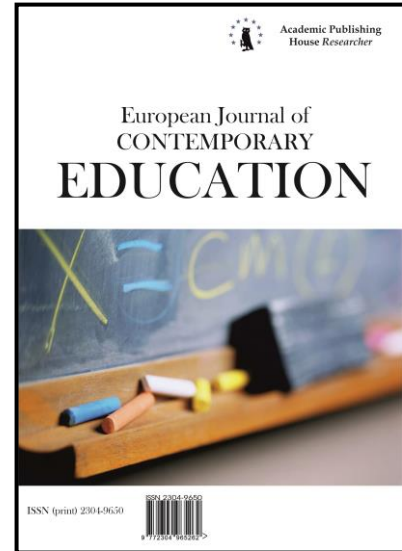




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Education and Financial Inclusion. An Empirical Study in Students of Higher Education

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Abstract

Financial products and services are increasingly present in our daily lives, so it is very important to know the advantages that can be obtained by using them. In this way, the present study seeks to determine the existence of an underlying structure that explains the knowledge towards the topics of Income, Money Management, Savings and Investment, Expenditure and Credit in students of higher education. For this, the Financial Education Test was applied to 126 participants. The results obtained through the exploratory factor analysis provide evidence of the existence of a structure that allows us to understand the phenomenon of financial education in the perception, knowledge, use and application of financial topics in Mexican students. Two factors represent 68.18 % of the phenomenon under study, the first on knowledge, use and application towards savings and investment (37.42 % of the total variance explained) and the second on knowledge, use and application about money management (30.75 % of the total variance explained).

Keywords: financial inclusion, financial education, savings, investment, income.

1. Introduction

The relevance that has been given to financial education in recent decades has been driven by different social, economic and demographic factors such as increasing indebtedness on the part of individuals due to greater supply of credits, the increase in supply and complexity of financial elements, the increase in job instability, the increase in life expectancy and the reduction of public pension coverage.

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The poor financial education in the Mexican population is mainly reflected in the little use of financial products and services, in bad habits at the time of acquiring them, in the ignorance of their rights and obligations as well as in the lack of financial planning. The aforementioned negatively affects their well-being and quality of life, while causing financial institutions not to reach the required levels of competitiveness and stopping the country's economic development (García et al., 2014).

The lack of saving habits, little culture of forecasting, planning of income and expenses, generate great risks in the population when making economic decisions (Torres, Zaldívar, 2012).

Around the world, only 50 % have an account in a formal financial institution. In the case of Latin America and the Caribbean, the percentage is even lower and only 8 % of adults request loans in the formal market (Demirguc-Kunt, Klapper, 2012). Therefore, it is not surprising that individuals are forced to use other informal mechanisms to cope with their economic needs. (Robinson, 2001).

Individuals with low levels of financial education have high levels of indebtedness and acquire high-cost credit (Rivera, Bernal, 2018).

In this way, including topics that contribute to improving money management in people in the country's secondary education programs will allow them to optimize their budget and identify appropriate sources of financing to improve their family dynamics and improve their consumption and saving practices (Moreno-García et al., 2017).

Programs that offer interactive experiences and real life learning are highly effective, while face to face education fosters commitment and strengthens the sense of team and interaction between participants (Casper et al., 2013).

The rate of savings and wealth of individuals who attended schools where financial education programs were implemented is significantly higher than that of individuals who did not participate in these programs (Bernheim et al., 2001).

Financial education is based on adequate financial planning that allows people to prepare the action plan to meet their personal goals in the short, medium and long term. The plan will determine what to do, how to do it, how long it will take and the real viability you have to get what you want (Samper et al., 2010).

Thus, access to financial information is the first step towards more efficient financial inclusion.

2. Literature review

The knowledge on financial issues has become more important given the accelerated development of financial markets as well as the current economic situation and the diversity of banking products that exist today, added to the multiple forms of financing, the largest number of banking institutions, the modification in pension schemes and technological advances coupled with the subject.

However, it has been found that people do not know the basic financial elements and concepts, which leads to making inappropriate decisions about savings, debt and investments (Raccanello, Herrera, 2014).

In the face of a market society that encourages people to consume and borrow, it is appropriate to develop a culture of forecasting and saving (International Center for Globalization and Development, 2009). Likewise, it is important to educate yourself financially to better understand the economy in general and the role it plays in it, so that the own resources are used efficiently (Ruíz, 2011).

