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LEARNING STRATEGIES IN EXCELLENT AND AVERAGE UNIVERSITY STUDENTS. THEIR EVOLUTION OVER THE FIRST YEAR OF THE CAREER

[*Estrategias de aprendizaje en estudiantes universitarios excelentes y medios. Su evolución a lo largo del primer año de carrera*]

by/por

Article record
About authors
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Gargallo, Bernardo (Bernardo.Gargallo@uv.es)
Almerich, Gonzalo (Gonzalo.Almerich@uv.es)
Suárez-Rodríguez, Jesús M. (jesus.m.rodriguez@uv.es)
García-Félix. Eloina (algarcia@ice.upv.es)

Ficha del artículo
Sobre los autores
Formato HTML

Abstract

The aim of this paper was to analyze the evolution of learning strategies of two groups of students, excellent and average, from 11 degrees of the UPV (Valencia/Spain) in their freshman year. We used the CEVEAPEU questionnaire. The results confirmed the availability of better strategies of excellent students and also the existence of evolutionary patterns in which affective-emotional strategies decrease, such as value of the task or internal attributions, and that others increase, such as extrinsic motivation and external attributions. It seems that the student does not meet your expectations in the new context and professors have important responsibilities.

Keywords

University students; learning strategies; evolutionary study; excellent students; average students.

Resumen

El objetivo de este trabajo era analizar la evolución de las estrategias de aprendizaje de estudiantes excelentes y medios de 11 titulaciones de la UPV (Valencia), en su primer año. Los alumnos contestaron el cuestionario CEVEAPEU en tres momentos. Los resultados constataron mejores estrategias en los estudiantes excelentes. También confirmaron patrones evolutivos en que estrategias afectivo-emotivas relevantes disminuyen, como valor de la tarea o atribuciones internas, y se incrementan otras, como motivación extrínseca y atribuciones externas. Parece que el estudiante no satisface sus expectativas en el proceso de adaptación al nuevo contexto y ahí los profesores tienen responsabilidades ineludibles.

Descriptores

Estudiantes universitarios; estrategias de aprendizaje; estudio evolutivo; estudiantes excelentes; estudiantes medios.

Introduction

Learning strategies are a multidimensional construct for which there are many definitions available (Ayala, Martínez & Yuste, 2004; Beltrán, 2003; Beltrán, Pérez & Ortega, 2006; Bernad, 1999; Danserau, 1985; Kirby, 1984; Monereo, 1997; Nisbet & Shucksmith, 1987; Pozo, 1990; Weinstein & Danserau, 1985; Yip, 2012). It is true that, when it comes to conceptualizing them, emphasis is occasionally placed on cognitive and metacognitive aspects. It is also true that the concept content

has increased, to the extent that it has become more integrative, and includes affective-motivational and support elements.

As we understand it, it is organized as a group that is aware and intentional of what learners do to fulfill a learning objective efficiently in a given social context by integrating affective-motivational, support, cognitive and megacognitive elements. A basic agreement has been reached on the three components of the strategic model of Weinstein, Husman and Dierking (2000), "will", "self-regulation" and "skill", among researchers (Abascal, 2003; Ayala, Martínez & Yuste, 2004; Corno, 1994; García & Pintrich, 1991; Gargallo, 2000; González-Pumariega, Núñez Pérez, González Cabanach & Valle, 2002; Monereo, 1997; Yip, 2012).

We are aware that the concept we propose is broad and eclectic. However, we chose this perspective rather than other more restrictive ones because it is more integrative and allows the design of a more complete strategies map.

The concept must be understood from a dynamic perspective. It emphasizes the "strategic" use of various procedures that are set into motion to learn. The keys are awareness, intentionality, flexibility, handling resources, connection with the context and the capacity to supervise and self-regulate – in short, metacognitive action– (Kirby, 1984; Monereo, 1995).

The psychopedagogic interest of the theme derives from the incidence that learning strategies have on academic performance (Camarero, Martín & Herrero, 2000; Cano & Justicia, 1993; Diset & Marthinsen, 2003; Gargallo et al., 2011; Gargallo, Suárez-Rodríguez & Pérez-Pérez, 2009; Pintrich, 1995; Pintrich & García, 1991; Pintrich, Smith, García & Mackeachie, 1991; Roces et al., 1999; Soares, Guisande, Almeida & Páramo, 2009; Valle & Rodríguez, 1998; Yip, 2007, 2009 and 2012). This is because learning strategies are one of the most powerful explicative constructs of students' learning processes.

Nevertheless, this theme has been poorly addressed in the context to which our research refers by analyzing the excellent student strategic profile that centers on first university years[1]. Yip (2007, 2009 and 2012) has conducted several studies which analyze differences in the use of learning strategies, evaluated with the LASSI scale, between students with high and low grades at the University of Hong Kong by using the division by mean procedure of the grades to differentiate between high- and low-performing students. By means of ANOVA and t-tests, the author found consistent differences, basically in the emotive-affective and metacognitive strategies that favored students with good grades. Similar results have been reported by Proctor, Prevat, Adams, Hurst and Petscher (2006) in a North American university, who also used the LASSI scale, and the division by mean procedure and MANOVA.

There are also studies into how students perform during their first year at university which: analyzed predictive well-fitting variables (Pritchard, Wilson & Yamnitz, 2007), impact of family structure (Deronck, 2007), social support and academic stress (Rayle & Chung, 2007). We also found studies that had analyzed the factors influencing academic performance of native students (Fore, 1998), or students whose parents did not go to university (Strayhorn, 2006). There are also research works into performance while studying (De Miguel & Arias, 1999; Meléndez, 2007).

Since very little research exists on the subject we are dealing with, we center on the learning strategies of excellent students as a relevant element of their learning profile. The aims of this work are to study how learning strategies evolve during university students' freshmen year, based on three data collections conducted during the study period, the differences in this construct between two student groups, excellent and average, and how the

profile in these two groups evolves. We hypothesize that there would be significant differences that would favor excellent students' handling of learning strategies during their first year at university. The analysis of the evolutive profile of their strategies will allow us to also draw relevant conclusions in order to improve not only the process of integration into university, but also academic performance.

Method

Design

This study employs the mixed longitudinal quasi-experimental design as three measures have been taken in the two selected student groups, excellent and average, by comparing the results of both the groups and by also analyzing their evolution throughout their first academic year –a mixed design- (Ato & Vallejo, 2007; Stevens, 2007).

Participants

The sample, which corresponds to the end of instrument application 3, is made up of 217 university students (124 excellent; 93 average) from the Valencia Polytechnic University (UPV), East Spain.

The sample was selected by intentional-type, non probabilistic sampling and by considering two criteria: degree and student type. The intention was to obtain, on the one hand, students from different degrees to explain the diversity in learning strategies over time by incorporating variations owing to the given degree's own characteristics. On the other hand, we opted for two student groups (excellent and average) for the purpose of obtaining two groups that were representative of exceptional and standard performance in the various degrees. This approach proved adequate for our objective because defining the most extreme groups, as far as performance is concerned, did not prove especially feasible in this case.

