



Copyright © 2023 by Cherkas Global University
All rights reserved.
Published in the USA

European Journal of Contemporary Education
E-ISSN 2305-6746
2023. 12(3): 766-787
DOI: 10.13187/ejced.2023.3.766
<https://ejce.cherkasgu.press>

IMPORTANT NOTICE! Any copying, reproduction, distribution, republication (in whole or in part), or otherwise commercial use of this work in violation of the author's rights will be prosecuted in accordance with international law. The use of hyperlinks to the work will not be considered copyright infringement.



**European Journal of
Contemporary Education**



ELECTRONIC JOURNAL

Screening Financial Literacy in Young Business-Oriented Professionals. Conjectures of Financial Duality and Financial Divergence

Sergio J. Chi3n-Chac3n ^{a, b}, Manuel Chu-Rubio ^{a, b}, Carlos Ag3ero-Olivos ^{a, b, *}

^a CENTRUM Cat3lica Graduate School of Business, Lima, Peru

^b Pontificia Universidad Cat3lica del Per3, Lima, Peru

Abstract

The main purpose of this research is the estimation and analysis of the level of Financial Literacy of professionals oriented to business management. The sample was composed of young executives starting MBA studies. The level of FL was analyzed in detail through various statistical techniques, under two perspectives. The first perspective referred to the dimensions involved in the definition of FL and the second referred to the demographic characteristics of the population. The results show a level of FL that does not reach an acceptable minimum in its global measurement; neither in its different dimensions, but the Information dimension. In general terms, this result is reproduced at the different demographic segments analyzed. In terms of the demographic categories, there were no differences in age or gender. Based on the income level, there were differences in the Knowledge and Information dimensions. Likewise, based on the number of dependents and on profession, there were differences in the Consciousness dimension. The results allow us to make two important conjectures for further research: the Financial Duality and the Financial Divergence conjectures. It is postulated that the Financial Duality conjecture could be explained through Kahneman's theory of System 1/System 2 and corresponding behavioral biases.

Keywords: financial literacy, financial knowledge, financial capacity, financial information, financial consciousness, financial duality conjecture, financial divergence conjecture.

1. Introduction

Life well-being is increasingly dependent on the goodness and quality of the plans and decisions made. Within this context the financial dimension takes particular importance for better allocation of income and expenses over time reflects on better balance of consumption levels throughout life, access to products and services not possible with current income, the well-being

* Corresponding author

E-mail addresses: sjchion@pucp.edu.pe (S. Chi3n-Chac3n), jchu@pucp.edu.pe (M. Chu-Rubio), caguero@pucp.edu.pe (C. Ag3ero-Olivos)

and education of offspring, reduction of risks exposure, etc. (Lusardi et al., 2010; Lusardi, Tufano, 2015; Hamid, Loke, 2020). Nowadays, these potential benefits are available to increasingly large segments of the population and with greater ease of access (Klapper, Lusardi, 2020; Ergun, 2018).

To access these higher standards of living a basic understanding and comprehension of routinely financial affairs is necessarily; which implies capabilities on financial reasoning and skills to apply basic financial concepts. In summary, an adequate level of financial literacy (FL) is required. (Huston, 2010; Remund, 2010; OECD INFE, 2011). The financial management and behavior of individuals can amplify the spectrum of quality of life levels that they can access; it can greatly improve their well-being or lead their lives into major disasters. Finance amplifies the consequences of decisions and plans.

Thus, the importance of reaching adequate levels of FL. Growing demand for FL is related to the greater dissemination and innovation of financial products and services, as well as to their greater diversity and sophistication; products and services which are becoming more and more accessible to broader population segments (Fernández et al., 2014). Individuals need to acquire an acceptable level of financial capabilities, including the understanding of financial concepts, capacities to use these financial concepts and instruments, knowledge of the implications of financial decisions, and the ability to keep informed of the alternatives offered by the market (van Rooij et al., 2012). In addition, individuals also need to acquire the ability to think about finance naturally, spontaneously, and on a regular basis. This challenge faces the obstacles of the lack of training (Hastings et al., 2013) and the natural limitations of financial thinking identified by various behavioral economics researchers, limitations that translate into different biases related to a rational behavior¹ (Kahneman, Tversky, 1979).

Due to this importance, the society as a whole, including governments and private institutions, as well as academic institutions have directed its attention towards this issue, especially after the financial crisis of 2007–2009. This financial crisis evidenced the low level of FL in individuals (Mandell, Klein, 2009; Robb, Woodyard, 2011; Shahrabani, 2012).

FL is much more than knowledge; it is a broad and complex concept. According to OECD (2014), it is the knowledge and understanding of financial concepts and risks; skills and capabilities; motivation and confidence to apply such knowledge and understanding; dimensions that help individuals to make effective decisions in different financial contexts to improve their well-being.

Importance of FL is such that individuals should naturally handle its different dimensions when facing situations where the efficient use of financial resources is at stake. Designs and implementation of FL educational programs play an important role to achieve this objective, aiming at improving financial literacy levels in the population (Lusardi et al., 2010; Lusardi, Mitchell; 2014). However, these programs have not achieved their purpose yet. Research conducted to date has shown that almost all sectors of most populations have not yet sufficiently comprehend the dimensions of FL (Lusardi, Mitchell, 2014).

L. Klapper and A. Lusardi (2020) emphasize that without an adequate progress in FL, people will not be able to make informed decisions regarding savings, investment, and loans. Likewise, they found that globally, one in three adults has knowledge of three out of four basic financial concepts: interest rates, compound interest, inflation and risk diversification. Moreover, they found that women, low-income and less educated adults are more likely to have important financial knowledge gaps.

Having financial knowledge is not enough; skills to apply it based on timely information and consciousness of the consequences of decisions is of high importance for the well-being of the individual and, as a consequence, of the society. FL is important in most aspects of human life; if resources are not properly manage, wealth can be wasted and financial goals will be difficult to achieve (Anik Yuesti et al., 2020). A key desired outcome for financial education is sustained financial well-being, in which people can fully meet current and ongoing financial obligations, can feel secure in their financial future, and are able to make choices that allow enjoyment of life (U.S. Financial..., 2020).

This paper presents the results of the analysis of the levels of FL achieved by professionals interested in business management, a population that has received little or no attention. The study of this population is of particular importance because they represent a community with a modern

¹ For example, confirmation bias, attentional bias, improbable favorite bias, anchoring bias, etc.

lifestyle, professional knowledge and interest in business management and in finance. The study of this population permits to inquire to what extent the backlog in FL reported in the literature is related to the lack of interest or deficiencies in training on FL or if it is linked to behavioral biases reported in the literature of economic theory and psychology (Kahneman, Tversky, 1979).

The results obtained reflect a level of LF that is below adequate, both at the global level and of its components. FL was analyzed from the perspective of the dimensions that define it but also according to the different demographic characteristics of the population studied.

The analysis carried out has allowed posing two conjectures, the Financial Duality conjecture and the Financial Divergence conjecture, for further research.

Raising these conjectures has been possible due to the characteristics of the population studied. The first conjecture has to do with a possible differentiation between the use of skills for professional financial management and for personal affairs. The second conjecture, linked to the first, has to do with possible divergences in the acquisition of skills and competencies in their financial training, for professional or personal use.

The paper is organized in seven sections. The following section, section two, present a definition of FL and its dimensions for this research--the particularity of the approach used to identify the dimensions refers to its basement on a model of financial behavior, unlike other research. Section third highlights the importance of studying the above-mentioned population, which can serve as a standard of comparison for other researches. This section also explains the sample, which has been of convenience, but also representative at the international level. Section fourth describes the instrument and the fieldwork. Section fifth explains the questions and hypotheses of research, which are organized into 3 groups: Global Approach, Demographic Approach and Dimensional-Demographic Approach. Section sixth presents a summary of the Sample Data as well as the analysis made according to each of the three mentioned approaches. The last section is the Conclusions section where the two important conjectures for further research are presented and discussed it.

2. Results and discussion

Definition of financial literacy and its dimensions

Financial Literacy is a concept that is not yet valued in its true dimension, nor is it given due importance; in spite of a modern life characterized by individuals constantly deciding among increasingly sophisticated and more accessible financial products. People face their retirement plans, make decisions regarding savings and investment alternatives, and choose among alternative credit conditions without a minimum of financial knowledge (Lusardi, Mitchell, 2014).

Compounding this situation, a low development of financial reasoning is observed, explained by lack of skills and financial maturity. This state of affairs blocks the monitoring and understanding of the financial environment in which they operate, making it practically impossible to evaluate the impact of their decisions and plans.

The first attempts to study FL date back to 1787, when John Adams¹, recognized for the first time the importance of FL and the need to develop a basic knowledge about money management. Nevertheless, it was not until the financial crisis of 2007–2009 that FL received its due importance. That event prompted a large volume of scattered investigations, though basic challenges are still pending. In spite of the huge number of research papers generated in recent years, progress on the subject is very limited. Inquiries on FL still have to do with basic aspects such as the study of the dimensions involved in FL, dependence on the concept of FL on the population in question and the definition of suitable and standardized measurement instruments.

