

Cognitive Style: An Empirical Research with Undergraduate Accounting Students

Jose Dutra de Oliveira Neto [†]

University of São Paulo - Riberão Preto

Victor de Oliveira ^Ω

UNIRG

Claudio de Souza Miranda ^Ψ

University of São Paulo - Riberão Preto

ABSTRACT: This study is mainly aimed at evaluating the relationship between the academic profiles and cognitive styles of undergraduate accounting students. GEFT was used as an instrument to identify cognitive styles, perceptual processes and particularly field-dependence and field-independence. A sample of two hundred and forty students participated in the study, corresponding to 82% of the population. The results show that only variables such as age, course grades, hours of extra studies outside the classroom and salary were significantly related to their cognitive styles. The study concludes that students within the higher age group, lower grades on the subjects, with more dedication to studies outside the classroom and with lower income in the labor market are more likely to be field-dependent. From the recognition of these cognitive differences, it is possible to implement new strategies for teaching and learning in a search of higher quality and greater effectiveness in the teaching-learning process.

Keywords: GEFT, cognitive style, accounting.

Received in 05/027/2008; revised in 03/21/2009; accept in 04/02/2009.

Corresponding authors:

[†] Professor of University of São Paulo - Riberão Preto Campus
Address: Avenida dos Bandeirantes, 3900, Riberão Preto – SP – Brazil – CEP: 14040-900
e-mail: dutra@usp.br
Telephone: (16) 3602-3902

^Ω Adjunct Professor of UNIRG University
Address: Fernando de Noronha no. 2057, Vila Alagoana, Gurupi – TO – Brazil – CEP: 77433-270
e-mail: victor_prof@hotmail.com
Telephone: (63) 3612-7600

^Ψ Professor of University of São Paulo - Riberão Preto Campus
Address: Avenida dos Bandeirantes, 3900, Riberão Preto – SP – Brazil – CEP: 14040-900
e-mail: csmiranda@fearp.usp.br
Telephone: (16) 3602-3902

Editor's note: This paper was accepted by Antonio Lopo Martinez.

1. INTRODUCTION

The production and dissemination of knowledge, arising from teaching, research and extension generate opportunities for local and regional development. In order to achieve excellence in this process, the search continues through the quality of education as it becomes increasingly a priority in higher education institutions (IES).

The recognition of different cognitive styles of learning and the evaluation of possibilities of adaptation of teaching strategies to the individual characteristics of students can generate opportunities for continuous improvement of quality education.

According to Marion, Garcia and Cordeiro (1999), the professor who knows the styles of learning and the profile of the students is able to adopt innovative teaching strategies. For Marion (2001, p. 127) the professor should know the students better and, according to their characteristics, vary the teaching methods.

The general objective of this research is to evaluate the relations between the cognitive styles and the academic profile of the students in a course of Accounting Sciences.

Although the IES, used for this research, has contributed to the development of local economy, we observed an adverse educational result, such as low concepts obtained by their students ("C" in 2003 and "2 out of 5" in 2006) in national assessments of the course, which calls for a search for teaching and learning solutions to help achieve better results.

According to the context, research works with the following variables: Cognitive styles of field-dependence and field-independence, whose indicators are the values obtained as a result of the application of the perceptual GEFT test.

Academic profile, which indicators are derived from three sources: a questionnaire prepared by the researcher, an assessment with questions from ENC and the average marks of the students in the disciplines.

Thus, when working at the relationship between the cognitive styles and academic profile, the following hypotheses were formulated:

- H1: there is no statistically significant difference between the cognitive styles as a result of the professional occupation;
- H2: there is no statistically significant difference between the cognitive styles in terms of education prior to enrollment in college;
- H3: there is no statistically significant difference between the cognitive styles in terms of the current enrolled period in college;
- H4: there is no statistically significant difference between the cognitive styles in terms of hours devoted to study outside the classroom;
- H5: there is no statistically significant difference between the cognitive styles as a result of age;
- H6: there is no statistically significant difference between the cognitive styles on the basis of gender;
- H7: there is no statistically significant difference between the cognitive styles on the basis of academic performance measured by means of the scores obtained in the evaluation prepared with questions taken from National Program Examination (ENC) 2002 and 2003;
- H8: There is no statistically significant difference between the cognitive styles as a result of the academic performance of students measured by the final grade average obtained in official assessments of the institution and the cognitive styles of the same;

- H9: there is no statistically significant difference between the cognitive styles in terms of weekly hours devoted to work;
- H10: there is no statistically significant difference between the cognitive styles as a result of the monthly salary received.

2. COGNITIVE STYLES

According to Lemes (1998, p.8), "the so-called Cognitive Styles, as constructs developed to describe perceptual traits of individuals, have their origins in studies of human cognition in the differential perspective", which can be defined as a field of psychology that has fundamental objectives the study of human behavior, understanding the mental processes and the search for causes and consequences.

Various cognitive thinkers explain the differences in human behavior in the acquisition of knowledge, some researchers sustain themselves on biological aspects, based on the belief that cognitive development occurs from the adaptation of the human being to the physical environment and environmental organizations. According to Silva (2004) the theory of Piaget is based on the biological aspect, and part of the belief that cognitive development occurs as of the adaptation of the human being to the physical environment and environmental organizations. Other investigators explain that the construction of knowledge takes place by means of mediating agents, who drive a person to acquire new knowledge. According to Silva (2004), in the learning theory of Vygotsky, learning drives development and interaction between the two elements of the relation, having a strong connection with the action of the individual and the cultural environment, being as of this point of view, a fundamental factor in mediation. The construction of knowledge occurs through mediating agents that drive a person to gain new knowledge.

