



Article

Financial Literacy as a Key to Entrepreneurship Education: A Multi-Case Study Exploring Diversity and Inclusion

Adriana Medina-Vidal ^{1,*} , Mariana Buenestado-Fernández ² and José Martín Molina-Espinosa ³

¹ Independent Researcher, Mexico City 03700, Mexico

² Department of Education, University of Cantabria, 39005 Santander, Spain; mariana.buenestado@unican.es

³ Institute for the Future of Education, Tecnológico de Monterrey, Monterrey 64849, Mexico; jose.molina@tec.mx

* Correspondence: adrnmdn@gmail.com

Abstract: This article presents the results of the financial literacy assessment of young Mexican students between the ages of 17 and 24 enrolled in public and private institutions in five Mexican cities. This study's objective was to approach the financial knowledge, behaviors, and attitudes of young Mexicans through focus groups and questionnaires to identify their perceptions of complex thinking and its use for financial products and services. The most relevant findings suggest that (a) most of the young participants in the study use banking services through their parents, (b) there are significant gender differences in financial knowledge and behaviors, (c) critical thinking significantly and positively correlates with financial behaviors and attitudes, and (d) the level of critical thinking predicts financial behavior. There is a need to develop women's critical thinking to discern between the financial behavior they socially imitate and their capabilities to become more involved in financial issues, thus decreasing the gender gap.

Keywords: financial literacy; complex thinking; gender; higher education; educational innovation; multiple case; critical thinking



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1. Introduction

The gender gap in financial inclusion can be diminished through financial education programs that counteract the double discrimination young women with low socio-economic status face. The definition of financial literacy developed by the OECD and recognized by the G20 states that financial literacy is a combination of awareness, knowledge, skills, attitudes, and behaviors needed to make sound financial decisions and ultimately achieve individual financial well-being (Atkinson and Messy 2012). Some authors have established that greater financial literacy consistently correlates to better financial inclusion; the more financially literate people are, the better the financial decisions they will make, thus demanding more sophisticated financial services (Grohmann et al. 2018). There is a growing concern about the financial decisions of the new generations because young people tend to spend more, tend to save less, tend to get into debt naively with the use of credit cards, tend to lack financial literacy, have not developed critical thinking, and are easily influenced by social networks (Hayei and Khalid 2019). The gender of young people influences their financial attitudes and behavior, with males tending to be more concerned about money as a status symbol and females being more conservative and concerned about planning their spending in detail (Amagir et al. 2020). The socio-economic status of young people determines the level of knowledge they have. Young people with high socio-economic status have more financial literacy than those with low socio-economic status (Ali et al. 2016). We agree with Dogra et al. (2023) regarding the need to examine demographic variables such as age, gender, and income to understand young people's financial knowledge, behaviors, and attitudes. However, other variables, such as the cognitive tools that young people develop during their higher education, have been neglected in the analysis.

Although acquiring financial education has been associated with greater complexity in decision-making and financial problem-solving, we identified that the literature analyzing the development of complex thinking concerning students' financial knowledge, behaviors, and attitudes in the transition to and during college is scarce. Studies on financial literacy among young people incorporating qualitative analyses are even scarcer.

The objective of this work was to link the financial knowledge, behaviors, and attitudes of diverse students between 17 and 24 participating in three focus groups in three types of institutions in Querétaro, Mexico, with their responses to two questionnaires, one about finances and the other about their perceived achievement of complex thinking competency and its sub-competencies. Our proposal opens the door to a new approach to complexity theory and its applicability in financial education with a gender perspective of young people during their higher education. This study provides valuable information to financial institutions and banks so that they can target their products and services to the appropriate segment of the population based on their level of financial literacy. Furthermore, the analysis results of demographic variables (age, gender, and income) and the level of perceived achievement of complex thinking and its sub-competencies are likely to be considered when developing advertising campaigns to encourage individuals' investments in particular financial services. This study employs a mixed-methods research approach. Given the complexity of topics such as youth financial literacy, mixed-methods designs provide a depth and breadth of perspectives that a singular method might miss. Such designs are more comprehensive and contextual, enabling more effective interventions and better-informed policies.

2. Literature Review

2.1. Financial Education for Young Students with a Gender Perspective

The financial education of young people, who are economic actors and future financial decision-makers who will shape the course of economies, is a vital concern of financial organizations. There is worldwide evidence of deficits in the financial education of young people, which concerns issues such as how to improve the knowledge of financial concepts, products, and risks and thus develop analytical skills to recognize financial opportunities and make the most effective decisions for their well-being (OCDE/CAF 2020). This concern deepens when the gender variable is considered in the studies. The gender gap in financial literacy is a recurring concern for economies (Klapper et al. 2015) and is well documented in the scientific literature (Jayaraman and Jambunathan 2018; Kiliyanni and Sivaraman 2016; Roy and Patro 2022; Yew et al. 2017). Younger women are among the most financially illiterate groups (Lührmann et al. 2015). This inequality has also appeared in young Mexican women (Villagómez 2016). Studies highlighting gender inequalities in the financial culture of young women show they have more vulnerability and difficulty in accessing and using financial services and making life-long decisions that impact their economic and social well-being (Garg and Singh 2018; Moreno-García et al. 2022). These problems negatively impact their economic and personal autonomy. The lack of sufficient financial literacy makes inappropriate and unsophisticated behaviors more likely, with harmful impact (Lusardi et al. 2017). Evidence reveals how these deficiencies negatively affect everyday personal financial behavior and long-term decision-making, such as retirement planning (Angelici et al. 2022) or financial decisions in divorce situations (West and Mitchell 2022).

In the literature, the gender gap in financial competency lacks a comprehensive explanation as to why women appear to be less financially educated than men. However, there is consensus in the literature that social norms, roles, and cultural and historical conditions have restricted women's opportunities to access financial assets to improve their empowerment (Bottazzi and Lusardi 2020). Analyses of the gender gap in financial literacy have concluded that disparities between men and women are due to socio-demographic characteristics and numerical or reading comprehension skills (Erner et al. 2016). Some studies have examined the gender gap in attitudes regarding interest in finance, specialization in household chores, and risk aversion (Kim and Mountain 2019). Recent studies of

this gap have introduced variables linked to psychological traits, such as self-confidence for financial mastery or the cognitive ability to learn financial content (Blaschke 2022; Bucher-Koenen et al. 2021). Concerning the latter, men not only score higher on the assessment of financial competency but also show higher levels of perceived financial competency (Jha and Shayo 2021). Likewise, studies have shown that the low expectations and stereotypes of women in tasks considered masculine, like financial ones, harm their financial literacy (Bordalo et al. 2019). All these attempts to explain the gender gap strongly suggest the need for considering the design, implementation, and assessment of financial education.

