

## SOME STUDENTS LEARNING STYLE PARTICULARITIES

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**Abstract.** The investigation aimed two objectives, namely to study the relationship between the learning styles, strategies, motivation, orientations and opinions with regard to learning, of Biology Domain students, comparative with those from double domain Biology – Chemistry, and particular learning styles of students from different specialties, which are in the first year of study, comparative with those which are in the last year of cycle I (age III of study), under the Bologna system. A version adapted by Trif, in 2007 [1], of the Learning Style Inventory (ILS), designed by Vermunt and Rijswijk (1998), was administrated to the total number of 77 students. Students of Biology specialization (Bologna system) were largely learning style oriented to understanding and at those of the Biology-Chemistry (last generation of the old system) we identified a style based on reproduction, but the differences of learning strategies and motivations, orientations and opinions were not statistically significant between the two groups of students. The second hypothesis formulated by us proved to be true, identifying significant statistically differences between the strategies, motives and opinions about learning of first academic year students, who prefer step by step learning or external guidance, learning orientation being to note, to obtain a degree, wishing much more support from teachers or colleagues (expressing an undirected learning style), compared with third academic year students, which use concrete processing of information, with getting a job motivation.

**Keywords:** learning style, learning strategies, students, double specializations, age of study.

### INTRODUCTION

Learning style refers to simple preference for the method by which we learn and remember what we learned; show us the way and how we learn; involve that the subjects are processing the information's in different ways, involving cognitive part, the affective-emotional elements, psychomotor and some learning situation characteristics. Learning style accompanies us from we are born. It is not a "given" for life. It is a "flexible" [2]. The students are learning using three principal sensory receivers, namely view, hearing and touch (kinesthetic). Most students are using all of them, to receive information. However, one or two of these styles are dominant. Dominant style defines the best way by which a person can acquire new information by filtering content which follow to be learned. This style may not always be the same for all tasks. Students may prefer a particular learning style for a task and a combination of other styles for other duties.

Often, the learning style is required by the approaches adopted in school, university etc.. In our culture, most students have the dominant visual style or kinesthetic/practical. Less students use the hearing learning style. So, as teachers, it is necessary to present information's using all three learning styles. This creates for all students, regardless of their preferred style, the opportunity to be involved.

Until two decades ago, most research on students learning focused primarily on cognitive processes and motivational strategies. For example, was identified a number of strategies that students can develop to be able to reach understanding concepts [14]. If were interviewed students about learning approaches and identified two different approaches: of surface and of depth [12].

Moreover, the purchase experience model, proposed by Kolb [9], allows the definition of four learning styles: convergent (abstraction), of assimilation (reflexive observation/abstraction), of accommodation (experiments/practical experience),

divergent. Other author [3] made a distinction between three types of strategies learned: deep, surface and motivational.

Classification of Wenstein and collaborators [22] contains scales not only related cognitive processes (information processing) and motivational (motivation), but some aspects of metacognitive regulation (self test). Other research [16] compared several classifications of learning components, concluding that the common elements are the students' basic knowledge, procedural skills, self regulation of learning, motivation and affectivity.

A model of learning styles was have developed [7] noting that in learning, the students are influenced by five main factors, namely: the medium (sound, light, temperature, furniture location and its design); own reactions and emotional processes (motivation, tenacity, sense of responsibility); social preferences (solitary or in different sizes study groups); physiological individual characteristics (visual, hearing, tactile, kinetic etc. and the features derived from them); the thinking type of individual level (synthetic/analytic, impulsive/reflexive, right/left brain sides).

Has developed [17] an inventory of learning strategies depending on the cognitive processes and studied the motivations and affectivity in learning process (an active interest, fear of failure, the excelare intention, directions lost).

Geisler - Brenstein and collaborators [8] have distinguished five types of cognitive learning strategies, namely: deep learning, elaborated processing, operative learning, methodic learning, memory letter by letter.

