, apud. Reid, 2001) consider that the role of metacognition in learning process is of great importance as this relates to the learner's awareness of thinking and learning. The value of metacognition is underline in active learning, through research and knowledge construction to make the students conscious about their own cognitive processes and about their learning strategies (Joita, 2002, 178). Peer and Reid (2001, apud. Reid, 2001) remark that metacognition relates to thinking about thinking, being aware of the learning process and using that in a new learning stage. In this vision, the teachers have an instrumental role in developing metacognition awareness to their students. Buchel (2000) correlates metacognition with the learning styles.

Fuhrman and Grasha (1983) define the learning style as a social interaction describing the different roles that the student acts in the classroom related to his teachers, classmates and study objects. Ford (1981) described the learning style as a reaction strategically adapted to a specific situation of learning. The learning styles, appreciated Cerghit, define on the fond of cognitive styles, but using an extension of the sense, because they include beyond the cognitive operation also general preferences for different types of situations of learning (Cerghit, 2002, 209).

It is easy to realize that the students adopt different learning styles, selecting/assimilation/processing information in different ways. These characteristics circumscribed the learning styles, influence the quality of educational process. The mission of the teacher is helping students to realize which their own learning style is and to adopt adequate teaching strategies.

Anthony Grasha and Sheryl Hruska-Riechmann (1982) elaborated a range to determine the learning style, adapted for the students. With this instrument, there were identified the following learning styles:

l. The competitive feels comfortable being in competition with the others, works better independently, is selfish, answers well to formative evaluations, and wants to affirm him and to get success.

2. The collaborative learns efficiently sharing his ideas with the others, likes working in a team, is communicative, flexible and is altruist.

3. The retractile doesn't manifest interest for learning, is flood with all happens in the educational medium, his motivation is reduce or extrinsic, doesn't involve voluntary in solving different didactic tasks.

4. The participative is eager after participating activities, manifests interest for learning, involves in the didactic activity, learns hard and is strongly motivated.

5. The dependent needs a structure and a support for his activity, manifests reduces self assurance, asks help to the others, and has no motion.

6. The independent manifests autonomy in thinking and in his actions is self confident, is curious, investigative, prefers the individual tasks, and ask for helping only in limit situations.

Using this scale of styles of learning, adjusted after Sheryl Hruska-Riechmann and Anthony Grasha (1982), we have made

a pedagogical micro research that aims the following objective:

l. the identification of the main learning styles, manifested by the students in the theoretical and practical activities;

2. the analysis of the connection between the learning styles and the didactic strategies used by the teachers, for improving the quality of learning;

3. optimizing the learning styles through forming and practicing the metacognitive capacities.

The searching hypotheses are the following:

l. If the teachers adapt the didactic strategies to the learning styles manifested by the students, then the quality of learning improves.

2. If inside the theoretical and practical activities, the teachers use meta-cognition strategies, then the students will develop their competences for an efficient learning.

The research was done using a sample of 112 students from the first year of Electrical Engineering Faculty (60 students) and of the Faculty of Materials Engineering, Mechatronics and Robot Equipments (52 students), "Valahia" University of Targoviste, in the period April - May 2007.

The students filled the scale of the learning styles (adapted from Grasha-Reichmann), structured on 60 items. For each item, reporting to the own learning style, they choose a grade from 1(total disaccord) to 5 (total accord).

Raw dates were structured for each student on the 6 columns of the answer table. By knowing the total score on each column (corresponding to the six learning styles: participative, collaborative, competitive, retractile, independent, dependent), was identified the main learning style of each student.

Inside our sampling, the percentage distribution of the main learning style was made so: 3,57% - competitive learning style, 35,71% - collaborative learning style, 3,57% - retractile learning style, 32,14% - participative learning style, 10,71% - dependent learning style, 14,28% - independent learning style.

The results obtained were correlated with the conclusions of another research we have made former, on the same sample of students. The objective of this research was to identify the metacognitive competences of the students and also, the taxonomical classes of these, such results from the Metacognitive Awareness Inventory (adapted from Schraw and Dennison, apud Buchel, Hessels, Hessels-Schlatter, 2003, 13). This inventory is structured on two dimensions: knowledge about cognition, which has three subclasses (declarative knowledge, procedural knowledge and conditional knowledge) and regulation of cognition, which has five subclasses (planning, information management strategies, comprehension monitoring, debugging strategies and evaluation).