Regarding the first criterion, 11 student groups from 11 degrees in 9 education centers were chosen, these being: Technical Industrial Engineer, Technical Industrial Design Engineer, Computer Science Engineer, Technical Engineer in Public Works, Technical Architect, Architect, Technical Telecommunications Engineer, Civil Engineer, Industrial Engineer, MA in Fine Arts and MSc in Biotechnology.

In relation to types of students, those students who had obtained the highest grades in the University Access Examination (PAU, in Spanish) were selected as excellent students[2], who were those situated in the 90 percentile, or higher, for each degree. The average students selected were those situated around the median of the degree, by taking a semi-interquartile deviation as the range as being above and below this value. In this way, the PAU grade for excellent students was 8.7 and 7.3 for average students, with significant differences between both groups ($t_{273,567}$=14.823; $p < .000$).

Based on both these criteria, the minimum planned sample for the 2-year research work included 10 excellent and 10 average students per group, a total of 220 students. Since there were reasonable expectations that some students would drop out of the experiment over the 2-year study period, the initially selected sample was slightly larger, with around 300 students, in order to have replacements for those who dropped out. Of these 300 students, a response was obtained from: 281 at instrument application 1; 236 at instrument application 2 and 217 at instrument application 3.

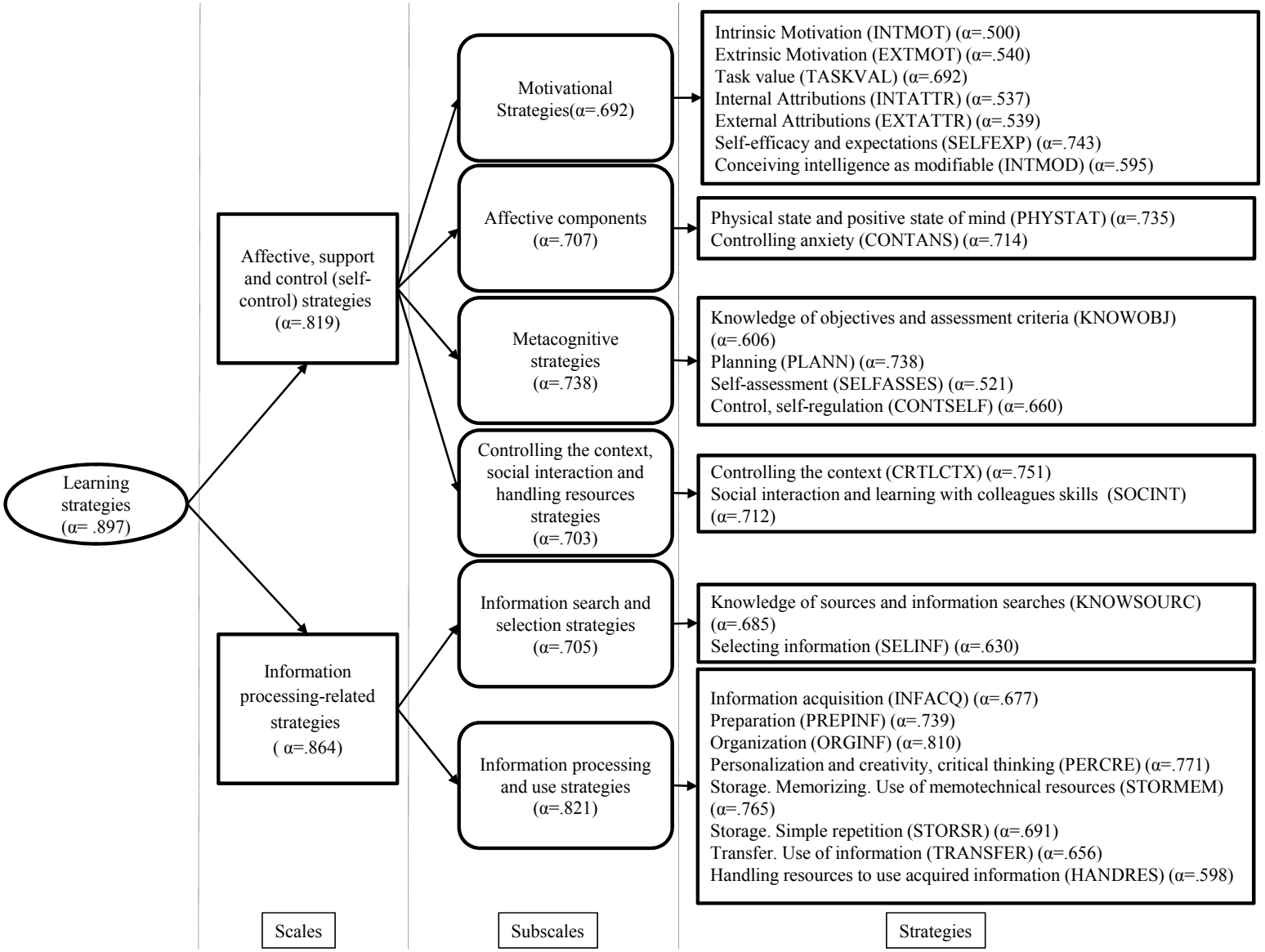

Chart 1.- The CEVEAPEU structure and the internal consistency of the scales

Data collection instrument

The data collection instrument employed was the CEVEAPEU instrument (the University Students' Learning Strategies Evaluation Questionnaire (CEVEAPEU, Gargallo et al., 2009). It contains 88 items with which students answer on a 5-grade scale[3] in terms of the valuation and/or use of the item corresponding to the strategy being dealt with. The questionnaire is arranged into two scales, six subscales and 25 strategies.

Its structure can be found in Chart I along with the corresponding reliability data. This chart also provides the abbreviations employed. The reliability of the whole questionnaire was α= .897. The reliability of the 25 strategies employed in the analysis ranged between .500 and .810, an acceptable value given the number of items involved, which was low in many strategies.

Procedure

The selected students were informed about the purpose of this research and were encouraged to participate in it by means of personal communication. There were three time points; at the beginning of the first 4-month period, students answered the questionnaire for the first time, along with others used in the research, by contextualizing their response as to how they proceeded in the high school course, the course they did before being admitted to university. They answered the questionnaire a second time at the beginning of the second 4-month period, and a third time when this 4-month period finished, by contextualizing their responses to how they worked during their first year at university.

To respond to the questionnaire, the UPV´s e-learning platform was used (https://poliformat.upv.es/portal).

Statistical analyses

The statistical analyses, done using SPSS 17.0, were descriptive and a mixed ANOVA model was used for repeated measures, which is ideal to examine the interaction between the temporal evolution of the strategies and belonging to one of the student groups. We employed the scores obtained by students in the 25 learning strategies, which provided a more detailed approach with a better explanation than taking the scores from the scales or subscales (Chart 1).