Financial education has not always had a gender perspective. Pérez-Roa et al. (2022) criticize the theory that traditional financial education programs have promoted the development of standard financial skills and have obscured structural elements that reproduce gender inequality. At the same time, studies have not considered the gender variable in the effectiveness of financial education programs, which could imply different formative implications than those established (Duarte et al. 2022). However, more recently, the positive impact of early financial education programs on women's financial knowledge and behavior, such as money management and how to spend it, has been proven (Bae et al. 2022; Cera and Tuzi 2019). Different approaches have bridged the gap. For example, digitalization helps to mitigate these gender inequalities in accessing and understanding the financial world (Agasisti et al. 2022). Families are also agents of financial education and socialization; gender differences in their influence on their children's financial knowledge, behavior, and attitudes have been found (Wee and Goy 2022). Financial education for adults helps families provide financial advice that considers equality (Fan et al. 2022). Therefore, early gender-sensitive financial education that targets various educational actors increases the likelihood of female financial empowerment in public and private spheres.

2.2. The Relationship between Complex Thinking and Financial Literacy with a Gender Perspective

Multiple factors need to be considered when analyzing the gender gap in financial literacy. Several studies have reported that women are less familiar with using digital financial services due to factors such as age, marital status, educational level, employment status, income level, financial calculation skills, cell phone use, bank account ownership, urban or rural context, and national context (Reynolds et al. 2023). This research delved into the possible correlation between financial literacy and differences between women's and men's complex thinking. Research conducted with students in the German education system indicated that women perform better in purely mathematical tasks requiring calculus-oriented knowledge and verbal tasks, while men excel in complex modeling and problem-solving requiring graphics in contextual situations (Sproesser et al. 2022). These differences could have implications for the gender gap in financial literacy.

On average, women have more empathy and emotional intelligence than men and less financial education. More men than women show greater interest in financial instruments and calculations because they are more systematic, according to the empathy-systematization (E-S) theory, which allows them to be more financially educated (Gudjonsson et al. 2022). According to the theory, systematization refers to the drive to build systems to predict and control a system's behavior (Wakabayashi et al. 2006). Such a concept coincides with the sub-competency of systems thinking: systems thinking analyzes the relevance of system elements in an existing set (Rodríguez-Abitia et al. 2022). The sub-competency of systems thinking is part of the competency of complex thinking, which allows for analyzing, synthesizing, and solving problems to transform contexts.

Complex thinking expands the capacity for higher-order skills through the development of four sub-competencies: critical thinking, systems thinking, scientific thinking, and innovative thinking (Baena-Rojas et al. 2022; Ramírez-Montoya et al. 2022; Vázquez-Parra et al. 2022). Therefore, if it is valid to correlate the development of systems thinking with better financial education, then financial education programs with a gender perspective could incorporate methodologies and techniques specifically focused on developing complex thinking skills among women to improve gender equality.

Research conducted with Finnish adolescents found that the financial literacy score is formatively associated with competitiveness and job mastery and similarly related to the effective use of metacognitive strategies (comprehension—recall, summarizing, and access credibility); therefore, the better the adolescents' metacognitive skills, the higher their financial literacy scores (Silinskas et al. 2021). According to the authors, an effective strategy with these skills was the variable most strongly associated with financial literacy abilities.

In general, the variety and complexity of financial products have increased, which has widened the gap between the knowledge needed to make responsible economic decisions and the actual financial literacy of individuals; in this context, the gender knowledge gap is further exacerbated (Suri and Jindal 2022; Liu et al. 2023). The difficulties women experience in accessing financial systems and engaging in economic activities suggest that gender equality and inclusion are linked to information technology; for example, in developing countries, blockchain technology can create new income opportunities for women who are unfamiliar with financial dynamics, lack access to mobility, or even lack identity (Di Vaio et al. 2023). In several countries around the world, progress has reduced the gender gap in different areas, but at the same time, the global economic context has made women's decisions in developing countries more complex to improve their financial situations. Fortunately, new technology offers solutions to counteract discrimination against women and advance the fight for gender equity.

2.3. Socio-Demographic Variables Related to Financial Literacy in Mexico

There is still much to do in Mexico regarding gender equity; women in households can also specialize in financial decisions. In the World Economic Forum's 2020 report, Mexico has closed 57.4% of its Participation and Opportunity gap, ranking 124th; only 47% of women are in the labor force, 26.4% work part-time, and women still engage three times more than men in unpaid household activities (World Economic Forum 2020).

According to an investigation on the level of financial literacy in Mexican adolescents conducted in 16 schools (public and private) in Mexico City with 889 higher education students, females scored higher in financial behavior; mathematical and financial ability was positively and significantly correlated with financial knowledge but not with financial behavior; and financial ability was positively related to financial behavior but not with financial attitudes (Arceo-Gómez and Villagómez 2017). The results indicated that Mexican youth have a low level of financial literacy, regardless of whether they study in public or private schools.

A pair of research studies that analyzed 12,446 records of the National Survey of Financial Inclusion (*Encuesta Nacional de Inclusión Financiera* 2018), conducted by the National Banking and Securities Commission (CNBV) and the National Institute of Geography and Statistics (INEGI) in 2018, revealed that financial attitude strengthens with age, young people present higher levels of financial knowledge and behavior than older adults, a higher educational level is associated with higher financial literacy, income level is directly related to financial literacy, men have a higher level of financial knowledge while women have a higher level of financial attitude, marital status does not influence financial literacy, and the size of the locality influences the scores in the financial behavior indexes (García Mata et al. 2021; Hernández et al. 2022).