One of the most consistent works on cognitive styles regarding field dependence / independence was developed by Herman Witkin and his collaborators (LEMES, 1998). The results of the Witkin's experiments revealed that the individual differences observed could be defined by the level of dependence that the subject had of the structure of his visual field. According to Silva (2004) and Ribeiro (1995), the theory of field dependence versus independence of Witkin stands out by the highest number of investigations and applications in the context of teaching and learning.

In his research, Lemes (1998) characterizes the cognitive styles of dependence and independence as:

Field-dependent - in the teaching-learning process, it requires a further external effort from the student; it depends on the structure provided externally; it prefers a more informal teacher-student interaction; it concentrates on clear and more effective evidence on learning of social material.

Field-Independent – more intrinsic motivation, they prefer to learn independently and individually; they wish to structure ambiguous material and need help in learning social material.

Another characterization of field-dependent and field-independent is provided by Bariani (1998):

Field-dependent individuals - skilled in situations that require personal perception and interpersonal skills; they prefer a more informal teacher-student interaction more informal and like to learn in groups. However, they are reluctant to give critical "feedback".

Field-independent – do better in situations that require an impersonal analysis; they easily correct other people and expose them wrong; they worry more with content than with the professor-student interaction and prefer to learn independently and individually.

According to Bariani (1998), the cognitive styles can be understood as relatively stable ways with respect to the characteristics of the cognitive structure of a person, who are defined in part by biological factors or by culture and are modified from the direct or indirect influence of new events.

2.1 Cognitive Styles in Accounting

The cognitive styles have been applied in various areas of knowledge and the area of accounting has been the object of study.

According to Siegel (1987), the identification of variables that affect the performance of the students in accounting examinations, has generated a large number of research works in the area of education and training. We have identified some of the work dealing with the cognitive styles in accounting.

The work of Mykytyn Jr. (1989) as of 48 experts in finance investigated the impact of the performance and learning with the cognitive styles. The study evaluated these differences based on age, sex, time of employment, time in a current role, educational level, position in the organization and time of academic experience and practical experience in finance. Only the relation of the cognitive styles with the variable time of employment was significant.

According to research conducted by Gul, Teoh and Shannon (1990), with 59 students of the advanced auditing course at the University of Wollongong (Australia), some evidence was identified that the cognitive style Field-dependent and an important variable in assessing the performance of the student in tests of the multiple choice type.

Murphy et al. (1997) administered the test of cognitive style using the GEFT to 110 undergraduate students in accounting, marketing and administration and the results indicated that the students of business administration were moderately field-independent. In addition, students in recent periods tend to be more independent.

Ramsay, Hanlon and Smith (2000) investigated the impact of cognitive style in the preferences for cooperative learning in accounting teaching and identified a significant association in two magnitudes of cognitive style.

Duff (2004) discusses in his work the use of cognitive styles in the development of the competencies of learning of the student of accounting and describes 5 proposals for the use of the cognitive styles of learning.

It was identified in the work surveyed in the area of accounting that there are empirical evidences that there are relations between cognitive styles and several educational variables.

To identify the cognitive style of individuals, the test of the hidden figures called GEFT was used.

2.2 Test of Hidden Figures – Group Embedded Figures Test (GEFT)

The Group Embedded Figures Test (GEFT) –Test of Hidden Figures – a tool used to test the prevalence of cognitive styles, specifically of the magnitude of field-dependent and field-independent. By participating in the test, the individual has to identify a series of 18 simple figures within other more complex figures, in which the bigger figure hides the simple figure.

The result of this test reflects the ability of the individual to identify the hidden figures. This ability is associated to differences in perceptive operation. The GEFT originates from the Test of the Hidden Figures (EFT), developed by Gottschaldt in 1926 and subsequently revised by Witkin and his team. As a result of the application of GEFT, people were classified as dependent or field-independent.

The employment of GEFT is based on the theory of cognitive styles and experience accumulated by research developed using the tool (Clark, Seat and Weber, 2000; Lemes, 1998; Hansen, 1997; Ribeiro, 1995; Rosa, 1994).

The GEFT instrument had its reliability measured in the range of 0.8 to 0.9 (Goldstein & Blackman, 1978). Its correlation with other tests of cognitive styles shows that the test has its concurrent validity in the construct dependent / independent (Witkin, Oltman, Raskin & Karp, 1971). The importance in the use of valid instruments to measure the cognitive styles was discussed by Stout and Rubles (1994).

Several studies which have investigated the relation of some variables with the cognitive style by means of the GEFT instrument (Chart 1).