For example, savings rates increase in relation to the financial education of respondent (Bernheim, Garret, 2003). There is also a positive correlation between financial knowledge and retirement planning (Lusardi, Mitchell, 2011; Van Rooij et al., 2011). In addition, retirement planning is directly related to financial knowledge and wealth levels (Lusardi, Mitchell, 2011). So individuals who have low financial education tend to acquire loans with higher interest rates and commissions (Stango, Zinman, 2009). On the contrary, individuals with greater financial education have lower debt levels (Hilgert et al., 2003).

In Mexico, promoting financial education is an urgent and necessary task because, in the first place: individuals lack financial knowledge, which produces consequences such as excessive indebtedness, lack of savings for the future, the unproductive use of remittances and the lack of

clarity about the benefits offered by investment in productive activities, the acquisition of assets or the education of children; second, the lack of information coupled with the limited penetration of the financial system that encourages the use of informal financial services; and because financial products have increased in recent years, this makes it difficult for people to make convenient decisions (Mexico Government, 2018).

Financial education differs substantially in terms of age, gender and profession of respondents (Van Rooij et al., 2007). It has also been found that for financial issues, women have less knowledge than men; likewise, young women and those belonging to the elderly indicate less financial literacy compared to middle-aged people. In addition, people with a higher level of education have greater financial knowledge than the rest (Lusardi, Mitchell, 2011).

García et al. (2014) also agree that the low levels of financial culture in Mexicans is related to the lack of financial education reflected in the little or no use of financial products and services, in bad habits in their acquisition, in the ignorance of their rights and obligations, as well as in the lack of financial planning.

Several authors have carried out work on measuring the level of financial education in individuals who have received formal education related to finance (Ruíz, 2011; Torres, Zaldívar, 2012; Raccanello, Herrera, 2014; Moreno-García et al., 2017; Rivera, Bernal, 2018).

The evidence gathered in the last decade indicates that Mexicans on average have a low level of financial education (BANAMEX – UNAM, 2008). For this reason, the aim of this study seeks to investigate the levels of financial knowledge that the teaching and administrative staff possesses in Technological Institute of Tierra Blanca, therefore, these are the dimensions of the variable that will be explained: Income (vi1), Money Management (vi2), Savings and Investment (vi3), Expenditure and Credit (vi4). The following section explains the procedure to carry out the study:

3. Methodology

Data collection instrument

To identify the level of knowledge about financial education in the participants, the data was collected from a survey that was designed with indicators used by the National Commission for the Protection and Defense of Users of the Financial Services and the National Bank of Mexico, as well as Banamex and the National Autonomous University of Mexico (UNAM), which was applied to 126 students of higher education in February 2019.

This survey was made up of 40 questions, divided into two sections: 6 questions corresponding to general information and 34 questions about information about Income, Expenditure and Credit, Savings and Investment, and Money Management.

Data Analyzing

With this information, the statistical procedure proposed by García-Santillán (2017) was carried out, in which, the Cronbach's alpha is calculated first, which should be as close to 1 (Hair et al., 2010).

Secondly, the normality of the data is checked, using the non-parametric Kolmogorov-Smirnov test, to subsequently analyze the data from the multivariate procedure of the Exploratory Factor Analysis, in which the calculation of the KMO and Bartlett's Test of Sphericity, X^2 with n df is made from the following expression:

$$\chi^2 = - \left[n - 1 - \frac{1}{6}(2p + 5) \ln |R| \right] = - \left[n - \frac{2p + 11}{6} \right] \sum_{j=1}^p \log(\lambda_j)$$

That met the following expression:

$$\left[n - \frac{2p + 11}{6} \right] \log \left[\frac{\frac{1}{p - m} \left(\text{traz} R^* - \left(\sum_{a=1}^m \lambda_a \right) \right)}{|R^*|} \right]^{p - m} \bigg/ \prod_{a=1}^m \lambda_a$$

Where: ln= natural logarithm; p= number of variables; n= sample size and R= is the correlation matrix.

Similarly, from the transformation of the determinant in the correlation matrix, the power of the correlations between the analyzed variables can be identified according to:

$$d_R = \left[n - 1 - \frac{1}{6}(2p + 5) \ln |R| \right] = - \left[n - \frac{2p + 11}{6} \right] \sum_{j=1}^p \log(\lambda_j)$$

Where: n= sample size; ln= natural logarithm, = values belonging to R $\lambda_j (j = 1 \dots p)$ and R= correlation matrix.