FL has acquired many different meanings and has been used from different perspectives: knowledge of financial products (differences between stock and bond, between a fixed and adjustable rate mortgage, etc.); knowledge of financial concepts (inflation, capitalization, diversification, credit scores, etc.); having the mathematical skills necessary to make effective financial decisions and being involved in certain activities such as financial planning. Despite the efforts made to date, the evidence shows that there is not a consensual standardized concept of FL (Vitt et al., 2000).

Based on the above, some researchers emphasize on the definition of FL from a perspective of knowledge of necessary financial terms and concepts to increase skills, confidence and

¹ John Adams is considered the founding father of FL in the United States (Goyal, Kumar, 2021)

motivation in the management of a proper consumer decision-making (Bowen 2002; Fox et al., 2005; Courchane y Zorn, 2005; Willis, 2008; Remund 2010). Moreover, some authors consider that FL should combine knowledge and the ability to use that knowledge in the economic life but also maximize people's opportunities to improve their well-being (Johnson y Sherraden, 2007). Some researches state that FL is the knowledge of basic financial concepts and the ability to do simple calculations; and others state that FL is a measure of how well a person can understand and use information related to personal finance. However, in practice it is difficult to explore how people process economic information and make informed decisions about household finance. (Lusardi, Mitchell, 2011a, Huston, 2010; Lusardi, Mitchell, 2011b).

From the perspective of knowledge, skills and application action, FL is the ability to use knowledge and skills to manage financial resources effectively for financial security (Jump\$tart Coalition..., 2007; Annual Report..., 2008; Hung et al., 2009).

FL has also been analyzed from a perspective of capacity and use of financial concepts supported by information and communications technology (Servon, Kaestner, 2008). Moreover, it has also been analyzed based on relevant skills and abilities to read, analyze, manage, and communicate personal financial conditions that affect material well-being; ability to discern financial alternatives, plans, and efficient respond to everyday life events that affect financial decisions, including events in the economy (Vitt et al, 2000).

Other researches have analyzed the relationship between FL and people's financial behavior. These studies recognize that this relationship is not clearly defined. There are researches that have found direct relationships, and others found that the relationship is indirect and that there is even evidence of a neutral relationship (Fox et al., 2005; Lusardi, 2004; Mandell, 2005; Willis, 2008; Lyons, 2006; Bell et al., 2009; Alsemgeest, 2015). While other studies considered the definition of FL from other different perspectives (Schuchardt et al., 2009 cited by Nicolini et al., 2013). These varieties of approaches to the concept of FT signals the lack of consensus for a definition of the concept, which affects the finding of a standard measurement instrument. This has led that some studies use specific instruments for each specific population (Nicolini et al., 2013).

As a consequence, this evolution of FL has produce different factors, such as knowledge, skills, attitudes, behaviors and personal circumstances, to measure it.

The analysis of Australia and New Zealand Banking Group Limited (ANZ, 2015) proposed a conceptual framework of FL with five independent components: (a) keeping track of finances, (b) planning ahead, (c) choosing financial products, (d) staying informed and (e) financial control. Each component "is measured by several behavioural indicators. The framework also points out that these five components of financial literacy are influenced by such things as people's financial knowledge and numeracy and their financial attitudes as well as their socio-demographic and household characteristics" (Australia and New Zealand..., 2014).

In all cases, studies do not consider in depth the aspects that help people in their own analysis, such as the technology, the daily economic information and the consciousness of the results of their decisions.

This requires a definition of FL that adapts to the evolution of both the financial products offered by the market, and the innovation of financial technology, which are part of our lives. The new definition should help to develop a standard measurement instrument that validates the relationship between financial knowledge and the current financial behavior of people.

The OECD/INFE (2018) defines FL as: "A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing." For a contemporary definition of FL, it should be considered that the Information dimension (which includes technology) should be included in the dimensions of FL.

Figure 1 explains FL from the perspective of the required components that influence the financial behavior of individuals. Based on this figure, the proposal is a broad and general definition of FL, which is given specificities through its dimensions involved. Financial Literacy is the capacity of individuals to manage their personal finance in order to achieve their well-being. This definition includes capabilities for decision-making, and short-term and long-term financial planning.

It includes the understanding of basic financial concepts of relevance to personal finances, as well as the ability to apply them; considers consciousness of the possible consequences of decisions and finally it involves monitoring the economic and financial situation. This definition proposal is based on the different definitions in the literature and it seeks to encompass the dimensions involved in our population of interest.

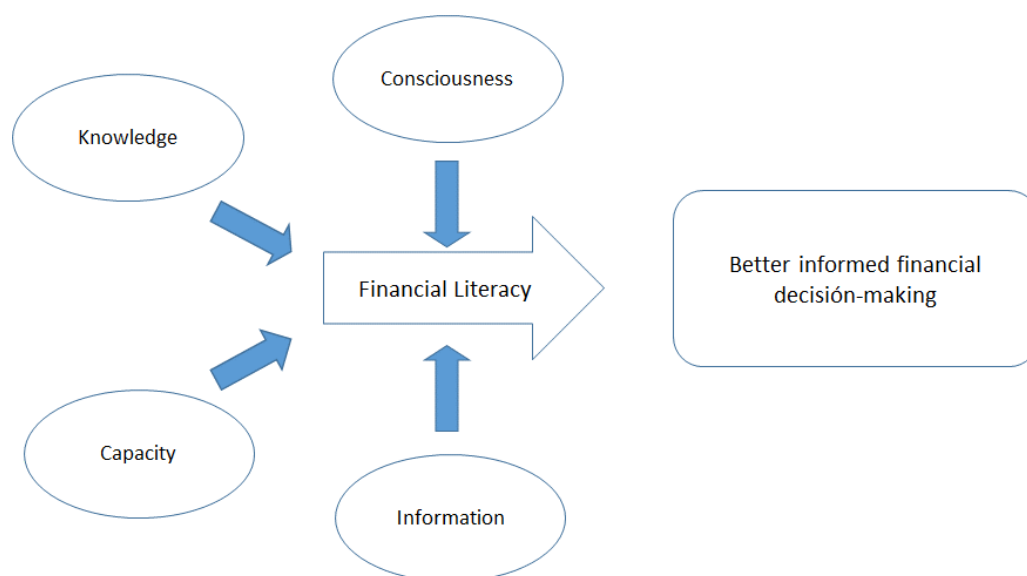


Fig. 1. Behavioral Dimensions of Financial Literacy

Specifically, the following dimensions are considered for FL. Knowledge, the understanding of the basic financial concepts for making personal decisions, as well as for the elaboration of personal plans. Capacity, ability to apply financial knowledge. Information, monitoring the situation and perspectives of the economic and financial environment. Consciousness, ability to weigh different possible outcomes in terms of personal benefit.

Population and sample

Population: Identification and Importance

The interest of this study is to analyze the FL level in professionals interested in business management, and to identify possible differences due to demographic characteristics (Chen, Volpe, 1998; Lusardi, Mitchell, 2011a; Atkinson, Messy, 2012; OECD, 2013). The findings of Potrich et al. (2015) confirm the need to design effective actions to minimize the FL problem with a model that considers socioeconomic and demographic variables that identify the FL level of the individuals.

This population composed of young professionals is of great interest because it allows us to analyze to what extent the accumulation of knowledge and academic preparation can improve the FL development. It also allows us to study a population with more access to financial products and services, with the maturity and the ability to make the most of those services, with modern characteristics and international lifestyles. Within this population, an important segment is made up of professionals with interest in pursuing further graduate studies in management. This population will allow us to analyze whether interest in professional management affairs has incidence on personal financial capabilities, and to what extent. This is important because FL does not mean the application of methodologies and professional practices; it concerns with the development of a natural financial reasoning and behavior of the individuals.

An adequate vehicle to analyze this population is the population defined by professionals entering an MBA program, they are interested in business management, their life characteristics are linked to modernization and internationalization, and they want to keep informed about financial and economic matters. Likewise, the cohort-age of these professionals were of special interest because they were developing a professional life and, most of them, trying to start a family. All these demographic characteristics were of particular interest for the study of FL. In addition, this population allowed us to analyze the differences between management professionals and non-management professionals.

Sample

This research used a convenience sampling without losing the representativeness of the population to be studied. The convenience sampling was necessary to control population characteristics linked to the interest in business management, young working professionals, and modern and international daily life habits.

People from the CENTRUM MBA program of the Pontificia Universidad Católica del Perú (PUCP) were selected because they fulfilled the above-mentioned characteristics. PUCP was founded in 1917 and it is the main university in Peru. Its business graduate school (with MBA programs) started in

2001 and, during its first 10 years, obtained the three most recognized accreditations of the world: AMBA, AACSB, and EQUIS, among others, up to now. It is one of the leading business schools in South America, and it is widely recognized worldwide. Its programs, faculty, students and partnerships with important universities around the world are recognized at an international level.