Variable	Investigator
Reading Comprehension	Rosa (94)
Performance (notes)	Clark, Seat and Weber (00); Lemes (98) and Hansen (97)
Different courses or areas	Clark, Seat and Weber (00), Hansen (97), Murphy (97)
Multiple choice exams	Gul, Teoh and Shannon (90)
Age	Lemes (98), Mykytyn Jr (89)
Educational level	Mykytyn Jr (89)
Ethnic origins	Hansen (97)
Period (enrolled)	Hansen (97), Murphy (97)
Position in the organization	Mykytyn Jr (89)
Gender	Lemes (98), Mykytyn Jr (89), Murphy (97)
Time of academic experience and practice in finance	Mykytyn Jr (89)
Time of employment	Mykytyn Jr (89)
Time in current role	Mykytyn Jr (89)
Professional Vocation	Hansen (97)

Chart 1: Few investigations using the GEFT

3. METHODOLOGY

Considering the proposed objective, this study can be considered as exploratory and descriptive research. According to Gil (2002) exploratory studies are designed to provide greater familiarity with the problem, to make it more explicit or to build hypotheses, including bibliography and interviews. Gil (2002), also emphasizes that the descriptive study aims at describing the primary characteristics of a given population or phenomenon.

From the point of view of the approach to the problem, the research is classified as predominantly quantitative. According to Richardson et al. (1999), the quantitative method, as the name indicates, is characterized by the use of quantitative analysis in both methods of collecting information, and in treating this information by means of statistical techniques, which means translating into numbers opinions and information to rank them and analyze them.

As to the means of investigation, a theoretical and empirical approach was used. To facilitate the implementation of this objective, the research worked with a technical procedure – a “survey”; according to Gil (2002), this procedure involves the direct questioning of people whose behavior one wishes to know. The roadmap with the development stages of the research is outlined in Figure 1.

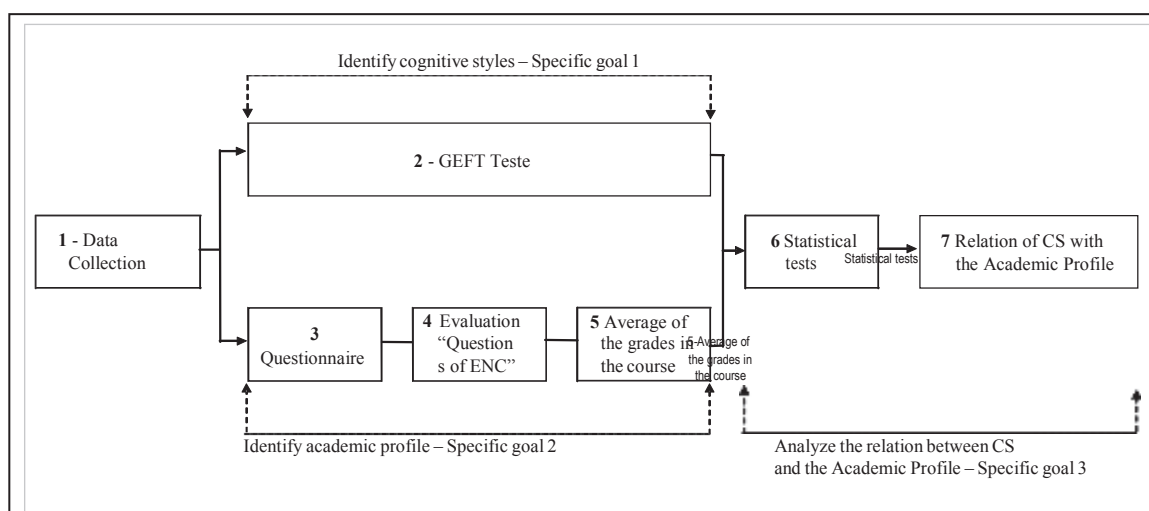


Figure 1: Stages of the performance of the field research

3.1 Sample

This item represents **Step 1** used to conduct this research (Figure 2). Of the 293 active students in the undergraduate course of accounting of the school under study during the second half of 2006, 240 participated in the mapping, representing a sample of 82% of the population. Their distribution by gender and year of enrollment can be observed in Charts 2 and 3. It is a non-probabilistic intentional sample composed by students who studied from the 1st to the 7th semester the accounting course during the performance of the investigation. The students who completed the 8th semester did not participate regularly in the attending academic activities, due to the amount of hours devoted to the preparation of Work of Completion of the Course (TCC). Therefore, the application of research tools for this group was not performed for this group.

Profile	percentage
Men	45%
Women	55%

Chart 2: Gender of the sample

Enrollment	percentage
1 st academic semester	21%
2 nd semester	13%
3 rd semester	18%
4 th semester	13%
5 th semester	13%
6 th semester	10%
7 th semester	12%

Chart 3: Gender of the sample

3.2 Data Collection

The data collection is represented by Steps 2 to 5 of the methodology described in Figure 2 and was responsible for the acquisition of data related to cognitive styles and the academic profile of students.

Step 2 – The cognitive styles of students were identified through the application of the instrument GEFT. The version of the GEFT test used in this study was translated into Portuguese by Oliveira Neto (2006). A kit was originally mounted for each student containing: a pencil, an eraser and a test GEFT. In all applications, it was respected the desire not to participate in the process; however, all students in the 1st to the 7th semester of the course expressed the desire to contribute to the research.

To sort the sample using the GEFT, the methodology used by Lemes (1998) and suggested by Chevrier and Inostrá (1987) was employed. To them, in the separation of the individuals of two categories (in this case, the field-dependent and field-independent categories) it is generally used the median (or arithmetic average). For the first half of the set of the elements, there is a category, and for the second half, there is another. According to the authors, one should eliminate the elements found in the bordering regions to avoid biases in the interpretations from one category to another. In this context, one intends to use the classification of subjects presented in Chart 4:

Subjects	Field Dependent	Eliminated Subjects	Field Independent
Male	0 to 6	7 to 11	12 to 18
Female	0 to 6	7 to 11	12 to 18

Chart 4 : Scores used to classify or delete subjects according to their cognitive style (LEMES, 1998)

For **Steps 3, 4 and 5** of the methodology, information was collected that was characterized in this research as the student's academic profile.