In the same procedure, the KMO and MSA values are calculated, to support the sample adequacy procedure, and these are given by the following expressions:

$$KMO = \frac{\sum_{j \neq i \neq j} \sum_{i \neq j} r_{ij}^2}{\sum_{j \neq i \neq j} \sum_{i \neq j} r_{ij}^2 + \sum_{j \neq i \neq j} \sum_{i \neq j} r_{ij(p)}^2} \quad MSA = \frac{\sum_{i=1}^p r_{ij}^2}{\sum_{i=1}^p r_{ij}^2 + \sum_{i=1}^p r_{ij(p)}^2}; i = 1, \dots, p$$

Where: $r_{ij(p)}$ = is the partial correlation coefficient of the correlation between the variables X_i and X_j in all cases.

In this way, to test the null hypothesis, the critical value of X^2 calculated is taken if it is greater than the value of tables, there is evidence for the rejection of H_0 , otherwise not reject. Finally, the components are extracted according to the criterion of eigenvalues > to 1 and their corresponding communality whose sum is the percentage of variance explained from:

$$h_i^2 = \text{Var} \left(\sum_{j=1}^k a_{ij} F_j \right) \dots y \dots \Psi_i = \text{Var}(u_i) \quad y \quad \text{Var}(X_i) = \sum_{j=1}^k a_{ij}^2 + \Psi_i = h_i^2 + \Psi_i; i = 1, \dots, p$$

The results obtained by the analyzed data are presented below.

4. Results

Of the total valid cases regarding demographic aspects of the sample, the highest percentage corresponded to the female gender with 57.1 %. [Table 1](#) shows the Cronbach's alpha index:

Table 1. Cronbach's alpha (α) reliability analysis

Cases	N	%	Cronbach's alpha	N of Items
Valid	126	100.0		
Excluded	0	.0		
Total	126	100.0	.705	34

Source: Own.

In this table, the value obtained from Cronbach's alpha is 0.705, which indicates that it is acceptable ([Hair et al., 2010](#)). [Table 2](#) below shows Bartlett's Test of Sphericity with Kaiser (KMO), X^2 , with significance ($p < 0.01$):

Table 2. KMO and Bartlett's Test

Bartlett's Test		Values	MSA	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.582	INCOME*	.625 ^(a)
Bartlett's Test of Sphericity	Approx. Chi-Square	302.673	ADMIDICO*	.573 ^(a)
	Df	21	ADMIDIUA*	.646 ^(a)
	Sig.	.000	AICO*	.606 ^(a)
			AIUA*	.631 ^(a)
			GCCO*	.393 ^(a)
		GCUA*	.522 ^(a)	

^a Measure of Sampling Adequacy.

**INCOME* = Income, *ADMIDICO* = Knowledge about money management, *ADMIDIUA* = Use and application of money management, *AICO* = Knowledge about savings and investment, *AIUA* = Use and application of savings and investment, *GCCO* = Knowledge about expenditure and credit, *GCUA* = Use and application of expenditure and credit

Source: Own.

The values obtained from the Bartlett's Test of Sphericity (.582) in Table 2 denote a value not very appropriate to the acceptable range (> 0.5) indicated by Hair et al. (2010). On the other hand, the measure of sample adequacy for each variable is > 0.5 in most cases, except for the GCCO variable (.393^(a)). Therefore, it is necessary to exclude it from the calculation and run the test again. Table 2.b presents the results below:

Table 2.b. Prueba KMO y Bartlett y MSA

Bartlett's Test		Values	MSA	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.635	INCOME*	.642 ^(a)
Bartlett's Test of Sphericity	Approx. Chi-Square	247.579	ADMIDICO*	.663 ^(a)
	Df	15	ADMIDIUA*	.609 ^(a)
	Sig.	.000	AICO*	.636 ^(a)
			AIUA*	.631 ^(a)
			GCUA*	.601 ^(a)

^a Measure of Sampling Adequacy.

**INCOME* = Income, *ADMIDICO* = Knowledge about money management, *ADMIDIUA* = Use and application of money management, *AICO* = Knowledge about savings and investment, *AIUA* = Use and application of savings and investment, *GCUA* = Use and application of expenditure and credit

Source: Own.

