

LEARNING STRATEGIES AND MOTIVATIONAL PATTERNS IN DEGREE OF THE SCHOOL OF ECONOMIC AND BUSINESS

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Abstract

In this study the main purpose is to explore relations between students' learning strategies and their motivational patterns in the course Introduction to Economic Statistics of University of Oviedo. The course Introduction to Economic Statistics is a basic training in a Business Administration degree. It is a course common to the degrees in Economics, Accounting and Finance and Labour Relations and Human Resources, which are also part of the course catalogue of the School of Economics and Business. The course has no prerequisites. It is recommended that the student should be competent in mathematics, in any of its options at secondary (high school) level. The evaluation of the course is based on continuous assessment throughout the course and final exam. The results of final grade are very different between the four degrees. In this study, the differences between the learning and motivational patterns employed by the students of the degrees are analyzed. The correlation of motivation and learning strategies with final grades and/or continuous assessment is exposed. The Data was collected thorough the Learning Strategies and Motivation Questionnaire. Participants were 169 undergraduates. The results about the disparities between grades could be useful to correct teaching practices and evaluation performances in some grades

Keywords: Motivation, Learning strategies, Higher education, Statistics.

1. INTRODUCTION

The course Introduction to Economic Statistics is a basic training in a Business Administration degree. It is a course common to the degrees in Economics, Accounting and Finance and Labour Relations and Human Resources, which are also part of the course catalog of the School of Economics and Business at University of Oviedo (Spain). The contents, teaching methodology and assessment of the course are the same the four degrees.

From an educational perspective, two reasons can be highlighted in order to justify the teaching of statistics at undergraduate level: statistics is useful for a future career in economics-business and knowledge of statistics as a part of general education is desirable for all citizens. In this context, the course in statistics in the first undergraduate year aims to introduce students to statistical reasoning, providing basic training to enable them to apply different analytical tools to economic and social problems. This training will be

supplemented with compulsory and optional courses in later years. The course has no prerequisites. It is recommended that the student should be competent in mathematics, in any of its options, at secondary (high school) level.

However, the academic outcomes of this course have been different between the degrees along the years. “The absence of an achievement in this field by students of social science, behavioral science or education, among others, is a recurring topic that teachers and researchers have highlighted in a diverse cultural context for more than 30 years” (García-Santillán et al., 2016).

The students’ attitude has been pointed out as key in the process of teaching-learning in the Statistics subjects (Mondéjar, Vargas & Bayot 2008; Mondéjar & Vargas 2010, among others). According to various authors (Alonso Tapia, 1999; Covinton, 2000; Rinaudo et al., 2003), interest and effort on the subjects depends basically on three factors: utility of learning concepts, possibilities of surpassing the subject and the cost in terms of time and effort that it will involve. Furthermore, several factors related with context and/or the student can be key in the adoption of a deep approach to learning in student-centred learning environments. Baeten et al. (2010) review the recent literature and detail the factors collected in the figure 1.