The ANOVA- and MANOVA-based models have been recently utilized in this setting for similar problems (Yip 2009 and 2012; Proctor, et al. 2006). This allows us to not only determine if a change took place throughout the study period, but also provides information to qualitatively evaluate this change when examining the interaction between the strategies' temporal evolution and belonging to the group

Results

First this section presents the analysis of the repeated measures model according to the two student groups (excellent and average). Second it offers the multivariate perspective in relation to the strategies' profile.

In order to analyze the evolution in learning strategies of both groups during students' first year at university, a mixed design of repeated measures was used depending on the two groups, which contains an intersubjects factor and an intrasubjects factor (Ato & Vallejo, 2007; Stevens, 2007). In this way, first the differences between excellent and average students in the scores obtained with the learning strategies were analyzed –intersubjects factor-. Second the evolution which occurred when handling learning strategies at three measurement times was studied –intrasubjects factor-. Finally, the interaction between temporal evolution and the student group belonged to was presented, which was completed by verifying the multivariate model in relation to the profile of the 25 strategies considered.

Differences between excellent and average students in their use of strategies during the first year

Excellent students obtained a higher score than average students in 20 of the 25 strategies (Table 1, Figure 1).

Differences with statistically significant means were obtained in 12 of the 25 strategies and in two others (internal attributions and knowledge of sources), with a difference near to the significance value of .05. This difference favored excellent students for task value, self- efficacy, controlling anxiety, planning, self-assessment, control/self-regulation, controlling the context, selection, information acquisition and personalization-creativity. Extrinsic motivation and storage-simple repetition favored average students. This latter finding did not comparably favor average students, who handled more extrinsic motivation and very elemental storage strategies (memorizing by mere repetition without understanding).

As regards effect sizes (from partial η2), we can state that the majority were small (Sink & Mvududu, 2010), although moderate values were achieved for extrinsic motivation and storage by mere repetition -which favored average students-, and for control/self-regulation, with a higher level accomplished by excellent students.

This implies a better strategic pattern for excellent students for the following strategies: affective-emotional, support and control (motivational, affective, metacognitive and controlling the context); information processing and use (selecting and searching for information, information processing and use).

Excellent students' best strategic handling was relevant given the influence of performance strategies, as we once again corroborated with the students of our study sample (Gargallo et al., 2011). This helped explain excellent students' better academic performance.

Table 1.- Differences in learning strategies between excellent and average university students

Dimensions	Excellent		Average				
	Mean	Standard deviation	Mean	Standard deviation	*F*	Significance	partial η^2
INTMOT	4.09	0.46	4.00	0.45	1.93	0.166	0.01
EXTMOT	2.32	0.76	2.75	0.76	16.31	**0.000**	0.07
TASKVAL	4.21	0.39	4.04	0.39	8.75	**0.003**	0.04
INTATTR	4.10	0.40	3.99	0.40	3.60	0.059	0.02
EXTATTR	2.65	0.65	2.71	0.64	0.38	0.540	0.00
SELFEXP	4.04	0.47	3.89	0.47	5.02	**0.026**	0.02
INTMOD	3.90	0.68	3.99	0.68	0.75	0.387	0.00
PHYSTAT	3.64	0.57	3.53	0.57	1.84	0.176	0.01
CONTANS	3.22	0.76	2.91	0.76	7.98	**0.005**	0.04
KNOWOBJ	3.72	0.51	3.63	0.51	1.67	0.197	0.01
PLANN	3.13	0.79	2.87	0.79	5.26	**0.023**	0.03
SELFASSES	3.97	0.44	3.80	0.44	7.06	**0.008**	0.03
CONTSELF	4.01	0.39	3.79	0.39	15.83	**0.000**	0.07
CRTLCTX	3.84	0.56	3.67	0.56	4.63	**0.033**	0.02
SOCINT	3.85	0.47	3.84	0.47	0.05	0.825	0.00
KNOWSOURC	3.39	0.55	3.25	0.54	3.04	0.083	0.01
SELINF	3.70	0.49	3.54	0.49	5.49	**0.020**	0.03
INFACQ	4.23	0.45	4.09	0.45	5.17	**0.024**	0.02
PREPINF	3.46	0.66	3.30	0.65	2.91	0.089	0.01
ORGINF	3.39	0.83	3.51	0.83	1.11	0.292	0.01
PERCRE	3.64	0.61	3.45	0.61	4.82	**0.029**	0.02
STORMEM	3.49	0.67	3.45	0.67	0.13	0.723	0.00
STORSR	1.80	0.66	2.22	0.66	19.40	**0.000**	0.09
TRANSFER	3.89	0.49	3.78	0.48	2.68	0.103	0.01
HANDRES	3.62	0.65	3.46	0.65	2.67	0.104	0.01