In his researches, Vermunt (1996-1998) [19] has identified four different styles, the quality of learning were conceptualized as above: undirected learning, directed towards reproduction, directed towards understanding and directed towards application. The last two styles are similar with orientation to understand, respectively to reproduction which was

identified by Biggs [3]. The learning style oriented to application combine concrete processing (realizing, implementation), a conception of learning in which is accentuate use of knowledge and orientation towards vocational learning. This is like an orientation identified [10], which they call an active professional guidance. Researches that led to study the students learning habits are many, from which we mention just the research [19], which used the Learning Styles Inventory (LSI), an instrument aimed to measure several learning components at the students, namely cognitive strategies and processes, adaptive metacognitive strategies, learning conceptions and learning orientations and/or an integrative theory of learning oriented to intercommunication between self training and external training of learning processes, as theoretical models.

Moreover, training the students self training competence is increasing an issue raised by education experts [4]. Very complex structure, called the "students self training competence" (SSC), represent all student capacity involved in planning/design, implementation and evaluation of their training [5]. SSC formation - justified with social, economic or pedagogical arguments (Le Meur, 1998, Siebert, 2001 etc., after [6]) - is a continuous transformation process initiated in undergraduate educational medium and to customize firstly, in relation with professionalization. Less noticed in the Romanian university pedagogy [21, 13], SSC problem (training) is well defined in western literature (Montmartin, 1997, Le Meur, 1998, Siebert, 2001; Straka, 2000, after [6]).

Years ago, double specialization proved to be the best solution, both for universities and in terms of graduates, from many point of view, namely the formation of interdisciplinary mentality, increasing the chances of finding jobs etc.. Because of mechanical application of the Bologna Declaration (1999), through Government Decision no. 88 from 2005 [24], the design of academic specialization under the "double degree" system was abolished and the subsequent legislation corrections, it was readmitted only in the "Language and Literature".

## MATERIALS AND METHODS

The objectives of this study was to identify learning styles of students from Biology and Biology-Chemistry specializations, or to compare learning styles of oradian students from first academic year with those from third academic year, the final year of the first cycle of educational qualification, after Bologna system.

The study hypothesis supposed that there are significant differences between learning styles of students from Biology, in third year (Bologna system) and those from Biology-Chemistry, in fourth year (old system). The second hypothesis supposed that the learning motivation of oradian students (all in Bologna system), in first academic year is different to those from thirty academic year.

The research design was a cross-type, compared. The subjects used in this study were represented by

students from University of Oradea, Faculty of Science, Biology Department, Biology Domain (first generation of Bologna System), and Biology – Chemistry (last generation of old system, with double specialization), both category being in last academic year, and for investigation of second objectives we interviewed students from those university, from different domains, namely: Environmental Geography, Biology, Economics, Political Science, Social Humanistic Sciences, and the total number of students was 77. The students from both specializations, namely Biology, respectively Biology-Chemistry has same teachers to biology courses, but students from Biology – Chemistry, have in addition the chemistry courses, with other teachers.