Step 3 – Questionnaire

A questionnaire was developed to help identify the student's academic profile and contained questions about the educational background, in addition to the performance of the academic and professional activities.

Step 4 – Questions of ENC (National Program Examination)

One of the indicators to determine the academic performance of the students was the average obtained from an assessment prepared by the researcher, in which the questions from the National Program Examination (2002 and 2003) were used.

Step 5 – Averages of the grades in the courses

For additional data regarding the academic performance of the students, the final grades obtained in the courses was used, made available by the program's coordination, by means of the school history of all students, with all average grades obtained in the evaluations of each course studied during the second semester of 2003 up to the second semester of 2006. In summary, the variables that were collected for this research are described in Chart 5.

Variable	Origin	Step
Cognitive Styles	GEFT	2
Professional Occupation	Questionnaire	3
Educational Training	Questionnaire	3
Enrollment Period	Questionnaire	3
Hours of study outside the classroom	Questionnaire	3
Age	Questionnaire	3
Gender	Questionnaire	3
Weekly hours of work	Questionnaire	3
Income(Salary)	Questionnaire	3
National assessment (ENC)	Assessment	4
Final grades (course)	Academic Records	5

Chart 5: Variables used in the research

3.3 Analysis of Data

This item represents the analysis of data collected during Steps 2 through 5 and refers to the Steps 6 and 7 of the methodology described in Figure 2. It was begun with a descriptive analysis of data collected along with a univariate analysis of the relation between CS (cognitive styles) and the variables that make up the academic profile.

After this initial analysis, multivariate logistic regression was used with the aim of analyzing the set of variables that presented significant relation with the variables of cognitive styles used in this work. The application of non-parametric tests is based on the following considerations: this research analyzes categorical data and the distribution of sample data of this research is not similar to normal distribution; this scenario, the non-parametric tests are distinguished in relation to the parametric ones. Moreover, the choice of the Mann-Whitney and Chi Square tests is justified by the fact that the initial analysis of data was developed in an univariate way.

When the statistical tests were applied, a level of 0.05 was adopted for alpha coefficient (α) and the results are presented and discussed in the following items.

4. RESULTS AND ANALYSIS

A descriptive analysis of data collected in Steps 2 to 5 of the methodology allowed the identification of cognitive styles and prevailing on academic profiles among the Accounting students of the college surveyed. Next, the possible relations between the academic profile of students of the course of Accounting Sciences from the college researched and their cognitive styles (Steps 6 and 7) were analyzed by means of univariate and multivariate analysis.

4.1 Cognitive Styles (Step 2 of the methodology)

With the determination of the responses obtained in the GEFT, it was possible to know the dominant cognitive styles in the sample. The absolute and relative frequencies are specified in Table 1. Observing the table, it appears that the cognitive style of students is composed predominantly by the field dependent cognitive style.

Table 1: Cognitive Styles of the Students

STYLES	QUANTITY	PERCENTAGE
Field Dependent	149	62,1%
Eliminated Subjects	60	25,0%
Field Independent	31	12,9%

According to the considerations displayed in data collection, the students who obtained grades from 7 to 11 in GEFT present in the bordering area; so, they were eliminated. Therefore, there remained 180 elements in the sample. It is seen that 83% of those who remained in the sample (180 students) tend to depend more on the structure provided externally, concentrate on more obvious signs and like to learn in groups, that is, are characterized as field-dependent.

4.2 Academic Profile (Steps 2, 3, 4 and 5 of the methodology)

The academic profile is represented by the following variables in this study: professional occupation, education, period in which the student is enrolled, hours of study outside the classroom, age, gender, ENC grades, scores obtained in institutional evaluations (average of the grades in the disciplines), weekly hours devoted to work and monthly income. For each of these variables, a descriptive analysis was made and an univariate analysis was made in relation to the cognitive style.

4.2.1 Professional Occupation

The professional occupation is one of the items that comprise the academic profile. This qualitative nominal variable is divided into the following categories: they work, they do not work; for the students who work, they work in the accounting area or do not work in the accounting area. The research instrument used to identify the professional occupation of the students was a questionnaire prepared by the investigators. It was observed that most of the sample works (89.4%) as shown in Chart 6.

Job		Do not work	Do not work account. area	Work in the account. area	Total	
GEFTCAT	Dep.	Individuals	18	93	38	149
		%	12,1%	62,4%	25,5%	100%
	Indep	Individuals	1	21	9	31
		%	3,2%	67,7%	29,0%	100%
TOTAL		Individuals	19	114	47	180
		%	10,6%	63,3%	26,1%	100%

Chart 6: Professional Occupation

In the analysis of relation between the variables, it is observed that there are no significant differences between the cognitive styles of the students as a result of the professional occupation (based on the chi-square test and a p-value = 0.34). Therefore, for the population studied, the fact of working or not, of being or not in the accounting area, shows no significant difference in the scores achieved in GEFT.