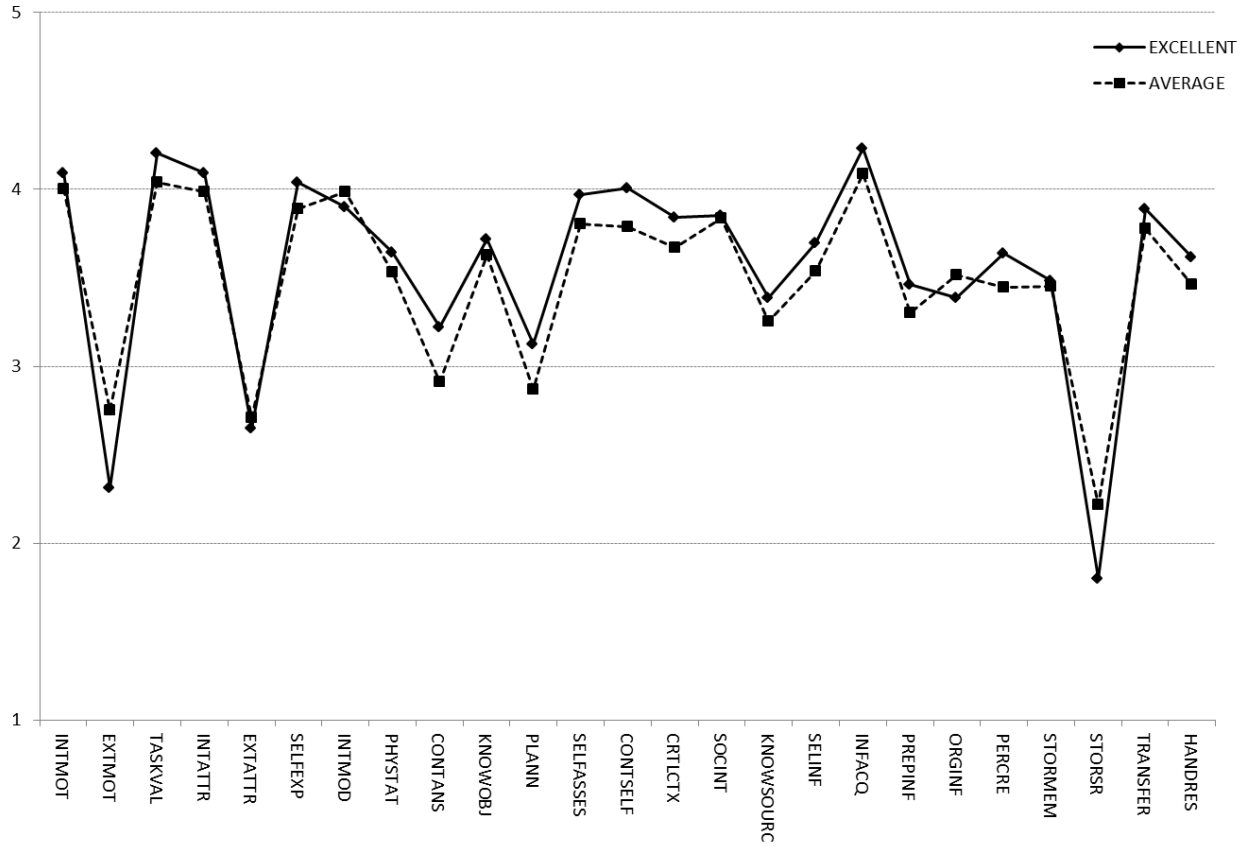

Figure 1.- *Differences in learning strategies between excellent and average university students*

Evolution of learning strategies during the first year after starting university

Four different patterns can be studied within this evolution and were defined depending on the use of the 25 strategies (Table 2 and Figure 2).

The first pattern was made up of learning strategies which increased throughout the first year. There were five: extrinsic motivation, external attributions, social interaction skills, knowledge of searches and sources and preparing information. Only interaction skills did not present a statistically significant difference. For the other four strategies, knowledge of searches and sources was the strategy with a larger effect size (14.6%), with constant evolution noted for all three time points (Bonferroni). Extrinsic motivation increased throughout the year, with a marked increase at the second time point, which slightly lowered at the third time point. For external attributions, evolution was more marked between the first and the second time point, and this increase continued at the third time point. Finally in preparing, a significant difference was found between the first and the third time point, and this increased remained between the second and the third time point. The effect size of these last three strategies took a low value of between 1.9% and 4.2%.

The second pattern included strategies which continued almost without variations. There were three of them: intrinsic motivation –for which a slight increase between the first and the second time point was noted-, controlling anxiety and planning, neither of which showed any significant differences.

Table 2 Evolution of learning strategies during the first year

	Time points measured									Pairwise comparisons (Bonferroni)		
	I		II		III					I-II	I-III	II-III
Dimensions	Mean	Standard deviation	Mean	Standard deviation	Media	Standard deviation	*F*	Sig.	partial η^2	Sig.	Sig.	Sig.
INTMOT	4.03	0.57	4.11	0.56	4.02	0.57	2.442	0.088	0.012	0.162	1.000	0.121
EXTMOT	2.38	0.89	2.59	0.96	2.52	0.90	8.199	**0.000**	0.039	0.001	0.017	0.404
TASKVAL	4.20	0.50	4.16	0.56	4.06	0.52	5.395	**0.005**	0.026	1.000	0.007	0.059
INTATTR	4.08	0.46	4.06	0.57	4.01	0.55	1.603	0.203	0.008	1.000	0.169	0.629
EXTATTR	2.53	0.75	2.72	0.85	2.77	0.78	8.847	**0.000**	0.042	0.009	0.000	0.865
SELFEXP	4.01	0.56	3.91	0.64	4.02	0.57	3.670	**0.026**	0.018	0.190	1.000	0.027
INTMOD	4.01	0.81	3.94	0.83	3.86	0.85	3.885	**0.021**	0.019	0.878	0.014	0.292
PHYSTAT	3.67	0.68	3.50	0.70	3.62	0.62	8.850	**0.000**	0.042	0.000	1.000	0.000
CONTANS	3.07	0.91	3.11	0.85	3.10	0.80	0.584	0.555	0.003	1.000	1.000	1.000
KNOWOBJ	3.78	0.69	3.58	0.69	3.69	0.68	5.636	**0.004**	0.027	0.008	0.582	0.071
PLANN	3.00	0.91	3.03	0.86	3.03	0.90	0.282	0.755	0.001	1.000	1.000	1.000
SELFASSES	3.93	0.55	3.83	0.55	3.94	0.56	5.071	**0.007**	0.024	0.038	1.000	0.013
CONTSELF	3.94	0.50	3.88	0.53	3.93	0.50	2.307	0.101	0.011	0.257	1.000	0.257
CRTLCTX	3.82	0.67	3.69	0.70	3.80	0.67	6.509	**0.002**	0.031	0.003	1.000	0.010
SOCINT	3.79	0.56	3.86	0.58	3.88	0.57	2.833	0.062	0.014	0.358	0.098	1.000
KNOWSOURC	3.12	0.72	3.42	0.62	3.46	0.63	34.473	**0.000**	0.146	0.000	0.000	0.000
SELINF	3.68	0.66	3.55	0.56	3.66	0.53	6.839	**0.001**	0.033	0.004	1.000	0.004
INFACQ	4.25	0.52	4.12	0.58	4.14	0.59	6.088	**0.002**	0.029	0.002	0.053	0.960
PREPINF	3.31	0.82	3.43	0.76	3.44	0.80	3.965	**0.021**	0.019	0.088	0.048	1.000
ORGINF	3.49	1.01	3.37	0.91	3.46	0.90	2.560	0.083	0.013	0.164	1.000	0.112
PERCRE	3.59	0.71	3.48	0.69	3.60	0.74	5.933	**0.003**	0.029	0.029	1.000	0.005
STORMEM	3.47	0.98	3.34	0.95	3.60	0.74	6.189	**0.004**	0.030	0.046	0.417	0.005
STORSR	2.08	0.89	1.93	0.79	1.91	0.79	6.665	**0.002**	0.032	0.018	0.006	1.000
TRANSFER	3.89	0.63	3.77	0.58	3.87	0.61	3.983	**0.019**	0.019	0.049	1.000	0.034
HANDRES	3.56	0.80	3.52	0.76	3.59	0.77	1.074	0.343	0.005	1.000	1.000	0.367

