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Cognitive and motivational variables that shape academic learning: A preliminary study

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The aim of this pilot study was to capture the relationship between cognitive and motivational variables and the student learning. 102 students from the Psychology specialization, license cycle, took part in the study. The following tools were used: the Rational-Experiential Inventory (Paccini & Epstein, 1999); the Intellectual development level questionnaire (Paloș, 2009), the Motivated Strategies for Learning Questionnaire (Rao & Sachs, 1999). The results indicated that the motivational and learning strategies used by students are influenced by their intellectual development level and their information processing style. Knowing the cognitive and motivational variables play an important role in devising the educational experiences and in making learning more efficient.

Key words: cognitive development, educational experiences, learning, motivation, processing information.

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Introduction

The „presage-process-product" model developed by Biggs (1987) attempts to explain learning from three perspectives: potential – process – product. The *potential* refers to all the factors which exist before the students engage in a learning situation and which will influence learning. The nature of the contents to be taught and learned, the teaching and evaluation methods, the institutional climate, the existing procedures, etc., model the context in which teaching takes place (Zhang, 2000). The interaction between these factors influences the approach to learning tasks (i.e. the *process*) and, implicitly, the *results* of learning (Ferla, Valcke & Schuyten, 2008). All of these factors are interdependent and make up a dynamic system (Biggs, Kember & Leung, 2001). What takes place at the "process" level is essential to the teaching-learning activity, as this determines the presence or absence of the expected results. In this context, the student-teacher relationship and the relationship between the students' perception and the teaching requirements become very important. If students reach the required results in an efficient manner, then the teachers' role is to engage students in learning activities that will increase the probability of achieving performances. In order to meet the students' needs and speak of efficiency in the teaching-learning activity, it is necessary to highlight the differences regarding certain variables that shape learning, the manner of learning (Nie & Lau, 2010).

Cronbach and Snow (1977) claimed that it is much more beneficial to approach a person "as a whole" as this perspective offers a clearer and more coherent understanding of the role that the individual differences play in learning. In this sense, Martinez (2001) and Martinez and Bunderson (2000) suggested focusing on four attributes that include: conative aspects (a person's wishes, intentions and will), affective aspects (emotions, feelings), cognitive and social aspects. All these attributes leave their imprint on learning results.

This research mainly focused on the *cognitive* (information processing style, cognitive and meta-cognitive strategies), on the *motivational* (self-efficacy, expectations, intrinsic value orientation) and on the *affective* attributes (affective and psychological arousal aspects of anxiety). Therefore, a first objective of this study was to identify the relationships that exist between motivational and learning strategies used by students during courses, the way in which they process information, and their intellectual development level. The second objective focused on highlighting certain differences between these variables, in terms of the intellectual development level that the students have reached during the 3 years of university studies.

Intellectual Development

Based on his activity with students, Perry (1970) noticed that the students' perception of learning and development influences the way in which they organize and evaluate the events in their environment, and the way in which they cope with these events (Felder & Brent, 2004). The author described four main periods traversed by the young adult in cognitive development – dualism, multiplicity, relativism and commitment in relativism (Perry, 1970). Each of these levels of development gives the educational activities a certain particularity, reflected in the students' perception of their own as well as the teachers' role, of the way in which informational contents are presented or of the learning strategies used (Wankat & Oreovicz, 1993).

At the *dualism* stage, of knowledge reception, the students need structure and frame. The only recognized authority in the field is the teacher. The tasks or exams that require independent thinking, seeking the correct solutions or various ways to solve a problem lead to frustration and irritability. The *multiplicity* period brings a change in the students' perception of their role, assuming a greater responsibility in the learning process. Also, this stage is marked by critical analysis of grading systems and evaluation methods. Evaluation becomes very important as the students expect that the effort invested in the learning activity be reflected in the grades received. The *relativism* period, of contextual knowledge, shows greater comfort in analyzing a wide range of options, in taking decisions, in arguing for logic and accuracy of these (Love & Guthrie, 1999). The conclusions drafted are the result of the students' own observations and critical analysis. The teacher is no longer seen as an authority in the field but as a source of expertise. In the *commitment in relativism* stage, students have reached a level where they know themselves, have identified the principles to which they can dedicate themselves and seek to achieve their full potential (Wilson, 1996).