The sample was composed of individuals from the CENTRUM MBA program. The information was taken during the first semester 2021. In the sections of Description of the Field Work and Summary of the Sample Data there is more information about the characteristics of the sample and its sampling process.

Description of instrument and field work

Description of the Instrument

The bibliographic research was a systematic, detailed and explicit review that allowed us to amalgamate different researches on FL and synthesize their evidence. The consulted databases were Web of Science and Scopus. For the selection of articles, search equations composed of descriptors and combined qualifiers (Boolean operators) based on keywords were used. As a result, the most cited papers in high-impact journals were identified on current trends and future challenges of the FL. Then, a summary of all the evidence found in previous studies was compiled. In addition, the surveys that were applied to different populations were analyzed. Furthermore, a first multiple-choice questionnaire was developed, composed of twenty questions, with equal number of items for each of the four dimensions of Knowledge, Capacity, Information and Consciousness. The questionnaire was adapted based on the researchers experience and the characteristics of the study population.

The questionnaire was reviewed by an expert panel. The panel of experts made valid suggestions that helped us to improve the questions and adapt them to the profile of different participants. They evaluated the precision, adequacy, the understanding of the questions, the alternatives to answer, the balance between questions and dimensions, financial concepts, and other aspects.

Then, the questionnaire was applied to a pilot sample, made further adjustments to it and tested for convergence and discriminatory properties, and finally approved it for using.

Description of Field Work

The improved questionnaire was applied to the enrolled students in the first semester of the MBA program. A relevant characteristic of the questionnaire was the random order of the questions regarding the four dimensions: knowledge, capacity, information and consciousness.

The instrument was administered using Google Forms, with the prior coordination and authorization of the Head's Office of the MBA program. The instructions of the questionnaire indicated that it was anonymous, confidential and voluntary. The estimated time to answer it was fifteen minutes and it was carried out via Zoom. Likewise, besides the twenty questions about the four dimensions, five questions were added to identify the demographic information of the sample: gender, profession, age, mean gross monthly income and number of dependents. The information was saved in the digital files of Google Suite, in an Excel database, with restricted access to only the researchers of this study.

The questionnaire was administered to 321 students of eight MBA cohorts. Responses were received from 241 valid questionnaires. [Table 1](#) shows examples of the type of questions.

Table 1. Type of question per dimension

Dimension	Dimension Focus	Type of question	Objective	Keyword
Knowledge	Understanding the basic financial concepts for personal decision-making and development of personal plans	Assume you have S/10,000 in a Savings Account and the interest rate you receive is 3 % compoundable annually. After three years, how much would you have in your account if you did not withdraw money until the date of expiration? a. Over S/ 10,900 b. Exactly S/ 10,900 c. Under S/ 10,900 d. I do not know	Test the knowledge of the interviewee about compounding interest rate.	Compounding interest rate.

Capacity	Putting into practice the financial knowledge	Fund 3, managed by the AFPs, is expected to have a higher return compared to the Fund 2. This means that members of the Fund 2 assume: a. Less risk that Fund 3 b. Similar risk as Fund 3 c. Higher risk that Fund 3 d. No risk	To test the knowledge of the interviewee about the risk/return relationship.	Risk and return
Consciousness	Testing individual abilities to weigh different results for their personal benefit.	Different risk positions can be adopted when investing in the Stock Market: conservative, moderate and aggressive. If you have a surplus of money, in which of the following alternatives would you invest, if your aim is moderate risk position: a. Shares of mining companies b. Shares of a company with the lowest volatility in the last 12 months c. Shares of a company with the highest profitability in the last 12 months d. Mutual Fund with a passive portfolio diversified according to the stock market index	To test the risk consciousness of the interviewee	Risk diversification
Information	Monitoring the current economic-financial situation and environment perspectives	In Peru, the responsible of Monetary Policy is: a. Printing and Mint Money House b. Ministry of Economy and Finance c. Central Reserve Bank of Peru d. Superintendency of Banking, Insurance and AFP	Test if the interviewee acquaintance with the institution responsible for the Monetary Policy in Peru	Monetary Policy

The option in “**bold**” is the right answer

Source: Own

Research questions and hypotheses

The main objectives of the research are to estimate and analyze the FL level of professionals oriented to business management. The research faced the limitation of the absence of studies related to the population of interest; therefore, there were no standards of comparison. This was partially compensated with the definition of these standards based on our teaching experience and some literature references.

In terms of the analysis, the results were reviewed and examined under two perspectives: (1) dimensions involved in the definition of FL and (2) demographic characteristics of the population. The analysis aimed to explain the differences in the FL performance according to the dimensions of the concept and the demographic characteristics of the population of interest.

There were two main questions in the research: (1) what is the FL level of the population studied and how this level is decomposed in the different dimensions of the concept? (2) What demographic characteristics explain the differences in FL among the individuals of the population studied?

In conceptual terms, the null hypotheses of the research were structured in three areas: (a) Global Approach, (b) Demographic Approach, and (c) Dimensional-demographic Approach, which are explained below:

1.1. Global Approach

Null hypothesis on the general level of FL:

H1₀: The FL level and its different components are not higher than 75 % of their corresponding maximum score of the measurement instrument. Specifically, the mean levels of FL (H1-0₀), Knowledge (H1-1₀), Capacity (H1-2₀), Consciousness (H1-3₀), and Information (H1-4₀) do not exceed the 75 % of the corresponding maximum levels of the questionnaire.

Behind this null hypothesis, which was intended to be rejected, there is a statement about the FL level of the population of professionals oriented to management. For this purpose, a minimum of 15 points in the total score of the instrument (75 % of 20) and 3.75 points for each of its dimensions (75 % of 5) were considered appropriate. As referred, these minimum scores were defined based on the researcher experiences and the levels reported by the scientific literature for other populations. “We consider people to be financially literate if they know at least three out of four concepts” (Klapper, Lusardi, 2020).

To test these hypotheses, the first moment of the distribution of the sample mean and the confidence intervals for the mean scores of each dimension were considered as test statistics.

Additionally, hypotheses aim to draw conclusions regarding possible imbalances between the different dimensions of FL were tested, for this, null hypothesis on the level of differences among the different FL components were formulated:

H2₀: There are no significant differences between the means of FL levels among the different dimensions of the concept: Knowledge, Capacity, Consciousness and Information

These hypotheses were tested based on the confidence intervals of the estimated mean scores for each FL component.

1.2. Demographic Approach

The aim is to analyze the influence of different demographic characteristics (age, income, dependents, profession and gender) on the FL differences in the population studied. A linear regression analysis was used to control the influences of each other characteristic on the relationship of the characteristic of interest with the level of FL. In this sense, the estimation of the linear regression does not aim to “predict” the FL level according to the demographic characteristics. It aims to validate if these variables influence on the explanation of the variations in the overall FL score, as well as the magnitude of this influence.

H3₀: The demographic characteristics do not influence the explanation of FL level.

H4₀: There are no differences in the FL level due to the age of the population subjects.

H5₀: There are no differences in the FL level due to the income of the population subjects.

H6₀: There are no differences in the FL level due to the number of dependents of the population subjects.

H7₀: There are no differences in the FL level due to the profession of the population subjects.

H8₀: There are no differences in the FL level due to the gender of the population subjects.

1.3. Dimensional-demographic Approach

These hypotheses are referred to the possible differences in the FL dimensions, as a result of the demographic differences. Compared to the previous hypotheses referred to the overall FL score, these hypotheses are referred to each individual dimension. Moreover, unlike the previous hypotheses, the statistical analysis was based on a test of mean differences. The previous correlational analysis was not considered, and acknowledged the limitation on the control of possible influences of third variables. This change in the statistic technique was made due to the limited dispersion of the score values, from 0 to 5, which are different from the overall score, from 0 to 20.

For this hypothesis, each demographic characteristic was grouped in two categories, as shown below in Table 2:

Table 2. Demographics

a. Age	Junior (0)	35 years old or younger
	Senior (1)	Over 35 years
b. Income (monthly)	Lower (0)	S/10,000 or less
	Upper (1)	More than S/ 10,000
c. Number of Dependents	Without (0)	Without dependents
	With (1)	With dependents
d. Profession	Engineering (0)	Not related to management. Basically Engineering.
	Administration (1)	Related to management:

		Administrations, Economics, Accounting
e. Gender	Fem (0)	Female
	Male (1)	Male

Source: Own

H9_o: Mean levels of FL in Knowledge dimension shows no differences between the two the categories of Age (H9-1_o), the two categories of Income (H9-2_o), the two categories of Dependents (H9-3_o), the two categories of Profession (H9-4_o) and the two categories of Gender (H9-5_o).