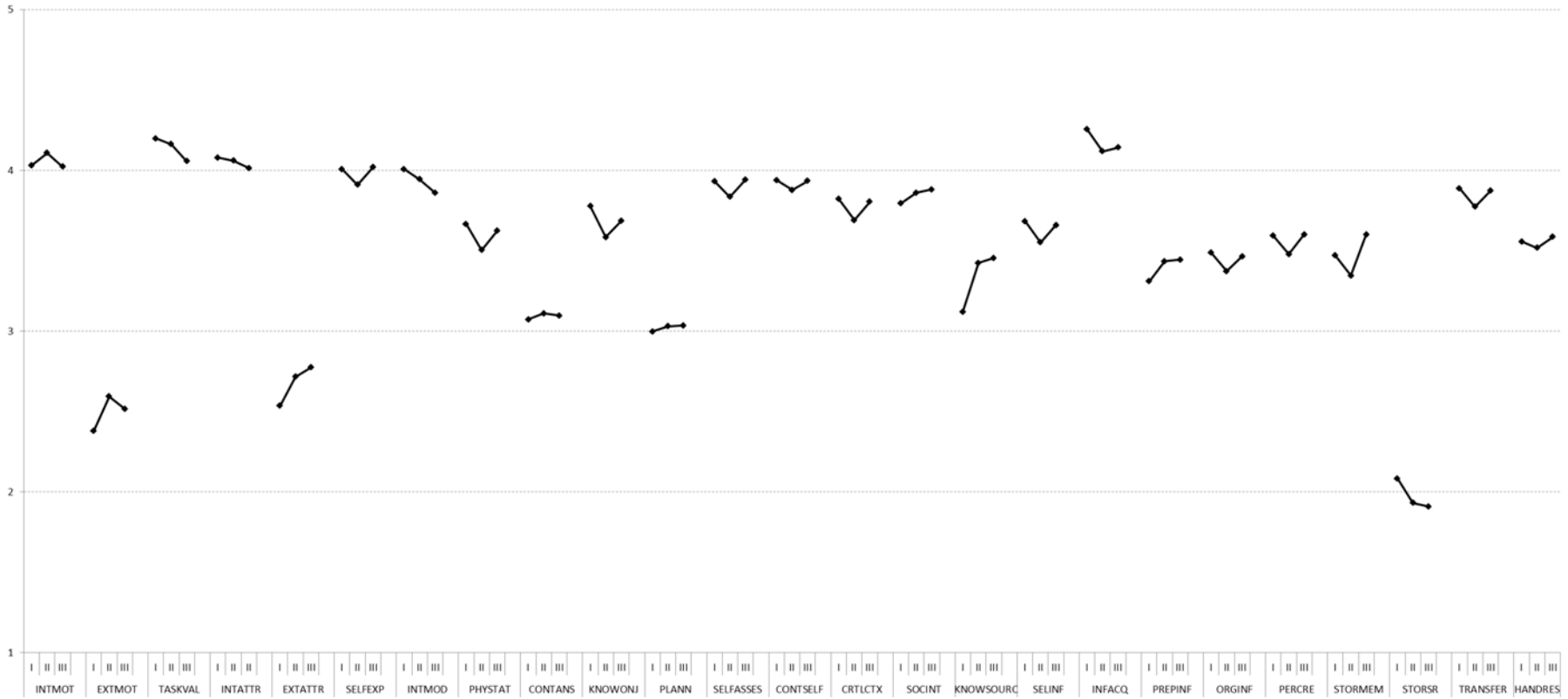

Figure 2.- *Evolution of learning strategies during the first year*

The third pattern included strategies which lowered. There were five: task value, internal attributions, conceiving intelligence as modifiable, information acquisition and storage-simple repetition. In all of them except internal attributions, significant differences were found among the three time points. For both task value and conceiving intelligence as modifiable, the change occurred particularly from the second time point to the third one, although the difference for both strategies was significant between the first and the third time point (Bonferroni). For the other two strategies, information acquisition and storage-simple repetition, the most marked reduction was seen between the first and the second time point –which slightly recovered for information acquisition between the second and the third time point-, while significant differences were encountered in them both between the first and the second time point, and also in storage between the first and the third time point. Effect size effect was small, somewhere between 1.9% and 3.2%.

The fourth group included twelve strategies whose evolution presented a U-shape pattern, with reduction noted at the second time point and recovery at the third. Except control/self-regulation, organization, and handling resources, the remaining strategies presented statistically significant differences at the three time points. Performance in physical state and state of mind, self-assessment, controlling the context, selecting information, personalization and creativity, storage-memorizing, and transfer and use was similar, and statistically significant differences were seen between the first and the second measure and between the second and the third measure (Bonferroni). The self-efficacy and positive expectations strategy only presented statistically significant differences between the second and the third time point. For knowledge of objectives and assessment criteria, the difference was statistically significant between the first and the second time point, and also between the first and the third time point, while the same evolutive pattern as at the other time points was maintained. In this group, effect size was also small in all cases: between 1.8% and 4.2% (Sink & Mvududu, 2010).

Evolution of learning strategies by analyzing the differences between excellent and average students

This section presents the interaction between the strategies' temporal evolution during the first year at university and belonging to one of the two groups: excellent and average.

The previously described patterns were reproduced, broadly speaking, in the interaction (Table 3 and Figure 3). Average students excelled excellent students in five strategies: external motivation, external attribution, conceiving intelligence as modifiable, organizing information and storage-simple repetition. Excellent students excelled average students in the other 20 strategies. Significant differences were found in controlling anxiety, controlling the context and information acquisition, with personalization and creativity coming close to $p<.05$. It is worth stressing the differences in order to be aware of the fact that excellent students display better strategic management.

Regarding evolution for the three time points, the four patterns described earlier were confirmed, with clarifications.

First we look at evolution in the first-scale strategies where relevant elements were found.

In extrinsic motivation, evolution in both student groups was similar, and the distance between average and excellent students remained, with a greater increase for average students, particularly between the first and the second time point.

In task value, a decrease was seen for both student groups at all three time points, although it was more marked in excellent students between the second and the third time point.

In internal attributions, there was a decrease in both student groups, be it at the third time

point, and in the average students where it was less marked.

In external attributions, there was an increase in both groups, which was greater in excellent students between the first and the second time point, and was practically the same for both at the third time point.

In self-efficiency, a decrease was noted in both groups between the first and the second time point, which recovered at the third time point. The excellent student group presented more marked variations.

In conceiving intelligence as modifiable, both groups maintained a decreasing pattern with a sharper drop in average students at the third time point.

In controlling anxiety, the performance of both groups differed: an increase was seen between the first and the second time point for excellent students, but a slight decrease was noted at the third time point, with an increase in average students during the same period.

In knowledge of objectives and assessment criteria, both groups maintained similar performance at all three time points, with a more marked increase in average students for the last measure.

In control/self-regulation, the pattern was similar, with a decrease between the first and the second time point for average students, which recovered at the third time point.

In controlling the context, a decrease occurred with both student groups at the second time measure, which was more pronounced for average students, but recovered at the third time point.

We now go on to detail the evolution of the second-scale strategies.

In information acquisition, the groups' performance differed. At the first two time points, a decrease was seen in them both. From the second to the third time point, excellent students decreased, while average students increased.

In preparing information, performance was also different. An increase between the first and the second time point was noted for excellent students, which lowered at the third time point. However, average students presented a constant increase.

In personalization-creativity, a decrease was found in both student groups between the first and the second time measure, which recovered in the third one, with a more intense change in average students.