Knowing these patterns and their characteristics is useful in designing the learning activities (Allen, 1981). Teachers obtain information regarding the way in which students learn, their perception of the learning situations in which they engage, or the manner of approaching these. By means of the style of organizing the contents, choosing the teaching and evaluation methods, teachers can enable establishing connections between the knowledge obtained in various subject matters, can stimulate the students to engage in activities that will be stimulating intellectually, and, eventually, help students become autonomous (Allen, 1981; Yang, Chang & Hsu, 2008). Previous research studies have shown that cognitive development as described in this theory plays an important role in academic performance (Schommer, 1993; Zhang, 1999). Starting from the characteristics of each stage, we expect to highlight differences regarding students' preference for a particular information processing style (rational or experiential) and for the motivational and learning strategies employed in the learning process, depending on the level of cognitive development at which the students are situated.

Processing Information

The manner in which the students approach learning and process information represent essential aspects in the educational context. Epstein (2003) speaks of two independent and interactive systems of information processing that lie at the base of the decisional and rational processes: the *intuitive-experiential system* and the *analytical-rational* one. The intuitive-experiential system operates in a preconscious, concrete, holistic, affective way, based on heuristics, with a minimum appeal to cognitive resources. The analytical-rational system operates in accordance with a person's understanding of the rules of reasoning and of evidence, which are mainly culturally transmitted; it is conscious, abstract, logical, affect-free and requires superior cognitive resources (Epstein, 2003). The fact that each person processes information through the two different systems, leads to the occurrence of individual differences reflected in the thinking styles, learning styles and in the person's receptivity to different types of messages (Epstein, 2003).

In an attempt to capture the type of cognitive processing that the person uses in various situations – the rational (need for cognition) and experiential (faith in intuition) thinking dispositions, Paccini & Epstein (1999) developed the Rational-Experiential Inventory. The tool enables to identify the belief in one's own ability to use one or the other processing system, along with one's preference to engage in one of the two types of processing. *The need for cognition* highlights a relatively stable individual difference and reflects the person's wish to engage in thinking activities. Persons with a more pronounced need for cognitive stimulation do not tolerate ambiguity, tend to seek, acquire, think about, reflect back on information and try to give sense to reality based on various heuristics and cognitive strategies (Cacioppo, Petty, Feinstein & Jarvis, 1996; Kemmelmeier, 2010). These persons are more drawn to complex cognitive tasks than to simple ones and manifest a pronounced preference for activities that imply a considerable cognitive effort (Cacioppo & Petty, 1982, as cited in Curşeu, 2004). *Faith in intuition* refers to a person's preference for experiential processing, considered being affective, heuristic and holistic (Paccini & Epstein, 1999).

Students' preference for a particular learning approach seems to be linked to the manner of information processing in general (Evans, Kirby & Fabrigar, 2003). Thus, the desire to engage in activities that require cognitive effort represents an important part of the deep approach to learning. Like the persons with high need for cognition, students who adopt a deep approach to learning seek information and reflect on it, in order to give meaning to reality and to relate to previous experience. Those who use a surface approach to learning focus on rote learning and on other heuristics, in avoidance of elaborative processing (Evans, Kirby & Fabrigar, 2003). Experimental and non-experimental studies suggested that the differences in information processing regarding the need for cognition are more likely due to differences related to motivation than to those related to ability (Cacioppo, Petty, Feinstein & Jarvis, 1996).

Motivation for Learning

Academic performance depends on the students' cognitive components (volume of knowledge, learning strategies, etc.), but also on the motivational components (expectations, self-efficacy, value attributed to tasks, etc.), as motivation explains the variance at the level of academic performance (Steinmayr & Spinath, 2009).

According to expectancy-value theory, the students' trust in their own abilities to carry out the academic tasks

(self-efficacy) and the extent to which they consider the given task to be important for achieving performances or for their development (task value), are two important variables in understanding academic behaviors and results (Liem, Lau & Nie, 2008). On the other hand, the level of self-efficacy and the type of attributions made by students in the case of academic success partially determine the study strategy. The study strategies used, the cognitive strategies and the strategies for regulating learning (meta-cognitive strategies) are reflected in the type of learning approach (Vermunt & Vermetten, 2004). *Deep learning approach* is centered on establishing connections between pieces of information, on highlighting evidences, with the aim of understanding what is being learned. The *surface approach* focuses on memorizing, refreshing and routine processing, seeking to reach immediate objectives. For this reason, the deep learning approaches are encouraged, which lead to a profound understanding and superior academic results (Vermunt & Vermetten, 2004). Students who feel efficient are much more likely to use a deep approach to learning (Zimmerman, Bandura, & Martinez-Pons, 1992). Also, self-regulated students make more use of surface and deep processing strategies, though their learning approach is primarily deep oriented, while external regulating strategies demand a surface learning approach (Vermunt & Vermetten, 2004).

