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Financial literacy and educational level in Ecuadorian students: a structural analysis

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Background: Financial literacy has been recognized as a key competency for making in-formed economic decisions, particularly in contexts where access to financial products exceeds the population's literacy level. However, in Ecuador, persistent gaps remain between formal educational attainment and applied financial knowledge. In this context, the objective of this study was to analyze the relationship between educational level and financial literacy among Ecuadorian students.

Methods: A quantitative approach was adopted, with a descriptive-correlational level, non-experimental type, and cross-sectional design. The sample consisted of 2,021 participants, selected through non-probabilistic convenience sampling. A structured questionnaire of 33 items was administered, distributed across four analytical dimensions. Statistical analysis was performed using SPSS and AMOS, including reliability testing, factorial validity, and structural model fit.

Results: The results revealed that educational level has a significant effect on financial literacy. Individuals with higher education exhibited the highest levels, while those who completed only primary education showed the lowest. Four latent factors were validated: technical knowledge, socioeconomic impact of financial education, practical application of knowledge, and financial self-management.

Conclusion: The correlations between these factors were strong and statistically significant, highlighting the pivotal role of educational level in shaping financial literacy. The proposed model presents a valid and consistent structure, effectively reflecting the relationships between the key variables. These findings emphasize the necessity for tailored and context-specific educational interventions that address the diverse needs of different population segments, thereby enhancing financial literacy across varying educational levels.

KEYWORDS

financial literacy, educational level, educational assessment, consumer behavior, economic culture, higher education, socioeconomic factors, financial decision-making

1 Introduction

Various studies have demonstrated that financial literacy constitutes an essential competency for the economic and social development of individuals, particularly in contexts where access to financial services has expanded rapidly without adequate education to support their responsible use (Grohmann et al., 2018; Lusardi, 2019). In Latin America, research by da Silva Souza Caggy et al. (2023), Méndez-Prado et al. (2022) highlights deficiencies in financial literacy levels, even among populations with higher education, reflecting a disconnect between educational attainment and mastery of financial knowledge and skills. This situation is particularly concerning in the Ecuadorian context, where recent studies have shown that a significant proportion of university students exhibit limitations in planning, budgeting, and making informed decisions about their personal finances (Loza et al., 2023; Méndez-Prado et al., 2022; Tulcanaza-Prieto et al., 2025).

Despite advances in the measurement of financial literacy, significant gaps remain in the national literature. First, there is limited empirical evidence linking financial literacy to key sociodemographic variables such as educational level, using a robust multivariate approach (Rehman and Mia, 2024; Siegfried and Wuttke, 2021). Second, the theoretical models commonly applied often lack rigorous statistical validation and instruments adapted to the Ecuadorian context (Méndez-Prado et al., 2023; Moreira-Choez et al., 2023). Moreover, a limited articulation is observed between academic findings and the formulation of public policies aimed at promoting financial inclusion based on the population's educational level.

In the Ecuadorian context, the study of financial literacy among students is particularly relevant due to the country's unique socioeconomic and educational characteristics. Ecuador, a developing nation in Latin America, faces significant disparities in terms of access to quality education and financial services. While recent educational reforms have aimed to address these gaps, financial literacy remains an area that has not been fully integrated into the national curriculum. The diverse socioeconomic backgrounds of students, particularly in rural and marginalized areas, further complicate efforts to provide consistent and effective financial education. As such, analyzing how educational level influences financial literacy in Ecuador provides valuable insights into how the education system can better meet the financial needs of its students and inform more targeted interventions.

Additionally, Ecuador's economic environment characterized by inflationary fluctuations, changing exchange rates, and high unemployment adds complexity to financial decision-making, especially for students in the process of developing financial knowledge. The findings from this study can offer critical evidence to help design educational interventions that are specifically tailored to the needs of Ecuadorian students, addressing their particular challenges and opportunities. By considering the country's unique economic and educational context, the research aims to contribute to the creation of more effective policies and practices that foster financial literacy, thereby empowering students to make informed financial decisions and improving their overall financial wellbeing.

Within this context, the following research question is posed: What is the relationship between educational level and financial

literacy among Ecuadorian students? This inquiry is pivotal in understanding how various levels of education impact the financial knowledge and behaviors of students within the context of Ecuador's unique socioeconomic environment. To explore this relationship, the study is framed around the following hypotheses:

H1. There is a significant positive relationship between the educational level and the financial literacy of Ecuadorian students.

H2. Socioeconomic awareness, as influenced by financial education, positively impacts students' practical application of financial knowledge.

H3. Technical-financial knowledge significantly predicts students' financial self-management behaviors.

H4. The perception of the socioeconomic impact of financial education is positively correlated with students' engagement in entrepreneurship and innovation.

To address the research question and test the proposed hypotheses, the study aims to analyze the relationship between educational level and financial literacy among Ecuadorian students, with the purpose of understanding how different educational backgrounds influence students' financial knowledge, decision-making, and behaviors. This analysis will provide valuable insights into the factors that contribute to financial literacy in a developing context, such as Ecuador, where socio-economic disparities may affect access to financial education.

2 Theoretical foundations

Financial literacy is conceptualized as the set of knowledge, skills, and attitudes necessary to make informed decisions regarding personal financial resource management. This competence involves not only understanding technical concepts but also the ability to apply them effectively in everyday life, with a significant impact on individual and collective economic wellbeing (Akbaş and Seedsman, 2024; Goyal and Kumar, 2021; Mavlutova et al., 2021). In the context of this research, financial literacy will be addressed through four key dimensions that reflect its practical applicability and its relationship with the socioeconomic environment.

Firstly, technical-financial knowledge refers to the understanding of fundamental concepts related to money management, such as saving, investing, credit, insurance, and financial planning (Muthu and Bharathi, 2025; Owuor et al., 2022). This component is essential for individuals to make informed and appropriate financial decisions in various contexts. However, although technical knowledge is crucial, its effectiveness depends on individuals' ability to apply it practically.

The dimension of the socioeconomic impact of financial education emphasizes how access to financial education can

improve individuals' economic conditions and, consequently, contribute to broader social and economic development (Brüggen et al., 2017; Resham et al., 2024). Previous studies suggest that financial literacy not only improves individuals' ability to manage finances but also has positive effects on the local economy by reducing vulnerability to economic crises (Katnic et al., 2024; Lusardi and Mitchell, 2014; Matewos et al., 2016).