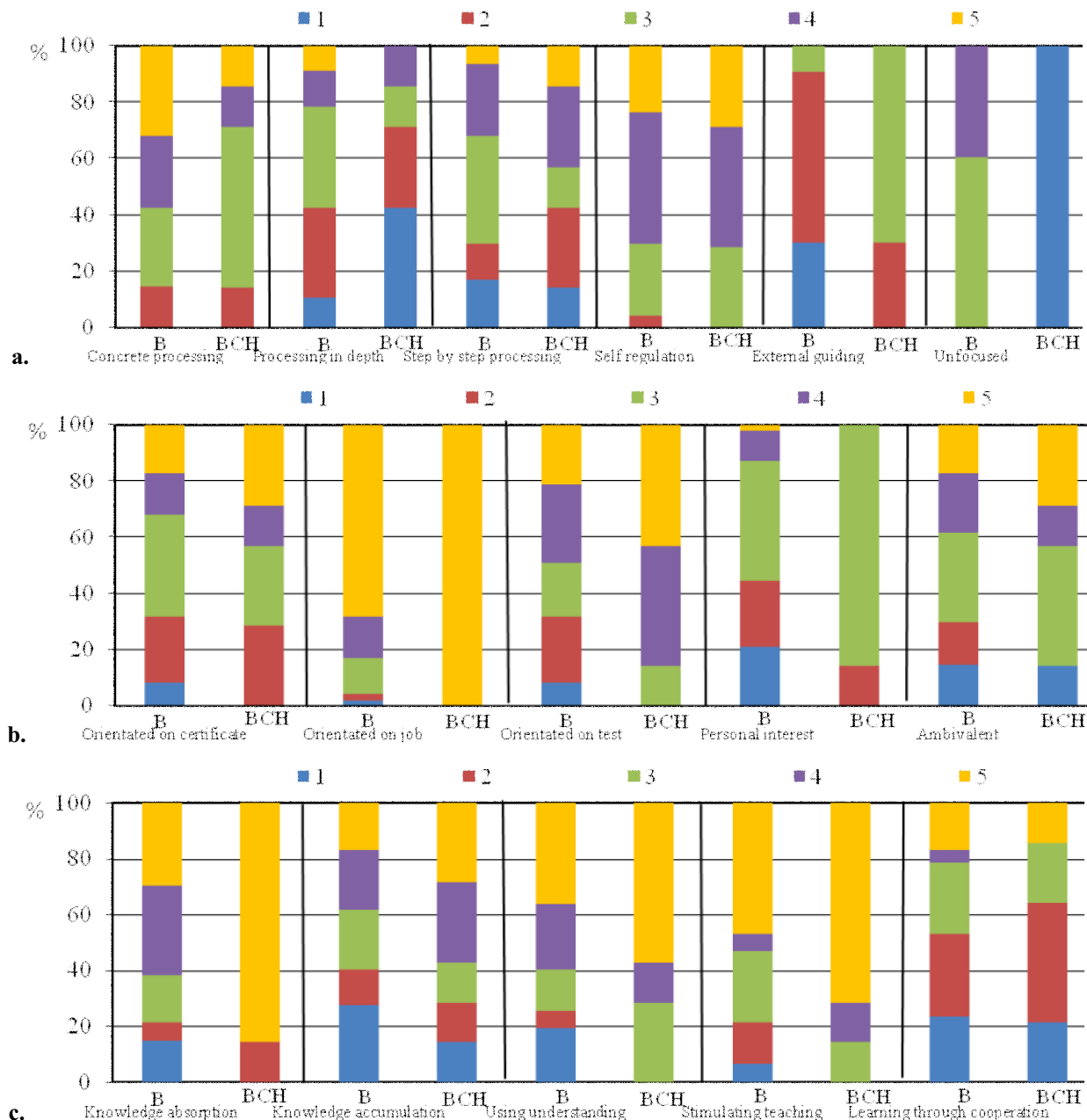
The method used in this research was investigation, the period was April-June 2008, and the information were collected using a questionnaire adapted by Trif F.G. [18], from the Technical University of Cluj – Napoca, by Learning Style Inventory (ILS), the authors being Jan D.H.M Vermunt Frank and A.W.M. van Rijswijk, from the Educational Psychology Department, K.U. Brabant. It contains 120 items, and students give points from 1 to 5 in the importance ascending order. This inventory is a list of statements developed to obtain a clear idea of how the students study (the learning, motivation for learning) and how they perceive the study (their view on the study). The construction of this instrument was based on the inter-individual differences idea looking as potential to develop not as a sign of pathologic or deficiency process. According to this principle, LSI (Learning Style Inventory) is a tool that facilitates the detection of inter-individual differences level of the student's preferences, temperament and personal styles [15].