Instructional practices have motivational consequences for student learning. The interactions between students or between the students and the teacher within discussions or problematic situations created during class (a) help consolidate their self-efficacy; (b) offer them the opportunity to choose and hold a certain control, to understand and live a sense of accomplishment in completing challenging tasks (Pintrich & Schunk, 2002). Also, the process of meaning making and deep understanding may foster students' interest in learning, and making connections with real world situations helps them understand the value and importance of the learning tasks (Resnick, 1987; Newmann et al., 1996; Petrovici, 2012). By means of the variety of tasks and the manner in which they are presented, of the involvement in decision-making, of acknowledging individual accomplishments or by means of the climate created, teachers, in turn, meet the students' behavior (Pintrich & Schunk, 2002).

Method

Objectives of the research

The objectives established for reaching the proposed target were the following:

O1. Identifying the relationships between the motivational and learning strategies used by students in the learning process, the information processing style and their intellectual development level.

O2. Capturing the differences that occur in the case of certain cognitive variables (motivational and learning strategies, information processing), in relation to the student's intellectual development level.

Participants

The study sample of this pilot research is represented by 102 students from the Faculty of Psychology within the West University of Timișoara, Romania – license cycle, distributed according to the year of university studies (30 first-year students, 36 second-year students and 36 third-year students). The represented age interval is between 18 and 23 years, and the average age is M = 20.99. The distribution according to gender is uneven as there are 15 men (14,70%) and 87 women (85,29%). This is due to the fact that the faculty has a higher percentage of women than men.

Instruments

The portfolio of tests used is made up of three questionnaires. The *Rational-Experiental Inventory* (Paccini & Epstein, 1999) aims to identify the experiential (faith in intuition) and rational (need for cognition) dimensions involved in information processing. Each of the main scales are divided into ability (experiential ability, rational ability) and favorability (experiential engagement/favorability, rational engagement/favorability) subscales. The version is made up of 40 Likert scale type 5-step items (1–completely false, 5–completely true). The inventory was initially translated from English into Romanian and then back-translated into English, according to the APA standards. The internal consistency was calculated for the entire questionnaire, as well as for each scale individually and vary between $\alpha = .703$ and $\alpha = .861$, indicating a good internal consistency of the test.

The Intellectual Development Level questionnaire was built based on Perry's cognitive development model (1970). It is a Likert scale type test with 6 steps (1–very strong disagreement, 6–very strong agreement), made up of 69 items that capture the three levels of cognitive development – dualism, multiplicity and relativism. At the dualism stage, the students see the world in opposite terms of black or white, good or bad; perceive their role as one of taking notes, memorizing and reproducing the presented information; prefer their work tasks and courses to have a higher degree of clarity and structuring. At the multiplicity stage, students realize that there can be several "correct" answers; they undertake a certain level of responsibility and try to learn how they can find the right answers. At the relativism stage, students already have the capacity to think in relativistic terms, they analyze evidence, compare interpretations and admit to the fact that the construction of knowledge is based on experience and reflection (Wankat & Oreovicz, 1993). The questionnaire was built during previous studies (Paloș, 2009; Paloș & Drobot, 2009; Paloș, Costea, Munteanu & Drobot, 2010) and is undergoing validation on the Romanian population. The internal consistency was calculated for the entire test as well as for each of the scales that make up the test, and vary between $\alpha = .715$ and $\alpha = .853$, the results indicating a good internal consistency of the test.

The Motivated Strategies for Learning Questionnaire (Rao & Sachs, 1999) captures the motivational orientation and the learning strategies used by students during courses. The questionnaire has 44 Likert scale type 7-step items (1–not at all true and 7–always true) and was built based on a general cognitive perspective on motivation and learning strategies. The five factors highlighted using this questionnaire are represented by: self-efficacy for learning and performance – which focuses on assessing one's own abilities to carry out a task and confidence in the skills to achieve performance in the task; intrinsic value orientation – referring to students' perception on the motives for engaging in a learning task; test anxiety – which is made up of a cognitive element and an emotional one; strategy use – which captures the cognitive and meta-cognitive strategies used by students in solving learning tasks; self-regulated learning strategies – which focus on the difficulties encountered during studying and in covering the curriculum (Pintrich, Smith, Garcia & McKeachie,

1991; Rao & Sachs, 1999). The questionnaire was initially translated from English into Romanian and then back-translated into English, according to the APA standards. The internal consistency was calculated for the entire questionnaire, as well as for each scale individually and vary between $\alpha = .703$ and $\alpha = .861$, indicating a good internal consistency of the test.