3. Objectives, Hypotheses, and Variables

This work comprises the following research objectives and hypotheses:

Objective 1. *To know the financial knowledge, behaviors, and attitudes of Mexican students.*

Hypothesis 1. *Mexican students perceive themselves as having low financial literacy. Young people tend to be more prone to spend and not save, although they have higher financial knowledge and behavior than older adults (García Mata et al. 2021). According to Arceo-Gómez and Villagómez (2017), 70% of young Mexicans surveyed have a positive attitude toward saving, 57% follow expected financial behavior patterns, and 20% have a mastery of basic financial knowledge.*

Objective 2. *To establish existing differences in financial knowledge, behaviors, and attitudes according to the level of socio-demographic variables such as gender and educational stage (pre-university and university) and type of institution (public or private).*

Hypothesis 2. *There are significant differences in financial literacy per gender, educational stage, and type of institution. Male university students attending private institutions show higher financial literacy. Males obtain higher scores in the assessment of financial competency and self-perception of financial competency (Jha and Shayo 2021). According to Villagómez (2016), Mexican women have low financial literacy. In Mexico, certain population groups present significant differences in financial literacy, particularly those with low levels of education, women, disabled people, the retired, low-income people, those excluded from the financial system, and those who lack training in financial literacy (Hernández et al. 2022). In Mexico, public universities receive government funding and, consequently, have fewer resources available than private universities. This directly affects the quality of education, as private institutions can invest more in infrastructure, equipment, and academic programs. Although there are renowned public universities in Mexico, the general perception is that private universities tend to have better-paid and more experienced professors, which can translate into higher-quality teaching and more focus on research and innovation.*

Objective 3. *To analyze how complex thinking sub-competencies and financial literacy are related.*

Hypothesis 3. *Complex thinking sub-competencies correlate with the level of financial literacy. Men are more financially literate because they think more systematically than women (Gudjonsson et al. 2022; Wakabayashi et al. 2006).*

Objective 4. *To establish the predictive capacity of complex thinking sub-competencies on the criterion variable (financial literacy).*

Hypothesis 4. *The levels of complex thinking sub-competencies predict the level of financial literacy. The financial literacy score of adolescents correlates with cognitive processes such as understanding and remembering, summarizing, and assessing the credibility of access (Silinskas et al. 2021).*

The variables considered in this study are (1) socio-demographic variables (gender, educational stage—pre-university and university—and type of institution: public or private); (2) financial literacy (financial knowledge, behaviors, and attitudes); and (3) the four sub-competencies of complex thinking (systematic, critical, scientific, and innovative thinking).

This section may be divided by subheadings. It should concisely and precisely describe the experimental results, their interpretation, and the experimental conclusions to draw.

4. Methodology

The research design used a mixed approach with triangulation models (Creswell and Clark 2007; Creswell et al. 2003). This approach involves collecting and analyzing quantitative and qualitative data to understand, contrast, and deepen the study phenomenon (Johnson et al. 2007). In this design, quantitative and qualitative data were collected and analyzed simultaneously, which allowed for a rapid delimitation of the study in a reduced period, with the participation of the same subjects. On the one hand, the work employed an ex post facto questionnaire to study students' perceived financial competency and reasoning for complexity. On the other hand, the research resorted to three focus groups to deepen the analysis of the data collected in the questionnaires for the two competencies. The qualitative technique to collect data was focus groups, which are collective conversations or group interviews. Focus groups are complex and multivalent articulations of instructional, political, and empirical practices that explore the nature and effects of developing social discourse in ways inaccessible through interviews or individual observations. They allow for cultivating new kinds of interactional dynamics by decentering the role of the researcher to establish another kind of student– professor relationship (Denzin and Lincoln 2015).

4.1. Participants

A total of 275 Mexican students in five cities (Monterrey, Mexico City, Pachuca, Querétaro, and Guadalajara) completed the financial competency and reasoning-for-complexity questionnaires, and these comprised 139 females and 136 males. Of these, 153 were university students, and 122 were in the last year of university preparation. Concerning the type of institution, 150 were students in public educational institutions, and 125 attended private universities.

Focus group data collection occurred in Querétaro (Mexico). This city is characterized as a development node, providing essential services, producing goods and services that add value and identity to rural production, and attracting inputs from large cities to generate trade, employment, and dynamism in local economies (IICA 2021), i.e., an intermediate city serving as a bridge between rural and urban populations; it provides employment opportunities and a better quality of life for young people and women. Specifically, 51 students from three different educational institutions in Querétaro (a private Catholic high school, a public university, and a private university) participated in three focus groups (Table 1).

Table 1. Focus group participants.

Focus Group	Institution Type	Educational Stage	Gender		Total	Age
			F	M		
FG-1	Private Catholic	High School	16	17	33	17–18
FG-2	Public	University	5	6	11	18–19
FG-3	Private	University	3	4	7	20–24
					51	17–24

Source: Created by the authors.

The institutions' administrations contacted and encouraged their students to participate voluntarily.

Table 1 presents a sample of 51 students from three different educational institutions in Querétaro. The selection of the students was random, choosing students from a broad age spectrum (17 to 24 years old). This study occurred in October 2022.

4.2. Instruments

The three instruments used were (1) the Financial Literacy Questionnaire, (2) the Complexity Reasoning Questionnaire, and (3) the interview protocol for the Financial Literacy and Complex Thinking focus groups.

4.2.1. Financial Literacy Questionnaire

Each item in the instrument had a 4-point Likert scale response ranging from a value of 4 corresponding to "strongly agree" to 1 indicating "strongly disagree".

Ten questions assessed the students' financial literacy: (1) I have a considerable amount of money, and a financial advisor offers me the following options: (a) put all your money in one business or investment, or (b) put your money in several businesses or investments. After careful consideration, I consider option a to be safer than option b so as not to risk my money; (2) I consider that an investment with a high return (higher profit) has more risk for my money; (3) I consider that it is possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares; (4) When I hear an expert mention that there is high inflation, it means that the cost of living is increasing rapidly; (5) Imagine that you have to wait a year to receive your share of an inheritance. Do you consider that one year from now, you will be able to buy the same thing you can now? (6) Suppose you put 1000 pesos into an investment account with a guaranteed annual interest rate of 2%. You do not make any other payments into this account, and you do not withdraw any money. At the end of the year, your account has 1100 pesos after receiving the interest payments. (7) Suppose you borrow 1000 pesos. You have two options: (a) pay 1050 pesos or (b) pay

1000 pesos plus 3% interest. (8) Suppose you deposit 1000 pesos in a savings account with a guaranteed interest rate of 2% per annum. If you do not make any other payments into that account and do not withdraw any money, at the end of 5 years, you have 1010 pesos; (9) Suppose you have 10,000 pesos in a bank account that gives you 10% net annual interest, and the bank does not charge you taxes or commissions. If you do not make any additional deposits or withdrawals, two years later, you will have 12,100 pesos; (10) I know what a cut-off date, payment date, and minimum payment on a card are.

