

Financial Literacy and Level of Financial Competence in Pre-University Students: A Comparison by Academic, Personal and Family Profile

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Abstract

The aim of this paper is to diagnose the level of personal financial knowledge of to date pre-university students in the Valencian Community, Spain. This is carried out by means of a double measure, one of which is a novel approach. First, we analyze their level of financial literacy, using the Basic Financial Literacy Test designed by the World Bank in 2012. Second, we determine their level of financial competence, enhancing the abovementioned test to a total of 17 questions, in order to provide a comprehensive view of their understanding of personal finance concepts. Both instruments were fully completed by a total of 1283 pre-university students of the Valencian Community during the 2017/2018 academic year. In both cases, comparisons were made by academic (level of studies, subjects studied and results to date) and personal profile (gender, influence level of their main role model and its activity as entrepreneur). We applied descriptive and inferential analysis techniques, such as Test t, Chi-square, Anova and Krustal Wallis. Obtained results show how groups with different academic background and achievement obtain significantly different results in both financial literacy and competence tests; however, when breaking down different measures of the former academic profile, results are heterogeneous. Finally, we find, with little exceptions, no significant differences between different personal profiles.

Keywords: financial literacy, financial competence, pre-university education, personal finance

Introduction

How transcendental financial decisions are can be denied, as our lives are highly influenced by them in our roles as workers, consumers, investors, savers, entrepreneurs or taxpayers. Everyday matters such as the purchase of an article, require of an analysis of the conditions of sale given by the price, the possible discounts, the relationship between cost and quality and its comparison with competitive products, among other factors, in order to make the most rational decision. All this justifies the need for population to resolve their financial ignorance gaps that have prevented them from making the best decisions.

The adoption of financial decisions requires the possession of a series of skills and the deployment of a certain set of behaviors by the consumer or the investor, in order to obtain satisfying results. The most frequently used concept to appoint the activity or process carried out to achieve these requirements, the resulting product or the level of instruction achieved, is generally that of financial education.

According to what the OECD (2005) outlines in its *"Recommendation on principles and good practices for education and financial awareness"*, financial education is conceived as "the process by which financial investors and consumers improve their understanding of products, concepts and financial risks and, through information, teaching and / or objective advising, develop skills and confidence required to achieve the highest level of awareness of financial risks and opportunities, make informed decisions, know where to turn up for help and carry out any effective action to improve their financial wellness".

However, financial competence reaches a greater magnitude, to the extent that citizens considered financially literate can exhibit different levels of financial knowledge.

The analysis of the existing literature on the impacts of financial education on knowledge and behavior in finance, as well as the contingent variables that influence its effectiveness, allow us to gather the factors that must be taken into account when explaining the level of both literacy and financial competence among citizens.

This paper analyzes several of these personal and academic factors as generating elements of a mayor financial knowledge, measured as financial literacy and financial competence, for pre-university students of the Valencian Community, Spain in the academic year 2017-2018.

Conceptual framework

Both the European Commission (2007d) and the OECD (2008), as well as a flood of subsequent studies (eg, Gnan, Silgoner & Weber, 2007, Stango & Zinman, 2009, Lusardi & Mitchell, 2011a, Caballero & Tejada, 2014, Hospido, Villanueva & Zamarra, 2015), share the enumeration of personal benefits (for all ages and income levels), as well as benefits for the economy as a whole, that emerge from an adequate level of financial education.

Financial education has a positive impact on financial knowledge both in developed (Danes, Huddleston-Casas & Boyce, 1999, Bernheim, Garrett & Maki, 2001, Swinton, DeBerry, Scafidi & Woodard, 2007, Waldstad, Rebeck & MacDonald, 2010, Batty, Collins & Odders-White, 2015, Lührmann, Serra-García & Winter, 2015) and developing nations (Bruhn, de Souza, Legovini, Marchetti & Zia, 2013, Jamison, Karlan & Zinman, 2014, Berry, Karlan & Pradhan, 2015).

These personal benefits are materialized as financial education helps youth developing their savings, investment, critical reasoning and problem-solving skills (Varcoe, Martin, Devitto & Go, 2005, Lusardi & Mitchell, 2009). In addition, it helps to plan savings necessary to cover future needs (for example for retirement) or unexpected situations (Lusardi & Mitchell, 2009, 2011b, Xu & Zia, 2012).

Greater financial knowledge is also associated with prudential behaviors such as the diversification of the investment portfolio or the prevention of over-indebtedness (Christelis, Jappelli & Padula, 2010, Van Rooij, Lusardi & Alessie, 2011, Lusardi & Tufano, 2015), even in young people (Brown, Van der Klaauw & Zafar, 2013). It does also help obtaining products such as mortgages and loans with lower interest and commission costs (Disney & Gatherwood, 2013, Lusardi & Tufano, 2015).