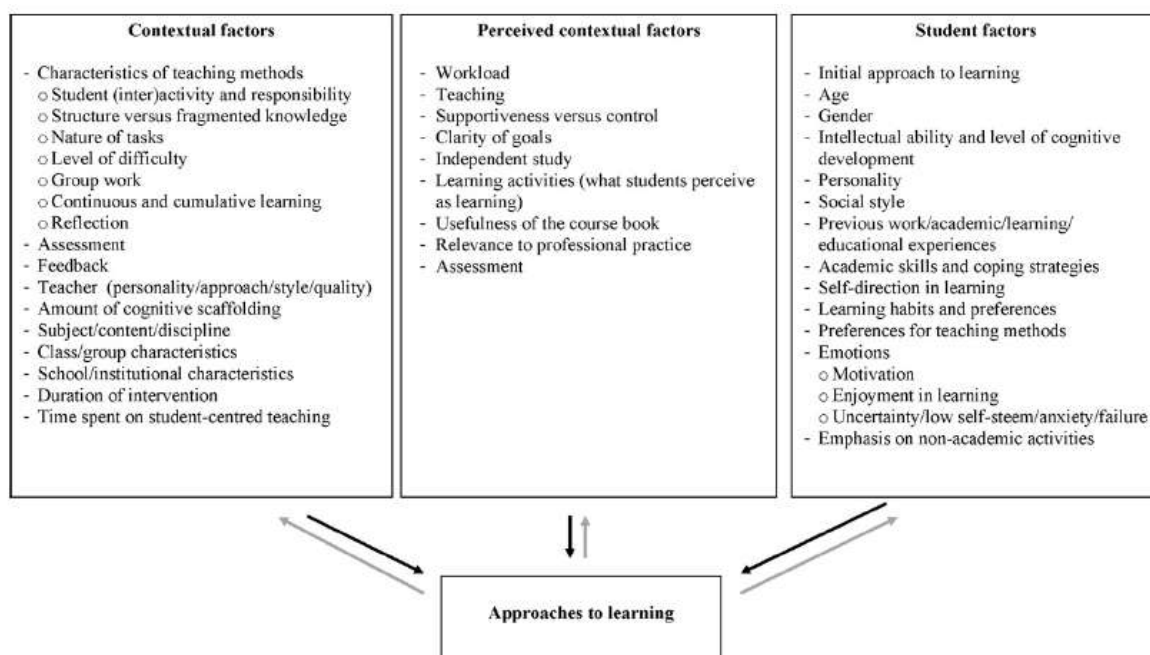


Fig. 1. Success rate.

Usually, questionnaires have been used for measurement the attitude toward Statistics (Blanco, 2008; Carmona, 2004) as: Statistics Attitudes Survey (Roberts & Bilderback 1980), Attitudes Toward Statistics (Wise 1985), Statistics Attitude Inventory (Zeidner 1991), Attitude Toward Statistics (Miller, Behrens, Green & Newman 2007), Survey of Attitudes Toward Statistics (Schau, Stevens, Dauphinee & Del Vecchio 1995), Quantitative Attitudes Questionnaire (Chang 1996) or some Spanish surveys (Auzmendi, 1992, Mondéjar et al. 2008, Estrada, Batanero and Fortuny 2004).

Nevertheless, Shaughnessy (2007) or Eichler and Zapata-Cardona (2016), among others, point out the need to expand empirical research on motivation, strategies and attitudes towards statistics.

In this work, the Motivated Strategies for Learning Questionnaire (MSLQ), developed by a team of researchers from the National Center for Research to Improve Postsecondary Teaching and Learning (NCRIFAL) and the School of Education at the University of Michigan (McKeachie, Pintrich, Lin, & Smith, 1986; Pintrich et al., 1991) is used to study the learning strategies and motivational patterns of the course Introduction to Economic Statistics in Business Administration, Economics, Accounting and Finance and Labour Relations and Human Resources degrees at University of Oviedo. This questionnaire can be applied to assess not only students’ motivation but some of factors key in the approaches to learning detailed by Baeten et al. (2010). The motivation and learning strategies items are correlated with final grades.

2. METHODOLOGY

The MSLQ is a an 81-item questionnaire founded on a cognitive view of motivation and learning strategies (McKeachie, Pintrich, Lin, and Smith 1986; Pintrich et al., 1991; Pintrich and DeGroot, 1990). Under this scope, the student's motivation and learning strategies is not the same in all the courses. The nature, interest of course or the efficacy for performing, among other can affect the social-cognitive view of the student. Students rate themselves on a 7-point Likert scale, from 1(not at all true of me) to 7 (very true of me).

The english version has been adapted to Spanish framework in the called "Cuestionario de Estrategias de Aprendizaje y Motivación- CEAM" (Roces,Tourón and González-Torres, 1995).

The used version in this study is consisted of 26 items which are exposed next. Some items of the MSLQ questionnaire have been excluded for lack of interest in the sample and the course.

Motivation scale

Task Value Sub-scale

- Item 4. I think I will be able to use what I learn in this course in other courses.
- Item 10. It is important for me to learn the course material in this class.
- Item 17. I am very interested in the content area of this course.
- Item 23. I think the course material in this class is useful for me to learn.
- Item 26. I like the subject matter of this course.
- Item 27. Understanding the subject matter of this course is very important to me.