4.2.2 Educational Training

The education is a variable of the academic profile. This nominal qualitative variable is divided into the following categories: public elementary school, private or hybrid; public high school, private or hybrid. The research instrument used to identify the education of the students, before they enroll in college, was a questionnaire prepared by the researcher. The basic and fundamental education of the sample under study, in its majority is derived from public education, as it is shown in Chart 7.

Modality	Elementary School	High School
Public and Private	1%	2%
Public	83%	86%
Private	16%	12%

Chart 7: Modality of Basic and High School Education

Using the Chi Square Test to study the relation of this variable with the results obtained from the GEFT, it was seen that there was no statistically significant difference between the cognitive styles in terms of basic education (p-value = 0.39). The same trend was also observed in high school (p-value = 0.63). The education of elementary and high school in public and private schools have no relation with GEFT scores.

4.2.3 Enrolment Period

The period in which the students were enrolled is an ordinal qualitative variable and comprises the academic profile. The sample contains students from every year of the present course as can be seen in Chart 8. The research instrument used to identify the periods in which the students were enrolled was the school record.

Period		1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	Total	
GEFTCAT	Dep.	Individuals	37	15	26	23	22	9	17	149
		%	24,8%	10,1%	17,4%	15,4%	14,8%	6,0%	11,4%	100%
	Indep	Individuals	5	3	6	5	4	5	3	31
		%	16,1%	9,7%	19,4%	16,1%	12,9%	16,1%	9,7%	100%
TOTAL	Individuals	42	18	32	28	26	14	20	180	
	%	23,3%	10,0%	17,8%	15,6%	14,4%	7,8%	11,1%	100%	

Chart 8: Variable Period

In studying the relation of this variable with the scores obtained from GEFT, you can affirm that there is no statistically significant difference between the cognitive styles as a result of the period that is attending in college (U test of Mann-Whitney $Z = 1.00$ and $p = 0.32$).

This result is similar to the results found by Hansen (1997). It was also found that there was no significant variation in the scores obtained in the GEFT when the students are grouped by period in which they are enrolled.

Considering that this study was not longitudinal, little could be ascertained about the differences between the cognitive styles of freshmen, sophomore, junior and, senior students. To verify if there are changes occurring in cognitive styles over time during the undergraduate studies, it would be necessary to follow these students at each completed period and see if there was a change of cognitive style over time. According to the results of Murphy (1997) the longer the period the student is enrolled, the more independent is the student. The author used a sample of 3 different courses (accounting, administration and marketing).

4.2.4 Hours of Study outside the Classroom

This variable making up the academic profile is classified as qualitative ordinal. The instrument used to identify the amount of extra-classroom hours that students spend per week was the questionnaire. It was identified, in the sample under study, that 42.9% of the students have a weekly commitment of up to 2 hours for extra classroom studies.

Relating the variable “studies outside the classroom” with the variable “cognitive style” (scores obtained from GEFT), one can affirm, by means of the results of the U test of Mann-Whitney ($Z = 1.93$ and $p = 0.05$), that there is no statistically significant difference between the cognitive styles as a result of the hours of studies outside the classroom. Dependent students devote a larger amount of hours to studies outside the classroom than students field-independent students, which reinforces the theoretical assumption of H. Witkin cited by Lemes (1998), whose statement is that those dependent on the field require more extrinsic reinforcement.

4.2.5 Age

The age variable is classified as ordinal qualitative and makes up the academic profile. To identify the age of the students, the school record was used. In Chart 9 we can observe that the vast majority of students are in the age group up to 25 years of age (70%), although we can highlight a portion of students above the age of 25 (30%). This could mean a parcel of professionals looking for the professional training through college education.

Age	Up to 20 years of age	20-25	26-30	31-35	36-40	Above 40 years of age
%	32%	38%	15%	10%	4%	1%

Chart 9: Age of the Sample

In studying the relation of this variable with the GEFT score, it was found to be a statistically significant difference between the cognitive styles according to age (U test Mann-Whitney $Z = 2.0$ and $p = 0.04$).

Unlike the results found by Lemes (1998) in the sample analyzed in his study, there is, in this study, differences in the GEFT scores when students are grouped by age. Mykytyn Jr (1989) found the same result as Lemes (1998).

By means of a qualitative analysis of the school records specific of the sample under study, we find that this significant variation in GEFT scores may have occurred because the older students (above the average age group) are generally accounting professionals, who after completion of the technical education, remained several years without any type of study and seek higher education as an alternative to obtain qualification and better positions. It was empirically observed by means of classes taught by the researcher in the education institution, that such students are highly dependent on teachers.

4.2.6 Gender

The nominal qualitative variable of gender is one of the items that comprise the academic profile. The instrument used to identify the gender of the students was the school

record. We see a balance in the sample in relation to the gender as described in Chart 10. With the objective of studying the relation of this variable with the results obtained from the GEFT, it was used the Chi Square test (χ^2).

When we relate the gender variable with the cognitive styles variable, we observed that there is no statistically significant difference between the cognitive styles as a result of gender (confirmed by the χ^2 Test and a p-value = 0.32). The same result was found in the research conducted by Mykytyn Jr (1989).

Period		Male	Female	Total	
GEFTCAT	Dep.	Individuals	67	82	149
		%	45,2%	54,8%	100,0%
	Indep	Individuals	17	14	31
		%	54,8%	45,2%	100,0%
TOTAL		Individuals	84	96	180
		%	46,7%	53,3%	100,0%

Chart 10: Variable, Gender

However, Lemes (1998), based on theoretical propositions highlighted in the manual of application of GEFT (WITKIN et al 2002), states that there are differences expressed in this type of test due to gender. To these researchers, men obtain higher scores than the scores obtained by women, because they women have more trouble viewing figures than men, except in some cases, which was not checked in this study. Therefore, a broader study is necessary to cover this issue.