Data processing was performed with SPSS 15.0. Software. Thus, the indices for testing distribution were done with Kolmogorov – Smirnov test. Since, the data distribution has proved to be symmetrical, we used parametrical tests. Dates were processed with t test (Student test).

## RESULTS

Regarding the learning strategies, students from Biology and Biology-Chemistry had similar preferences, according greater importance on self-regulation and concrete processing of information (Fig. 1). However, in terms of motivation and orientations, if students from Biology are more oriented towards personal interest, suggesting a learning style orientated to understanding, those from Biology - Chemistry, by awarding the maximum points to items belonging scales "Orientation on certificate", "Orientation on test", have shown a learning style orientated on reproduction and the answers given 100% to scale "Oriented on jobs", the style is combined with the those applicative.

Both groups has subjects with undirected learning style, especially at Biology-Chemistry, revealed through gave high score to scales "Ambivalent", "Stimulating teaching" and "Study in group, or through cooperation".



**Figure 1.** Learning style strategies profile (a), motivations and learning style orientations (b) and opinions about learning (c), on scale, of students from Biology (B) or Biology – Chemistry (BCH) Domain, reported values by the total number of students investigated in each group separately (1 - percentage of students which gave 1 points of this items, 2 - percentage of students who gave 2 points of items, 3 - percentage of students who gave 3 point of items; 4 - percentage of students who gave 4 points of items; 5 - percentage of students who gave 5 points of items).

By their style oriented on understanding, the biology students feel that they are the persons who determine what should be taught and what the resources needed insight. They study to know things that interest them personally, want to know which are the subjects of interest area for them, are curious and want to know what they can understand, read books and articles on topics that are not compulsory. In case of problems with the credits obtained, students with learning styles orientated on understood to be realistic and able to differentiate between them and teachers blame. This learning style has a positive effect meaning the chances of success in exams, notes and rate of progress.

Moreover, students of the Biology-Chemistry, generally because of their reproductive styles considered should only acquire knowledge which offers teachers, and these should be limited to material for the exam during the course and not divagation on other issues. For them, the study means learning information paragraph by paragraph. They consider it is irrelevant, even exaggerated, to form their own opinions about the materials studied. After Vermunt [19], a reproductive learning style can be recognized by the mode in which the student mark their courses: if half of the book is colored in yellow marker and all definitions are outlined, the student is like "learning by heart", mechanical. These students marked text to feel good about them: looks like you worked hard. On the other

hand, those who market comments of theory, probably have a learning style orientated on understanding. A learning style oriented on reproduction negative affect the chances of successful, exam results and rate of progress.

As can be seen in Table 1, the first assumption made by us, namely that Bologna students' learning

styles is different toward those of the old system, with double degree, respectively Biology-Chemistry proved to be unjustified, because, after statistical processing of data differences between two groups of students were insignificant.

**Table 1.** Comparison of responses to „Learning Styles Inventory” (LSI) items, depending on the domain of students - Student test (B - Biology; BCH - Biology – Chemistry).