In information transfer and use, both groups displayed unequal performance. A decrease was noted for both groups between the first and the second time point, which was slightly more marked for excellent students. Between the second and the third time points, both groups recovered, with a slightly higher increase seen for average students.

As mentioned previously, the interactions were statistically significant in: controlling anxiety, controlling the context and information acquisition. Effect size was small for all three cases (Sink & Mvududu, 2010).

Table 3.- Evolution of learning strategies by differentiating between excellent and average university students

	Time points measured														
	I				II				III						
	Excellent		Average		Excellent		Average		Excellent		Average				η^2
Dimensions	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	*F*	Sig	parcial
INTMOT	4.08	0.58	3.96	0.54	4.15	0.59	4.05	0.52	4.04	0.60	3.99	0.53	0.315	0.730	0.002
EXTMOT	2.24	0.85	2.58	0.90	2.37	0.88	2.91	0.97	2.34	0.77	2.77	1.02	1.504	0.223	0.007
TASKVAL	4.28	0.47	4.09	0.52	4.25	0.54	4.03	0.57	4.10	0.52	4.00	0.50	1.293	0.275	0.006
INTATTR	4.11	0.48	4.03	0.44	4.10	0.55	4.01	0.60	4.08	0.55	3.92	0.53	0.583	0.559	0.003
EXTATTR	2.47	0.75	2.62	0.76	2.72	0.86	2.71	0.85	2.76	0.79	2.79	0.76	0.926	0.397	0.005
SELFEXP	4.11	0.52	3.86	0.58	3.95	0.61	3.85	0.69	4.07	0.55	3.96	0.59	1.737	0.177	0.009
INTMOD	3.95	0.89	4.08	0.69	3.88	0.88	4.03	0.76	3.87	0.91	3.85	0.76	1.300	0.274	0.006
PHYSTAT	3.71	0.66	3.61	0.70	3.57	0.68	3.41	0.72	3.65	0.62	3.59	0.61	0.726	0.484	0.004
CONTANS	3.23	0.91	2.85	0.87	3.26	0.83	2.90	0.84	3.17	0.79	2.99	0.81	3.093	**0.046**	0.015
KNOWOBJ	3.85	0.69	3.67	0.69	3.63	0.68	3.51	0.70	3.68	0.69	3.70	0.67	1.748	0.175	0.009
PLANN	3.09	0.94	2.86	0.85	3.15	0.88	2.86	0.82	3.14	0.95	2.88	0.79	0.173	0.841	0.001
SELFASSES	4.01	0.50	3.83	0.61	3.92	0.52	3.71	0.57	3.99	0.50	3.88	0.63	0.869	0.420	0.004
CONTSELF	4.04	0.50	3.80	0.47	4.00	0.46	3.71	0.56	3.99	0.53	3.85	0.44	2.002	0.136	0.010
CRTLCTX	3.88	0.67	3.75	0.67	3.82	0.64	3.51	0.75	3.84	0.71	3.76	0.61	3.591	**0.028**	0.017
SOCINT	3.80	0.61	3.78	0.48	3.88	0.57	3.83	0.60	3.87	0.58	3.90	0.57	0.535	0.586	0.003
KNOWSOURC	3.17	0.73	3.05	0.70	3.48	0.63	3.34	0.60	3.51	0.65	3.37	0.61	0.029	0.971	0.000
SELINF	3.76	0.68	3.58	0.61	3.63	0.54	3.45	0.58	3.72	0.54	3.58	0.52	0.216	0.806	0.001
INFACQ	4.34	0.53	4.14	0.48	4.21	0.53	3.99	0.62	4.15	0.67	4.13	0.46	3.522	**0.030**	0.017
PREPINF	3.38	0.86	3.22	0.75	3.52	0.74	3.31	0.78	3.49	0.85	3.38	0.72	0.394	0.674	0.002
ORGINF	3.44	1.05	3.55	0.96	3.33	0.97	3.44	0.82	3.40	0.98	3.56	0.78	0.117	0.889	0.001
PERCRE	3.68	0.71	3.47	0.70	3.59	0.65	3.32	0.72	3.63	0.75	3.56	0.72	2.850	0.059	0.014
STORMEM	3.45	1.07	3.50	0.85	3.38	0.97	3.30	0.93	3.63	0.75	3.56	0.72	0.548	0.579	0.003
STORSR	1.88	0.76	2.37	0.98	1.76	0.73	2.16	0.81	1.76	0.76	2.12	0.80	0.790	0.454	0.004
TRANSFER	3.97	0.65	3.77	0.58	3.82	0.59	3.71	0.55	3.88	0.64	3.86	0.57	2.151	0.118	0.011
HANDRES	3.63	0.80	3.45	0.79	3.59	0.77	3.41	0.74	3.63	0.76	3.53	0.78	0.425	0.654	0.002