Self-Efficacy for Learning & Performance Sub-scale

- Item 5. I believe I will receive an excellent grade in this class.
- Item 12. I'm confident I can learn the basic concepts taught in this course.
- Item 6. I'm certain I can understand the most difficult material presented in the readings for this course.
- Item 15. I'm confident I can understand the most complex material presented by the instructor in this course.
- Item 20. I'm confident I can do an excellent job on the assignments and tests in this course.
- Item 21. I expect to do well in this class.
- Item 29. I'm certain I can master the skills being taught in this class.
- Item 31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Learning strategies scales

Time/Study Environmental Management Sub-scale

- Item 70. I make sure that I keep up with the weekly readings and assignments for this course.
- Item 73. I attend this class regularly.
- Item 43. I make good use of my study time for this course.
- Item 34. When studying for this course, I often try to explain the material to a classmate or friend.

Peer Learning Sub-scale

- Item 45. I try to work with other students from this class to complete the course assignments Item 50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.

Help Seeking Sub-scale

- Item 58. I ask the instructor to clarify concepts I don't understand well.
- Item 68. When I can't understand the material in this course, I ask another student in this class for help.
- Item 75. I try to identify students in this class whom I can ask for help if necessary.

3. RESULTS

Historically, the learning outcomes vary greatly between degrees. The next figure presents the success rate in the course since the beginning of the degrees in the Bologna process. Economics shows the higher rates in contrast with Labour Relations and Human Resources.

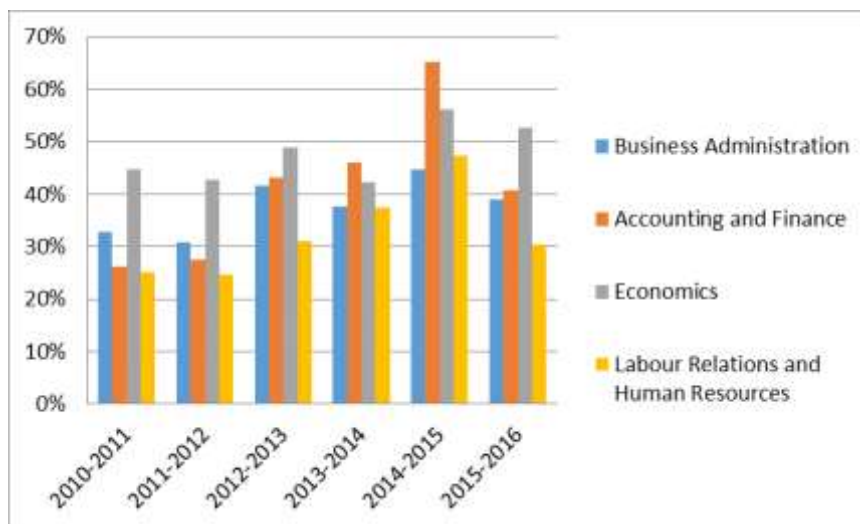


Fig. 2. Success rate. Source: Own elaboration.

The results of MSLQ can provide an empirical linkage between the individual differences in motivation and/or learning strategies with academic performance. The MSLQ was inserted as *Online Questionnaire* in the course web in University Virtual Campus at the end of the quarter. The sample was 168 students of School of Economics and Business at University of Oviedo. There were 62 Business Administration students, 46 Economics students, 28 Accounting and Finance students and 32 Labour Relations and Human Resources.

With the aim of analysis the reliability and validity of MSLQ, alfa and confirmatory factor analysis are used. Cronbach's alpha is a frequently employed index of test reliability or internal consistency of a test or scale. Alpha is a measure to evaluate the extent to which multiple-item measure a concept or construct. Its values are between 0 and 1. In this study, the used instrument had a reliability of 0.889 (Cronbach's $\alpha=0,889$) in the motivation area, all items contributed adequately to this reliability. In the learning strategies area, the reliability is minor but acceptable (Cronbach's $\alpha=0,711$).