The profile of learning style		Domain	Student no.	Mean	Standard deviation	t value	Signification
STRATEGIES	Concrete processing	B	20	17.2553	3.3717	1.004	.320
		BCH	20	16.2857	2.3346		
	Processing in depth	B	20	35.5745	7.6008	2.094*	.041
		BCH	20	30.8571	6.6432		
	Step by step processing	B	20	28.0851	6.4059	-1.461	.149
		BCH	20	31.2857	9.4741		
	Self regulation	B	20	31.9787	6.2952	-0.092	.927
		BCH	20	32.1429	4.0923		
	External guiding	B	20	31.7447	6.6903	-0.290	.773
		BCH	20	32.2857	3.5394		
	Unfocused	B	20	14.7234	3.3212	-0.662	.511
		BCH	20	15.4286	4.0708		
MOTIVATIONS AND ORIENTATIONS	Orientated on certificate	B	20	15.7021	3.8781	-0.986	.328
		BCH	20	16.8571	3.7387		
	Orientated on job	B	20	22.2553	2.8166	-2.841	.006
		BCH	20	24.4286	0.7559		
	Orientated on test	B	20	14.9574	5.1960	-2.202*	.032
		BCH	20	18.1429	2.6270		
	Personal interest	B	20	14.5957	2.6594	-1.333	.188
		BCH	20	15.5714	1.0894		
	Ambivalent	B	20	11.0851	4.2978	-0.682	.498
		BCH	20	12.0000	4.7717		
OPINIONS ABOUT LEARNING	Knowledge absorption	B	20	32.4468	6.4835	-3.098*	.003
		BCH	20	38.2857	5.0143		
	Knowledge accumulation	B	20	32.9149	6.2374	-1.004	.320
		BCH	20	34.7143	4.4277		
	Using understanding	B	20	24.8936	3.3637	-2.120*	.038
		BCH	20	27.0000	2.8823		
	Stimulating teaching	B	20	29.6809	6.5909	-3.156**	.003
		BCH	20	35.5714	4.1084		
	Learning through cooperation	B	20	21.5319	7.9231	-0.139	.890
		BCH	20	21.8571	6.8932		