The practical application of knowledge is another relevant dimension, as it refers to individuals' ability to use acquired knowledge in real-life situations, such as making decisions about saving, investing, or borrowing (Garg and Singh, 2018; Pang, 2010). Unlike theoretical knowledge, the ability to make correct financial decisions depends on experience and the contextual application of financial principles. Finally, personal financial management refers to the ability to plan and control spending, save adequately, and manage credit, which is a fundamental part of individual financial decision-making (Mieënskienė et al., 2023; Rodríguez et al., 2024). This dimension is closely linked to economic wellbeing, as proper personal financial management can prevent debt issues and improve long-term financial stability.

3 Materials and methods

This study was framed within a quantitative approach, with a descriptive-correlational level of research, as it aimed to characterize the population based on sociodemographic variables and establish associations between these and the level of financial literacy. The research was non-experimental in nature, since the variables were not intentionally manipulated, and a cross-sectional design was adopted, as data were collected at a single point in time.

The study population consisted of students at different levels of the educational system, as well as individuals engaged in continuing education (CE), with no geographical or age restrictions. This allowed for a broad perspective on financial literacy across various social segments. The sample was composed of 2,021 participants, selected through non-probabilistic convenience sampling. This technique was employed due to the ease of access to participants in both face-to-face and digital settings, which facilitated efficient data collection in diverse contexts.

In order to contextualize the characteristics of the sample, Table 1 presents the sociodemographic distribution of the participants according to gender, educational level, and age group. These attributes are relevant for the subsequent analysis, as the specialized literature has highlighted their potential influence on levels of financial competence. The detailed characterization reveals, for instance, a gender balance with a slight female majority, a significant presence of secondary and continuing education students, and a broad representation of individuals within economically active age groups. This internal diversity of the sample strengthens the analytical validity of the study and ensures the relevance of the findings in comparable contexts.

The sociodemographic distribution of participants in the study provides key insights into the profile of the sample, which includes several variables that are critical for understanding the factors influencing financial literacy. The gender distribution indicates a gender-balanced sample, with a slight majority of females (51.9%) compared to males (47%), and a minimal representation

of non-binary individuals (0.4%). The inclusion of gender as a variable is relevant, as financial literacy may differ across genders due to societal roles, economic opportunities, and access to financial resources. This variable is crucial for understanding the possible disparities in financial behavior and decision-making across different gender groups.

In terms of education level, the sample is primarily composed of individuals with secondary education (35.2%), followed by continuing education students (23.4%) and those with higher education (17.8%). A smaller proportion holds a technical education (8.4%) or primary education (15.2%). This distribution is important because it highlights that the majority of participants have mid-level education or are in the process of professionalizing. This educational background may significantly influence the level of financial literacy, as higher levels of education generally correlate with better financial knowledge and decision-making skills. The relatively lower proportion of participants with technical or primary education may reflect systemic barriers to accessing higher educational opportunities in certain sectors, which could affect their financial literacy levels and overall economic opportunities.

Regarding age, the majority of participants fall within economically active age groups: 26.3% are between 15 and 29 years, 23.5% are between 45 and 59 years, and 23.0% are between 30 and 44 years. These age groups are particularly relevant for analyzing financial literacy, as individuals within these ranges are likely to face responsibilities associated with income generation, saving, investing, and managing debt. Moreover, younger adults are often in the process of acquiring financial knowledge, while middle-aged individuals might already be making significant financial decisions, such as home ownership, retirement planning, and family budgeting. The inclusion of these age categories allows for a deeper understanding of how financial literacy varies across the life cycle and within different stages of financial responsibility.

The data collection technique consisted of administering a structured survey both in person and online, ensuring the participation of individuals with diverse sociodemographic profiles. The instrument used was a 33-item questionnaire distributed across four analytical factors, designed to assess multiple dimensions of financial literacy. These dimensions address key aspects of financial literacy, such as technical-financial knowledge, the practical application of knowledge, the socioeconomic impact of financial education, and personal financial management. The questions were designed to capture both theoretical knowledge and the participants' ability to apply this knowledge in everyday situations, allowing for a comprehensive and detailed assessment of the students' financial competencies. The administration of the questionnaire was preceded by informed consent, safeguarding ethical principles of confidentiality, anonymity, and voluntariness.

Additionally, several methodological limitations are recognized that should be considered when interpreting the results. The sample was selected through non-probabilistic convenience sampling, meaning that the findings cannot be generalized to all populations but are limited to the specific group studied. Furthermore, the gender distribution in the sample showed a slight imbalance, with a majority of female participants, which could have influenced the responses obtained.

For statistical analysis, SPSS version 25 was used during the preliminary phase to perform descriptive statistics and assess the internal reliability of the instrument. Subsequently, AMOS version

24 was employed to conduct structural equation modeling (SEM), which allowed for the examination of latent construct structures and the verification of theoretical relationships among the variables included in the proposed model.

At this initial stage, the reliability of the instrument was established using Cronbach's alpha coefficient ($\alpha = 0.972$) and McDonald's Omega index ($\omega = 0.972$), both indicating excellent internal consistency. Thereafter, to validate the construct structure, a two-phase factorial strategy was implemented. First, an exploratory factor analysis (EFA) was conducted to identify the underlying dimensions without imposing prior theoretical assumptions, which enabled the reorganization and refinement of the questionnaire items based on emerging correlation patterns.

Subsequently, a confirmatory factor analysis (CFA) was carried out with the explicit objective of empirically validating the dimensional structure suggested by the EFA. In contrast to the exploratory phase, CFA tested a theoretically grounded measurement model by evaluating factor loadings, error variances, and overall model fit indices. This procedure was essential to confirm that the latent constructs were accurately represented by the observed indicators. In this context, the inclusion of CFA was not a redundant step, but a critical methodological phase prior to the structural analysis. The robustness of the dataset for these techniques was supported by a Kaiser-Meyer-Olkin (KMO) index of 0.976 and a statistically significant Bartlett's test of sphericity ($p < 0.001$), confirming sample adequacy for factorial analyses.

Finally, once the measurement model had been validated, SEM was employed to evaluate the hypothesized relationships among latent constructs. The resulting model fit indices were satisfactory (CFI = 0.929; RMSEA = 0.073), thereby confirming both the validity of the structural model and the theoretical soundness of the framework. Therefore, the application of CFA was not a remnant of a previous draft but an integral part of the methodological approach, aimed at ensuring the psychometric quality of the instrument before testing structural hypotheses within the overall model.

4 Results and discussion

This section presents the results obtained from the statistical analysis of the data, aimed at determining the influence of educational level on participants' financial literacy. To this end, an inter-subject effects test was applied to identify whether statistically significant differences existed among educational groups with respect to their reported levels of financial literacy.