4.2.7 Hours per week dedicated to work.

The performance measurement of the professional activities was done because the issues studied in this item (professional occupation (working or not), number of hours dedicated to work, remuneration and experience in the accounting area (may influence the performance of academic activities.

This variable is classified as ordinary qualitative and makes up the academic profile. In order not to make the analysis too complex to analyze, this variable was classified as follows: no work, dedication to work of up to 20 hours, dedication over 20 hours up to 44 hours of work per week; dedication over 44 hours of work per week, as noted in Chart 11.

Man hours		0hs	20hs	20 – 44hs	Over 44hs	Total
GEFTCAT	Individuals	19	13	81	36	149
	Dep.	%	12,8%	8,7%	54,4%	24,2%
	Individuals	1	-	22	8	31
	Indep	%	3,2%	-	71,0%	25,8%
TOTAL	Individuals	20	13	103	44	180
	%	11,1%	7,2%	57,2%	24,4%	100%

Chart 11: Variable Weekly Hours dedicated to work

It is important to highlight that when analyzing the number of hours devoted to study outside the classroom, we find no significant difference between the students who work and those that do not work, a fact illustrated in Chart 12. Therefore, these results have shown that specifically in the sample under study, weekly hours devoted to work are not directly related to the number of hours dedicated to the study.

Work Day	Average Weekly Hours of Study outside the Classroom
Not working	3,9
Work up to 20 hours	3,6
Work over 20 up to 44 hours	3,7
Working over 44 hours	3,7

Chart 12: Work hours X Outside Classroom Hours

In order to study the relation of the number of hours dedicated to weekly work dedicated to work with the cognitive styles (GEFT scores), the Chi Square test was used. Through this test, it was possible to see that there is a statistically significant difference between the cognitive styles in terms of weekly hours devoted to work (p -value = 0.005).

In the sample under study, the students with more days of work had higher scores on the GEFT test. The higher the working day of those students, the more skills they would have to learn individually. This is justified because students who dedicate high loads of time to work have difficulties to participate in study groups outside the classroom and to interact with the teacher during class due to the exhaustion caused by work. Although this evidence has been detected, it is suggested to conduct more research to explore this construct, both theoretically and in relation to its validity.

4.2.8 Monthly Income (Salary)

The performance of professional activities, as mentioned in the previous item, can influence the performance of academic activities, accounting for the study of this variable. Classified as qualitative ordinal, this variable comprises the academic profile. In Chart 13 we

can observe that the income profile of the sample is placed mostly under 2 minimum wages. (80%) featuring a sample of low income.

Income (M.W.)	No income	1 to 2	3 to 4	5 to 10	Above 10
%	14	66	17	2	1

Chart 13: Monthly Income

For the analysis of the relation of this variable with the cognitive styles, it was used the U Test. The result found ($Z = 2.19$ and $p = 0.03$) showed that there is a significant relation between variables when the students are grouped by salary categories.

In the sample studied, it is seen that there is a statistically significant difference between the cognitive styles depending on the salary range. The students presented as field-independent receive scores that are significantly higher than those who are field-dependent. This fact may be related to the issue that will be discussed in the next topic. Most businessmen in the region under study values the field-independent professionals.

4.2.9 Notes obtained in the evaluation prepared with questions from the National Program Examination (ENC)

This variable refers to the evaluation with questions from the ENC (Chart 14). The instrument used to identify the results of the students in this variable was an assessment made by the researcher, with ENC questions. Only 25% of the sample received the same score or a score above 5.

Score (0-10)	0	1	2	3	4	5	6	7	8	9
%	3.80%	5.00%	16.70%	27.50%	22.10%	15.40%	7.10%	1.70%	0.40%	0.40%

Chart 14: ENC Assessment

To study the relation of the variable under study with the cognitive styles, the U statistical test was used. The test showed that there is a significant relation between the variables ($Z = 2.81$ and $p = 0.005$). Therefore, there is a statistically significant difference between the cognitive styles as a result of the academic performance measured by means of the scores obtained in the evaluation prepared with questions taken from the “big exams” of 2002 and 2003. In the sample analyzed, the students who have obtained better results in the assessment achieved higher values in the GEFT.

The work of Clark, Seat, Weber (2000); Lemes (1998) and Hansen (1997) (found results similar to those found in this study: students who achieve higher academic performance (grade) score higher values in GEFT.

4.2.10 Scores obtained in institutional assessments.

This variable is classified as continuous quantitative. The instrument used to identify the results of the students in this variable was the school record. We can see in Chart 15 that the institutional measures are high and well above the scores of the ENC evaluation obtained by the same sample (Chart 14).

To study the relationship between this variable and cognitive style, we used the statistical test U of Mann-Whitney. The result of the test showed that there is a statistically significant difference between the cognitive styles depending on the average academic performance through institutional assessments ($Z = 2.88$ and $p = 0.004$).

Average (0-10)	%
5-7	4%
Between 7 and 9	94%
Above 9	2%

Chart 15: Distribution of the scores obtained by the students

The result from this variable reinforces the theoretical assumption of Clark, Seat, Weber (2000), Lemes (1998) and Hansen (1997), presented previously.