In addition to the abovementioned personal benefits, financial education brings important general economic benefits, which can be spilled in the four classical aspects of economic analysis: allocation of resources, economic stability, economic development and distribution (Domínguez, 2017).

With regard to the allocation of resources, financial education has been recognized as a public good because of its specific characteristics: joint consumption (non-rivalry in consumption) and the impossibility of avoiding its enjoyment by anyone within the territorial scope where the service is offered.

Regarding economic stability, financial education favors greater protection for users of financial services, because greater financial education induces the providers of such services to respect ethical practices and to discard bad practices that reduce the creation of value (Caballero & Tejada, 2014: 120). Research on the effectiveness of previous professional advising for house purchasing among low-income citizens in the United States shows that the consumers of this service have a 13% lower level of delinquency on average (Hirad & Zorn, 2001).

Economic development is enhanced by stimulating the approach of viable business projects by investors better prepared financially and with an entrepreneurial vocation that can result in greater entrepreneurship, in promoting innovation and in higher economic growth (OECD INFE, 2015, Lusardi, 2015). From a macroeconomic point of view, the development of complete, advanced and transparent financial markets stimulates the aggregate growth of the economy. It is well

established in the economic literature (Greenwood & Jovanovic, 1990, Levine, 1997, 2005, Beck, Kunt & Levine, 2007) that financial development produces faster growth by improving the capital allocation.

Finally, regarding distribution, financial education helps eliminate or mitigate another market failure: the problems of financial exclusion (Villasenor, West & Lewis, 2016: 18 Atkinson & Messy, 2013, Sánchez & Rodríguez, 2015, Chakrabarty, 2012). Ignorance of basic financial issues considerably reduces the probability of people's participation in financial markets (Van Rooij, Lusardi & Akessie, 2011). Financial education collaborates in mitigating the high financial costs associated with illiteracy in this area (Lusardi & Mitchell, 2014: 24) and is therefore crucial to the development of more complete, advanced and transparent financial markets, resulting in the reduction of poverty and income inequality among families (Lusardi, Michaud & Mitchell, 2013).

The evaluation of the positive impact of financial education initiatives is, however, extremely complicated because the variables that can measure their effects (such as the delinquency rate or the volume of financing available) are influenced by a broad amount of forces whose individualization is not an easy task. The analysis of the effectiveness of financial education has served to illustrate the factors associated with the acquisition of financial knowledge, which include, together with the educational system, other factors related to the family environment and the personal profile of the students, which may explain 80% of the total variance of the results (Moreno, Campillo & Salas-Velasco, 2015).

Within the personal profile, gender has stood out as a discriminating variable, with men achieving better results both among the adult population (Bucher-Koenen et al., 2014, Lusardi & Mitchell, 2008) and among the youth (Mandell, 2008, Lusardi & Mitchell, 2009, Lusardi, Mitchell & Curto, 2010, INEE, 2014a, b, 2017, Cordero & Pedraja, 2016a).

The family economic context also plays an important role in explaining the financial knowledge of youth, according to international evidence (Lusardi & Mitchell, 2009, Lusardi, Mitchell & Curto, 2010, Lusardi & Mitchell, 2014, Van Rooij et al, 2011, 2012, INEE, 2014a, b).

The type of school (public versus private or concerted) has also been investigated without finding, after considering the specific profile of the students for each center, significant differences in the results achieved in the financial knowledge tests (Mancebón & Pérez, 2014, Cordero & Pedraja, 2016a).

The social environment both in and outside the school has been similarly analyzed because from this environment arises valuable social and cultural capital. The peer effect has been identified as highly explicative of the student's financial knowledge (Cordero & Pedraja, 2016a), increasing the intensity of the effect when the school is below the average performance (Albert, Neira and García-Aracil, 2014). On the other hand, other contextual factors such as the group of friends seem to be less important (Pinto, Parente & Mansfield, 2005).

Finally, the level of financial literacy is influenced by the socioeconomic characteristics of the population, including the level of GDP per capita (Klapper, Lusardi & Oudheusden, 2015). There is a positive relationship between per capita income and financial education, but only for the 50% economies with the highest standard of living. In these economies, 38% of the variation in the financial literacy rate is explained by per capita income.

The debate about the correlation between the degree of financial knowledge and certain practices in the management of personal finances has even led to recognizing problems when establishing the sense of causality (Lusardi, 2011: 45). Hastings, Madrian & Skimmyhorn (2012: 15) and question whether it is financial education that leads to behaviors that generate better economic results, or on the contrary, certain financial behaviors are the ones that leads to a better instruction in the field, as a manifestation of the well-known learning by doing effect. However, Lusardi & Mitchell (2014: 34) reaffirm the thesis that causality flows from financial education to financial behavior, relying on studies based on instrumental variables and experimental-type ones.