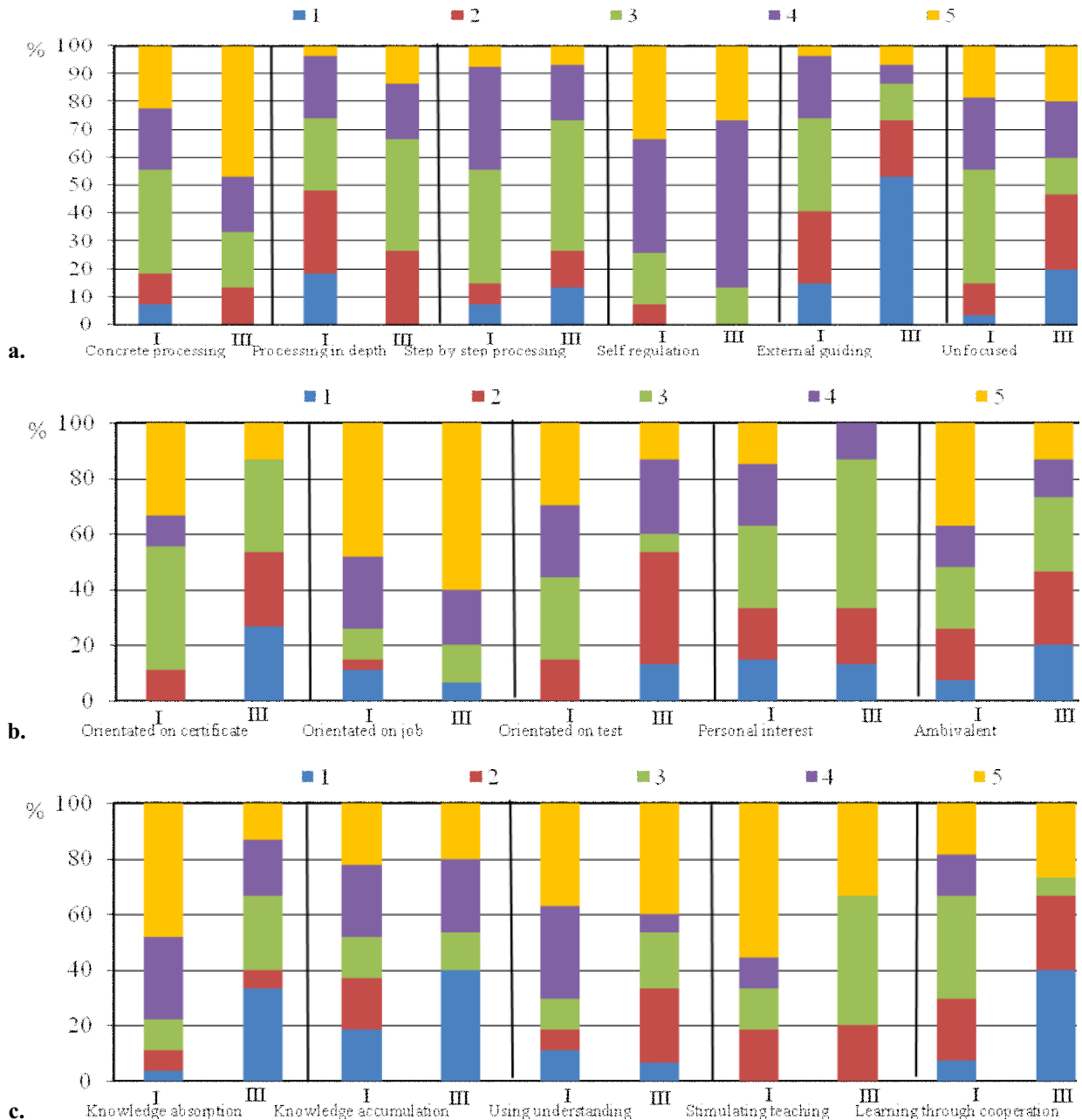
\*\* p < .01; \*p < .05

In the second studies, regarding the particular learning styles of students from first academic year toward those from the third academic year, we can see the tendency self regulation, orientated on test, on knowledge absorption and ambivalence and the need of stimulate learning at students in the first year, suggesting an undirected learning style (Fig. 2).

These students considered that the main task for teachers is to clarify the material and tell them what and how should learn. An undirected learning style reduces the chances of success and slows progress.

Instead, students of third year has such extrinsic motivations, namely getting a job, they already having more clearly defined learning strategies for concrete processing of information (Fig. 2).

Note, however, that half of the students of first year, their reasons are to learn for a job. We will continue this study in a broader analysis of social conditions of these students, the age, marital status, sex etc., in order to conclude with certainty the reasons of early learning.



**Figure 2.** Learning style strategies profile (a), motivations and learning style orientations (b) and opinions about learning (c), on scale, of students from age of study I or III, from different specialization domain, reported values by the total number of students investigated in each group separately (1 - percentage of students which gave 1 points of this items, 2 - percentage of students who gave 2 points of items, 3 - percentage of students who gave 3 point of items; 4 - percentage of students who gave 4 points of items; 5 - percentage of students who gave 5 points of items).

Students of first year significantly need more learning strategies step by step and external orientation, versus with those from third year (Table 2). Their orientation towards notes, to obtain a certificate, significantly higher versus those from third year, is reminiscent of the high school specifically teaching and learning system. Highly statistically significant differences were identified in respect of opinions about learning, namely accumulation of knowledge and the significant for learning through cooperation (Table 2). These students (with undirected learning style) like to

learn with other students, because it can stimulate and motivate each other and talk about things they do not understand. They want to spend time studying regularly, but rarely get to do that. They are not sure if they chose the right program and wonder if the task it is too difficult. After Vermunt [19], the study in group seems to lead to poor results, as generally weak students they work together and encourage each other in their learning style, inadequate, and it has a negative effect on results. But, working in groups can lead to good results.

**Table 2.** Comparison of responses to „Learning Styles Inventory” (LSI) items, depending on the student academic years of study - Student test.