The measurement of young people's financial behaviors comprised eight questions: (1) Before buying something, I check if I have enough remaining in my budget to afford the expense; (2) I usually keep a record of purchases and expenses; (3) I pay my debts on time; (4) I pay my debts in full and in one lump sum; (5) From the money I receive, I save a certain amount to buy something I want in the future; (6) I save money in a savings account, investment accounts, or promissory notes; (7) I have set financial goals for the next five years, and I am taking actions to achieve them; (8) I have an app on my phone that helps me control my spending. I use apps that help me plan where and how to use my money.

The measurement of young people's financial attitudes comprised seven questions: (1) It is more important to buy things that satisfy my needs than to save; (2) Money is there to spend; (3) I am interested in paying my debts on time; (4) I identify opportunities to improve my financial situation and not generate debt; (5) I like to find new options to use money; (6) The decisions I make about my money come after I consult with my family and friends; (7) I willingly accept new ideas to plan my expenses.

Reliability coefficients were extracted from the questionnaire on financial knowledge, behaviors, and attitudes for each dimension: financial knowledge, 0.668; financial behaviors, 0.718; and financial attitudes, 0.600.

4.2.2. Reasoning for Complexity Questionnaire

In addition to this questionnaire, the e-C omplexity instrument measured the participants' perception of their mastery of the complex reasoning competency and its sub-competencies. A team of experts in the field theoretically and statistically validated this instrument. The validation was verified by 443 participants, who demonstrated the reliability and internal consistency of the instrument. For this validation, the criteria of Clarity (mean 3.31), Coherence (mean 3.38), and Relevance (mean 3.54) established that the e-Complexity instrument was highly valid and reliable ([Castillo-Martínez and Ramírez-Montoya 2022](#)). The instrument comprises 25 items divided into four sub-competencies: systemic, scientific, critical, and innovative (or creative) thinking. Each item utilizes a 5-response Likert scale: completely agree, agree, neither agree nor disagree, disagree, and completely disagree.

The following reliability coefficients were extracted in each dimension: systemic thinking, 0.781; scientific thinking, 0.858; critical thinking, 0.809; and innovative thinking, 0.853. Therefore, the internal consistency of the instrument is considered good.

4.2.3. Interview Protocol for the Focus Groups on Financial Literacy and Complex Thinking

The focus groups were conducted and structured in four blocks to learn about the same aspects in each educational institution. The first block addressed the following generalities: obtaining and using money, the financial aid/support the students received, and the financial products they used. The second block assessed their financial knowledge about aspects such as the forms of investment, their notions about inflation, and the consequences of not paying the interest charged by banks. The third block dealt with financial behaviors concerning savings culture, their use of money if they won the lottery, and what they would like banks to offer in their credit cards. Finally, the fourth block dealt with financial attitudes concerning savings culture, what they would like to be offered by banks in general, and their attitude toward investment. The four blocks served to deepen the understanding of the financial culture of young people within the framework of reasoning for complexity.

4.3. Procedure and Data Analysis

Descriptive, correlational, inferential, and predictive analyses examined the data collected from the questionnaires with the statistical program SPSS (v22). The focus group data were analyzed with an ATLAS.ti coding construction program, which performs manual mechanical tasks of organizing and storing information; it identifies fragments, codes, and records; assigns several codes to the same text fragment; records relationships; and constructs conceptual networks (Sánchez Fontalvo et al. 2020).

ATLAS.ti helped identify the thematic axes that give rise to concepts (code categories) and the central category in each focus group. The identification of code categories provides an abstract and condensed view. The central category is the code that explains and gives meaning to all the data and their relationships and explains the most significant variability in the pattern of social behavior under study.

The next step in the program is to continuously code each sentence by using the family of the six “C’s” until reaching the point of saturation of the code categories to search for causes, contexts, consequences, contingencies, covariances, and conditions between them. Subsequently, conceptual networks of the main code categories identified were generated, and memos were constructed about them and their relationships. The authors recorded and transcribed the focus groups to process the resulting documents with ATLAS.ti. The program identified the word cloud of each document and the list of words that yield information about the central category and the main code categories. Then, each sentence was coded using the six “Cs” mentioned above until reaching the saturation point of the first 20 code categories and obtaining the most representative conceptual networks. Sankey diagrams helped visualize the relationship between the main code categories and the other code categories in the study.

5. Results

The results of this study per the four proposed objectives are as follows:

5.1. Financial Knowledge, Behaviors, and Attitudes of Young Adults (Objective 1)

Descriptive analyses depict the position of the sample in the three dimensions of the financial literacy questionnaire: financial knowledge, behaviors, and attitudes.

The results do not show statistically significant differences between the dimensions, with practically the same means for financial behaviors and attitudes (Table 2). On the other hand, the standard deviations are not characterized by a high magnitude, and it can be deduced, provided that the distributions are assumed to be normal, that most of the participants in the sample attained intermediate scores on the scale, although they are higher in financial behaviors and attitudes.

Table 2. Means and standard deviations in the dimensions of the Financial Literacy Questionnaire.

Dimensions	N	Mean	Standard Deviation
Financial knowledge	275	2.484	0.34
Financial behaviors	275	2.944	0.47
Financial attitudes	275	2.917	0.33

Source: Created by the authors.

The ATLAS.ti qualitative analysis of the three focus groups indicates that most students between 17 and 19 generally use cash, while private university students between 20 and 24 use debit cards; some also use credit cards to pay expenses (Figure 1). There are three groups (FG-1, FG-2, and FG-3). FG-1 corresponds to a private Catholic high school. Its central category is money and closely correlates with the concepts of parents, banks, and tastes. The second group, FG-2, is a public university. Its central category is money and closely correlates with card, investment, and purchase concepts. The third group is FG-3, which corresponds to a private Catholic university. Its central category is card and closely correlates to money, bank, and investment concepts.