The factor analysis requires at least five observations per variable in order to make an adequate and reliability study (Hair et al., 1998). Given the sample size, a confirmatory factor analysis is not completed for each degree. One confirmatory factor analysis was done for the set of motivational items and another for the set of learning strategies items. Previously, the Bartlett's sphericity test and the KMO index were applied. Bartlett's test of sphericity tests whether the correlation matrix is an identity matrix, which would show that the factor model is inappropriate. KMO are based on the comparison of the elements of the matrix correlation with the partial correlation coefficients. KMO returns values between 0 and 1. KMO values between 0.8 and 1 indicate the sampling is adequate for factor analysis. KMO Values between 0.60 to 0.8 are middling sampling adequacy for factor analysis. In table 1 the results of these tests are exposed.

Table 1. Bartlett's sphericity test and the KMO index

	Motivation	Learning strategies
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.850	0.670
Bartlett's Test of Sphericity		
Approx Chi-Square	1212.039	359.390
Df	91	36
Sig	0.000	0.000

The correlation between the variables is checked and therefore, the factor analysis application is justified. The motivation data present a meritorious adequacy, but the learning items adequacy is middling.

The table 2 present the rotated component matrix obtained from the factor analysis.

Table 2. Rotated Component Matrix

	Component	
	Performance	Task
IT20	.859	.082
IT31	.842	.024
IT29	.798	.278
IT5	.743	.032
IT12	.661	.283
IT15	.637	.248
IT6	.627	.319
IT26	.621	.342
IT17	.498	.364
IT10	.220	.832
IT23	.335	.791
IT4	.133	.752
IT27	.020	.622
IT21	.298	.317

	Component		
	Time	Help	Peer
IT70	.803	-.019	.097
IT43	.740	.007	.053
IT73	.675	.255	-.078
IT58	.617	-.035	.155
IT75	.021	.843	-.053
IT68	-.058	.797	.333
IT50	.248	.664	.412
IT45	.039	.184	.846
IT34	.121	.111	.786

Source: Own elaboration.

The obtained factors are very similar to the sub-scales proposed by Pintrich et al. (1993). Only the items: 26, 17, 21, 58, 50 and 34 are located in other sub-scales.

The MSLQ sub-scales were correlated with student's final course grades. All the correlations are presented in annex. Only Self-Efficacy for Learning & Performance aspects and Time or Study Environmental Management have a significant correlation with final grades. Differences between the grades are observed. Final mark present a significant positive correlation with factors related with the time study management in Business and Administration degree. In Economics degree, the factors correlated with the final mark are the self-Efficacy for Learning & Performance strategies and the help of others. However, the performance is the only factor with a significant correlation with final marks in Accounting and Finance degree. No significant correlation with final mark is present in the Labour Relations and Human Resources degree.

These results point out not common motivational patterns for learning in the four degrees. The non-parametric Kruskal- Wallis test can be used for comparing the samples of the four degrees and test the assumption that the medians of all groups are equal. The next table presents the items in which there is evidence that the medians of the four grades are not equal.

Table 3. Kruskal- Wallis test

	IT4	IT10	IT17	IT23	IT26	IT27	IT5	IT12	IT6	IT15	IT20	IT29	IT31	IT70	IT73
Chi cuadrado	30.892	38.039	7.891	20.274	10.135	7.010	7.474	11.700	27.235	33.508	13.221	16.716	9.796	8.957	8.059
gl	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
p	.000	.000	.048	.000	.017	.072	.058	.008	.000	.000	.004	.001	.020	.030	.045

Source: Own elaboration.

So, the differences are in the management of the regularity in the adopted learning strategies (Item 70, Item 73), but above all are concentrated in the value of the subject (Item 4, Item 10, Item 17, Item 23, Item 26, Item 27) and the expectative about the possible performance in the subject (Item 5, Item 6, Item 12, Item 15, Item 20, Item 29, Item 31).

The figure 3 reports 95% confidence intervals for the mean of the previous items, as basic approximation to detect the differences between degrees in these items descriptively. The numbers associated to the grade in the X-axis represent the degrees: Business Administration (1), Accounting and Finance (2), Economics (3), and Labour Relations and Human Resources (4). The value attached to "Introduction to Economic Statistics" course and the expectative about self-efficacy for learning and possible performance course in Labour Relations and Human Resources are smaller than for the rest of the degrees which are more similar. Labour Relations and Human Resources students step up efforts to management their time study by attending the class regularly and keeping up the weekly course tasks. In contrast, Accounting and Finance students retreat from the tasks more usually. Furthermore, Labour Relations and Human Resources and Accounting and Finance students assign lesser value to the learning of the Statistics concepts.