H10_o: Mean levels of FL in Capacity dimension shows no differences between the two categories of Age (H10-1_o), of Income (H10-2_o), of Dependents (H10-3_o), of Profession (H10-4_o), and of Gender (H10-5_o).

H11_o: Mean levels of FL in Consciousness dimension shows no differences between the two categories of Age (H11-1_o), of Income (H11-2_o), of Dependents (H11-3_o), of Profession (H11-4_o), and of Gender (H11-5_o).

H12_o: Mean levels of FL in Information dimension shows no differences between the two categories of Age (H12-1_o), of Income (H12-2_o), of Dependents (H12-3_o), of Profession (H12-4_o), and of Gender (H12-5_o).

Financial literacy evaluation

Summary of the sample data

Demographic characteristics of the sample is shown in [Table 3](#).

Table 3. Sample demographic characteristics

Total number of sample units:	241	
Gender:	Female (37.34 %)	
	Male (62.66 %)	
Profession:	Administration, economics and accounting (39.83 %)	
	Engineering and others (60.17 %)	
Age	Mean:	35.34 years
	SD:	6.19 years
	Minimum:	28 years
	Maximum:	53 years
Gross monthly income	Mean:	S/ 9,977
	SD:	S/ 4,864
	Minimum:	S/ 5,500
	Maximum:	S/ 22,500
Number of dependents:	Mean:	1.2282 individuals
	SD:	1.2949 individuals
	Minimum:	0 individuals
	Maximum:	4 individuals

Source: Own

Thus, the “Typical” individual of the sample is male, in the first stage of adulthood, of the engineering profession, with an income of around S/.10,000 and with a dependent.

[Table 4](#) provides a summary of the scores obtained by the sample units, considering the following:

a. Notation for FL and its dimensions: FL (Y), Knowledge (YCO), Capacity (YCA), Consciousness (YCN), Information (YI). Demographic characteristics: Age (X₁), Income (X₂), Dependents (X₃), Profession (X₄), Gender (X₅).

b. Only two categories are considered for the different demographic characteristics, identified as 0 and 1 in the previous section.

c. The total score ranges from 0 to 20 points, and for each dimension from 0 to 5 points. The total score of each sample unit is obtained through the sum of the scores obtained in each dimension.

Table 4 shows the following:

- a. Number and percentage of subjects in the two categories (0 and 1) for each demographic characteristic.
- b. Mean score for each category of each demographic characteristic, for each dimension.
- c. Mean score for each dimension and for the total score.

Table 4 shows the following results:

- a. The sample size is 241 subjects or observations. The categories for each demographic characteristic are, relatively, balanced; with the largest imbalance of 37% and 63%.
- b. A total mean FL score of $Y = 13.5447$ was found, which would represent a mean passing grade, but below the acceptable. The distribution of this total mean score, in its 4 dimensions, shows that the Information dimension has the best performance ($YI = 4.0539$) and the Capacity dimension, the lowest performance ($YCA = 2.0913$). This shows a failed mean level for the ability to use financial concepts and tools and a passing mean level for the ability to monitor the situation and prospects of the economic-financial environment. The other two dimensions register low passing evaluations, above 3 but below 4 points.
- c. Each category of each demographic characteristic registers total mean scores above 13, lower or slightly higher than 14, and below 15, which is the level considered as acceptable. In each of the demographic characteristics, category 1 obtained a FL total mean score higher than category 0. This higher mean score tends to reproduce in each of the dimensions as well, but there are some exceptions.
- d. The failed score for the Capacity dimension for the total units of the sample is reproduced in each category of each demographic characteristic. The opposite occurs with the Information dimension, where all the categories of all the characteristics obtain a score higher than 3.98, reaching above the mark of 4.13 in some cases. The other two dimensions show low passing scores in the different categories, for the different demographic characteristics, in the different dimensions of FL.
- e. The best performing demographic category is the Upper category in the Income characteristic and the lowest performing category is the one without dependents.

Table 4. Summary of Sample Data

		Number	YCO Mean	YCA Mean	YCN Mean	YI Mean	Y Mean
X1	Junior (0)	134 56 %	3.7388	2.0075	3.6716	4.0000	13.4179
	Senior (1)	107 44 %	3.7850	2.1963	3.6075	4.1215	13.7103
X2	Lower (0)	152 63 %	3.5921	2.0263	3.6184	3.9868	13.2237
	Upper (1)	89 37 %	4.0449	2.2022	3.6854	4.1685	14.1011
X3	Without (0)	101 42 %	3.7327	1.9307	3.4851	3.9802	13.1287
	With (1)	140 58 %	3.7786	2.2071	3.7571	4.1071	13.8500
X4	Eng. (0)	145 60 %	3.6690	2.0759	3.5034	4.0000	13.2483
	Adm. (1)	96 40 %	3.8958	2.1146	3.8542	4.1354	14.0000
X5	Female (0)	90 37 %	3.7333	1.9667	3.6556	4.1222	13.4778
	Male (1)	151 63 %	3.7748	2.1656	3.6358	4.0132	13.5894
Total Sample		241 100 %	3.7593	2.0913	3.6432	4.0539	13.5477

Source: Own

Table 5 provides the correlation matrix between Xs and Y, as well as between the Xs. For this purpose, we worked with the original demographic variables, without grouping them into two categories. In this regard, we need to be careful with the interpretations of X₄ (Profession) and

X₅(Gender) which are dummy variables, categorical variables, and not ratio variables. It is presented for completeness.

Table 5 shows the following:

a. The correlations of the demographic variables with the FL score are low in magnitude and only the categories of Income (X₂) and Profession (X₄) (categorical variable) show estimates with statistical significance of 5 %. Therefore, when the regression analysis is used, its relevance will be limited to detecting possible links of statistical significance, but low in magnitude. In other words, the technique is used from an estimation point of view, not a prediction point of view (Hill et al., 2011: 135).

b. Regarding the variables referring to demographic characteristics, Age (X₁), Income (X₂) and Dependents (X₃) show significant correlations higher than 0.3 and lower than 0.5. They are the largest correlations in magnitude. In general, there were no high correlations between the Xs, so no major multicollinearity problems are expected.

Table 5. Correlations of FL scores[#]

	Y	X1	X2	X3	X4 [#]	X5 [#]
Y	1.0000*					
X1	0.1227	1.0000*				
X2	0.1741*	0.3902*	1.0000*			
X3	0.0562	0.4917*	0.3174*	1.0000*		
X4 [#]	0.1317*	-0.1784*	-0.1271*	-0.0781	1.0000*	
X5 [#]	0.0193	0.1680*	0.1802*	0.2094*	-0.1428*	1.0000*

Source: Own

#: When reading the table, be careful with X₄ and X₅, which are dummy variables, categorical variables, and not ratio variables.

*: Significance level of 5 % (Null hypothesis: the correlation is 0)

Global Approach Analysis (H_{1o} and H_{2o})

This section tests the hypotheses related to the general population, without differentiating by demographic characteristics. Specifically, the total score and the score of each dimension were considered. Table 6 shows the statistics regarding these scores:

- Row 1: Number of observations
- Row 2: Mean
- Row 3: Standard Deviation (SD)
- Row 4: Standard error (SE)
- Row 5: Target Score (TS)
- Row 6: t-test statistic = (Mean – TS) / SE
- Row 7: Degrees of freedom (Number of observations – 1)
- Row 8: p-value (Right tailed test)

For the null hypothesis H_{1o} the following generic statement is proposed:

H_{1o}: Mean score of YYY of professionals interested in business management is not higher than XXX.

Where: YYY has the following meanings: FL, Knowledge, Capacity, Consciousness, Information. As for XXX, the values were 15 for FL and 3.75 for the other YYY.

The test statistic for these hypotheses is the mean, through the respective t-value of the Student's distribution of N - 1 = 240 levels of freedom. The assumption of normality of the mean distributions is based on the central limit theorem and the sample size.

Table 6 shows these hypotheses tests. Considering a significance level of 5 %, hypotheses H_{1-0o}, H_{1-1o}, H_{1-2o} and H_{1-3o} were rejected. Hypothesis H_{1-4o} could not be rejected. Therefore, it could not be assumed that the population studied shows an acceptable level of FL. Likewise, the levels of Knowledge, Capacity and Consciousness did not show levels that could be considered acceptable. The Information dimension did obtain an acceptable level. In other words, the population interested in business management showed an acceptable behavior in terms of monitoring the economic-financial environment. This can be explained by the interest in management issues that encourages the monitoring of the environment related to economics and finance, as well as an effort to understand it,

despite the limitations in the other FL dimensions. This understanding of the environment could be greatly enhanced with a better competence in the other three dimensions.