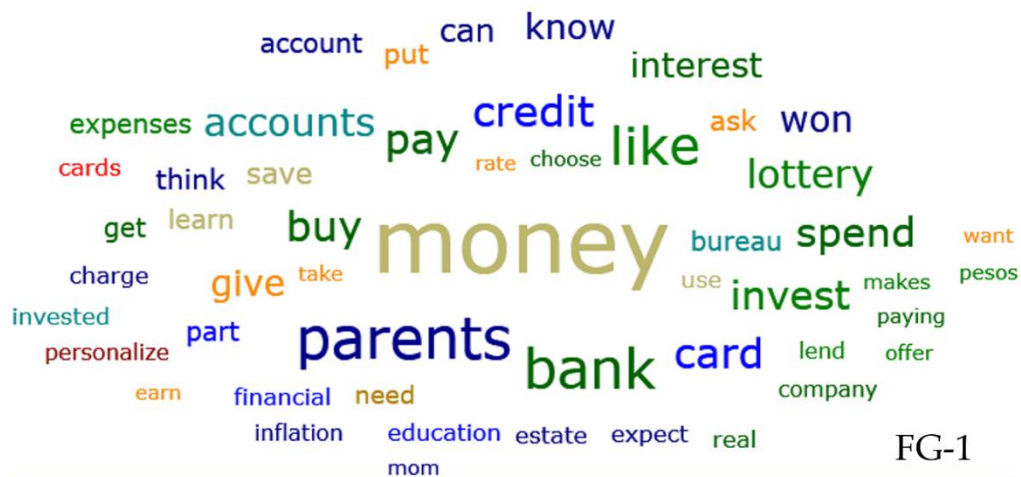


Figure 1. Word clouds for FG-1, FG-2, and FG-3.

In the first focus group, high school students depend on their parents for money and expenses. The FG-1 diagram (Figure 2) shows that the categories that are most highly rooted are money, parents, and bank, and the category with the highest density is buying. It follows that high school students at the private Catholic university use money mainly to buy rather than to save; saving is a category that is in the last place in their financial culture.

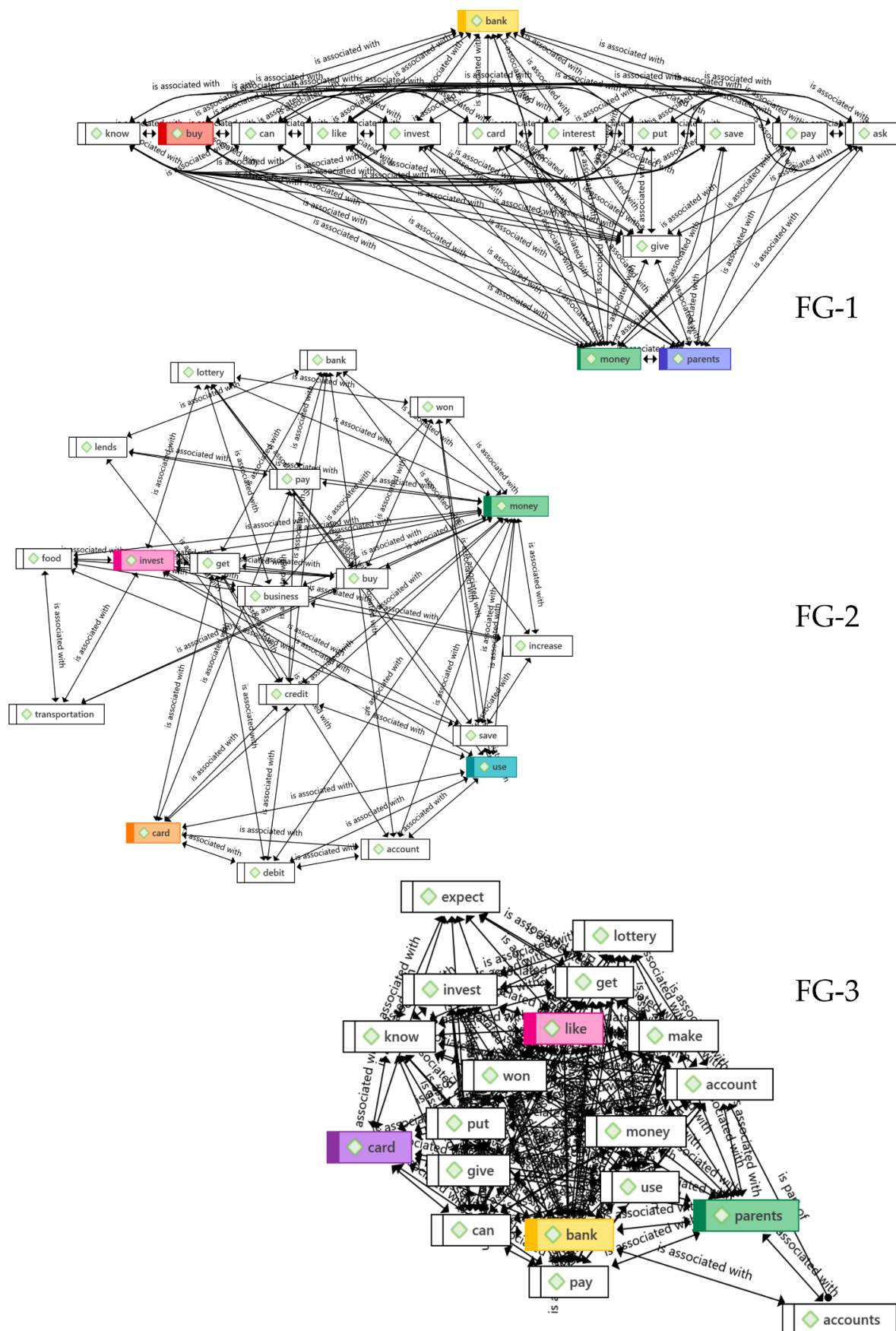


Figure 2. Diagrams FG-1, FG-2, and FG-3.

One of the most relevant quotes found in FG-1, reflecting the ways of thinking and perceiving of the high school students, is the following: “I can’t know how much I’m really spending because I’m not the one who pays for everything. My parents are the ones who pay for water, gas, and food. I don’t have to worry if I have enough money to eat in the afternoon, so I don’t know if I spend more than I have. They may give me 100 pesos, but I don’t spend it because they give me food, water, gas. . . everything” (male student). High school students’ perspective on their living expenses and how they use money prevents them from having a clear idea of the types of expenses that exist, which means that, without proper financial education, they have difficulty discerning between their saving and borrowing behaviors.

In the second focus group, public university students use money for essential expenses such as transportation, food, and class materials. The FG-2 diagram (Figure 2) shows that the categories with the highest rootedness are money, investment, and card, and the category with the highest density after money and investment is “buy”. It follows that public university students use money mainly to invest in their education through what they spend on transportation and food to attend university.

These students do not depend solely on their parents for money because they work to cover their expenses; most of the parents do not have bank accounts, and one of the students even opened a debit account in his name to receive the money his father charges for the services he provides; few students have debit cards, and none have credit cards. Several students help with family expenses by contributing a little money for gas, internet, water, electricity, and other services. They have limited financial knowledge about investments, inflation, and bank interest. They would like banks to offer them scholarships and support for public transportation and financial education. Because their closest social circle invests money in food businesses, they said they would do the same if they won the lottery.