Another criticism is done against the early introduction of financial education in the school curriculum based on its limited usefulness, since its distance from the moment of real application will lead to this knowledge to be diluted when its actually needed (McDermott, 2014, Eley, 2014). The supporters of this thesis believe that it would be more fruitful to divert the resources allocated to financial education towards mathematical training (Webb, 2014).

Database

The universe of the empirical study are young people living in the Valencian Community who have completed compulsory and non-compulsory secondary education or a Vocational Training cycle of basic or higher education.

To accurately diagnose their educational level, this students group has been divided into five segments: (a) students who have completed compulsory secondary education (ESO); (b) students who have completed the secondary school cycle through Baccalaureate; (c) students who have completed an cycle of basic Vocational Training; (d) students who have completed a cycle of higher Vocational Training; (e) students who have completed the first two years of a university degree in Social and/or Legal Sciences. This last group of undergraduate students, despite not being studied in this paper, gives us have a balanced sample that allows, in future work, to analyze the evolution of financial education for young people who are taking degrees university students in the field of economic, business or legal sciences.

The selection of the sample has responded to criteria of representativeness in order to achieve a selection proportional to the existing population level by educational cycles and territory. The sample has been stratified taking into account the student population in each training cycle and the weight of them in each of the provinces, as well as the specific weight of each province on the autonomous total.

The size of the sample representative of the population to be studied has been fixed with the following formula, which is the one commonly accepted when the population size is known:

$$n = \frac{k^2 * N * p * q}{e^2 * (N - 1) + (k^2 * p * q)}$$

being:

n: sample size.

N: size of the universe.

k: constant that depends on the confidence level (probability of results of the study to be true). This level has been established at 95% (which means that the probability of erring is 5%), corresponding to a value of k equal to 1.96.

e: desired sample error. It represents the difference between the result obtained by asking a sample of the population and the one that would be obtained by asking the total of the universe. The desired margin of error is 3%

p: proportion of individuals within the population that possess the property investigated. This data is generally unknown, taking as a convention the safest option that is: p = q = 0.5.

q: proportion of individuals who do not possess this characteristic, which will be: q = 1-p = 0.5.

Table 1: Students who completed training cycles of primary, secondary and university education in social and legal sciences degrees in each province of the Valencian Community, 2014-15 academic year (Source: Valencian Institute of Statistics, from the Ministry of Education, Culture and Sport. Statistics of non-university and university education)

Province	Number of students who finished the cycle					
	ESO	Baccalaureate *	Basic Vocational Training	Higher Vocational Training *	University Studies Social and Legal Sciences**	Total
ALICANTE	11.620	8.247	4.457	3.894	2.832	31.050
CASTELLÓN	3.658	2.609	1.691	1.376	1.113	10.447
VALENCIA	17.410	11.847	7.017	8.406	4.353	49.033
VALENCIAN COMMUNITY	32.688	22.703	13.165	13.676	8.298	90.530
% of the total students who finished a cycle						
Province	ESO	Baccalaureate	Basic Vocational Training	Higher Vocational Training	University Studies Social and Legal Sciences	Total

ALICANTE	12,84%	9,11%	4,92%	4,30%	3,13%	34,30%
CASTELLÓN	4,04%	2,88%	1,87%	1,52%	1,23%	11,54%
VALENCIA	19,23%	13,09%	7,75%	9,29%	4,81%	54,16%
VALENCIAN COMMUNITY	36,11%	25,08%	14,54%	15,11%	9,17%	100,00%

* Students who have completed these cycles by distance mode are not included.

** Given that data is not available for students enrolled or graduates according to the year of the degree they are studying or have finished, we have taken as data the students graduated in undergraduate studies of the branches cited in public universities.

According to the information provided by the Ministry of Education, Culture and Sports, the number of students who completed their studies at each level in the 2014-15 academic year (the last one for which complete data was provided on the date of consultation) by provinces is the indicated in Table 1.

Therefore, the population under study is 90,530 young people who had completed some secondary or higher education cycle of the type cited in centers of the Valencian Community. The representative sample size of this universe with the established reliability parameters (95% confidence level with a sampling error of $\pm 3\%$) is 1,055 people.

However, it is also desired the sample to be representative of the population distribution by province and training cycle, that is, that corresponds to the specific weights of the students of each cycle on the total of students in each province and with the proportion between students of the different cycles and between the three provinces. Table 3 already gives us that distribution of the universe in percentage terms. Applying these percentages to the chosen sample size, we have obtained the number of surveys to be carried out for each group in total and in each province of the Valencian Community (Table 2).