Table 2 below summarizes the results of the one-way analysis of variance (ANOVA), in which educational level was considered the independent variable and financial literacy the dependent variable. The table reports values for the sum of squares, degrees of freedom, mean square, F statistic, and the significance level associated with each source of variation.

The analysis of variance (ANOVA) revealed that educational level exerts a statistically significant effect on financial literacy, as reflected by the F statistic = 115.559 and a significance level of $p < 0.001$. This result confirms that there are meaningful differences in financial literacy across the different levels of educational attainment, indicating that academic formation

TABLE 1 Sociodemographic distribution of participants.

Variable	Category	Frequency	Percentage (%)
Gender	Male	964	47
	Female	1,049	51.9
	Gender non-binary	8	0.4
Education level	Primary	308	15.2
	Secondary (high school)	712	35.2
	Superior technique	169	8.4
	Higher education	359	17.8
	Continuing education student	473	23.4
Age group	10–14 years	182	9.0
	15–29 years	531	26.3
	30–44 years	464	23.0
	45–59 years	475	23.5
	60 years or older	369	18.3

plays a relevant role in explaining the variability observed in financial knowledge. Furthermore, the coefficient of determination ($R^2 = 0.187$; adjusted $R^2 = 0.185$) shows that approximately 18.7% of the variance in financial literacy scores is attributable to differences in educational level. Although this represents a moderate effect, it is consistent and statistically robust, supporting the hypothesis that formal education contributes substantially to individuals' financial competencies.

These findings are aligned with previous empirical evidence. Jugnandan and Willows (2023) highlight that individuals with higher levels of academic achievement tend to demonstrate a stronger command of essential financial principles, enabling more informed and sustainable financial decision-making. Similarly, Mindra and Moya (2017) argue that formal education enhances financial behavior by fostering critical attitudes and practices. In line with this, Gerrans and Heaney (2019) found that individuals with tertiary education exhibit significantly better outcomes in financial planning, savings, and credit use.

Table 3 presents the mean comparison of financial literacy scores across different educational levels, using the Tukey HSD *post hoc* test to identify significant differences between groups. The table shows the mean differences, standard errors, significance values, and confidence intervals for each pairwise comparison. These results highlight the impact of educational attainment on financial literacy, with higher education levels associated with greater financial knowledge.

The data presented in Table 3 highlights the significant differences in financial literacy scores across various educational levels, demonstrating a clear trend: as educational attainment increases, so does financial literacy. This pattern suggests that education plays a critical role in equipping individuals with the necessary knowledge and skills to make informed financial

TABLE 2 Analysis of variance: effects of educational level on financial literacy.

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	414,482,982 ^a	4	103,620,746	115,559	.000
Intercept	15,037,862,648	1	15,037,862,648	16,770,355	.000
Educational level	414,482,982	4	103,620,746	115,559	.000
Error	1,807,733,410	2,016	896,693	–	–
Total	20,823,952,000	2,021	–	–	–
Corrected total	2,222,216,392	2,020	–	–	–

Dependent variable: financial literacy. ^aR² = 0.187 (adjusted R² = 0.185).

TABLE 3 Mean comparison of financial literacy by educational level.

Variable dependiente: nivel educativo						
HSD tukey						
(I) Nivel educativo		Diferencia de medias (I–J)	Desv. error	Sig.	Intervalo de confianza al 95%	
					Límite inferior	Límite superior
Estudiante	Bachiller	–17,6747*	1,77628	0,000	–22,5244	–12,8251
	Técnica	–24,7434*	2,68359	0,000	–32,0703	–17,4166
	Superior	–33,4530*	2,09607	0,000	–39,1758	–27,7302
	Primaria	8,7363*	2,19251	0,001	2,7502	14,7223
Bachiller	Estudiante	17,6747*	1,77628	0,000	12,8251	22,5244
	Técnica	–7,0687*	2,56228	0,046	–14,0643	–0,0730
	Superior	–15,7782*	1,93834	0,000	–21,0704	–10,4861
	Primaria	26,4110*	2,04224	0,000	20,8352	31,9868
Técnica	Estudiante	24,7434*	2,68359	0,000	17,4166	32,0703
	Bachiller	7,0687*	2,56228	0,046	0,0730	14,0643
	Superior	–8,7095*	2,79350	0,016	–16,3365	–1,0826
	Primaria	33,4797*	2,86657	0,000	25,6533	41,3061
Superior	Estudiante	33,4530*	2,09607	0,000	27,7302	39,1758
	Bachiller	15,7782*	1,93834	0,000	10,4861	21,0704
	Técnica	8,7095*	2,79350	0,016	1,0826	16,3365
	Primaria	42,1892*	2,32575	0,000	35,8394	48,5391

Mean differences marked with an asterisk are statistically significant at the $*p < 0.05$ level, according to the Tukey HSD *post hoc* test. Gray-shaded values indicate statistically significant differences in mean scores ($p < 0.05$) with the largest absolute differences among educational level comparisons.

decisions. It is widely recognized that higher education fosters a deeper understanding of complex financial concepts, which could explain the differences observed in this study. The observed progression in financial literacy is consistent with the findings of previous studies, such as those by Silva et al. (2017), who emphasized the positive correlation between educational level and financial knowledge, suggesting that higher levels of formal education lead to better financial planning and decision-making.

Specifically, individuals with primary education had the lowest financial literacy scores (74.2955), whereas those with higher education achieved the highest (116.4847). This significant gap between the two groups underscores the impact of education on financial knowledge and behavior. The Tukey HSD *post hoc* test showed that all educational categories were significantly different from each other, with the largest difference observed between primary education and higher education (42.1892),

which was statistically significant ($p < 0.000$). This finding suggests that educational attainment is not only associated with financial literacy but also plays a substantial role in narrowing or widening the knowledge gap between individuals from different educational backgrounds.

The pairwise comparisons provided by the Tukey test further clarify the specific differences between the educational groups. These comparisons offer a more precise understanding of how financial literacy varies across educational levels. The results reinforce previous literature, such as that of Johan et al. (2021), who found that individuals with higher educational attainment are more likely to engage in behaviors such as saving, investing, and managing credit effectively. The clear differences between educational groups in this study support the notion that formal education is a key driver of financial knowledge and decision-making capabilities.

TABLE 4 Factor components of financial literacy.