Table 6. Hypothesis Tests H1_o

	FL (Y)	Knowledge (YCO)	Capacity (YCA)	Consciousness (YCON)	Information (YI)
1. Number of Observations	241	241	241	241	241
2. Mean	13.5477	3.7593	2.0913	3.6432	4.0539
3. SD	2.8001	1.1727	1.2583	1.0069	0.7425
4. SE	0.1804	0.0755	0.0811	0.0649	0.0478
5. Target Score (TS)	15	3.75	3.75	3.75	3.75
6. t-test statistic	-8.0504	0.1232	-20.4525	-1.6456	6.3577
7. Levels of Freedom	240	240	240	240	240
8. p-value	1.0000	0.4510	1.0000	0.9494	0.0000

Source: Own

The above conclusion allowed us to draw the respective implications for hypothesis H2; however, this hypothesis was formally tested. This hypothesis test was based on the statistical confidence interval.

Table 7 shows the confidence interval estimates for the scores of FL and of its dimensions.

Table 7. Confidence Intervals for the FL dimension scores

	FL (Y)	Knowledge (YCO)	Capacity (YCA)	Consciousness (YCON)	Information (YI)
Number of Observations	241	241	241	241	241
Mean	13.5477	3.7593	2.0913	3.6432	4.0539
SD	2.8001	1.1727	1.2583	1.0069	0.7425
SE	0.1804	0.0755	0.0811	0.0649	0.0478
Degrees of Freedom	240	240	240	240	240
t-critical (95 %, two-tailed)	1.9699	1.9699	1.9699	1.9699	1.9699
Error	0.3553	0.1488	0.1597	0.1278	0.0942
Lower Limit	13.1924	3.6105	1.9316	3.5154	3.9597
Higher Limit	13.9030	3.9081	2.2510	3.7709	4.1482

Source: Own

Table 7 shows the following:

a. The FL mean level, under a Confidence Level of 95 %, was between 13 and 14, which shows a deficiency in respect to the acceptable level of 15, in this important competence.

b. The best performance is in the Information dimension and the lowest performance is in the Capacity dimension. The latter did not reach a passing level. Thus, at 95 % of confidence, the estimate of the mean of the Capacity competence is between 1.9316 and 2.2510, an interval below the mark of 2.5 points. The Knowledge and Consciousness dimensions have similar intervals for their means, between 3.6105 and 3.9081, and between 3.5154 and 3.7709, respectively. These intervals have a passing level, but lower compared to the Target Score of 3.75 level; only the upper end of the interval for Consciousness is 2 hundredths of points above the mark of 3.75. Therefore, the hypothesis of a balanced development of FL is rejected, in terms of its different dimensions, through the confidence interval statistic. At 95 % confidence, the intervals for the Capacity and Information dimensions did not intersect with each other, neither with those of the Knowledge and Consciousness dimensions.

The following are the confidence intervals for the mean score:

YI > Acceptable > YCO and YCON > Failed > YCA

A balanced development of the FL dimensions was not found. This is due to the higher performance of the Information dimension for possible explanations already mentioned above and the lower performance of the Consciousness dimension. This low performance of the Capacity dimension indicated a lack of emphasis on training in the use of the acquired knowledge.

Demographic Approach Analysis

This section analyzes the possible relevance of demographic characteristics as explanatory variables for differences in the total FL score. The interest is not focused on the magnitude of the explanatory power of these factors, but rather on identifying whether they play a role or not. This is relevant in terms of the continuing academic and social interest of the role of these factors and their effects on various topics of the human endeavor.

For this purpose, the regression analysis technique was used to estimate the effects of one factor, controlling the effects of the other factors. Based on this methodology, we tested hypotheses H3₀, H4₀, H5₀, H6₀, H7₀ and H8₀.

The regression model used was:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$$

Null hypotheses were:

$$H3_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$$

$$H4_0: \beta_1 = 0$$

$$H5_0: \beta_2 = 0 \text{ (X}_2 \text{ in thousands of soles)}$$

$$H6_0: \beta_3 = 0$$

$$H7_0: \beta_4 = 0$$

$$H8_0: \beta_5 = 0$$

Standard assumptions for ordinary minimum squares regression were checked and no problems were found.

Table 8. Results of the Regression Model Estimation

	Estimate	Standard Error	p-value	Confidence Interval 95 %	
				Lower values	Upper values
1. Observations	241				
2. R ²	0.0620				
3. Adjusted R ²	0.0421				
4. Typical Error	2.7405				
5. F	3.1082		0.0098		
6. β ₀	10.6124	1.1535	0.0000	8.3400	12.8849
7. β ₁	0.0476	0.0346	0.1693	-0.0204	0.1157
8. β ₂	0.0951	0.0403	0.0191	0.0157	0.1744
9. β ₃	-0.0769	0.1603	0.6320	-0.3927	0.2390
10. β ₄	0.9658	0.3697	0.0096	0.2375	1.6941
11. β ₅	0.0201	0.3789	0.9577	-0.7263	0.7665

Source: Own

Table 8 shows the results of the regression model estimation. As expected from the correlations between each explanatory variable and the explained variable, there is a low adjustment of the model to the data, as can be seen in the low level of the coefficient of determination R² and the adjusted R². However, the F-statistic value, with a p-value of 0.0098, indicates that the model does explain the data obtained; that is, not all the βs are null. Therefore, the null hypothesis H3₀ is rejected, and concluded that the demographic characteristics have an influence on the explanation of FL.

For each demographic characteristic, through their respective p-values, for a 5 % statistical significance, it is concluded that the null hypotheses H4₀ (Age), H6₀ (Dependence) and H8₀ (Gender) cannot be rejected. These results conclude that it cannot be affirmed that there are differences in the FL score based on the age, dependence and gender. On the other hand, the p-values allowed rejecting the null hypotheses H5₀ (Income) and H7₀ (Profession) and conclude that these characteristics do have relevance in the explanation of the differences in FL scores.

To analyze the two variables of income and profession, the regression model was adjusted and the variables that lacked statistical significance were eliminated. A progressive process of successive estimates of the linear regression model was followed, eliminating variables without statistical significance, one variable at a time, until a model was reached where all the variables reached a statistical significance of 5 %. The order in which non-significant variables were eliminated considered as criteria the sign of the estimate and the magnitude of the p-value. The order resulting from this process was dependence, gender and age. Therefore, it ended up with the following regression model:

$$Y = \beta_0 + \beta_2 X_2 + \beta_4 X_4 + \varepsilon$$

The variable X_2 refers to income in thousands of soles and X_4 to the dummy variable of profession.

Results are shown in [Table 9](#).

Table 9. Estimates of the Regression Model based on the Income and Profession Variables

	Estimate	Stand. Error	p-value	Confidence Interval 95 %	
				Lower values	Upper values
1. Observations	241				
2. R ²	0.0544				
3. Adjusted R ²	0.0464				
4. Typical Error	2.7343				
5. F	6.8403		0.0013		
6. β_0	12.0782	0.4456	0.0000	11.2004	12.9560
7. β_2	0.0001	0.0000	0.0025	0.0000	0.0002
8. β_4	0.8925	0.3627	0.0146	0.1779	1.6070

Source: Own

[Table 9](#) presents a low R², but the F-test ratifies the relevance of the model in the explanation of FL. The explanatory variables Income and Profession show statistical significance; however, the importance of the Income variable is nil, therefore, it was not considered in the following analysis.

Regarding the profession dummy variable (X_4), its estimated slope was 0.8924. This means that a professional related to the business administration area, compared to engineering professionals (other professions have marginal numbers) produced an increase in the total score of 0.8924; that is, less than 1 point. This is a relevant result. The administration major, compared to the engineering major, represents less than a one-point difference in FL. This may be a reasonable indication of a serious limitation in the training of management professionals in terms of generating natural and habitual financial thinking skills for situations involving analysis of personal financial issues. Academic training in administration may be educating efficient professionally individuals, but with limited effects in terms of FL. This result may have broader implications; it could be an indicator that the training of these professionals is carried out with serious limitations regarding the generation of competencies and skills beyond the aspect of technical training and acquisition of knowledge and skills for professional methodologies and procedures.

Dimensional-Demographic Analysis

This section discusses the analysis of the different dimensions of FL in order to determine possible differences between the categories of each demographic characteristic. A regression analysis has not been used due to limitations of the measurement scale for each dimension, which only takes integer values from 0 to 5.

The null hypotheses clusters for H_{9o} (Knowledge), H_{10o} (Capacity), H_{11o} (Consciousness) and H_{12o} (Information) are specifically tested. Within each of these clusters, there are 5 hypotheses for each of the 5 demographic characteristics. In these hypotheses, the scores of the two categories of each demographic characteristic were compared for each dimension. The sample mean is used as the test statistic, through the respective Student's t-test. The assumption of normality of distribution of the sample mean is guaranteed by the central limit theorem and the sample size.

The tests have the following standard format:

$$H_0: \mu_1 - \mu_0 = 0$$

Where, μ_0 is the population mean of category 0 of the considered demographic characteristic, for the analyzed dimension. In the same way for μ_1 .