Table 2: Number of surveys to be carried out according to the sample size and the desired stratification by province and training cycle (Source: own elaboration)

Province	ESO	Baccalaureate	Basic Vocational Training	Higher Vocational Training	University Studies Social and Legal Sciences	Total
ALICANTE	135	96	52	45	33	362
CASTELLÓN	43	30	20	16	13	122
VALENCIA	203	138	82	98	51	571
VALENCIAN COMMUNITY	381	265	153	159	97	1.055

If we also want the sample size for students who follow each training cycle in each province to have a level of significance and a margin of error similar to those of the total sample, in order to compare each segment with the same levels of exigence, it is necessary to increase the number of surveys to be completed by those levels with a lower initial surveys objective. Given this objective, there has been an increase in the number of surveys to be carried out to students in the vocational training cycles in the intermediate and higher levels and to those who study in the social sciences and legal sciences in the three provinces, as well as to the students of the province of Castellón. In order to maintain the significance of the total sample, without the representativeness in each segment deteriorating, it will be necessary to carry out 1,448 surveys, with the sample distribution established in Table 3.

Table 3: Number of surveys to be carried out according to the sample size and the desired stratification corrected by province and training cycle (Source: own elaboration)

Province	ESO	Baccalaureate	Basic Vocational Training	Higher Vocational Training	University Studies Social and Legal Sciences	Total
ALICANTE	135	98	90	76	90	490
CASTELLÓN	43	31	34	27	35	170
VALENCIA	203	140	142	164	138	788

VALENCIAN COMMUNITY	381	269	267	267	264	1.448
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The empirical study has required the design of a survey that serves as the basis for the collection of information and the measurement of the variables on which the diagnosis is desired. The questionnaire consists of 71 questions and the average time to complete it was 45 minutes. For the present work, however, only part of this questionnaire has been used. In particular, certain questions regarding the personal, academic and family profile, as well as the questions related to the finance knowledge test. This abbreviated version of the questionnaire can be found in Annex 1.

The questionnaire also incorporates several questions aimed at shaping the personal, familiar and academic profile of the students, as well as their learning strategies and their motivations and expectations. The selection of this group of variables has been inspired by the results of previous research on the determinants of educational performance, as has been done in previous studies (Molina, Marcenaro & Martin, 2015, Cordero & Pedraja, 2016a, b). The characteristics of the educational center (type of school -public or private-, location, size, etc.) have been captured directly from information provided by the institution itself.

The number of valid surveys finally received and processed has risen to 1,607. The sample collected is important and highly significant, if we take into account that the PISA 2012 report was developed on a sample of 1,050 students belonging to 170 educational centers. After the data collection, the database was cleaned, eliminating those observations in which the amount of unanswered questions was greater than 20%. The total number of surveys available after this purification is 1,571, of which 1,282 correspond to pre-university education and are therefore subject to empirical exploitation in this report.

This sample guarantees compliance with confidence levels and established error margins, both for the whole population studied and for the differentiated segments by type of study and province. As can be observed in the sample distribution indicated in Table 4, the number of surveys obtained for each stratum of the sample has exceeded the minimum size pre-set. The results can then be considered a faithful and statistically significant reflection of the universe studied.

Table 4. Number of surveys that make up the final sample and its distribution by level and province (Source: own elaboration)

Province	ESO	Baccalaureate	Basic Training	Vocational	Higher Vocational Training
ALICANTE	194	207	98		499
CASTELLÓN	106	87	40		233
VALENCIA	312	377	150		839
VALENCIAN COMMUNITY	611	671	288		1.571

Variables and segmentation

Financial literacy: financial literacy is a dichotomous variable that takes the value 1 when the student has answered correctly, at least, 3 out of the first 5 questions of the test, while taking the value 0 when the number of correct answers is 2 or less.

Financial competence: the level of financial competence corresponds to the percentage of correct answers over the total number of questions, resulting from the division of the number of correct answers between 17.

For the analysis of the data, the database has been segmented based on various criteria. The groups generated have been carried out taking into account two criteria. On the one hand, different groups have been drawn up based on the student's academic profile, being segmented by level of studies to date (compulsory studies / intermediate studies), results obtained to date (excellent / high / medium / low / poor) and for having completed or not each of the subjects presented in the

curricula in ESO, Vocational Training and Baccalaureate. On the other hand, the study has been segmented based on the personal profile, by gender, income level of the family, level of influence of the role model and business activity of the latter.

The answers are therefore segmented based on 7 criteria, which constitute the basis for the subsequent analysis of the results obtained, for which the following criteria have been taken into account:

Students with a compulsory level of education are those who have completed Compulsory Secondary Education or a module of Basic Vocational Training, while those with higher education are those who have completed the Baccalaureate or a module of Higher Vocational Training and have therefore gained access to the University.

The study of each of the subjects corresponds to a dichotomous variable that takes value 1 when the student has taken the course and value 0 when this same subject has not been taken.

The level of academic results to date corresponds to the student's response to this same question in the questionnaire, so that it is a subjective variable.