Items	Component			
	1	2	3	4
P6. I know the legal and credit consequences of defaulting on debt	0.812	0.204	0.195	0.172
P4. I understand the importance of maintaining a good credit history	0.812	0.250	0.202	0.160
P12. Fulfilling my obligations (debts) is a priority	0.749	0.330	−0.067	0.285
P3. I understand the impact of interest rates on my loans and savings	0.747	0.152	0.301	0.192
P7. I know the rights and responsibilities of financial consumers	0.731	0.248	0.331	0.104
P10. I know the importance of having an emergency fund for unexpected expenses	0.713	0.249	0.123	0.298
P13. I understand how unplanned expenses can affect my budget	0.701	0.257	0.121	0.342
P8. I understand basic financial concepts	0.594	0.313	0.470	0.150
P1. I know basic financial concepts (savings and investments, interest rates, financial planning)	0.569	0.246	0.306	0.283
P5. I know the difference between assets and liabilities	0.548	0.290	0.475	0.184
P27. Financial education helps me identify and take advantage of market opportunities	0.287	0.799	0.215	0.232
P28. Financial education influences my ability to innovate	0.270	0.788	0.237	0.224
P29. Financial education improves my financial relationships (family, friends, investors)	0.253	0.783	0.279	0.147
P31. Financial education is important for developing an entrepreneurial and innovative culture	0.320	0.771	0.221	0.178
P26. Financial education can increase the efficiency of my resources	0.279	0.766	0.239	0.246
P30. Financial education contributes to reducing poverty and inequality in the country	0.197	0.743	0.234	0.171
P24. I believe that financial education on the use of financial technologies is sufficient to manage my resources	0.228	0.628	0.353	0.295
P25. I believe current regulations are adequate to protect users of financial technologies	0.217	0.627	0.405	0.217
P14. I feel comfortable making important financial decisions (such as investments or purchases of property)	0.415	0.416	0.396	0.272
P33. I have participated in at least one financial education program	0.078	0.287	0.674	0.065
P9. I use my credit card to pay for basic services and/or food	0.098	0.152	0.670	0.082
P17. I regularly use financial tools (budgets, financial products and services) to manage my finances	0.245	0.254	0.636	0.417
P15. I believe my current financial knowledge is sufficient to make informed decisions	0.263	0.363	0.606	0.297
P16. I apply basic financial concepts	0.326	0.394	0.555	0.377
P2. I know about financial education services provided by different institutions	0.446	0.220	0.539	0.205
P11. I am capable of creating a personal finance budget	0.427	0.226	0.533	0.297
P32. I know the differences between banks and cooperatives	0.311	0.411	0.485	0.209
P19. I keep track of my personal expenses	0.311	0.214	0.195	0.787
P18. I keep track of my personal income	0.323	0.213	0.198	0.780
P21. I allocate a portion of my monthly income to savings	0.234	0.281	0.221	0.709
P20. I have an investment plan to achieve my long-term financial goals	0.185	0.278	0.461	0.588
P23. My level of debt is manageable	0.406	0.399	0.072	0.474
P22. I compare fees and conditions of different financial products before contracting them	0.379	0.386	0.310	0.465

Exploratory factor analysis allows for the identification of latent dimensions that structure a set of items related to financial literacy. This statistical procedure aims to group items based on shared patterns of variability, reducing data complexity and facilitating the theoretical interpretation of the factors. Table 4 below presents the factor loadings of 33 items distributed across four main components, obtained through the principal components method with rotation. It is important to note that non-orthogonal rotation was applied, which enabled the conceptual grouping of the items while allowing for the factors to be correlated, thereby providing

a more flexible and realistic model for interpreting financial literacy dimensions.

The interpretation of the table reveals that Component 1 groups items associated with technical financial knowledge, particularly those related to credit obligations, interest rates, consumer financial rights, and fundamental concepts such as assets, liabilities, and financial planning. This factor can be conceptualized as instrumental financial literacy, as it encompasses the essential knowledge required for informed economic decision-making. This finding is consistent with the work of [Luèiæ et al. \(2023\)](#), who

emphasize that understanding fundamental financial concepts is the foundation for rational financial behaviors, including spending, saving, and investing. Without this foundational knowledge, individuals may struggle to navigate complex financial decisions, potentially resulting in suboptimal financial outcomes.

Component 2 groups items related to the perception of the impact of financial education on broad social and economic dimensions, such as innovation, entrepreneurship, inequality reduction, and resource optimization. This factor can be interpreted as socioeconomic awareness of financial education, reflecting an understanding of its structural value. Financial education goes beyond personal financial management and contributes to sustainable development and social inclusion. For example, it can foster entrepreneurship by providing individuals with the knowledge to identify market opportunities, efficiently manage resources, and build sustainable businesses. In rural or marginalized communities, this can lead to the creation of small businesses, job opportunities, and greater economic mobility. Furthermore, financial education plays a crucial role in inequality reduction by empowering underserved populations, such as low-income individuals or women, to access and effectively utilize financial services. This leads to improved financial security and a reduction in socioeconomic disparities. In addition, resource optimization through financial education enables individuals to make informed decisions about saving, investing, and budgeting, enhancing personal wealth and contributing to overall societal prosperity. Thus, financial literacy not only enhances individual financial wellbeing but also promotes broader social inclusion, fostering a more equitable and sustainable society. In line with [Cebrián and Junyent \(2015\)](#), it is evident that financial literacy is a powerful tool for social transformation, as it equips individuals with the skills needed to engage fully in economic activities and improve their quality of life.

Component 3, in contrast, encompasses items related to the use and practical application of financial tools, such as budgeting, the use of financial services, credit card management, and participation in financial education programs. This factor can be interpreted as functional financial behavior, which represents the level of practical engagement in managing personal finances. This dimension has been highlighted by [Weerasinghe et al. \(2025\)](#), who assert that observable behaviors, rather than theoretical knowledge alone, are more immediate predictors of financial stability. Individuals who actively apply financial tools and participate in financial education programs are more likely to manage their finances effectively, leading to greater economic stability and resilience.

Finally, Component 4 integrates items related to income and expenditure management, savings, and long-term financial planning, thereby reflecting a personal financial self-management dimension. This aspect operationalizes the individual's ability to organize household finances and achieve financial goals, ensuring long-term economic security. Studies, such as those conducted by [Festa and Knotts \(2021\)](#), support this interpretation by demonstrating that competencies in financial self-management are positively associated with higher levels of economic wellbeing and a reduced risk of problematic indebtedness. Effective personal financial management not only contributes to financial stability but also mitigates the risks associated with over indebtedness, fostering a more secure and prosperous future for individuals and their families.

The assessment of the psychometric quality of measurement instruments is essential in studies on financial competencies, as it ensures the validity and reliability of conclusions derived from the data. In this context, analyses of internal consistency and convergent validity were applied to the factors derived from the financial literacy model. [Table 5](#) presents the reliability and validity indicators for the four identified factors, reporting standardized factor loadings, Cronbach's alpha coefficient, McDonald's omega, composite reliability (CR), and average variance extracted (AVE).