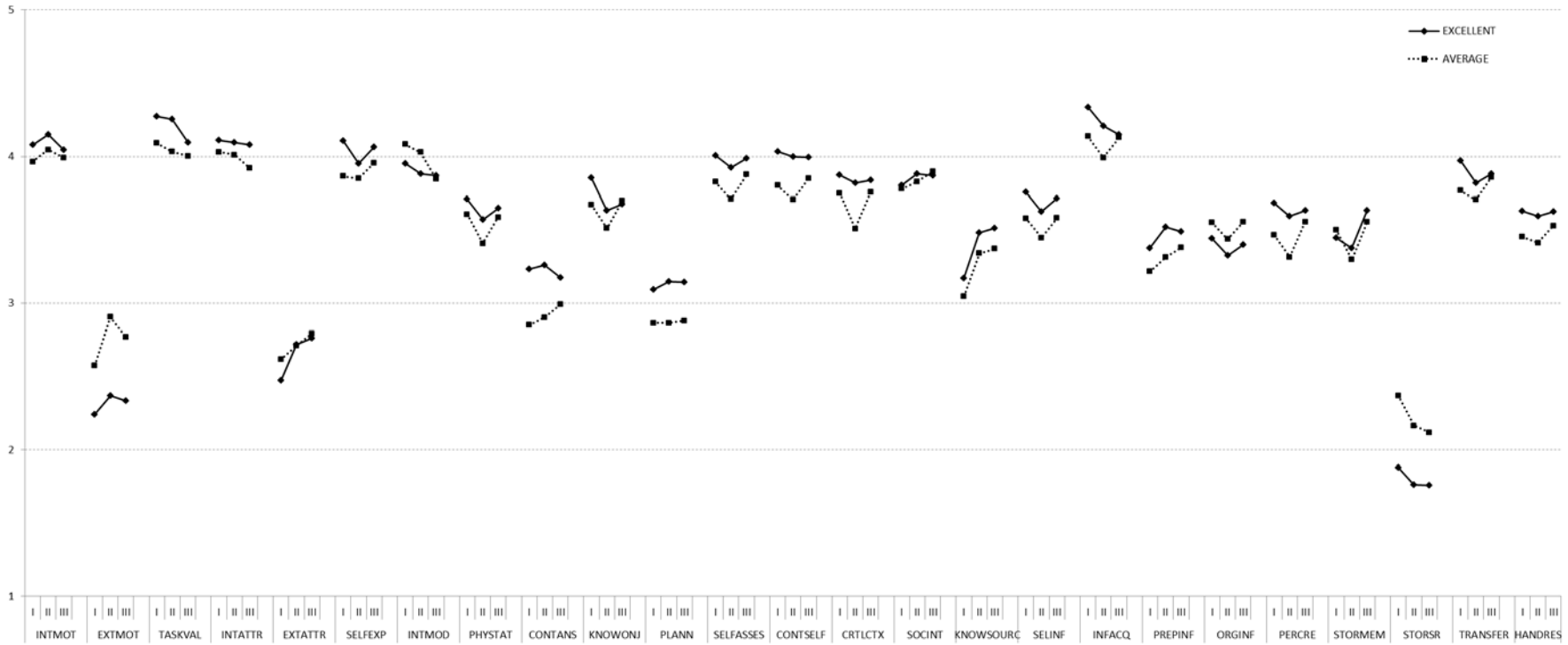

Figure 3.- *Evolution of learning strategies by differentiating between excellent and average university students*

The multivariate perspective: comparisons made in relation to strategies' profiles

In order to estimate all the effects at a multivariate level, the indicator proposed by Wilks was selected.

Firstly, the profile of the 25 considered learning strategies showed a highly relevant significance when comparing both student groups ($F_{25,178}$=2.539; p<0.001; partial η^2 = 0.263). Therefore, we can state that there was an overall difference between both student groups' strategic profile –with the aforementioned specifications- and that it presented a very high level –although in this multivariate indicators case, there tended to be high values, which cannot be interpreted in terms of the proportion of variance explained -.

Regarding the temporary evolution of the profile of the students' learning strategies during their first career year, a very high significance was obtained ($F_{50,153}$=4.620; p<0.001; partial η^2 = 0.602), which perfectly agreed with the large number of significant signs at the univariate level. Thus, we can state that the evolution of the strategies was extremely consistent in terms of the patterns noted at the univariate level.

Finally, as far as the evolution of students' strategic profile during their first career year being different for both student types is concerned -interaction effect-, no significant multivariate effect was found ($F_{50,153}$=1.138; p<0.420; partial η^2 = 0.253). This fact is also in agreement with the lower significant signs found at the univariate level for this point. Nonetheless, the effect size discovered, even when contemplating the above considerations, indicate the need to go into this more deeply, but with a larger sample, and possibly with more extreme differences between the students compared.

Discussion and conclusions

The results obtained in this work have allowed us to verify the objectives set at the beginning and to establish a university student profile by differentiating between excellent and average university students by analyzing learning strategies' evolution during the first year at university. Excellent students are essentially characterized by a good strategic profile, with overall scores during the study period, in which the following strategies predominate; task value, self-efficacy, controlling anxiety, planning, self-assessment, control/self-regulation, controlling the context, selecting information, information acquisition and personalization/creativity. Average students are characterized by a weaker strategic profile in which two strategies stand out: external motivation and storage-simple repetition. As mentioned earlier, this profile is not a positive one: motivation is fundamental in complex, quality learning (Suárez, Fernández & Anaya, 2005; Castejón, Gilar & Pérez, 2006) and intrinsic motivation must be a priority among university students –which influences students' strategic performance (Gil, Bernaras, Elizalde & Arrieta, 2009; Yip, 2009 and 2012)- and storage with understanding.

Although the measurement instrument used is not the same one employed by Proctor et al. (2006) and by Yip (2007, 2009 and 2012), the authors coincide in that the differences, which are favorable to students with good grades, appear in the "will" (affective-motivational elements) and the "self-regulation" (metacognitive elements) components. In our case, significant differences also clearly emerge in the "skills" (skills and cognitive processing strategies) component elements.

These results allow us to verify most of the hypothesis put forward on significant differences favoring excellent students. It is true that by analyzing the interaction between the strategies' temporal evolution and belonging to the excellent and average student groups, significant differences considerably lower. Even so, the mean score of 20 of the 25 strategies for excellent students surpasses that of average students. The results of the multivariate analysis confirm the trends encountered in the results obtained with the univariate analysis.

Moreover, four different performance patterns in the learning strategies were found. The first includes strategies which increase throughout the first year at university (extrinsic motivation, external attributions, social interaction skills, knowledge of sources and searches, and preparing information). It is worth briefly reflecting on this aspect: it is still striking that students' extrinsic motivation and external attributes increase throughout year 1. This should make university teachers working with year-1 students think about the role they play and about their possible responsibility for this increase in the two strategies, which have a negative connotation. Perhaps students do not identify expect the scenario they expected in university classrooms, or teachers' actions. It is also worth stressing the improvement obtained in the three aforementioned strategies (social interaction skills, knowledge of sources and searches, and preparing information), which is positive.

The second pattern includes strategies which are maintained (intrinsic motivation, controlling anxiety and planning). All three have positive connotations. It comes over clearly that only intrinsic motivation acquires a high score in both groups, which is higher in the excellent student group, and that controlling anxiety and planning only obtain a score with a mean value of over 3 among excellent students. So, there is plenty room for improvement.

The third pattern integrates strategies which lower (task value, internal attributions, conceiving intelligence as modifiable, information acquisition and storage/simple repetition). It also seems relevant that motivational strategies worsen, such as assigning a value to a task, employing internal attributions or considering intelligence modifiable. The same remarks made on the first pattern also apply for this one. It is positive, however, that storage by simple repetition lowers, but it is negative that information acquisition becomes worse.

The fourth pattern implies returning to the beginning because a reduction in the strategies is noted between the first and the second time point which increased at the start of the academic year, thus they recover their initial state (this happens with self-efficacy and positive expectations, physical state and state of mind, knowledge of objectives and assessment criteria, self-assessment, control/self-regulation, controlling the context, selection, organization, personalization and creativity, storage and use of memotechnical resources, transfer and use of information, and handling resources to use information). It is still striking that the use of learning strategies becomes worse at this first time point if we compare it with the way students performed in the previous academic year. It is true that the scores obtained with the strategies recover later when the first university year finalizes. This is likely influenced by students moving from a known setting that they master to another less known and more complex one. When students have adapted and settled in this new setting, their scores recover. It is necessary to bear in mind that this trend appears in both the affective-emotional and the support and control strategies (self-efficacy, physical state and state of mind, knowledge of objectives and assessment criteria, etc.) and in the information processing strategies (selection, organization, personalization-creativity, etc.). In any case, teachers form part of this new context and can, and must, act accordingly.