The students which was investigated have obtained maximal scores, percentage divided in this way: 35,71%-declarative knowledge, 42,85%- procedural knowledge, 39,28%-conditional knowledge, 32,14% - planning, 21,43% - information management strategies, 21,43%-comprehension monitoring, 39,28%-debugging strategies and 14,28%-evaluation. These scores demonstrate that the students have metacognitive competences low developed.

3 Problem solution

Starting from the obtained results and disseminated after, the teachers will realize the necessity of projection an adequate didactic demarche that be reported accordingly the main learning styles and permit forming and practicing the meta-cognition competences.

The metacognition competences represent those cognitive capacities superior developed, that help the student to identify the cognitive instruments used in solving different tasks of learning and assess their functionality objectively.

The absence or weak developing of the metacognition competences represent an important factor in the etiology of learning difficulties, factor that could generate the

lack of success in school and then in profession. So, it is necessary to adapt permanently the strategies of teaching that the teachers use to the different characteristics of the learning styles. The teaching must be structured in a manner to permit the students to be active, to formulate ideas, opinions, to confront them one each other, to debate, to compare their learning styles, their experiences and to reflect. In order to ensure the development and revaluation of cognitive, affective and operational resources is necessary to build a learning environment based on action, research, experiment.

This way, they will have the opportunity of practicing a high quality learning, getting lasting acquisitions being possibly used and transferred to various instructive contexts and not only.

By using, preponderantly, some didactic interactive-participating and metacognitive strategies, the student is placed in the centre of the instructive- educational process, stimulating him to participate effectively in the development of theoretical and applicative activities, revaluating his spirit of initiative, independence and creative potential. So, for the students who practice competitive learning styles there will be use didactic tasks meant to satisfy their need for personal affirmation and also some tasks that imply the student's involvement in collective activities aiming at learning through cooperation. For the students who practice a collaborating learning style there will be used didactic strategies that stimulate personal reflection, promoting the learning through cooperation, the problem-solving, in pairs or in group teams, with a distribution of the roles within the group, according to the individual resources, with a view to achieving the didactic tasks. For the students who practice a retractile learning style, the teachers will adopt strategies that lay an emphasis on raising their motivation for activities in groups. For the students who prove to have a participative learning style, there will be used didactic strategies that lay on accent on their involvement in individual and group activities, taking the responsibility of the didactic tasks, developing the cognition and stimulating the personal reflection etc. When working with students who prove to have a dependent learning style, the teachers will have to offer them many opportunities for their affirmation, meant to improve self confidence and develop the independence of thinking. The strategies based on individual work, on resolving the problems independently harmonized with the strategies that stimulate the personal reflection, the interaction with the others, the effective involving in the theoretical and practical - applicative activities are recommended in the activity with the students who manifest an independent learning style.

All these didactic strategies are subsumed the main trends of the modernizing of the didactic methodology. These follow (after Jinga, Istrate, 1998, 287): the revaluation of all methods for activating the students, their involving consciously and actively in knowledge acquisition and in the transfer of knowledge; the accentuation of the formative character of all methods of teaching, learning and evaluation; the optimal combination between the individual learning strategies and those based on learning through cooperation; the accentuation of the practical-applicative character of the didactic methods, in the context of learning based on action; using those strategies that permit developing of the metacognition competences required the demarche of self formatting and self training.

Promoting some efficient didactic strategies, correlated with the learning styles of the students have to be the imperatives for each teacher.

4 Conclusions

The reducing of the existent discrepancy between the learning styles practiced by the students and the didactic strategies used by some teachers contribute, obviously, to the improvement of the learning process. So, it is necessary to : reconsidering the role of

the teacher, organizing of a learning environment centered on the needs and expectations of the students, knowing and optimizing the learning style of the students through formatting /practicing the metacognition competences, elaborating a didactic strategy centered the student, correlated with the learning style, entering obligations by the student for responsibility for his own learning process, developing a positive attitude for learning, matching the learning experiences with the real need of the students, achieving a continuous and personalized feedback, support and assistance offered to the students in the process of learning.

We didn't accomplish a complete inventory of the strategies, principles, pedagogical solutions that have to be adopted for improving the process of learning and we didn't pretend that we identified "miracles" solutions for ameliorating this process and its result. We only tried to attention you that it is necessary to rethink our roles as teachers, to change our perception about the beneficiaries of the didactic activity and to realize that, if we want to achieve the quality of learning we have to conceive some didactic strategies adapted to the learning styles practiced by the students.

Proceeding in this manner, we demonstrate that we consider education as being "(...) a process that you join for reaching some specific aims (regarding the talent, competences or economical potential), thus the accent be placed on the personal developing of all points of view; briefly, means *learn to be*"(De1ors, 2000, 70).

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