The test statistic is

$$t = \frac{(\bar{x}_1 - \bar{x}_0) - (\mu_1 - \mu_0)}{\sqrt{\frac{s_0^2}{n_1} + \frac{s_1^2}{n_2}}}$$

Where \bar{x}_i are the sample means, s_i^2 are the sample variances and n_i are the sample sizes. The levels of freedom of the student's distribution are estimated as follows:

$$df = \frac{\left(\frac{s_0^2}{n_0} + \frac{s_1^2}{n_1}\right)^2}{\left(\frac{s_0^2}{n_0}\right)^2 + \left(\frac{s_1^2}{n_1}\right)^2}$$

The p-value defined by the t-statistic was contrasted against a significance level of 0.05.

Tables 10-14 show the results for the characteristics Age (X_1), Income (X_2), Dependency (X_3), Profession (X_4) and Gender (X_5), respectively. Each column of these tables corresponds to a dimension of the FL: Knowledge, Capacity, Consciousness and Information. The rows are organized in three blocks of information; the first block refers to sample data corresponding to category 0, the second block to category 1 and the third block to the hypotheses test. The first two blocks, used for the categories, show the mean estimate and its corresponding 95 % confidence interval.

Table 10. Age. Scores for each Dimension and Hypotheses Test

	Knowledge YCO	Capacity YCA	Consciousness YCN	Information YI
Category 0: Junior				
Number of observations	134	134	134	134
Mean	3.7388	2.0075	3.6716	4.0000
SD	1.2258	1.2832	1.0389	0.7559
Standard error (SE)	0.1059	0.1109	0.0897	0.0653
t-critical 95% (two-tailed)	1.9780	1.9780	1.9780	1.9780
Error	0.2095	0.2193	0.1775	0.1292
Lower limit (at 95%)	3.5293	1.7882	3.4941	3.8708
Upper limit (at 95%)	3.9483	2.2267	3.8492	4.1292
Category 1: Senior				
Number of observations	107	107	107	107
Mean	3.7850	2.1963	3.6075	4.1215
SD	1.1077	1.2243	0.9689	0.7231
Standard error (SE)	0.1071	0.1184	0.0937	0.0699
t-critical 95 % (two-tailed)	1.9826	1.9826	1.9826	1.9826
Error	0.2123	0.2347	0.1857	0.1386
Lower limit (95 %)	3.5727	1.9616	3.4218	3.9829
Higher limit (at 95 %)	3.9973	2.4309	3.7932	4.2601
Hypothesis Test	H9-1 ₀	H10-1 ₀	H11-1 ₀	H12-1 ₀
Degrees of Freedom	235	232	233	231
t-test statistic	0.3070	1.1643	-0.4946	1.2701
p-value	0.7591	0.2455	0.6213	0.2053
Rejection decision at 5 %	NO	NO	NO	NO

Source: Own

Table 11. Income. Scores for each Dimension and Hypotheses Test

	Knowledge YCO	Capacity YCA	Consciousness YCN	Information YI
Category 0: Lower				
Number of observations	152	152	152	152
Mean	3.5921	2.0263	3.6184	3.9868
SD	1.2307	1.2068	1.0095	0.8055
Standard error (SE)	0.0998	0.0979	0.0819	0.0653
t-critical 95 % (two-tailed)	1.9758	1.9758	1.9758	1.9758
Error	0.1972	0.1934	0.1618	0.1291
Lower limit (at 95 %)	3.3949	1.8329	3.4566	3.8578
Upper limit (at 95 %)	3.7893	2.2197	3.7802	4.1159
Category 1: Upper				
Number of observations	89	89	89	89
Mean	4.0449	2.2022	3.6854	4.1685
SD	1.0103	1.3415	1.0067	0.6075
Standard error (SE)	0.1071	0.1422	0.1067	0.0644
t-critical 95 % (two-tailed)	1.9873	1.9873	1.9873	1.9873
Error	0.2128	0.2826	0.2121	0.1280
Lower limit (at 95 %)	3.8321	1.9197	3.4733	4.0406
Upper limit (at 95 %)	4.2578	2.4848	3.8975	4.2965
Hypothesis Test	H9-2 _o	H10-2 _o	H11-2 _o	H12-2 _o
Degrees of Freedom	213	169	185	224
t-test statistic	3.0931	1.0191	0.4979	1.9807
p-value	0.0022	0.3096	0.6191	0.0488
Rejection decision at 5 %	YES	NO	NO	YES

Source: Own

Table 12. Dependents. Scores for each Dimension and Hypotheses Test

	Knowledge YCO	Capacity YCA	Consciousness YCN	Information YI
Category 0: Without Dependents				
Number of observations	101	101	101	101
Mean	3.7327	1.9307	3.4851	3.9802
SD	1.1991	1.1769	1.1191	0.8122
Standard error (SE)	0.1193	0.1171	0.1113	0.0808
t-critical 95 % (two-tailed)	1.9840	1.9840	1.9840	1.9840
Error	0.2367	0.2323	0.2209	0.1603
Lower limit (at 95 %)	3.4960	1.6984	3.2642	3.8199
Upper limit (at 95 %)	3.9694	2.1630	3.7061	4.1405
Category 1: With Dependents				
Number of observations	140	140	140	140
Mean	3.7786	2.2071	3.7571	4.1071
SD	1.1572	1.3058	0.9046	0.6859
Standard error (SE)	0.0978	0.1104	0.0765	0.0580
t-critical 95 % (two-tailed)	1.9772	1.9772	1.9772	1.9772
Error	0.1934	0.2182	0.1512	0.1146
Lower limit (at 95 %)	3.5852	1.9889	3.6060	3.9925
Upper limit (at 95 %)	3.9719	2.4253	3.9083	4.2218
Hypothesis Test	H9-3 _o	H10-3 _o	H11-3 _o	H12-3 _o
Degrees of Freedom	211	227	187	193
t-test statistic	0.2975	1.7180	2.0137	1.2764

p-value	0.7664	0.0872	0.0455	0.2033
Rejection decision at 5 %	NO	NO	YES	NO

Source: Own

Table 13. Profession. Scores for each Dimension and Hypotheses Test

	Knowledge YCO	Capacity YCA	Consciousness YCN	Information YI
Category 0: Engineering				
Number of observations	145	145	145	145
Mean	3.6690	2.0759	3.5034	4.0000
SD	1.1729	1.2643	0.9727	0.7906
Standard error (SE)	0.0974	0.1050	0.0808	0.0657
t-critical 95 % (two-tailed)	1.9766	1.9766	1.9766	1.9766
Error	0.1925	0.2075	0.1597	0.1298
Lower limit (at 95 %)	3.4764	1.8683	3.3438	3.8702
Upper limit (at 95 %)	3.8615	2.2834	3.6631	4.1298
Category 1: Administration				
Number of observations	96	96	96	96
Mean	3.8958	2.1146	3.8542	4.1354
SD	1.1651	1.2555	1.0258	0.6589
Standard error (SE)	0.1189	0.1281	0.1047	0.0672
t-critical 95 % (two-tailed)	1.9853	1.9853	1.9853	1.9853
Error	0.2361	0.2544	0.2078	0.1335
Lower limit (at 95 %)	3.6598	1.8602	3.6463	4.0019
Upper limit (at 95 %)	4.1319	2.3690	4.0620	4.2689
Hypothesis Test	H9-4 _o	H10-4 _o	H11-4 _o	H12-4 _o
Degrees of Freedom	205	205	196	227
t-test statistic	1.4759	0.2337	2.6523	1.4409
p-value	0.1415	0.8154	0.0087	0.1510
Rejection decision at 5%	NO	NO	YES	NO

Source: Own

Table 14. Gender. Scores for each Dimension and Hypotheses Test

	Knowledge YCO	Capacity YCA	Consciousness YCN	Information YI
Category 0: Female				
Number of observations	90	90	90	90
Mean	3.7333	1.9667	3.6556	4.1222
SD	1.1689	1.1062	0.9500	0.7162
Standard error (SE)	0.1232	0.1166	0.1001	0.0755
t-critical 95 % (two-tailed)	1.9870	1.9870	1.9870	1.9870
Error	0.2448	0.2317	0.1990	0.1500
Lower limit (at 95 %)	3.4885	1.7350	3.4566	3.9722
Upper limit (at 95 %)	3.9782	2.1983	3.8545	4.2722
Category 1: Male				
Number of observations	151	151	151	151
Mean	3.7748	2.1656	3.6358	4.0132
SD	1.1785	1.3388	1.0423	0.7571
Standard error (SE)	0.0959	0.1090	0.0848	0.0616
t-critical 95 % (two-tailed)	1.9759	1.9759	1.9759	1.9759
Error	0.1895	0.2153	0.1676	0.1217
Lower limit (at 95 %)	3.5853	1.9503	3.4682	3.8915

Upper limit (at 95 %)	3.9643	2.3808	3.8034	4.1350
Hypothesis Test	H9-5 _o	H10-5 _o	H11-5 _o	H12-5 _o
Degrees of Freedom	188	215	201	196
t-test statistic	0.2658	1.2464	-0.1508	-1.1183
p-value	0.7907	0.2140	0.8803	0.2648
Rejection decision at 5 %	NO	NO	NO	NO

Source: Own

Based on the information in the tables, it is concluded that with a statistical significance level of 5 %, there are no significant differences in the FL scores in any of the dimensions between the two categories considered due to age.