The result of the univariate analysis showed some significant relations between cognitive style and academic profile (Chart 16).

Variable	Instrument	Nature	Levels / Categories	Statistical Tests Used	Significant Relation with Cognitive Styles
Professional Occupation	Questionnaire	Qualitative Nominal	Works/Does not Work Accounting/Another area	Chi-Square	No
Education	Questionnaire	Qualitative Nominal	Public / Private / Combined	Chi-Square	No
Period	Records	Qualitative Ordinal	1. to 7.	Mann-Whitney	No
Study outside Classroom	Questionnaire	Qualitative Ordinal	1 h, 2 h, 3 h, ...	Mann-Whitney	Yes
Age	School Record	Qualitative Ordinal	17, 18, 19 .years old	Mann-Whitney	Yes
Gender	School Record	Qualitative Nominal	Men – Women	Chi-Square	No
Assessment (ENC)	Evaluation	Qualitative Continuous	0 – 10	Mann-Whitney	Yes
Assessment (Institution)	Evaluation	Qualitative Continuous	0 – 10	Mann-Whitney	Yes
Hours of Work	Questionnaire	Qualitative Ordinal	1 h, 2 h, 3 h, ...	Chi-Square	Yes
Income	Questionnaire	Qualitative Ordinal	1 - 2 min. wages / 3 - 4 / 5 - 6 / above 6	Mann-Whitney	Yes

Chart 16: Classification of the Variables

4.3 Multivariate analysis of variables with significant relations

As the cognitive style variable (field-dependent or field-independent) is binary and dichotomous, after the selection of variables that have or do not have a significant relation with cognitive styles, we used the method of multivariate logistic regression, in order to identify which variables really have a relation with the cognitive styles.

In choosing the variables that make up the initial model, we decided to choose those that presented a significant relation with the dependent variable; therefore, we have in the model: Study outside the classroom, Age, Evaluation (ENC), Institutional Evaluation, Hours of Work and Income illustrated in Chart 17. It was possible to verify, therefore, that by means of the first multivariate regression, the variables scores in the simulated and weekly hours of work are no longer related with GEFT classified as we can see in Chart 17.

	B	S.E.	Sig.	Exp(B)	95,0% C.I.for EXP(B)		
					Lower	Upper	
Step 1	AGE	-,135	,052	,009	,873	,789	,967
	N. disclip.	1,314	,500	,009	3,723	1,397	9,922
	N. simul	,239	,146	,102	1,270	,954	1,690
	H. week	,146	,363	,688	1,157	,568	2,357
	R. month	1,372	,543	,012	3,942	1,360	11,420
	H. extra	-,192	,089	,030	,825	,694	,981
	Constant	-11,290	4,112	,006	,000		

Chart 17: Multivariate Regression, Model 01

Selecting the variables again, only those that have maintained the relation remained in the model (Chart 18).

After the completion of the statistical tests, it was possible to see the results of the relation of the variables: age: for each increase of one year of age, there is a 15% increase in the probability of the student presenting the cognitive style of field-dependence, Grade's courses: every 1 point in increase in the grade, the probability of independence of field increases by 4 times; Hours of Study outside the classroom: at each 1 hour of study outside the classroom, the likelihood of being field-dependent increases by 20% and Salary: at each increase of one level in the classification of salary, the probability of field-independence increases by 4.2 times.

	B	S.E.	Sig.	Exp(B)	95,0% C.I.for EXP(B)		
					Lower	Upper	
Step 1	AGE						
	N. disclip.	-,145	,052	,005	,865	,782	,958
	N. mensal.	1,426	,491	,004	4,163	1,590	10,900
	R. month	1,450	,511	,005	4,263	1,565	11,611
	H. extra	-,197	,085	,021	,821	,695	,970
	Constant	-10,886	4,065	,007	,000		

Chart 18: Multivariate Regression, Model 02

4.4 Regional Labor Market and Cognitive Styles

Due to the high concentration of field-dependent students in the sample under study, there emerged the possibility of identifying the expectations of regional employers before the cognitive profile of the future preferred professionals for the accountancy profession.

The relevance of the questioning was justified by the need for insertion of these future professionals in the regional labor market and even the context of the Law of Guidelines and Bases of National Education (Law No. 9,394 of December 20, 1996, Article 43), which refers that higher education means to "train graduates in different fields of knowledge, suitable for inclusion in professional sectors" and "provide specialized services to the community by encouraging the understanding of problems of the modern world, especially in the national and regional levels."

Aiming at identifying this preference, as additional contribution to this research, an interview was held with 92 businessmen in the region investigated, a sample corresponding to 38% of all companies established in that region. In the interview, only the characteristics of the field-dependent and field-independent professionals were presented to the businessmen (without their name). These characteristics were created from the theoretical framework presented in this research.

After characterizing the field-dependent and field-independent professional, the employers should tell which of the two options, they would rather hire to render accounting services for their company. Approximately, 69% of respondents chose the field-independent professional. Therefore, it is observed that the cognitive styles prevailing among the college students surveyed are antagonistic to the styles preferred by the regional labor market, represented here by the sample under study, to act in the area of accounting. To Nakagawa (1995) the quality of teaching and result of several processes that include not only the creation but also meeting the needs and expectations of the labor market.