Procedures

The questionnaires were applied to a sample of 102 students. The participants were chosen based on voluntary action, after having attended an optional course on the Psychology of learning. The tests were distributed at the beginning of the course and were returned after having been filled out. There was no time limit for filling out the tests, but the process lasted approximately one hour. For the statistical processing of data, we used the SPSS 15.0 program. For the verification of formulated hypotheses, the Pearson coefficient was calculated in order to capture the relationships between the variables analyzed. For the identification of the differences between students, according to the variables taken into consideration, we used the simple ANOVA technique. We only analyzed the results that were significant in relation to the effect size and the statistical power, values calculated using the PowerStaTim 1.0 program (Sava & Maricuțoiu, 2007).

Results

Regarding the relationship between motivational and learning strategies and the information processing style, one can notice significant positive correlations between self-efficacy in learning situations, self-regulated learning strategies and the students' preference for rational information processing, doubled by their need for engaging in activities that require cognitive effort. The effect size values indicate a medium to strong effect for the relationships.

The motivational and learning strategies used by students also correlate significantly with the intellectual development levels that they have reached during the years of university studies. Thus, in the case of the „dualism" development level, one can notice a positive correlation with the anxiety manifested in evaluation situations, and a negative correlation with the self-regulated learning strategies. Also, significant positive correlations were obtained in the case of the „multiplicity" and „relativism" stages of development with self-efficacy in learning situations, the intrinsic value attributed to these, the cognitive and meta-cognitive strategies used and the self-regulated learning strategies – in the case of the „relativism" stage. All the effect size values indicate a strong effect of these relationships (Table 1).

Table 1. Relationships between motivational and learning strategies, the information processing style and the intellectual development levels

Thinking style	Subscales	Self-efficacy	Intrinsec value	Test anxiety	Strategy used	Self-regulated learning strategies
Rational ability	r	.332**				.470*
	r^2	0.110				0.220
Rational engagement	r	.436**				.461**
	r^2	0.190				0.212
Dualism	r			.396		-.411
	r^2			0.156		-0.168
Multiplicity	r	.409**	.552**		.440**	
	r^2	0.167	0.304		0.193	
Relativism	r	.425**	.598**		.503**	.419**
	r^2	0.180	0.357		0.253	0.175

N=102; *p < .05; ** p < .01; r^2=.01 – low effect; r^2=.06 – medium effect; r^2=.14 – strong effect

Selecting the students according to the study year was based on the idea to identify and cover the three levels of intellectual development – dualism, multiplicity and relativism – according to the theory developed by Perry (1970). Due to the fact that, in the entire student sample, we identified only 7 subjects in the dualism stage of intellectual development, 79 in the multiplicity stage and 16 in the relativism stage, in order to reach the second objective of the research, we resorted to making up a new sample. Thus, the 7 *dualist* and the 16 *relativist* subjects were kept. Out of the 79 students in the multiplicity stage we randomly picked a number of 20 subjects, using the SPSS 15.0 program. Thus, the verification of the hypotheses using the ANOVA one way analysis was carried out on a new sample of 43 students. We only kept those relationships for which the effect size values indicated a medium-superior and a strong effect. The decision to random select 20 subjects is a conservative approach and is based on the idea that large disproportions between group sizes would lead to an unjustified increase in statistical power. Although ANOVA is robust-enough to deal with such large group differences, we believe that it could lead to type I errors in hypothesis testing (rejecting the null hypothesis when it should be accepted) by artificially increasing the statistical power of our analyses (Sava & Maricuțoiu, 2007).

By analyzing the results presented in Table 2, one can notice that there are significant differences concerning the intrinsic value attributed to learning tasks and methods (which focus on the difficulties encountered during studying and in covering the curriculum) – according to the students' intellectual development level. The values of the effect size indicate a strong effect of these relationships.