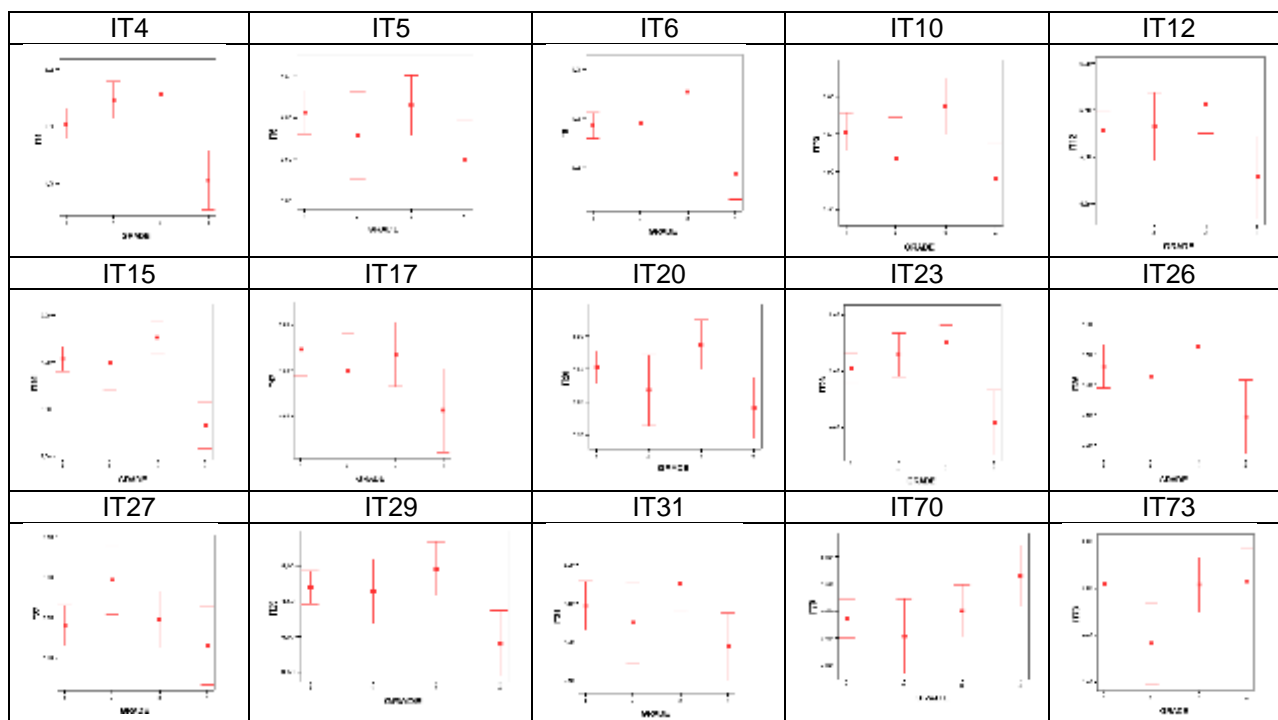


Fig. 3. Error Bar. Source: Own elaboration.

4. CONCLUSIONS

This study examines the linkages between motivation, learning strategies and classroom academic performance for 168 students of the first statistic course in the Faculty of Economics and Business of University of Oviedo. The subject Introduction to Economic Statistics is a course common to the degrees in

Economics, Accounting and Finance and Labour Relations and Human Resources. The contents, teaching methodology and assessment of the course are the same for the four degrees.

The results obtain from the MSLQ point out a different cognitive view of motivation in the degrees. In general, the learning strategies are more stable between degrees with the exception of regularity in the assignments and assistant in the class.