In the third focus group, private university students depend on their parents’ support to cover university expenses and obtain money from the enterprises they carry out; they tend to invest the money they save. The FG-3 diagram (Figure 2) shows that the categories with the highest rootedness are card, bank, and parents, and the category with the highest density after bank is “likes.” This shows a close correlation between their parents and their education, given that the university they attend is fee paying. They use their bank accounts and money to acquire things they like and resort to multiple strategies to obtain money and invest.

The parents of these students have bank accounts (credit and debit); all students have debit cards, and few have credit cards (either as additional or as cardholders); few students depend on their parents to obtain money; at least half of the students have had entrepreneurial experiences during their university education to obtain economic income. These students have extensive and specific knowledge about investment (NFTs, Caleb, Actinver, CETES, and banking instruments), bank interest payments, and inflation. If these students won the lottery, they would use the money to buy real estate, invest in various financial instruments, invest in a startup, and travel. They would like a bank to offer them greater security to use financial products and services.

Therefore, Hypothesis 1 is rejected.

5.2. Differences in Financial Knowledge, Behaviors, and Attitudes as a Function of Socio-Demographic Variables (Gender, Educational Stage—Pre-University and University—and Type of Institution: Public or Private) (Objective 2)

As shown in Table 3, significant differences by gender exist in financial knowledge and behaviors but not in financial attitudes.

On the other hand, the students’ responses in each focus group were analyzed for each of the four blocks and constituted differentiated participation by gender. While men participated in all institutions and all blocks, no participation of women was noted in FG-2 (public university) in the questions related to financial knowledge about inflation, financial behaviors in investment, financial attitudes toward credit management, and financial attitudes toward investment (Table 4).

Table 3. Basic descriptive gender statistics in each financial literacy variable and *t*-test results.

Dependent Variable	Gender	Mean	Standard Deviation	<i>T</i>	<i>g.l.</i>	<i>p</i>
Financial knowledge	Male	2.53	0.34	−2.586	273	0.010
	Female	2.43	0.34			
Financial behaviors	Male	2.86	0.33	2.705	273	0.007
	Female	3.01	0.33			
Financial attitudes	Male	2.91	0.32	−0.082	273	0.935
	Female	2.9	0.30			

Source: Created by the authors.

Table 4. Presence/absence participation by gender.

		FG-1		FG-2		FG-3	
		Female	Male	Female	Male	Female	Male
Financial knowledge	Investment	1	1	1	1	1	1
	Inflation	1	1	0	1	1	1
	Interest	1	1	1	1	1	1
Financial behaviors	Savings	1	1	1	1	1	1
	Credit management	1	1	1	1	1	1
	Investment	1	1	0	1	1	1
Financial attitudes	Savings	1	1	1	1	1	1
	Credit management	1	1	0	1	1	1
	Investment	1	1	0	1	1	1

Source: Created by the authors.

Regarding the content of the responses, in FG-1, the women mentioned systematic strategies for saving, their tendency to support household expenses, and difficulties in investing. Men in this focus group showed expertise in taxes, long-term returns, and stock market investments and expressed their need for financial education. Women in FG-2 participated in a lower proportion than men, mentioning that they spend money mainly on transportation and food and tend to save it when they receive it. The men in this focus group showed knowledge of using credit cards, bank applications, and alternative sources of earnings, such as sports betting. Unlike students at the other educational institutions, women and men at the public university expressed that if they had money, they would invest it to start a beverage business or a street food stand.

The women in FG-3 mentioned that they work or have worked in clothing stores or started a business (children's classes, making pillowcases, t-shirts, and online jewelry). They are familiar with using credit cards and have even invested in a financial instrument. The men in this focus group have experience in real estate, have worked in business, have their own ventures, and have expertise in investment and credit management. The students in this focus group have a higher socio-economic level than those in the other two institutions, which is reflected, among other things, in their experience in credit management, use of financial instruments, and technological knowledge.

The questionnaires show that in FG-1, more women use some financial services than men. In FG-2, no women used any financial services. In FG-3, all the women and all the men used some financial service (Table 5).

A significant difference in financial literacy was found in the educational stage concerning knowledge (Table 6), which was higher among the university students.

As with the educational stage, a statistically significant difference was only found in financial literacy, which was specifically higher in private university students (Table 7).

Sankey diagrams (Figure 3) compared the coding of the three focus groups, revealing that the public university students did not consider banking institutions relevant as a means to obtain money to pay expenses and did not depend solely on their parents to obtain money. The private university students considered the categories of cards and bank more relevant than money to buy things they need and like. The high school students did not consider investing and saving relevant.

Table 5. Use of financial services by gender.

	FG-1		FG-2		FG-3	
	Yes	No	Yes	No	Yes	No
Female	6	9	0	4	2	0
Male	4	13	3	3	4	0

Source: Created by the authors.