For Factor 1, associated with technical and conceptual financial knowledge, all items showed factor loadings above 0.70. Cronbach's alpha was 0.944 and McDonald's omega was 0.945, indicating high internal consistency. The composite reliability was 0.944 and the average variance extracted (AVE) reached 0.629, exceeding the thresholds recommended by [Hafeez et al. \(2022\)](#), who suggest that AVE values above 0.50 and CR values above 0.70 provide evidence of adequate convergent validity. These results reflect a robust structure for measuring essential knowledge related to responsible credit use, financial planning, and understanding of basic financial concepts.

Regarding Factor 2, related to the perception of the social and economic impact of financial education, high loadings were observed across all items, with values exceeding 0.85. Cronbach's alpha was 0.948 and McDonald's omega reached 0.949, indicating excellent reliability. Additionally, the composite reliability was 0.949 and the AVE was 0.675. These results are consistent with studies such as [Kyeyune and Ntaye \(2025\)](#), who emphasize that financial education not only strengthens individual decision-making but also fosters the development of competencies that influence the social, professional, and productive spheres.

With respect to Factor 3, which groups the practical application of financial knowledge, satisfactory indicators were also reported. Both Cronbach's alpha and McDonald's omega were 0.894, while the composite reliability reached 0.896 and the AVE was 0.524. Although some items presented slightly lower loadings (e.g., items P9 and P33), the overall values remained within acceptable parameters. These findings suggest that the construct measured has a solid structure for representing everyday financial behavior, in line with [García-Mata and Zerón-Félix \(2022\)](#), who argue that the practical application of financial knowledge constitutes a critical dimension of sustainable financial wellbeing.

Finally, Factor 4, associated with financial self-management and resource control, also showed high levels of reliability: Cronbach's alpha was 0.896, McDonald's omega was 0.893, composite reliability was 0.899, and AVE reached 0.600. Factor loadings were high across all items, particularly those related to saving, planning, and managing income and expenditures. These results support the findings of [Kasoga and Tegambwage \(2024\)](#), who emphasize that conscious control of personal finances represents a key skill to avoid excessive debt and promote long-term economic stability.

[Figure 1](#) below presents the structural model estimated based on the empirical data collected. This model establishes relationships between the identified latent factors (F1 to F4) and their corresponding observed indicators, as well as the correlations among the factors. Each component was modeled based on the validated items from the previous exploratory factor analysis, allowing for an assessment of model fit quality and the significance of the estimated paths.

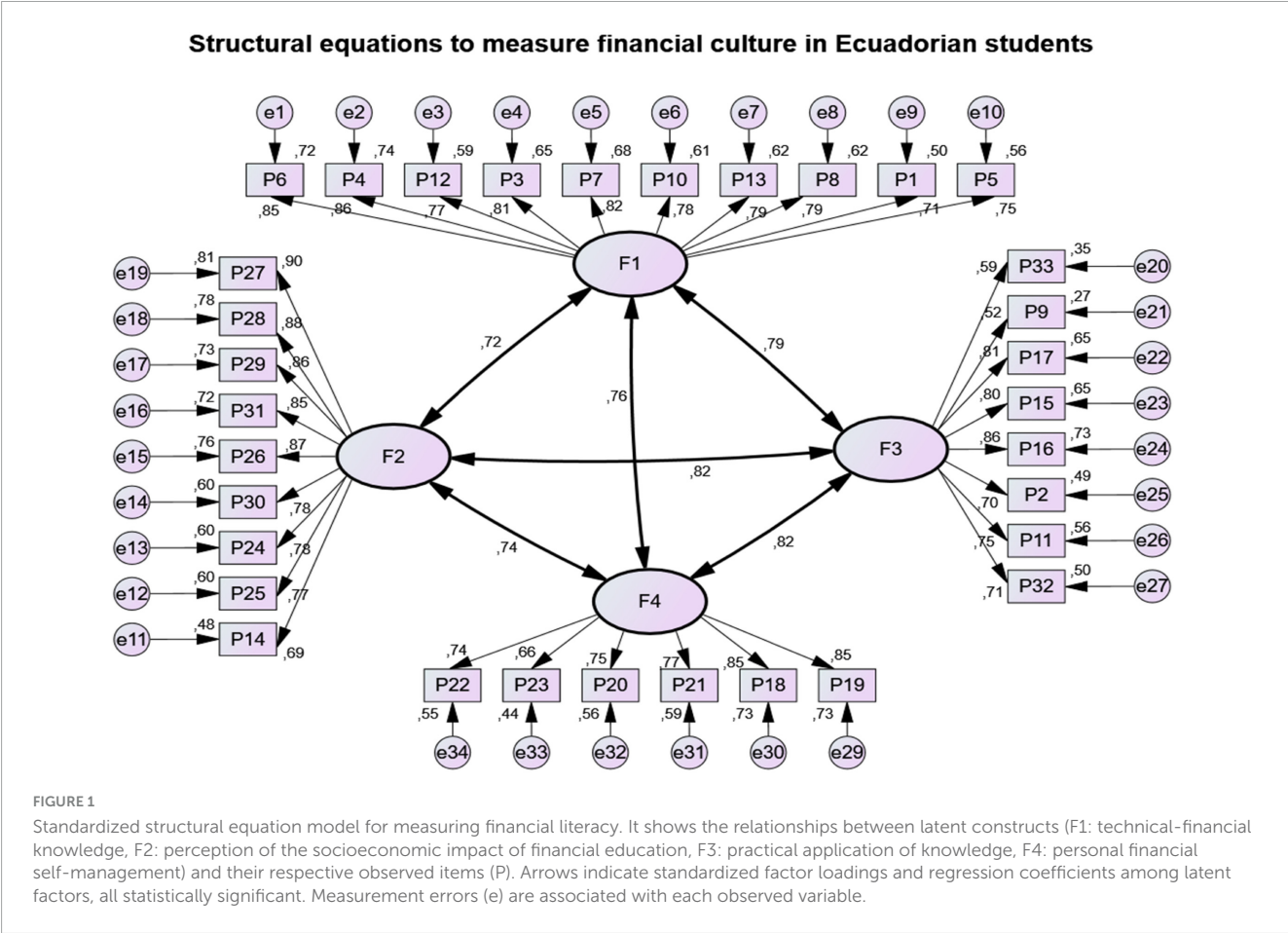
TABLE 5 Reliability and validity indicators of the financial literacy factors.