The results generated by the reapplication of GEFT in 2007, a year after applying the GEFT test that originated the results of this research, support this hypothesis. By means of a non-probability sample of convenience, we selected 92 students who participated in the first application to redo the test. Among them, 75% changed the cognitive style and 46 students had lower scores (more dependent) in comparison to the results of 2006. This means that these students were even more dependent on the field, a situation contrary to the preferred sample of employers in the labor market of the region under study.

5. FINAL CONSIDERATIONS

The identification of cognitive styles and the academic profile of the students that comprise the sample of this study have allowed to characterize the predominant trends in it. From this knowledge, it was possible to verify whether there are significant variations in cognitive styles depending on the academic profile of the students of the course of Accounting Sciences at the college investigated. The theme of the teaching-learning processes, educational objectives and cognitive styles discussed in the theoretical framework, brings important information about the individualities of learning, generating subsidies to improve the quality of education. In the theoretical reference, a careful survey was also made of research that validates the use of the GEFT to study the cognitive styles.

The cognitive styles analyzed specifically were the perceptive processes of field dependence and independence. To identify the academic profile, the following variables were analyzed: professional occupation, education prior to enrollment in college, period of the

course, weekly hours of dedication to study outside the classroom, age, gender, number of hours devoted to professional activities. The scores obtained in the evaluation (questions from the National Examination of Courses of 2002 and 2003) and the scores of students recorded in the school record also indicated the academic profile.

In the case of the relation between variables, it is worth emphasizing the expressive number of variables that make up the academic profile. This research was not subject to a limited number of variables; we tried, however, to characterize and analyze a broad set of variables that could directly influence the learning of students. It is believed that this vast composition can contribute to enhance and validate future research.

It was found that, among the variables analyzed, which make up the Academic Profile, only age, grades on disciplines, hours of study outside the classroom and remuneration showed a significant relation with the GEFT classified.

The first hypothesis “there is no statistically significant difference between the cognitive styles as a result of professional occupation” was accepted. There are no significant differences in the GEFT score, regardless of the students working or not, or acting or not in the accounting profession.

The second hypothesis “there is no statistically significant difference between the cognitive styles as a result of the education previous to enrollment in college” was accepted, through statistical tests, it was found that the students coming from public schools did not achieve significantly different GEFT scores than those who studied in private schools.

In the third hypothesis, “there is no statistically significant difference between the cognitive styles as a result of the enrolment period in course in college”, it was found that there is no significant relation between the scores obtained at the GEFT and the period in which the students are enrolled, being this hypothesis accepted.

The fourth hypothesis “there is no statistically significant difference between the cognitive styles as a result of hours devoted to study outside the classroom” was rejected. Field-dependent students devote greater amount of hours to study outside the classroom than students field-independent.

In the fifth and sixth hypotheses, “there is no statistically significant difference between the cognitive styles as a result of age” and “there is no statistically significant difference between the cognitive styles as a result of gender”, by means of statistical tests, it was found that there is difference in the GEFT scores when the students are grouped by age. In the sample, the older students are more likely to be dependent on field. Regarding gender, there was no significant difference when students are grouped by gender. Therefore, the fifth hypothesis was rejected and the sixth was accepted.

The seventh hypothesis, “there is no statistically significant difference between the cognitive styles as a result of the academic performance measured by means of the grades obtained in the evaluation developed with questions taken from the big exams from 2002 and 2003”, and the eighth, “there is no statistically significant difference between the cognitive styles as a result of the academic performance of the students measured by the averages obtained in the official assessments of the institution and their cognitive styles”, were not accepted. Students who achieve higher academic performance punctuate higher in the GEFT.

The ninth hypothesis “there is no statistically significant difference between the cognitive styles in terms of weekly hours devoted to work” was not accepted. By means of statistical tests, it was found that there was a significant relation: students who work on longer work shifts tend to score more in the GEFT.

The tenth hypothesis – “there is no statistically significant difference between the cognitive styles as a result of the monthly remuneration received” – was rejected. The field-independent students receive higher income than the dependent ones.

Following a univariate analysis of the variables, a multivariate logistic regression was performed. Through this regression, it was possible to note that among the variables that showed significant differences when related to cognitive styles, only the variables age, grades on the disciplines, hours of study outside the classroom and remuneration really have a significant relation with cognitive styles. In this multivariate analysis, we found that only the variables age, grade of the disciplines, hours of study outside the classroom and remuneration have significant relations with cognitive style. This means that the students with in the higher age group, lower grades in the disciplines, with study outside the classroom and with less income in the labor market are more likely to be dependent on field.

From recognition of these cognitive differences in the sample under study, we believe it to be possible to implement teaching strategies to improve the relationship between faculty and students, thus providing greater effectiveness and quality in the teaching-learning process, taking into account the individual characteristics of the students.

Another important contribution of this research is the finding that the cognitive style prevailing in the population field-dependent is opposite to that desired by the labor market for the accounting professionals, here represented by a sample of companies surveyed. Noting the concepts of Witkin and Goodnough (1991) cited by Silva (2004, p. 46), the cognitive styles are modified due to biological factors, cultural influences and educational practices. In this context, it is believed that it is possible to make some changes in cognitive styles of the students, which can provide them better opportunities for insertion into the labor market.

Thus, the discussions observed in this study are relevant as they represent a further step towards the understanding of the individuals in learning and, therefore, subsidies to improve the teaching-learning process.

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