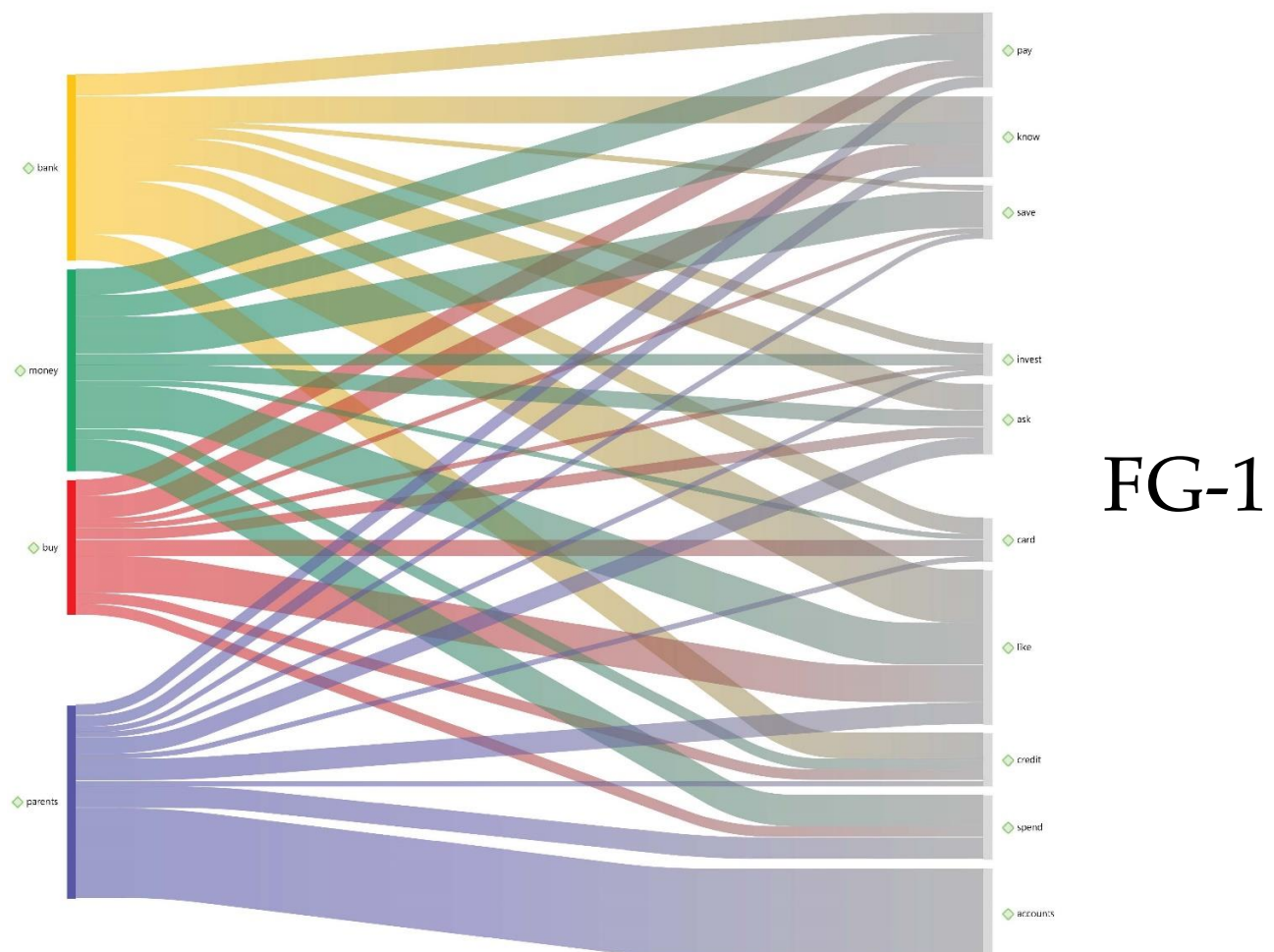
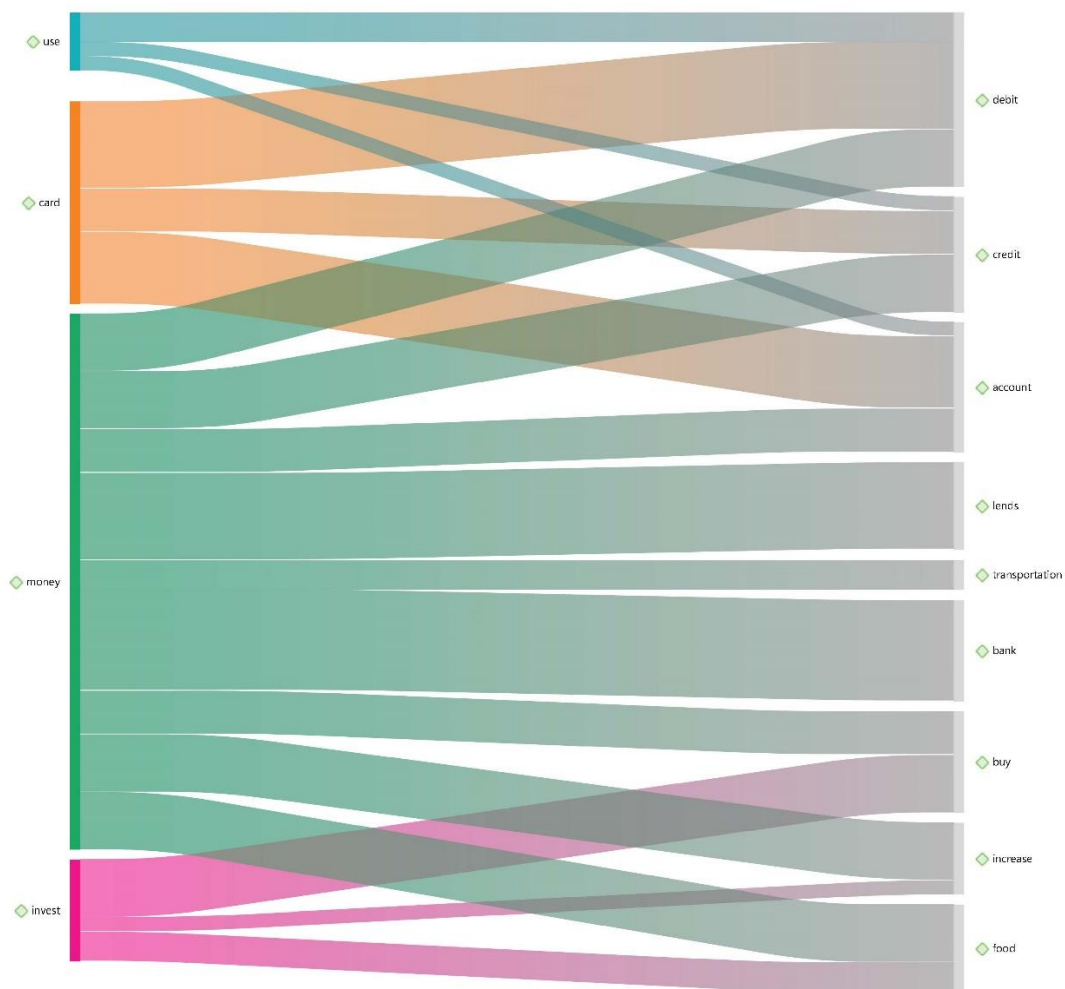


Figure 3. Cont.



FG-2



FG-3

Figure 3. A Sankey diagram of the main categories of each focus group: FG-1, FG-2, and FG-3.

Table 6. Basic descriptive statistics per educational stage in each financial literacy variable and *t*-test results.

Dependent Variable	Educational Stage	Mean	Standard Deviation	<i>T</i>	<i>g.l.</i>	<i>p</i>
Financial knowledge	High School	2.40	0.34	−3.585	273	0.000
	University	2.55	0.34			
Financial behaviors	High School	2.96	0.33	0.541	273	0.589
	University	2.93	0.33			
Financial attitudes	High School	2.91	0.32	0.058	273	0.954
	University	2.91	0.30			

Source: Created by the authors.