Regarding the two Income categories, there are differences at the significance level of 5 % in terms of better performance for the Upper category, and also in the Knowledge and Information dimensions, but not in the Capacity and Consciousness dimensions.

As for the characteristics of the Dependents categories, the population with dependents showed a higher performance than the population without dependents at the statistical significance of 5 %. In the other dimensions, no statistically significant difference could be considered between the two population categories.

For the Profession dimension, the Administration population showed a performance higher than the Engineering population, within the Consciousness dimension, at 5 % statistical significance. For the other dimensions, it was not possible to reject the hypotheses of equality in the means.

No statistically significant differences were detected in the category of gender.

3. Conclusion

The level of FL in the population of professionals interested in management has been studied in detail. The importance of this population is related to the homogeneity factor, given their interest in a professional field, where financial thinking and skills are highly important; for the relevance of the age for the study of FL and for the characteristics of modern life. The population is also important because it can be used for comparison purposes with other populations.

The results obtained were lower than expected for this professional segment. The mean performance in the total score was below the 75 % of the maximum potential score. The results were similar for the other dimensions, except for the Information dimension. This may draw attention, since the evolution of FL in individuals is expected to follow sequentially the sophistication in the involved dimensions: Knowledge, Capacity, Information and Consciousness. However, the only acceptable score was in the Information dimension. How is it possible that with low scores in the first two basic dimensions, an acceptable score is obtained in the third dimension? This can be explained by the main characteristic of the population: the interest in management. The result would indicate a limited education and training in basic topics, such as the concepts (Knowledge) and their use (Capacity), which is compensated by the interest in management topics. This interest encourages these professionals to follow the evolution of the economic-financial environment through different means of dissemination of news and information; this keeps them informed and generates skills for self-training. Therefore, there is a great deal of work to be done in the basic training of these professionals, which would allow them to understand better this economic-financial environment.

The Capacity dimension obtained the lowest performance and a failing grade, which has to do with skill to use knowledge and concepts in specific situations. This would indicate that the training of the population does not emphasize the aspects of use and employment of the knowledge acquired. Care must be taken here to distinguish between the use of such knowledge in the profession and the use at the individual's personal level. FL is targeted at the personal level, at the natural, habitual behavior of the individual in matters involving financial perspectives. This population of professionals interested in management may have the basis for a good professional performance based on learned methodologies and procedures, but which have not been internalized in their personal thinking and behavior. In other words, there may be a situation of a separation between professional and personal skills in finance.

These conclusions regarding the performance of the population were also reflected in the results of the regression analysis performed. This analysis was conducted to identify possible

demographic differences in FL scores. In general, in terms of impact, a lower explanatory power was obtained; however, the F test did indicate that the model was valid for explaining FL. The Income and Profession dimensions were statistically significant among the demographic variables considered. Although the Income dimension was statistically significant, its extent is very limited and it does not merit further study. The effect of the Profession generated and motivated conjectures and reflections. In practice, the sample only included two professions, those related to administration and those related to engineering. The result obtained shows that the difference between both professions is less than one point in the total score; which means that a difference of more than 4 years of academic training in management and economics is only reflected in less than one point of better performance (out of 20) between the two occupations. This limited result for the management profession is related to the arguments of the previous paragraph; there is a differentiation between what may be professional skills and personal skills in the finance area. This remark is also reflected in the analysis of the relative performance between these two professions in each of the FL dimensions. Only the Consciousness dimension showed a significant difference in this relative analysis; not in the dimensions that best differentiate the characteristics of these two occupations, such as Knowledge, Capacity and Information.

No statistically significant differences were detected between demographic groups in the performance of each FL dimension, neither by age nor by gender. Differences by income were detected in favor of the Upper category in the Knowledge and Information dimensions. To a great extent, this may be due to the need for financial skills that this economic category imposes due to the greater variety and scope of decisions. Differences were detected in the Dependency variable in favor of the "with dependents" group in the Consciousness dimension, reflecting a greater concern for the consequences of financial decisions and plans. Having dependents generates a greater consciousness, concern and sense of responsibility. Regarding the profession, as mentioned above, there were differences in favor of Administration in the dimension of Consciousness.

The important conclusions of this research allow us to make two conjectures, both of which generate incentives for future research. The first of these conjectures, the Financial Duality Conjecture, is the existence of a difference between professional skills and personal financial skills in the field of finance. In other words, professional training in finance is not necessarily indicative of financial expertise on a personal level. This opens up a number of questions as to why this may be the case. Questions ranging from possible differences in the skills involved, in the methodology used in the training of professionals and in the limitations to natural, habitual, Kahneman-like financial thinking (Kahneman, 2011). The last of these possible reasons would be linked to the limitations of System 1 and System 2 referred to by Kahneman¹ which generate biases in financial behavior.

The second conjecture, the Financial Divergence Conjecture, refers to limitations and restrictions in basic training, in the Knowledge and Capacity dimensions among management-interested individuals, generating a compensatory effect in terms of self-preparation and self-training. The orientation and interest in management motivate self-learning through the information with which the media report the evolution of the economic-financial environment, leading to the paradox of achieving an understanding of it that is not supported by basic financial concepts. This would be our best recommendation to those interested in the subject of FL, to come together to generate studies around these two conjectures.

References

Atkinson, Messy, 2012 – Atkinson, A., Messy, F. (2012). Measuring Financial Literacy: Results of the OECD. International Network on Financial Education (INFE) Pilot Study. OECD Working Papers on Finance, Insurance and Private Pensions, No. 15, OECD Publishing, Paris. DOI: <https://doi.org/10.1787/5k9csfs90fr4-en>

Alsemgeest, 2015 – Alsemgeest, L. (2015). Arguments for and against financial literacy education: where to go from here? *International Journal of Consumer Studies*. 39(2): 155-161. DOI: <https://doi.org/10.1111/ijcs.12163>

ANZ, 2015 – Australia and New Zealand Banking Group Limited (ANZ), 2015, ANZ Survey Of Adult Financial Literacy In Australia-Full report of the results from the 2014 ANZ Survey, ABN 11 005 357 522. [Electronic resource]. URL: www.anz.com/about-us/corporate-responsibility/cr-library/

¹ System 1 is fast, intuitive and emotional, while system 2 is slower, deliberative and logical.