Table 2. Differences regarding the motivational and learning strategies, according to the students' intellectual development level (Statistics from ANOVA)

Dependent variable	(I) development level	(J) development level	Mean difference (I-J)	F	η^2
Intrinsic value	Dualism	Multiplicity	-5.250	F(2,40) = 5.151, p=.010	0.204
		Relativism	-8.250*		
Methods	Dualism	Multiplicity	-6.414*	F(2,40) = 9.329, p<.001	0.500
		Relativism	-8.714**		

* the difference is significant at p<.01; ** the difference is significant at p<.001; η^2=.01 – low effect; η^2=.06 – medium effect; η^2=.14 – strong effect.

Table 3 indicates significant differences that occur between students in the dualism and the relativism stages of intellectual development – concerning the information processing style. The *relativist* students prefer to a greater extent critical reflections, analyses and comparisons, seeking learning activities that strain them intellectually. The effect size values show a strong effect of these relationships.

Table 3. Differences regarding the information processing style, according to the students' intellectual development level (Statistics from ANOVA)

Dependent variable	(I)development level	(J) development level	Mean difference (I-J)	F	η^2
Rational Ability	Dualism	Multiplicity	-4.742	F(2,40) = 9.095, p=.001	0.312
		Relativism	-9.330**		
Rational engagement	Dualism	Multiplicity	-7.742*	F(2,40) = 9.921, p<.001	0.335
		Relativism	-11.205**		

* the difference is significant at p<.01; ** the difference is significant at p<.001; η^2=.01 – low effect; η^2=.06 – medium effect; η^2=.14 – strong effect.

Discussion

The starting point of this pilot research consisted of two objectives: *Identifying the relationships between the motivational and learning strategies used by students in the learning process, their information processing style, and the intellectual development level,* as well as: *Capturing the differences that occur in the case of certain cognitive variables in relation to the students' intellectual development stage.*

Two important elements contribute to the approach of a learning situation: the person's motives for engaging in a learning activity – why the person learns, and strategies the person uses in the given situation – how the person learns (Zhang, 2004). Self-efficacy is defined as a person's confidence to succeed in carrying out a task, and it depends on the person's level of cognitive engagement in the given task. The level of cognitive engagement refers to the volume and type of self-regulating and knowledge strategies used in learning situations (Silver, Smith & Greene, 2001). Self-efficacy beliefs help determine how much effort individuals will expend on an activity, and how long they will persevere when facing obstacles (Phan, 2011). The sense of personal efficacy experienced by the students of our sample and their capacity to improve their performances by adjusting the behavior in a learning task, makes them not only invest cognitive effort, but also engage in activities that require thinking (Paccini & Epstein, 1999; Marks, Hine, Blore & Phillips, 2008).

At the *dualism stage* of intellectual development, students prefer that the work tasks and the courses they attend have a high level of clarity and structure, and any ambiguity or uncertainty that occurs induces doubt and confusion (Wankat & Oreovicz, 1993). From the results obtained by us, one can notice that they worry about their capacity to achieve academic performances and encounter difficulties in covering the subject matters specific of the study year. In the *multiplicity* and *relativism stages*, students already realize that there can be more than one correct answer, or several perspectives that an issue can be approached from, and have the capacity to think in relativistic terms (Wankat & Oreovicz, 1993; Felder & Brent, 2005). This leads to an increase in confidence in their own abilities to cope with learning situations, and the learning activities are given intrinsic value, utility and importance in forming competencies. The meta-cognitive strategies are used more efficiently, and the behavior is adjusted to the tasks to be solved (Rao & Sachs, 1999). In

fact, researches show that using self-regulated learning strategies is influenced by the value attributed to the learning task. Students with high task value prefer using deep cognitive processing and meta-cognitive strategies (Aydin, Uzuntiryaki & Demirdöen, 2010).

Therefore, we can state that a close relationship is outlined between the way in which students perceive their role and that of the teacher in the learning process (in relation to the intellectual development level), the preferred information processing style (experiential or rational), and the way in which students choose their motivational and learning strategies.