Table 7. Basic descriptive statistics per educational institution type, financial literacy variables, and *t*-test results.

Dependent Variable	Type of Institution	Mean	Standard Deviation	<i>T</i>	<i>g.l.</i>	<i>p</i>
Financial knowledge	Public	2.41	0.346	−3.633	273	0.000
	Private	2.56	0.332			
Financial behaviors	Public	2.97	0.498	1.219	273	0.224
	Private	2.90	0.449			
Financial attitudes	Public	2.90	0.320	−0.550	273	0.583
	Private	2.92	0.345			

Source: Created by the authors.

Therefore, Hypothesis 2 is partially confirmed.

5.3. Relationship between Financial Literacy Competency and Complex Thinking Competency (Objective 3)

The sub-competencies of complex thinking were correlated with those corresponding to the central object of study in this research, financial literacy, giving rise to the coefficients shown in Table 8. Only critical thinking correlates significantly and positively with financial behaviors and attitudes; therefore, Hypothesis 3 can hardly be confirmed.

Table 8. Correlations between the sub-competencies of complex thinking with the dimensions of financial literacy.

	Financial Knowledge	Financial Behaviors	Financial Attitudes
Systemic thinking	−0.005	0.054	0.005
<i>p</i>	0.934	0.369	0.937
Scientific thinking	−0.058	0.002	−0.042
<i>p</i>	0.338	0.980	0.485
Critical thinking	0.037	0.124	0.038
<i>p</i>	0.544	0.040 *	0.036 *
Innovative thinking	0.037	0.086	−0.500
<i>p</i>	0.543	0.156	0.405

Note. * $p < 0.05$ (bilateral) Source: Created by the authors.

5.4. The Predictive Capacity of Complex Thinking Sub-competencies on Financial Literacy Competency (Objective 4)

In this section, two predictive models were developed, taking as a basis the correlation coefficients in which statistical significance was attained in the previous table. Each of them is detailed below:

- Regarding predicting financial behaviors, the model was configured with a predictor for critical thinking: $\beta = 0.124$, $t = 2.097$, $p < 0.037$.
- Concerning predicting financial attitudes, the model was configured with a predictor for critical thinking: $\beta = 0.138$, $t = 0.620$, $p < 0.536$.

The results allow us to identify critical thinking as a predictor of financial behavior but not attitudes. *However, Hypothesis 4 can hardly be confirmed.*

6. Discussion

The new generations tend to spend more and save less, lack financial knowledge, and quickly incur debts using credit cards. Table 2 does not show statistically significant differences between financial behaviors, knowledge, and attitudes among students, although the knowledge dimension is slightly lower compared to behaviors and attitudes. Mexican youth were perceived to have low financial literacy, regardless of whether they studied in public or private schools (Arceo-Gómez and Villagómez 2017). As Mexican students advance in their school careers, a higher level of financial knowledge, behavior, and attitude is observed; therefore, a higher educational level is associated with higher financial literacy.

Young students imitate the financial behavior they see at home and in their immediate social environments. Table 3 shows that males attained a higher mean perception of financial literacy than females, and females had a higher mean in financial behaviors. Men scored higher on the financial competency assessment and showed higher levels of self-perception of financial competency (Jha and Shayo 2021). There is a need to develop women's critical thinking to discern between the financial behavior they socially imitate and their capabilities to become more involved in financial issues, thus decreasing the gender gap.

Gender differences decrease among students with a high socio-economic level. Table 6 shows that financial literacy is higher among private institution students than public universities. The socio-economic status of young people determines the level of knowledge they have. Young people with a high socio-economic status perceive more financial literacy than those with a low socio-economic status (Ali et al. 2016). Youth with a higher socio-economic status perceive high financial literacy regardless of gender, which shows in their experience of credit management, use of financial instruments, and technological literacy, among other things.

Developing a complex thinking competency and its sub-competencies positively impacts young people's financial perceptions and behaviors during higher education. Table 8 shows that critical thinking correlates significantly and positively with financial behaviors and attitudes and is necessary to predict financial behavior. Complex thinking is a cognitive tool that can expand individuals' thinking capacity when they face challenging situations or problems. It can also help develop competencies that allow them to think comprehensively about reality with a broad view of the world (Vázquez-Parra et al. 2022). Higher education allows students to form a judgment when faced with a financial situation or problem and to apply strategies to formulate and test financial hypotheses; however, it is necessary to strengthen their ability to analyze all the relevant elements of their financial systems to design and create financial solutions.

7. Conclusions

Complex thinking and financial literacy competencies are critical in the education of young people. This study analyzed and compared students' personal finance behaviors and their mastery of complex thinking competencies. The qualitative and quantitative data analysis yielded the following findings: (a) differences were found among the categories

identified by institution, money in relation to parents, banks, and family preferences, or bank cards, investment, and purchases; (b) young people's knowledge, perceptions, and manners closely correlate to their immediate family and social context; (c) young university students focus on investments and purchases, in contrast to high school students, who focus on purchases rather than savings; (d) in reasoning for complexity, students receive help from critical thinking concerning financial management, as opposed to scientific, systemic, and innovative thinking.

The implications for educational practice are possibilities for training in financial literacy and broadening competencies for a more profound development of complex thinking for decision-making. In this training, it would be valuable to work with challenges and problems in line with the motivations and attitudes of young people. Implications for research include the need to study the contextual situations of young people, such as parents' actions, which is a significant reference point for young people's behavior. It would also be valuable to conduct studies that integrate mixed methods to explore questions that measure competencies and identify the meaning of the data.

A limitation of this study is that it analyzed perceptions, leaving behind an opportunity to study the actual, practical behavior of youth; although the focus groups encouraged them to make judgments, this nevertheless allows for an opportunity to study practical actions. Investigating the actual financial competency of young people makes it possible to identify objective skills and shortcomings in their money management. Concrete data would support designing more effective educational programs. Reliance on perceptions alone can lead to erroneous conclusions, as people often overestimate or underestimate their capabilities. Future studies can analyze behaviors in real situations, promote the study of values and attitudes about financial situations and problems, and apply strategies to formulate and test financial hypotheses. This work is an invitation to further explore financial literacy in young people and promote opportunities to accumulate informed knowledge for personal and professional financial management.

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