To obtain the level of influence of the role model, students have been asked about the level of implication of their role model in various aspects of their academic life. From the sum of the responses to each of the dimensions, the variable level of influence is constructed. When ordering from highest to lowest, students located in the first tercile are those with a high level of influence, those located in the second correspond to a medium level of influence and those present in the last tercile imply a low level of influence.

The gender, family income level and role model activity as an entrepreneur or not are direct answers of the student in the questionnaire.

Analysis of data and results

The descriptive analysis of the results allows us to obtain the financial literacy level of the surveyed students, which is shown in Table 5: 67% of the students have answered 3 or more questions and are therefore financially literate. Thus, 17% of students have answered all the questions, while 22.4% and 27.6% have answered 4 and 3 questions respectively. With regard to the non-literate, 19.3% have answered 2 questions, while 10.1% and 3.7% have scored 1 and no questions respectively.

Table 5: Distribution of students by number of correct answers in questions 1 to 5 of the test and level of financial literacy (Source: own elaboration)

Number of right answers	Students	(%)
0	48	3,7%
1	129	10,1%
2	247	19,3%
3	354	27,6%
4	287	22,4%
5	218	17,0%
Financial literacy (3/4/5)	859	67,0%

When analysing the results of the questionnaire as a whole, obtaining the results of financial training, a clear decrease in the performance of the students is observed. In fact, only 612 of the 1283 students have appropriately responded more than half of the questions, which would imply passing the evaluation, in an assessment from 0 to 10. This result leads to a level of average financial training of the students of 47.7%, less than 50%. Table 6 shows the distribution of students by number of correct answers and allows to observe that only one of the 1283 students was able to respond correctly all the questions, while 60 students answered correctly 2 or fewer answers, which implies a score barely higher than 1 in the best case.

Table 6: Distribution of students by number of correct answers in questions 1 to 17 of the test and level of financial competence (Source: own preparation)

Number of right answers	Students	Level of Financial Competence	(%)
0	21	0,0%	1,6%

1	12	5,9%	0,9%
2	27	11,8%	2,1%
3	57	17,6%	4,4%
4	75	23,5%	5,8%
5	85	29,4%	6,6%
6	118	35,3%	9,2%
7	139	41,2%	10,8%
8	137	47,1%	10,7%
9	126	52,9%	9,8%
10	127	58,8%	9,9%
11	121	64,7%	9,4%
12	74	70,6%	5,8%
13	72	76,5%	5,6%
14	53	82,4%	4,1%
15	29	88,2%	2,3%
16	9	94,1%	0,7%
17	1	100,0%	0,1%
Average level of financial competence		612	47,70%

Regarding the success rates by questions, the results allow us to observe how certain aspects of personal finances are widely understood and internalized by the majority of the students, while other concepts present certain success rates that are certainly worrisome. Inflation and the calculation of total and unit costs rise as the best understood concepts, while savings planning, the determination of the risk profile and the hierarchy of financial obligations are the least understood concepts.

Table 7: Success rates by concepts associated with questions (Source: own elaboration)

Concept	Success Rate (%)
Inflation and purchase power	80%
Total costs	74%
Unit costs	69%
Simple interest rate	68%
Diversification and risk management	60%
Insurances	57%
Payrolls	55%
Compound interest rate	53%
Financial market investment	48%
Capitalization	44%
Saving planning	42%
Obligations prioritization	42%
Risk profile	39%
Mortgages	30%
Income tax	29%
Loans	21%
Market prices	17%

To deepen the results, a multivariate analysis of the financial literacy and competence rates of the students has been carried out. Using the generated segments, inferential analyses have been carried out to compare the levels of financial

literacy and capacity of the students. The analysis of differences of means has been used to compare the different groups and subjects taken. The assumption of normality was verified using the Shapiro-Wilk test and the assumption of homoscedasticity using the Levene test. A Kruskal Wallis test was carried out to analyse those variables that did not meet the normality condition. For those variables that did meet this condition, an Anova test was carried out, with the subsequent Tukey post-hoc tests. We have worked with Stata 14.2, both for descriptive and inferential analysis, always considering a level of statistical significance of 5%.

This analysis has allowed us to obtain relevant conclusions as well as helps to understand what the particularities and characteristics of the academic and personal environment of the student that are generate groups with significant differences in their level of financial literacy and competence

The analysis of our results reveals a high degree of heterogeneity in the differences found among groups. While on the one hand, the academic profile appears to be a clear determinant of results at the level of financial literacy and competence, on the other hand robust differences between students for different educational levels, subjects taken, or results obtained have been found. Conversely, virtually no significant differences by personal profile have been found, but only by gender. In any case, there are no differences by income levels, role model influence or businessman role. This gives special relevance to the work in the classrooms and the academic training as determinants of the financial literacy and competence of Valencian youth.