- Annual Report..., 2008** – Annual Report to the President, 2008, President’s Advisory Council on Financial Literacy, The Department of the Treasury. [Electronic resource]. URL: https://www.treasury.gov/resource-center/financial-education/Documents/PACFL_ANNUALREPORT_1-16-09.pdf
- Bell et al., 2009** – Bell, C., Gorin, D., Hogarth, J.M. (2009). Does financial education affect soldiers’ financial behavior? Networks Financial Institute Working paper, no. 8.
- Bowen, 2002** – Bowen, F. (2002). Financial knowledge of teens and their parents. *Journal of Financial Counseling and Planning*. 13(2): 93-102. [Electronic resource]. URL: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.631.362&rep=rep1&type=pdf>
- Chen, Volpe, 1998** – Chen, H., Volpe, R. (1998). An Analysis of Personal Financial Literacy Among College Students. *Financial Services Review*. 7(2): 107-128. DOI: [https://doi.org/10.1016/S1057-0810\(99\)80006-7](https://doi.org/10.1016/S1057-0810(99)80006-7)
- Courchane, Zorn, 2005** – Courchane, M., Zorn, P. (2005). Consumer literacy and credit worthiness. Presented at Federal Reserve System Conference, Promises and Pitfalls: as consumer options multiply, who is being served and at what cost? April 7, 2005, Washington, DC.
- Ergun, 2018** – Ergun, K. (2018). Financial literacy among university students: A study in eight European countries. *International Journal of Consumer Studies*. 45(1): 2-15. DOI: <https://doi.org/10.1111/ijcs.12408>
- Fernandes et al., 2014** – Fernandes, D., Lynch, J.G., Netemeyer, R.G. (2014). Financial Literacy, Financial Education, and Downstream Financial Behaviors. *Management Science*. 60(8): 1861-1883. DOI: <https://doi.org/10.1287/mnsc.2013.1849>
- Fox et al., 2005** – Fox, J., Bartholomae, S., Lee, J. (2005). Building the case for financial education. *Journal of Consumer Affairs*. 39(1): 195-214. DOI: <https://doi.org/10.1111/j.1745-6606.2005.00009.x>
- Goyal, Kumar, 2021** – Goyal, K., Kumar, S. (2021). Financial literacy: A systematic review and bibliometric analysis. *International Journal of Consumer Studies*. 45(1): 80-105. DOI: <https://doi.org/10.1111/ijcs.12605>
- Hamid, Loke, 2021** – Hamid, F.S., Loke, Y.J. (2021). Financial literacy, money management skill and credit card repayments. *International Journal of Consumer Studies*. 45(2): 235-247. DOI: <https://doi.org/10.1111/ijcs.12614>
- Hasying et al., 2013** – Hasying, J.S., Madrian, B.C., Skimmyhorn, W.L. (2013). Financial Literacy, Financial Education, and Economic Outcomes. *Annual Review of Economics*. 5(5): 347-373. DOI: <https://doi.org/10.1146/annurev-economics-082312-125807>
- Hill et al., 2011** – Hill, J.C., Griffiths, W.E., Lim, G.C. (2011). Principles of Econometrics. John Wiley and Sons, Inc.
- Huston, 2010** – Huston, S.J. (2010). Measuring Financial Literacy. *Journal of Consumer Affairs*. 44(2): 296-316. DOI: <https://doi.org/10.1111/j.1745-6606.2010.01170.x>
- Hung et al., 2009** – Hung, A.A., Parker, A.M., Yoong, J.K. (2009). Defining and measuring financial literacy. RAND Labor and Population Working Paper WR-708.
- Johnson, Sherraden, 2007** – Johnson, E., Sherraden, M.S. (2007). From financial literacy to financial capability among youth. *The Journal of Sociology & Social Welfare*. 34(3): 199-145. [Electronic resource]. URL: <https://scholarworks.wmich.edu/jssw/vol34/iss3/7>
- Jump\$tart Coalition..., 2007** – Jump\$tart Coalition for Personal Financial Literacy, 2007, National standards in K-12 personal finance education. [Electronic resource]. URL: <http://jumpstart.org/national-standards.html>
- Kahneman, Tversky, 1979** – Kahneman, D., Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*. 47(2): 263-291. DOI: <https://doi.org/10.2307/1914185>
- Kahneman, 2011** – Kahneman, D. (2011). Thinking, Fast and Slow. Farrar Straus Giroux.
- Klapper, Lusardi, 2020** – Klapper, L., Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management*. 49(3): 589-614. DOI: <https://doi.org/10.1111/fima.12283>
- Lusardi, 2004** – Lusardi, A. (2004). Savings and the Effectiveness of Financial Education. In O. Mitchell, & S. Utkus (Eds.). In Pension Design and Structure: New Lessons from Behavioral Finance (pp. 157–184). Oxford: Oxford University Press.
- Lusardi et al., 2010** – Lusardi, A., Mitchell, O.S., Curto, V. (2010). Financial Literacy among the Young. *Journal of Consumer Affairs*. 44(2): 358-380. DOI: <https://doi.org/10.1111/j.1745-6606.2010.01173.x>

Lusardi, Mitchell, 2011a – Lusardi, A., Mitchell, O.S. (2011a). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance*. 10(4): 497-508. DOI: <https://doi:10.1017/S1474747211000448>

Lusardi, Mitchell, 2011b – Lusardi, A., Mitchell, O.S. (2011). Financial literacy and retirement planning in the United States. *Journal of Pension Economics & Finance*. 10(4): 509-525. DOI: <https://doi:10.1017/S147474721100045X>

Lusardi, Mitchell, 2014 – Lusardi, A., Mitchell, O.S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*. 52(1): 5-44. DOI: <https://doi:10.1257/jel.52.1.5>

Lusardi, Tufano, 2015 – Lusardi, A., Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics & Finance*. 14(4): 332-368 DOI: <https://doi:10.1017/S1474747215000232>

Lyons et al., 2006 – Lyons, A.C., Palmer, L., Jayaratne, K.S.U., Scherpf, E. (2006). Are we making the grade? A national overview of financial education and program evaluation. *The Journal of Consumer Affairs*. 40(2): 208-235. DOI: <https://doi:10.1111/j.1745-6606.2006.00056.x>

Mandell, 2005 – Mandell, L. (2005). Financial literacy: Does it matter? SUNY-Buffalo: University at Buffalo, Department of Finance and Managerial Economics. April 8.

Mandell, Klein, 2009 – Mandell, L., Klein, L. (2009). The impact of financial literacy education on subsequent financial behavior. *Journal of Financial Counseling and Planning*. 20(1): 15-24. [Electronic resource]. URL: <https://files.eric.ed.gov/fulltext/EJ859556.pdf>

National Field Study... – National Field Study Commissioned and Supported by The Fannie Mae Foundation, [Electronic resource]. URL: www.ISFS.org

Nicolini et al., 2013 – Nicolini, G., Cude, B.J., Chatterjee, S. (2013) Financial literacy: A comparative study across four countries. *International Journal of Consumer Studies*. 37(6): 689-705. DOI: <https://doi.org/10.1111/ijcs.12050>

OECD INFE, 2011 – OECD INFE, 2011. Measuring Financial Literacy: Core Questionnaire in Measuring Financial Literacy: Questionnaire and Guidance Notes for conducting an Internationally Comparable Survey of Financial literacy. Paris: OECD.

OECD, 2013 – OECD. Financial literacy and inclusion: Results of OECD/INFE survey across countries and by gender, Financial Literacy & Education, Russia Trust Fund.

OECD, 2014 – OECD. PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI), PISA, OECD Publishing. DOI: <http://dx.doi.org/10.1787/9789264208094-en>

OECD, 2018 – OECD. OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion, 2018.

Potrich et al., 2015 – Potrich, A.C.G., Vieira, K.M., Kirch, G. (2015). Determinants of financial literacy: Analysis of the influence of socioeconomic and demographic variables. *Revista Contabilidade e Finanças – USP, Sao Paulo*. 26(69): 362-377. DOI: <https://doi.org/10.1590/1808-057x201501040>

Remund, 2010 – Remund, D.L. (2010). Financial Literacy Explicated: The Case for a Clearer Definition in an Increasingly Complex Economy. *Journal of Consumer Affairs*. 44(2): 276-295. DOI: <https://doi.org/10.1111/j.1745-6606.2010.01169.x>

Robb, Woodyard, 2011 – Robb, C., Woodyard, A. (2011) Financial Knowledge and Best Practice Behavior. *Journal of Financial Counseling and Planning*. 22(1): 60-70. [Electronic resource]. URL: <https://files.eric.ed.gov/fulltext/EJ941903.pdf>

Schuchardt et al., 2009 – Schuchardt, J., Hanna, S., Hira, T., Lyons, A., Palmer, L., Xiao, J. (2009). Financial literacy and education research priorities. *Journal of Financial Counseling and Planning*. 20(1): 84–95. [Electronic resource]. URL: <https://files.eric.ed.gov/fulltext/EJ859569.pdf>

Servon, Kaestner, 2008 – Servon, L.J., Kaestner, R. (2008). Consumer Financial Literacy and the Impact of Online Banking on the Financial Behavior of Lower-Income Bank Customers. *Journal of Consumer Affairs*. 42(2): 271-305. DOI: <https://doi.org/10.1111/j.1745-6606.2008.00108.x>

Shahrabani, 2012 – Shahrabani, S. (2012). The effect of financial literacy and emotions on intent to control personal budget: A study among Israeli College Students. *International Journal of Economic Finance*. 4(9): 156-163. DOI: <https://doi.org/10.5539/ijef.v4n9p156>

U.S. Financial..., 2020 – U.S. Financial Literacy & Education Commission, 2020, U.S. National strategy for Financial Literacy 2020. [Electronic resource]. URL: www.mymoney.gov

[van Rooij et al., 2012](#) – van Rooij, M. C. J., Lusardi, A., Alessie, R. J. M. (2012). Financial Literacy, Retirement Planning and Household Wealth. *Economic Journal*. 122(560): 449-478. DOI: <https://doi.org/10.1111/j.1468-0297.2012.02501.x>

[Vitt et al., 2000](#) – Vitt, L., Anderson, C., Kent, J., Lyter, D. M., Siegenthaler, J. K., Ward, J. (2000). Personal Finance and the Rush to Competence: Financial Literacy Education in the U. S. National Field Study Commissioned by the Fannie Mae Foundation.

[Willis, 2008](#) – Willis, L.E. (2008). Against Financial-Literacy Education. *Iowa Law Review*. 94(1): 197-285.

[Yuesti et al., 2020](#) – Yuesti, A, Rustiarini, N.W., Suryandari (2020). Financial Literacy in the covid-19 pandemic: Pressure conditions in Indonesia. *Entrepreneurship and Sustainability Issues*. 8(1): 884-898. DOI: [https://doi.org/10.9770/jesi.2020.8.1\(59\)](https://doi.org/10.9770/jesi.2020.8.1(59))