Variable	Ítem	Factor loading	Cronbach's alpha	McDonald's omega	Composite reliability (CR)	Average variance extracted (AVE)
F1	P6. I know the legal and credit consequences of defaulting on debt	0.85	0.944	0.945	0.944	0.629
	P4. I understand the importance of maintaining a good credit history	0.86				
	P12. Fulfilling my obligations (debts) is a priority	0.77				
	P3. I understand the impact of interest rates on my loans and savings	0.81				
	P7. I know the rights and responsibilities of financial consumers	0.82				
	P10. I know the importance of having an emergency fund for unexpected expenses	0.78				
	P13. I understand how unplanned expenses can affect my budget	0.79				
	P8. I understand basic financial concepts	0.79				
	P1. I know basic financial concepts (savings and investments, interest rates, financial planning)	0.71				
	P5. I know the difference between assets and liabilities	0.75				
F2	P27. Financial education helps me identify and take advantage of market opportunities	0.90	0.948	0.949	0.949	0.675
	P28. Financial education influences my ability to innovate	0.88				
	P29. Financial education improves my financial relationships (family, friends, investors)	0.86				
	P31. Financial education is important for developing an entrepreneurial and innovative culture	0.85				
	P26. Financial education can increase the efficiency of my resources	0.87				
	P30. Financial education contributes to reducing poverty and inequality in the country	0.78				
	P24. I believe that financial education on the use of financial technologies is sufficient to manage my resources	0.78				
	P25. I believe current regulations are adequate to protect users of financial technologies	0.78				
	P14. I feel comfortable making important financial decisions (such as investments or property purchases)	0.77				
F3	P33. I have participated in at least one financial education program	0.59	0.894	0.894	0.896	0.524
	P9. I use my credit card to pay for basic services and/or food	0.52				
	P17. I regularly use financial tools (budgeting, financial products and services) to manage my finances	0.81				
	P15. I believe my current financial knowledge is sufficient to make informed decisions	0.80				
	P16. I apply basic financial concepts	0.86				
	P2. I know about financial education services provided by different institutions	0.70				
	P11. I am capable of creating a personal finance budget	0.75				
	P32. I know the differences between banks and cooperatives	0.71				

(Continued)

TABLE 5 (Continued)

Variable	Ítem	Factor loading	Cronbach's alpha	McDonald's omega	Composite reliability (CR)	Average variance extracted (AVE)
F4	P19. I keep track of my personal expenses	0.85	0.896	0.893	0.899	0.600
	P18. I keep track of my personal income	0.85				
	P21. I allocate a portion of my monthly income to savings	0.77				
	P20. I have an investment plan to achieve my long-term financial goals	0.75				
	P23. My level of debt is manageable	0.66				
	P22. I compare fees and conditions of different financial products before contracting them	0.74				



The figure represents the relationship between the four latent variables (F1 to F4) and their observed indicators, as well as the correlations among factors. Factor 1 (F1), associated with technical-financial knowledge, shows high standardized loadings (= 0.71) across all items, supporting its internal consistency. This factor is significantly related to Factor 2 (F2), which measures awareness of the social impact of financial education ($r = 0.72$), suggesting that a solid foundation in technical knowledge is associated with a greater perception of the social utility of financial literacy. This finding is consistent with [Lontchi et al. \(2022\)](#), who argue that understanding

basic financial concepts enhances both economic autonomy and responsible participation in the financial environment.

Factor 3 (F3) reflects the practical application of financial knowledge. Factor loadings in this component are consistent (ranging from 0.52 to 0.86), indicating a well-defined structure. The relationship between F3 and both F1 ($r = 0.79$) and F2 ($r = 0.84$) demonstrates that the implementation of financial concepts depends on both knowledge and the contextual appreciation of financial education. [Murari \(2019\)](#) states that financial literacy should be assessed not only by knowledge acquisition but also by

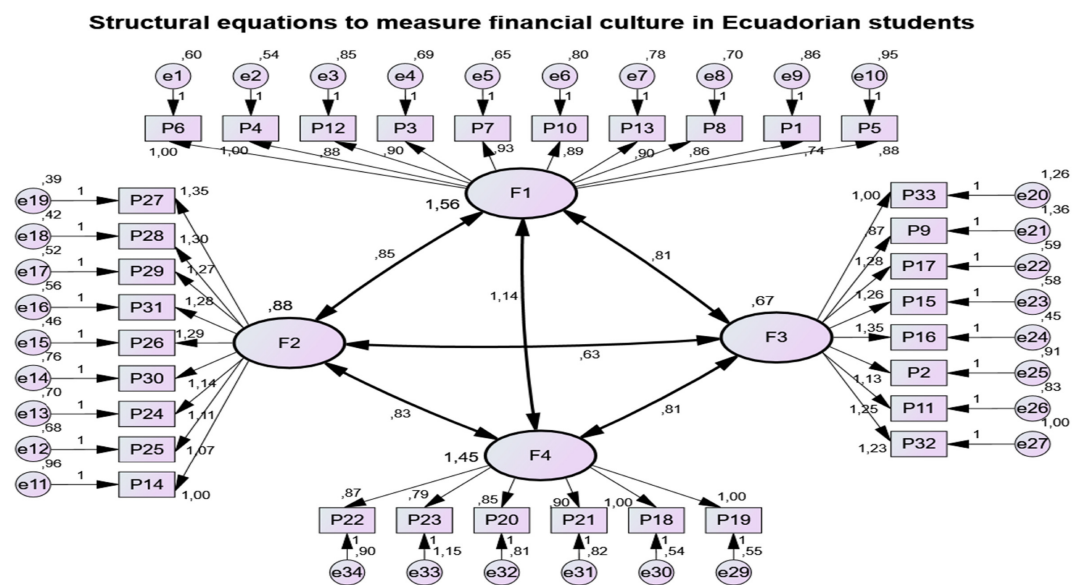


FIGURE 2

Unstandardized structural model of financial literacy: relationships between latent factors and observed indicators. It shows the relationships between latent factors (F1: technical-financial knowledge, F2: perception of the socioeconomic impact of financial education, F3: practical application of knowledge, and F4: personal financial self-management) and their respective observed indicators. All depicted paths are statistically significant ($p < 0.001$), and standardized coefficients are shown along the arrows.

its behavioral impact, including everyday financial decisions such as saving, credit use, and budgeting.

In turn, Factor 4 (F4) encompasses indicators related to personal financial management, such as income control, savings, and planning. The relationships between F4 and the other factors are all statistically significant ($r = 0.74$), suggesting that financial self-management is holistically influenced by knowledge, perception, and practice. This finding aligns with [Kiesnere and Baumgartner \(2019\)](#), who affirm that the combination of technical knowledge, a positive attitude, and practical experience increases the likelihood of efficient and sustainable financial management.