However, this variability is not relegated to the differentiation between academic profile and personal profile. There is still evident heterogeneity within the academic profile. Thus, compulsory education students (those who have completed compulsory education or basic vocational training) have literacy and competence rates of 56.7% and 41.4% respectively, while students with intermediate studies (high-school and higher vocational training), increase their results to rates of 76.6% and 55.4% respectively. (8)

Table 8: Descriptions and results of the Kruskal Wallis tests among groups by level of studies (Source: own elaboration)

	Observations	Financial literacy		Financial competence	
		Mean	Standard deviation	Mean	Standard deviation
<i>Compulsory studies</i>	612	0.566	0.495	0.414	0.185
<i>Intermediate studies</i>	671	0.763	0.425	0.554	0.197
<i>Differences among segments</i>		-0.196***		-0.139***	

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

This heterogeneity is also present among subjects taken (9), allowing us to obtain certain conclusions and draw future lines of work. While students who have completed the subjects of high-school (Economics in the first year and Business Economics and Fundamentals of Administration and Management in second year) present significantly higher results than those who have not completed these subjects, when analysing the level of compulsory education (ESO) and higher-basic vocational training, certain contradictions arise: some subjects present differences in favour of the students who have taken them, while others present them in favour of those who did not. Additionally, in most cases, these differences are not significant. This heterogeneity leads us to think that there are certain factors associated with students in lower-level education that contaminate the analysis by subject. Differences that can be associated with the lower age and therefore the maturity of the students or the lower interest given to the studies, given that certain of the students surveyed will surely not intend to continue their studies or, in any case, access to the University. A future analysis should introduce these particularities as potential moderating variables.

Table 9: Descriptions and results of the Kruskal Wallis test among groups that have taken or not each subject (Source: own elaboration)

		Observations	Financial literacy		Financial competence	
			Mean	Standard deviation	Mean	Standard deviation
<i>Economy (1st year high-school)</i>	No	805	0.624	0.484	0.454	0.195

	Yes	478	0.744	0.436	0.543	0.207
<i>Differences between segments</i>			-0.119***		-0.088***	
<i>Business Economics (2nd year high-school)</i>	No	753	0.593	0.491	0.434	0.190
	Yes	530	0.777	0.416	0.563	0.200
<i>Differences between segments</i>			-0.183***		-0.129***	
<i>Fundamentals of Administration and Management (2nd year high-school)</i>	No	1092	0.646	0.478	0.470	0.200
	Yes	191	0.801	0.400	0.584	0.200
<i>Differences between segments</i>			-0.154***		-0.113***	
<i>Business and Entrepreneurship (vocational studies)</i>	No	1237	0.672	0.469	0.487	0.203
	Yes	46	0.586	0.497	0.483	0.221
<i>Differences between segments</i>			0.085		0.004	
<i>Initiation to Entrepreneurial and Business Activity (1st level ESO)</i>	No	1251	0.669	0.470	0.489	0.204
	Yes	32	0.656	0.482	0.404	0.191
<i>Differences between segments</i>			0.013		0.085***	
<i>Initiation to Entrepreneurial and Business Activity (4th year ESO)</i>	No	1189	0.678	0.467	0.493	0.202
	Yes	94	0.553	0.499	0.418	0.217
<i>Differences between segments</i>			0.125***		0.074***	
<i>Economy (4th year ESO)</i>	No	1010	0.681	0.466	0.500	0.203
	Yes	273	0.626	0.484	0.439	0.200
<i>Differences between segments</i>			0.054*		0.061***	
<i>Financial Education (ESO)</i>	No	1273	0.669	0.470	0.487	0.204
	Yes	10	0.7	0.483	0.470	0.186
<i>Differences between segments</i>			-0.030		0.017	

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

From the analysis of the differences in the results among groups by academic results obtained to date (Table 10 and Table 11) two main conclusions are obtained. First, there are significant differences globally and among the different groups analysed. Thus, the tests carried out show that the level of financial literacy and competence of students is significantly different for distinct levels of academic results (p-value 0.00 in both cases). However, when performing a post-hoc analysis by pairs, the differences obtained are concentrated in few cases. This gives us the second conclusion: in general terms, we observe how significant differences are shown in favour of students with exceptional results compared to all others and, to a lesser extent, for certain comparisons between students with high results and the rest with lower performance. However, these differences are not exhibited when analysing the results between students of medium and low performance, which indicates that only when the student has a performance significantly higher than the average in their general studies and is, therefore, extraordinary, is able to transfer it to its performance in the financial literacy and competence tests carried out.