After resetting, the values are modified. Therefore, Bartlett's Test of Sphericity improves to 0.635, so its importance is > 0.05 and the X² value calculated with 15 df is 247,579, which is greater than the X² value of the tables (24,996). Table 3 shows the correlation values of the analyzed dimensions:

Table 3. Correlation Matrix

Variables*	1	2	3	4	5	6	7
INCOME (1)	1.000	.595	.286	-.301	-.261	-.024	-.255
ADMIDICO (2)		1.000	.366	-.161	-.110	.212	-.207
ADMIDIUA (3)			1.000	.371	.440	.164	.108
AICO (4)				1.000	.737	-.101	.117
AIUA (5)					1.000	.078	.188
GCCO (6)						1.000	.465
GCUA (7)							1.000

a Determinant = .083

(1) INCOME = Income, (2) ADMIDICO = Knowledge about money management, (3) ADMIDIUA = Use and application of money management, (4) AICO = Knowledge about savings and investment, (5) AIUA = Use and application of savings and investment, (6) GCCO = Knowledge about expenditure and credit, (7) GCUA = Use and application of expenditure and credit

Source: Own.

Table 3 gives the value of the determinant of 0.083 that is closer to zero, that is, it moves as far as possible from value 1, which gives support to say that the correlations are acceptable in theoretical terms (Hair et al., 2010). Being the correlations of greater value between the variables INCOME and ADMIDICO (.595) and the variables AICO and AIUA (.737). In Table 4 the extraction of components is carried out under the criterion of eigenvalues > to 1, with the corresponding communalities (ψ) representing the proportion of variance.

Table 4. Components Matrix, Communalities, Eigenvalue and total Variance

Variables	Components		Extraction
	1	2	
AIUA	.833	.355	.771
AICO	.831	.286	.749
GCUA	.431	-.147	.771
ADMIDIUA	.305	.824	.772
ADMIDICO	-.456	.736	.820
INCOME	-.612	.630	.208
Eigenvalues	2.246	1.845	4.091
Total Variance	37.427	30.754	

INCOME = Income, ADMIDICO = Knowledge about money management, ADMIDIUA = Use and application of money management, AICO = Knowledge about savings and investment, AIUA = Use and application of savings and investment, GCUA = Use and application of expenditure and credit

Source: Own.

Finally, Table 5 shows the total variance explained:

Table 5. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	% Cumulative	Total	% of Variance	% Cumulative
1	2.246	37.427	37.427	2.246	37.427	37.427
2	1.845	30.754	68.181	1.845	30.754	68.181
3	.912	15.193	83.374			
4	.403	6.723	90.097			
5	.339	5.653	95.750			
6	.255	4.250	100.000			

Extraction Method: Principal Component Analysis.

Source: Own.

As can be seen in [Table 5](#), the eigenvalue of components 1 and 2 is greater than 1. Both factors represent 68.18 % of the phenomenon under study.

5. Discussion

It is interesting to contrast the results of this study with those obtained by Contreras et al. (2017) because the same instrument was applied. However, a difference is observed around the variables studied since in this work the GCCO variable was excluded given its $MSA < 0.5$ (.393^(a)) so that it did not generate a bias in the results since it was not significant in statistical terms ([Hair et al., 2010](#)).

In the present work, it is also possible to identify in the studied population a high interest in the administration of money in its knowledge, use and application dimension towards savings and investment issues. The latter contrasts with the studies conducted by Contreras et al. (2017) since these studies show that students lack knowledge about investment instruments, although they do have knowledge about basic savings channels.

The starting point of financial education is the culture of savings and investment, so the application of such knowledge will allow for proper planning for the future. The success of these objectives requires that regardless of income level, each individual adopts the habit of saving at least 10 % to 20 % of their gross income ([Samper et al., 2010](#)).

For all the above described, financial education is relevant as it provides people with tools to make decisions that improve their economic well-being. Therefore, it is not surprising that its importance is increasing given the increasing and complex number of products offered by financial markets, in order to meet the profitability needs of a population increasingly concerned about changes in systems of pensions that imposes the challenge of retirement at an older age with lower income.

6. Conclusion

These results provide evidence to indicate that there is an underlying structure that allows explaining the phenomenon of financial education in Mexican students of higher education and, in the same way, this structure can be explained at least by one factor.

The statistical evidence comes from the rejection of the null hypothesis, since according to the decision criterion to reject H_0 if X^2 calculated is $>$ to X^2 of tables, otherwise reject. Then the criteria are met.

From the results obtained, it was possible to know that in component 1, the items related to knowledge, use and application towards saving and investment represented significant charges (AIUA and AICO .833 and .831, respectively) and for component 2, those related to knowledge, use and application about money management (ADMIDIUA and ADMIDICO .824 and .736, respectively).

7. Suggestions

As future lines of research, it is considered of great importance to carry out a study of the same population in order to measure financial competence based on a list of mini-cases associated with the financial topics analyzed in this document.

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