[Figure 2](#) below graphically presents the structural model of financial literacy. This diagram displays the direct relationships between the four latent factors and their corresponding observed variables. It also highlights significant correlations among the latent components, thus emphasizing the interdependence of the dimensions within the construct under analysis.

[Figure 2](#) displays high unstandardized factor loadings across all items, particularly those associated with Factor F1, related to basic financial knowledge and credit obligations, with loadings ranging between 0.74 and 0.93. In this context, values greater than one may be interpreted as indicators of stronger predictive capacity within the multivariate model, without compromising the validity of the analysis. This supports the conclusion that the first factor exhibits adequate internal consistency, reinforcing its relevance as a central axis of the theoretical construct. These findings confirm that mastering fundamental financial concepts is essential for efficient and informed personal economic management ([Engelbrecht, 2014](#); [Gallery et al., 2011](#)).

Regarding Factor F2, which measures perceptions of the socioeconomic impact of financial education, the figure shows high factor loadings, especially for items related to

market opportunities, innovation, and entrepreneurship. This configuration highlights the importance individuals attribute to the transformative and social impact of financial education, correlating strongly with the first factor ($F1 = 0.85$). Consistent with findings from several studies, financial literacy is increasingly recognized as extending beyond the individual dimension, having meaningful implications for economic and social development ([Engelbrecht, 2014](#); [Glory et al., 2024](#); [Lusardi and Messy, 2023](#)).

As for latent Factor F3, linked to the everyday practical application of financial knowledge, factor loadings ranged from 0.52 to 0.86, reflecting an adequate level of consistency. This result indicates that, beyond theoretical knowledge, the practical application of financial concepts in daily life constitutes a critical component of financial literacy. [Goyal and Kumar \(2021\)](#) argue that sound financial literacy must be grounded not only in technical knowledge but also in the ability to translate such knowledge into practical, informed, and responsible decisions.

Finally, latent Factor F4, associated with financial self-management, includes elements related to personal income and expenditure control, systematic saving, and long-term financial decision-making. This dimension shows high factor loadings (between 0.66 and 0.85), confirming its robustness and relevance as both an independent and complementary factor within the model. These findings are consistent with previous research, which has demonstrated that effective self-management and strategic planning in personal finances are strong predictors of financial wellbeing ([Palmer et al., 2021](#)).

[Table 6](#) below presents the results of the estimated structural model. This table summarizes the relationships between latent factors and their respective indicators, organized by dimension, and reports standardized and unstandardized estimates, standard

TABLE 6 Results of the structural model of financial literacy.

Item	Path	Factor	Standardized estimate	Unstandardized estimate	S.E.	C.R.	P-value
P3	< —	F1	0.805	0.904	0.020	45.243	***
P7	< —	F1	0.823	0.934	0.020	46.935	***
P10	< —	F1	0.780	0.894	0.021	42.981	***
P13	< —	F1	0.788	0.904	0.021	43.690	***
P24	< —	F2	0.778	1.106	0.033	33.252	***
P30	< —	F2	0.776	1.144	0.034	33.192	***
P26	< —	F2	0.872	1.293	0.035	37.002	***
P31	< —	F2	0.849	1.282	0.035	36.103	***
P29	< —	F2	0.856	1.271	0.035	36.364	***
P17	< —	F3	0.807	1.277	0.046	27.793	***
P15	< —	F3	0.803	1.256	0.045	27.725	***
P16	< —	F3	0.855	1.351	0.047	28.803	***
P2	< —	F3	0.697	1.131	0.045	25.240	***
P11	< —	F3	0.747	1.252	0.047	26.456	***
P18	< —	F4	0.854	0.999	0.021	48.545	***
P21	< —	F4	0.767	0.898	0.022	40.900	***
P20	< —	F4	0.752	0.852	0.021	39.714	***
P23	< —	F4	0.665	0.792	0.024	33.383	***
P6	< —	F1	0.850	1.000	—	—	—
P4	< —	F1	0.862	1.003	0.020	50.865	***
P12	< —	F1	0.768	0.883	0.021	41.977	***
P1	< —	F1	0.708	0.744	0.020	37.205	***
P5	< —	F1	0.747	0.877	0.022	40.185	***
P8	< —	F1	0.788	0.856	0.020	43.716	***
P33	< —	F3	0.589	1.000	—	—	—
P9	< —	F3	0.520	0.867	0.043	20.263	***
P32	< —	F3	0.709	1.226	0.048	25.530	***
P19	< —	F4	0.852	1.000	—	—	—
P22	< —	F4	0.742	0.874	0.022	38.996	***
P27	< —	F2	0.897	1.351	0.036	37.989	***
P28	< —	F2	0.882	1.296	0.035	37.390	***
P14	< —	F2	0.691	1.000	—	—	—
P25	< —	F2	0.772	1.067	0.032	33.022	***

*** $p < 0.001$; S.E., standard error; C.R., critical ratio; P -value, significance level; F1, technical-financial knowledge; F2, perception of the socioeconomic impact of financial education; F3, practical application of knowledge; F4, personal financial self-management.

errors, critical values, and significance levels. Only items with highly significant values ($p < 0.001$) are included, thereby supporting the robustness of the proposed model.

Regarding Factor 1, which represents technical-financial knowledge, all standardized estimates exceeded 0.70, with particularly high values for item P4 (0.862) and item P6 (0.850). These results suggest a strong conceptual loading on this factor, confirming that participants demonstrate a high degree of familiarity with topics such as credit history, interest rates, and financial consumer rights. This finding aligns with the work of

Cwynar et al. (2019), who assert that technical knowledge is a central component of financial literacy and a key predictor of healthy financial behaviors.

Factor 2, related to the perception of the socioeconomic impact of financial education, shows even higher standardized loadings, such as P27 (0.897) and P28 (0.882). These results reflect a strong association between this construct and participants' awareness of the role that financial education plays in processes such as innovation, inequality reduction, and economic development. This empirical evidence is consistent with the findings of Menberu

(2024), who argue that a critical and transformative perspective on financial education enhances social participation and informed decision-making.

Regarding Factor 3, focused on the practical application of financial knowledge, loadings range from 0.520 (P9) to 0.855 (P16). Although some items exhibit moderate loadings, such as P33 (0.589), the majority fall within an acceptable range. The relationship between this factor and its indicators reveals that individuals not only possess financial knowledge but also apply it in their daily lives through budgeting, the use of financial products, and financial planning. *Stolper and Walter (2017)* emphasize that such practical application is essential for translating knowledge into responsible financial behavior, reinforcing the importance of this component within the model.