Table 10: Descriptive for groups with different levels of academic results to date (Source: own elaboration)

	Observations	Financial literacy		Financial competence	
		Mean	Standard deviation	Mean	Standard deviation
<i>Excellent</i>	88	0.795	0.405	0.580	0.194
<i>High</i>	417	0.729	0.445	0.520	0.202
<i>Medium</i>	706	0.617	0.486	0.459	0.203
<i>Low</i>	69	0.666	0.474	0.458	0.178
<i>Poor</i>	3	1	0	0.549	0.206

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

Table 11: Results of the post-hoc tests among groups with different levels of academic results to date (Source: own elaboration)

	Financial literacy				Financial competence			
	Contrast	Std. Err. S.d.	Tukey		Contrast	Std. Err. S.d.	Tukey	
			t	P> t			t	P> t
<i>Medium vs Excellent</i>	-0.177***	0.052	-3.37	0.007	-0.121***	0.022	-5.35	0.000
<i>Low vs High</i>	-0.062	0.060	-1.03	0.843	-0.062	0.026	-2.37	0.124
<i>Medium vs High</i>	-0.111***	0.028	-3.86	0.001	-0.061***	0.0124	-4.96	0.000
<i>Poor vs Excellent</i>	0.204	0.274	0.75	0.946	-0.031	0.118	-0.27	0.999
<i>Medium vs Low</i>	-0.049	0.058	-0.83	0.920	0.000	0.025	0.02	1.000
<i>Poor vs High</i>	0.270	0.270	1.00	0.855	0.028	0.116	0.24	0.999
<i>Excellent vs High</i>	0.066	0.054	1.21	0.744	0.060	0.023	2.55	0.080
<i>Poor vs Medium</i>	0.382	0.270	1.42	0.618	0.089	0.116	0.77	0.938
<i>Poor vs Low</i>	0.333	0.275	1.21	0.746	0.090	0.118	0.76	0.941
<i>Excellent vs Low</i>	0.128	0.075	1.71	0.425	0.122***	0.032	3.78	0.002

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels. S.d. means Standard deviation

However, this conclusion could be certainly risky, since from an analysis of the distribution of the answers in question number 5 of the questionnaire (How would you rate your school results so far?), which has been used for the segmentation of the answers, a high bias is observed to indicate high results. Thus, while only 3 students have indicated that they had poor results, a total of 88 have indicated "excellent" results. Moreover, while 417 students have identified their results as "high", only 69 consider them "low". It is logical to think, then, that the measurement of results, of a purely subjective nature, generates a certain bias in the analysis. It is highly probable, in view of the results, that a large part of the students consider that they have obtained results superior to those indicated by reality. Future research to this publication should address this discrepancy using an objective measure of results, such as the average note of the academic record or the university access note.

Just as the student's academic profile has generated significant differences in each of its segmentations, the personal profile points in an opposite direction, showing only significant differences in the groups generated based on the student's gender. In this sense, the results show a level of financial literacy of 63.5% in women and 70.5% in men. This difference is also showed in the level of financial competence, which is reduced to 46.7% in the case of women and 50.9% in the case of men (Table 12). Although it is evident that the capacity of men and women does not present significant differences at the cognitive level, this difference is explained by the traditionally greater interest shown by the male gender in the financial sector. In fact, this difference in the level of knowledge in finance between men and women has already been found recurrently in the literature (Bucher-Koenen et al., 2014, Lusardi & Mitchell, 2008, Mandell, 2008, Lusardi & Mitchell, 2009, Lusardi, Mitchell & Curto, 2010, INEE, 2014a, b, 2017, Cordero & Pedraja, 2016a).

Table 12: Descriptive and results of the means tests according to gender (Source: own elaboration)

	Observations	Financial literacy		Financial competence	
		Mean	Standard deviation	Mean	Standard deviation
<i>Women</i>	639	0.635	0.481	0.467	0.008
<i>Men</i>	641	0.705	0.456	0.509	0.008
<i>Differences between segments</i>		-0,069***		-0,042***	

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

When we continue with the analysis of the differences between the different levels of monthly household income (Table 13 and Table 14), we observe how, in no case, there are significant differences. Likewise, when contrasting the influence or implication of the role model (Table 15 and Table 16), which has been classified as high, medium and low depending on whether the student was in the upper, middle or lower third in the distribution of responses to the scale proposed in the questionnaire, no significant difference has been found.