Concerning the differences that occur at the level of these cognitive variables in relation to the intellectual development level, we have obtained results that indicate the fact that between the students in the dualism stage of intellectual development and those in the relativism one, there are differences regarding the intrinsic value attributed to learning tasks and self-regulated learning, and adapting their behavior to the learning tasks (Table 2). The *dualist* students focus on taking notes, memorizing information and reproducing it in evaluating situations. It is very difficult for them to establish connections between the information provided within the various subject matters, to develop a holistic perspective on the given phenomenon and to appreciate the tasks' stimulating value and utility in forming and developing competencies (Wankat & Oreovicz, 1993; Felder & Brent, 2005). In *relativism*, the students already have the capacity to think in relativistic terms, to analyze evidence, to compare interpretations and admit to the fact that the construction of knowledge is based on experience and reflection (Perry, 1970; Zhang, 2002). Under these circumstances, learning tasks are considered to be a challenge, and adapting one's behavior is made along with solving the given task.

The *relativist* students' need to reflect, analyze and compare information that they are confronted with, is supported by their involvement to a greater extent in activities that require thinking (rational information processing – Table 3). Unlike the *dualists*, they are inclined and willing to invest more cognitive effort in solving learning tasks. Due to the fact that at this level they are able to establish connections between the knowledge acquired from various subject matters, their approach is no longer linear, step by step. By reflecting, debating and discussing, they engage in a social construction of knowledge, and daily life experience capital becomes essential (Yang, Chang & Hsu, 2008). In this case, it is not only an effective involvement in activities that require thinking, but also an attitude favorable to thinking activities (Bartels, 2008).

Implications of the study

This study's utility is highlighted by the results obtained. Thus, knowing the intellectual development level of the students, depending on the study year, helps teachers understand and shape their expectations regarding the students' capacity to change their way of thinking, to encourage the development and evolution towards superior levels of thinking. All these allow teachers to organize their *teaching activity* (choosing the methods and adapting to the conveyed contents) (Petrovici, 2012), to enable the *learning activity* by means of the educational experiences suggested and to better manage the *evaluating activity* – by devising and choosing those forms of evaluation that allow an "authentic" highlighting of the students' abilities and performances (Allen, 1981).

Emphasizing the value of the tasks suggested for learning and connecting them to practice help students understand the instrumentality of these (their importance for their future), engage in the process to a greater extent and invest more effort into carrying out the tasks. Green, Miller, Crowson, Duke and Akey (2004) underline the fact that perceiving this value has implications in the type of established achievement objectives: students are much more willing to invest effort into studying in order to develop their competence (establishing learning objectives), but also to work harder in order to become better than their colleagues (establishing performance objectives).

Knowing the manner in which the student processes information (experiential and rational) creates the starting point for efficiently devising the learning experiences. Research shows that people achieve better performances when issues are presented to them in a concrete manner, thus stimulating the intuitive-experiential processing, which in turn enables to apply tacit knowledge in problem solving, even when there is not any relevant formal knowledge (Gilhooly & Falconer, 1974).

Limits of the study

The structure of the studied sample (the uneven proportions: male gender-female gender; the intellectual development levels; the years of university studies, the academic specialization) represents a limit of this study. Balancing these characteristics of the sample would be useful in order to obtain a clearer image of the results obtained regarding the relationships with the studied variables. Also, this calls for precaution in generalizing the obtained results, despite the effect size values and the statistical power.

Conclusion and future research direction

Stimulating motivation for learning calls for knowing the students' particularities related to the intellectual development level and the information processing style. Knowing the cognitive and motivational variables play an important role in devising the educational experiences and in making learning more efficient. In the dualism stage of intellectual development students perceive their role to be that of "learning the correct solution" (Perry, 1970). Under these circumstances, they prefer that the information be provided in a structured manner, without any ambiguity. Students are concerned with their capacity to achieve performances and have difficulty covering the curriculum. In the relativism stage, students understand the necessity of their orientation in a "relative world" and perceive their task to be that of "learning to evaluate solutions" (Perry, 1970). This change in paradigm is reflected in their preference for learning situations and the rational information processing style. Having reached this level of intellectual development, students seek situations that require thinking, explaining the way in which things work, comparing, doing things differently from the majority and checking their utility. The feeling of personal efficacy and the efficient management of cognitive and meta-cognitive strategies come to support the efforts of their engagement in the learning process. We can state that, unlike the *dualist* students, the *relativist* ones are more confident in their capacities to achieve performances, understand the importance of learning in forming competencies and manage to adapt their behaviour to the tasks they encounter. All of the above mentioned also demand to

adapt the teaching-evaluating activity on the teachers' behalf. Teachers must not only seek to harness the students' potential, but also to enable their evolution towards superior levels of intellectual development, to help them become „independent thinkers" (Allen, 1981).

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