In Economics degree and Accounting and Finance degree, the motivation for learning has a significant impact in the mark of the subject. Not significant correlation between motivation and final mark is observed in Business and Administration degree and Labour Relations and Human Resources degree. The learning strategies around the time study management present a positive repercussion in the final mark only in Business and Administration. The observed attitudes are reported usually in the literature and as consequence a decrease of the interest in the Statistics course and a limitation in the quantitative training is produced (García-Santillán et al., 2016, Eichler and Zapata-Cardona, 2016).

In this sense, the perceived contextual factors to learning should be considered and adapted to each degree to get improved in academic results of the students. It might be advisable to reflect on this point and not require a common content and teaching framework to be kept. Labour Relations and Human Resources needs to make further efforts in order to create an environment conducive to increase attached value of the Statistics and the expectative about self-efficacy for learning. The value of Statistics for Accounting and Finance students should also be increased. A clear application of the Statistics in their respectively professional field can enhance their perception about the topic and their attached value (Vanhoof et al., 2006)

A future question of research refers to the change in these students' motivation and learning strategies along the different years of the degree. The literature reports mixed results between improvements in attitudes (Bond, Perkins, & Ramirez, 2012; Chiesi & Primi, 2010) and not changes (Schau and Emmioglu, 2012) although the individual variability can be large (Millar and White, 2014).

5. ANNEX

Table A1. Correlations

	Performance	Task	Time	Help	Peer	Final mark
Performance	1	.000	.274(**)	.084	.032	.259(**)
		(1.000)	(.000)	(.280)	(.678)	(.001)
Task	.000	1	.009	.087	-.158(*)	.073
	(1.000)		(.912)	(.261)	(.041)	(.349)
Time	.274(**)	.009	1	.000	.000	.180(*)
	(.000)	(.912)		(1.000)	(1.000)	(.020)
Help	.084	.087	.000	1	.000	.019
	(.280)	(.261)	(1.000)		(1.000)	(.808)
Peer	.032	-.158(*)	.000	.000	1	-.049
	(.678)	(.041)	(1.000)	(1.000)		(.531)
Final mark	.259(**)	.073	.180(*)	.019	-.049	1
	(.001)	(.349)	(.020)	(.808)	(.531)	

Source: Own elaboration.

*, ** and *** indicate, respectively, that the correlation is significant at the 0.05 and 0.01 levels (2-tailed).

Table A2. Correlations by degrees: Business and Administration and Economics

	Performance	Task	Time	Help	Peer	Final mark
Performance	1	-.038 (.769)	.255(*) (.045)	-.065 (.615)	-.188 (.144)	.205 (.109)
Task	-.128 (.398)	1	.130 (.316)	-.142 (.271)	-.015 (.907)	-.016 (.899)
Time	.375(*) (.010)	.057 (.706)	1	-.013 (.920)	.009 (.945)	.250(*) (.050)
Help	.177 (.241)	-.010 (.946)	-.007 (.961)	1	.011 (.931)	-.214 (.095)
Peer	.185 (.219)	-.279 (.061)	(-.030) .842	-.185 (.220)	1	-.055 .671
Final mark	.309(*) (.037)	-.007 (.961)	.188 (.211)	.336(*) .022	-.296(*) .046	1

Source: Own elaboration. Business and Administration (above the diagonal) and Economics (below the diagonal).

Table A3. Correlations by degrees: Accounting and Finance and Labour Relations and Human Resources

	Performance	Task	Time	Help	Peer	Final mark
Performance	1	-.391(*) (.040)	.405(*) (.033)	-.050 (.800)	.098 (.621)	.442(*) (.018)
Task	.025 (.892)	1	-.398(*) (.036)	.316 (.101)	-.249 (.202)	.129 (.512)
Time	.178 (.329)	.512(**) (.003)	1	.021 (.916)	.079 (.691)	.155 (.431)
Help	.235 (.195)	.413(*) (.019)	.021 (.909)	1	.136 (.490)	-.010 (.958)
Peer	.059 (.747)	-.083 (.651)	-.102 (.578)	.106 (.565)	1	.206 (.292)
Final mark	-.124 (.500)	.071 (.700)	.165 (.367)	-.095 (.605)	.196 (.282)	1

Source: Own elaboration. Accounting and Finance (above the diagonal) and Labour Relations and Human Resources (below the diagonal).

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