Table 13: Descriptive by groups according to the monthly income level of the household (Source: own elaboration)

	Observations	Financial literacy		Financial competence	
		Mean	Standard deviation	Mean	Standard deviation
<i>From 1000 to 1999 Euros</i>	399	0.656	0.475	0.494	0.202
<i>From 2000 to 2999 Euros</i>	337	0.658	0.474	0.489	0.207
<i>From 3000 to 3999 Euros</i>	188	0.771	0.421	0.492	0.184
<i>From 4000 to 5999 Euros</i>	94	0.680	0.468	0.495	0.205
<i>Less than 1000 Euros</i>	90	0.6	0.492	0.490	0.211
<i>More than 6000 Euros</i>	63	0.634	0.485	0.472	0.235
<i>DK/NA</i>	112	0.642	0.481	0.449	0.210

Table 14: Results of the ANOVA and Kruskal-Wallis test by groups according to the monthly income level of the household (Source: own calculations)

	Financial literacy		Financial competence	
	F	Prob>F	χ^2	Prob> χ^2
<i>Levels of monthly household income</i>	2,01	0,062	5,443	0,488

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

Table 15: Descriptive by groups according to the level of implication of the role model (Source: own elaboration)

	Observations	Financial literacy		Financial competence	
		Mean	Standard deviation	Mean	Standard deviation
<i>High</i>	481	0.681	0.466	0.492	0.205
<i>Medium</i>	415	0.669	0.471	0.490	0.199
<i>Low</i>	387	0.655	0.475	0.480	0.207

Table 16: Results of the ANOVA test by groups according to the level of implication of the role model (Source: own elaboration)

	Financial literacy		Financial competence	
	F	Prob>F	F	Prob>F
<i>Level of implication of the role model</i>	0,35	0,7028	0,43	0,650

Asterisks indicate the statistical significance at 0.01 (***), 0.05 (**) and 0.10 (*) levels.

Finally, the level of financial literacy and competence is analysed based on the activity as a student entrepreneur role model or not (Table 17). It is curious how, both in financial literacy and competence, students with a non-entrepreneur role model have obtained better results. This difference, however, is not significant.

Table 17: Descriptive and results of the Kruskal Wallis tests according to activity as a role model entrepreneur (Source: own elaboration)

		Observations	Financial literacy		Financial competence	
			Mean	Standard deviation	Mean	Standard deviation
<i>Entrepreneur role model?</i>	No	935	0.683	0.465	0.493	0.202
	Yes	341	0.636	0.481	0.476	0.208
<i>Differences between segments</i>			0.047		0.016	

Conclusions and practical and academic implications

The analysis carried out shows relevant conclusions regarding the level of financial literacy and competence of the students of the Valencian Community, adding additional empirical evidence on determining factors in juvenile financial education.

Firstly, it is shown that there are very significant differences among students according to their academic profile. This materializes both in the simpler group division (compulsory studies or intermediate studies) and in the division according to whether or not they have taken certain subjects. Within this second distinction, it is extracted how the students who have taken high-school subjects show a behaviour far superior to those that have not taken them. However, these differences are not always observed among students who have completed ESO or vocational training courses, which leads us to conclude that certain aspects of high-school students, essentially age, maturity and incentive, enable them to absorb from most successful way in terms of finance treated in the classroom.

This conclusion is in full agreement with a critical current against the early introduction of financial education in the school curriculum, which refers to its limited usefulness, since its distance from the moment of real application will lead to the dilution of knowledge acquired when it is going to be used (McDermott, 2014, Eley, 2014). The performance of financial education is also considered in this sense conditioned by the attitude of the student before the subject. Thus, both the self-confidence (Arellano et al., 2014) and the effort (approximated by indicators of perseverance) (Fernández de Guevara, Serrano & Soler, 2014) of the students have been identified as moderating variables of the effect of the instruction on Financial knowledge in the PISA 2012 tests in Spain

With regard to the academic results of the student, it is only verified that those with extraordinary results obtain better results than the rest. When going down to high levels of results, there is still some significant difference, but it disappears in the middle and low levels. This makes us think that we may have to obtain results that are much higher than the average to be able to transfer these more global results to specific financial tests.

With regard to the personal profile, a greater performance is observed in male students. These results point in the same line as the existing literature to date, in which gender has stood out as a discriminating variable, with men achieving better results both among the adult population (Bucher-Koenen et al., 2014, Lusardi & Mitchell, 2008) and the juvenile (Mandell, 2008, Lusardi & Mitchell, 2009, Lusardi, Mitchell & Curto, 2010). We converge to the Spanish evidence in this issue (INEE, 2014a, b, 2017, Cordero & Pedraja, 2016a). We believe that this may be due to the traditionally greater interest of the male sector in the field of finance, both personally and professionally and we believe that it is necessary to enhance the female interest in this field through activities both inside and outside the educational curriculum.

Finally, the family environment, as we have measured it, does not generate groups with significant differences among them in terms of results. Thus, the different segments generated based on the family income level have not shown different results. Likewise, those groups with a higher level of implication in the role model have not done so, nor those in which this role model was an entrepreneur.

In general terms, we detect a great significance of classroom training for the acquisition of financial competences. This has important practical implications for the teachers of both public and private pre-university institutions, since they reinforce the role of formal education as a key determinant for the development of university students with high literacy rates and high levels of financial competence.

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