We are well aware that many variables influence student learning and student performance: some originate from students, such as motives, interests, attitudes, personal idiosyncrasy, expectations, former experience, etc., and others from the context, such as the nature of tasks, the learning contents themselves, the teaching and evaluation methodology, etc. Yet we must highlight the influence of learning strategies on academic performance. In this sense, the results that we obtained by analyzing the instrument application 1 sample data, collected in a former publication (Gargallo et al. 2011), are similar to those reported in the

recent research works by Proctor et al. (2006) and by Yip (2007, 2009 and 2012): they are affective-motivational-type strategies ("will") and metacognitive ones ("self-regulation") that best predict performance (multiple regression analysis) and are more clearly associated with excellent students (discriminate analysis), without ruling out the weight of some processing strategies ("skills") which appear in our works.

As part of the context in which students learn and in which they develop some strategies or others, teachers influence how students learn and how much they learn. Despite there being some data from available studies demonstrating improvements in students' learning strategies when specific programs are employed (Hernández Pina, Rosário, Cuesta, Martínez & Ruiz, 2006; Honkimäki & Tynjälä, 2007; Maehr & Yamaguchi, 2001; Tuckman & Kennedy, 2011), we are all for working by integrating the teaching methodology into classrooms to bring about positive changes. We have obtained data from research works which prove that teachers' evaluation and teaching methodology significantly influences the way students work (Biggs & Tang, 2007; Entwistle, 2009; Gargallo, 2008; Gargallo, Garfella, Pérez & Fernández, 2010; Hounsell & Hounsell, 2007; McCune & Entwistle, 2011). When teachers contribute considerations based on learning, and employ appropriate teaching and evaluation methodologies (we mean methods that complement those presented in teaching, e.g., problem solving, case studies, use of questions, class discussions, undertaking projects, cooperative work, etc., which favor students participation and commitment, and evaluation formative methods that complement the summative ones with feedback to students) (Smith, Douglas & Cox, 2009), students decide to use more and better quality strategies. This is the opposite to what happens when teaching-based considerations are offered and when teachers focus on a presentation methodology with no other alternatives and employ a final exam as their evaluation method rather than other training procedures. If such considerations are complemented by programs with tutorial- and accompanying-type action during initial academic years, with competent and especially committed teachers, we are convinced that our students' strategic learning would improve, as would their performance in their first years at university, which are crucial, which would help promote excellence at university. This work is to be performed in subsequent research works.

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NOTE

[1] We have chosen the first academic year because it is a crucial year in which students find themselves in a new setting they do not yet master: new organization, new teachers, new methods, new classmates, etc. Besides it is the academic year with higher university failure rates (Cabrera, Bethencourt, Álvarez & González, 2006).

[2] We are aware that it is questionable to interpret excellent students as only those who obtain better grades. The decision was made by the research team and it has to do with the need to set the most objective parameters possible for classification purposes, which academic grade are.

[3]. Score scale: Strongly disagree (1), disagree (2), uncertain (3), agree (4), Strongly agree (5).

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ABOUT THE AUTHORS / SOBRE LOS AUTORES

Gargallo, Bernardo (Bernardo.Gargallo@uv.es)**.** Catedrático de Teoría de la Educación de la Facultad de Filosofía y Ciencias de la Educación de la Universidad de Valencia. Es el autor de contacto para este artículo. Obtuvo el Primer Premio Nacional de Investigación Educativa en 2000 con un trabajo sobre estrategias de aprendizaje y también en 2002 con un trabajo sobre nuevas tecnologías y educación. Actualmente sus líneas prioritarias de investigación son las estrategias de enseñanza y de aprendizaje, y las nuevas tecnologías de la información y la comunicación (TIC) y su uso educativo. Su dirección postal: Facultad de Filosofía y Ciencias de la Educación. Avda. Blasco Ibáñez, 30; 46010-Valencia (España). Buscar otros artículos de este autor en Scholar Google / Find other articles by this author in Scholar Google

Almerich, Gonzalo (Gonzalo.Almerich@uv.es). Profesor Contratado Doctor del Área de Métodos de Investigación y Diagnóstico en Educación de la Universidad de Valencia. Miembro de la Unidad de Tecnología Educativa en dicha universidad. Su dirección postal es: Facultad de Filosofía y CC. de la Educación. Avda. Blasco Ibáñez, 30. 46010-Valencia (España). Buscar otros artículos de este autor en Scholar Google / Find other articles by this author in Scholar Google

Suárez-Rodríguez, Jesús M. (jesus.m.rodriguez@uv.es). Catedrático de Métodos de Investigación en Educación de la Facultad de Filosofía y Ciencias de la Educación de la Universidad de Valencia. Fue Director de la revista RELIEVE hasta Junio de 2009. Es coordinador de la Unidad de Tecnología Educativa en la Universidad de Valencia. Su trabajo se centra en los elementos metodológicos, analíticos y de medición en los ámbitos de Ciencias Sociales y Salud. En los últimos años su línea de investigación prioritaria se centra en el impacto de las TIC en los diferentes niveles educativos. Su dirección postal: Facultad de Filosofía y Ciencias de la Educación. Avda. Blasco Ibáñez, 30. 46010-Valencia (España). Buscar otros artículos de este autor en Scholar Google / Find other articles by this author in Scholar Google

García-Félix, Eloina (algarcia@ice.upv.es). Asesora pedagógica en el Instituto de Ciencias de la Educación de la Universidad Politécnica de Valencia (UPV) y profesora asociada del Departamento de Métodos de Investigación y Diagnóstico en Educación, de la Universidad de Valencia. Su dirección postal es Facultad de Filosofía y Ciencias de la Educación. Avda. Blasco Ibáñez, 30. 46010-Valencia (España). Buscar otros artículos de esta autora en Google Académico / Find other articles by this author in Scholar Google

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Abstract / Resumen	*The aim of this paper was to analyze the evolution of learning strategies of two groups of students, excellent and average, from 11 degrees of the UPV (Valencia/Spain) in their freshman year. We used the CEVEAPEU questionnaire. The results confirmed the availability of better strategies of excellent students and also the existence of evolutionary patterns in which affective-emotional strategies decrease, such as value of the task or internal attributions, and that others increase, such as extrinsic motivation and external attributions. It seems that the student does not meet your expectations in the new context and professors have important responsibilities.* El objetivo de este trabajo era analizar la evolución de las estrategias de aprendizaje de estudiantes excelentes y medios de 11 titulaciones de la UPV (Valencia), en su primer año. Los alumnos contestaron el cuestionario CEVEAPEU en tres momentos. Los resultados constataron mejores estrategias en los estudiantes excelentes. También confirmaron patrones evolutivos en que estrategias afectivo-emotivas relevantes disminuyen, como valor de la tarea o atribuciones internas, y se incrementan otras, como motivación extrínseca y atribuciones externas. Parece que el estudiante no satisface sus expectativas en el proceso de adaptación al nuevo contexto y ahí los profesores tienen responsabilidades ineludibles.
Keywords / Descriptores	*University students; learning strategies; evolutionary study; excellent students; average students.* Estudiantes universitarios; estrategias de aprendizaje; estudio evolutivo; estudiantes excelentes; estudiantes medios.
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