The profile of learning style		Years of study	Student no.	Mean	Standard deviation	t value	Signification
STRATEGIES	<i>Concrete processing</i>	I	27	16.4074	3.3196	-1.516	.138
		III	30	18.1333	3.9073		
	<i>Processing in depth</i>	I	27	34.0000	7.1253	-1.808	.078
		III	30	38.3333	7.9970		
	<i>Step by step processing</i>	I	27	31.6296	6.4340	2.209*	.033
		III	30	27.3333	5.2327		
	<i>Self regulation</i>	I	27	33.0370	6.7680	0.050	.961
		III	30	32.9333	5.9458		
	<i>External guiding</i>	I	27	33.4444	5.6182	2.467*	.018
		III	30	28.5333	7.1100		
	<i>Unfocused</i>	I	27	15.4444	3.1050	0.869	.390
		III	30	14.4667	4.1208		
MOTIVATIONS AND ORIENTATIONS	<i>Orientated on certificate</i>	I	27	17.4444	3.5337	3.342*	.002
		III	30	13.4667	3.9797		
	<i>Orientated on job</i>	I	27	20.2963	4.4705	-0.447	.658
		III	30	20.9333	4.3502		
	<i>Orientated on test</i>	I	27	16.5185	4.2278	2.588*	.013
		III	30	12.6000	5.4746		
	<i>Personal interest</i>	I	27	16.0741	3.0246	1.483	.146
		III	30	14.6667	2.7946		
	<i>Ambivalent</i>	I	27	12.7778	4.8305	1.465	.151
		III	30	10.4000	5.4090		
OPINIONS ABOUT LEARNING	<i>Knowledge absorption</i>	I	27	35.5185	5.1319	3.863 **	.000
		III	30	28.3333	6.8104		
	<i>Knowledge accumulation</i>	I	27	34.1111	6.2347	1.009	.319
		III	30	31.9333	7.4878		
	<i>Using understanding</i>	I	27	25.1111	3.7141	0.386	.702
		III	30	24.6667	3.3094		
	<i>Stimulating teaching</i>	I	27	32.1111	5.9247	1.968	.056
		III	30	28.4000	5.7296		
	<i>Learning through cooperation</i>	I	27	25.1111	6.0912	2.146 *	.038
		III	30	20.0000	9.3503		

\*\* p &lt; .01; \*p &lt; .05

## DISCUSSIONS

Students from Biology specialization had a style mainly aimed to understanding learning and those from Biology-Chemistry, in particular oriented on reproduction, but as statistically was shown, the differences were not significant. The fact that both groups of students have learning strategies and motivation, or opinions about learning similar, without significant differences, although those from double specializations benefits in addition that some chemistry courses, and teaching styles of respective teachers, suggest that this variable is not so important in expressing the students' learning styles, although, as it can see when we compared the learning styles of student from first year and those from the third year, there was significant differences, both in terms of learning strategies and motivations, or opinions about learning. Our conclusion is that these differences were due to the specific teaching from higher education in

general and not in particular to the different teaching styles of university professors.

This conclusion comes in line with dates provided by the literature. Quoting many researchers [11, 10], learning activities are not triggered directly by teaching, especially to students. Students learning conceptions or their mental learning models determine what they mean by "learning" and how they understood learning objectives, learning tasks and teaching methods.

However, knowing by teachers the student's specific learning styles and strategies, the motivation for learning of their needs, a good feedback from their high school performance etc., can be a tool useful to improve their teaching style. Arrangements for identifying learning styles, their characteristics and learning and teaching suggestions for different learning styles, in various forms [1, 23] from the strengths of each style are elements of the reach of any teacher who wants to improve their teaching style. After Viau [20], to students learning starts from the following

assumptions as motivations base and teachers teaching styles. Marton and Saljo [11] made a classification of teaching methods by which educators can improve academic learning for students.

Especially for students in first year of study is important to form their own learning style, slightly different than high school, so we can play a role and academics as to allow students to discover their own style learning is necessary activate all possible means of exposure and information. Basically, we can say that information should be presented in various perceptual forms. It is vital for teachers to use a variety of methods to "enrich" students with strategies to develop learning styles. It is also important to propose activities which should be a backing for learning style self-observation by the student, observations made in group or individual.

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