As for Factor 4, related to financial self-management, high standardized loadings are also reported, notably for P18 (0.854) and P19 (0.852), both of which pertain to income and expense control. These loadings reflect the internalization of personal financial management habits such as planned saving, investment, and debt assessment. *Isler et al. (2022)* argue that these skills though often underestimated are fundamental for achieving long-term financial stability and wellbeing, and should be actively promoted within educational programs.

Table 7 below presents a comparison between the original structural model and its adjusted version, based on the main fit indices. This table allows for the evaluation of improvements obtained after the adjustments, considering standard criteria for assessing model acceptability.

The results indicate that the original model presented a CMIN value of 7142.804 with a CMIN/DF ratio of 14.607, which far

exceeds the recommended threshold of 3. This value suggests a poor model fit. However, the incremental indices (IFI = 0.882; TLI = 0.872; CFI = 0.882) fall within the acceptable range (> 0.80), while the RMSEA = 0.082 is considered adequate, though not optimal. These values suggest that while the initial model had a theoretically solid structure, it required adjustments to improve its empirical fit. This situation is common in models with a large number of indicators, as noted by *Hein et al. (2021)*, who warn that model complexity may negatively affect parsimony without necessarily compromising structural validity.

After making the necessary adjustments, the refined model showed a substantial improvement. The CMIN value decreased to 3707.377, and although the CMIN/DF ratio remained high (11.807), the incremental indices improved: IFI and CFI reached 0.929, while TLI increased to 0.920. Additionally, the RMSEA decreased to 0.073, a value considered acceptable in complex models with large samples. A significant reduction in AIC was also observed (from 7352.804 to 3889.377), indicating improved model efficiency and a higher probability of replicability. In this context, *Amare et al. (2024)* assert that targeted modifications can optimize model fit without compromising theoretical structure, as long as conceptual coherence is maintained.

Table 8 presents the correlations among the four latent factors of the financial literacy model: technical-financial knowledge (F1), perception of the socioeconomic impact of financial education (F2), practical application of financial knowledge (F3), and personal financial self-management (F4). All reported correlations are positive, high, and statistically significant, supporting the interdependence of the analyzed dimensions.

TABLE 7 Fit indices of the original and adjusted structural model of financial literacy.

C	CMIN	CMIN/DF	IFI	TLI	CFI	RMSEA	AIC
Original	7142.804	14.607	0.882	0.872	0.882	0.082	7352.804
Interpretation	–	Poor	Acceptable	Acceptable	Acceptable	Acceptable	–
Adjusted	3707.377	11.807	0.929	0.920	0.929	0.073	3889.377
Interpretation	–	Poor	Acceptable	Acceptable	Acceptable	Acceptable	–
Interpretation criteria	–	Between 1 and 3	> 0.700	> 0.700	> 0.810	> 0.04	–
Cut-off criteria	–	Excellent	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

CMIN, minimum discrepancy function; DF, degrees of freedom; IFI, incremental fit index; TLI, Tucker-Lewis index; CFI, comparative fit index; RMSEA, root mean square error of approximation; AIC, akaike information criterion.

TABLE 8 Correlations among the latent factors of the financial literacy model.

Latent Factor	F1. Technical-financial knowledge	F2. Socioeconomic impact of financial education	F3. Practical application of knowledge	F4. Personal financial self-management
F1. Technical-financial knowledge	–	0.753***	0.805***	0.799***
F2. Socioeconomic impact of financial education	0.753***	–	0.843***	0.790***
F3. Practical application of knowledge	0.805***	0.843***	–	0.836***
F4. Personal financial self-management	0.799***	0.790***	0.836***	–

Correlation significance levels: $^{\dagger}p < 0.100$, $^*p < 0.050$, $^{**}p < 0.010$, $^{***}p < 0.001$.

The results show a correlation of 0.753 between F1 and F2, indicating that a higher level of financial knowledge is associated with a stronger perception of the social value of financial education. This relationship suggests that individuals who understand technical concepts are more likely to recognize financial education as a tool for inclusion and transformation. This finding aligns with Marron (2014), who argues that financial literacy not only improves individual resource management but also fosters an economically informed and socially engaged citizenry.

Additionally, the correlation between F1 and F3 was 0.805, revealing that technical financial knowledge is closely linked to its practical application. In other words, those who master fundamental financial concepts tend to implement this knowledge in their everyday decisions. This result is supported by Dao et al. (2024), who assert that financial literacy only yields tangible benefits when it is connected to observable behaviors such as saving, planning, or responsible credit use.

As for the relationship between F2 and F3, the correlation reached 0.843, indicating an even stronger association. This reflects that awareness of the socioeconomic relevance of financial education not only promotes positive attitudes but also encourages functional financial practices. Such a link has been highlighted by Kumar et al. (2023), who point out that a broad and informed view of financial education enhances autonomous and sustainable decision-making, especially among youth and vulnerable populations.

Finally, Factor 4 (financial self-management) showed high correlations with F1 (0.799), F2 (0.790), and F3 (0.836). This confirms that effective management of income, expenses, savings, and investments does not occur in isolation but results from an integrated process involving knowledge, contextual perception, and action. Braßler and Sprenger (2021) agree that the development of financial competencies requires a holistic approach that includes knowledge, skills, attitudes, and values, as only such integration can foster sustainable financial behaviors.

5 Conclusion

The present study aimed to analyze the relationship between educational level and financial literacy, considering that academic training may significantly influence the development of financial competencies. To this end, a structural model was designed to identify the latent dimensions of the construct and empirically evaluate the strength of these relationships. The stated objective was successfully achieved, and the research question was answered based on robust statistical evidence.

The results confirmed that there is a significant difference in financial literacy levels according to the level of education attained. Individuals with higher education presented the highest scores, while the lowest levels corresponded to those with only primary education. Additionally, the structural model revealed four fundamental dimensions: technical-financial knowledge,

perception of the social impact of financial education, practical application of knowledge, and financial self-management. The correlations among these factors were high, demonstrating the multidimensional and interrelated nature of the construct.

Regarding the psychometric quality of the instrument, the analyses showed high levels of reliability and validity, which support the relevance of the proposed model. Nevertheless, certain limitations should be acknowledged. The sample was selected through non-probabilistic convenience sampling, which limits the generalizability of the findings. Furthermore, the gender distribution was not fully balanced, which could influence certain response patterns.

As a future direction, it is recommended to include additional contextual variables such as occupation, monthly income, or family environment, which could enrich the analysis. Longitudinal studies are also suggested to observe changes over time and assess the impact of specific training programs on financial literacy. In conclusion, the results provide a solid foundation for future research and constitute a valuable input for the formulation of educational strategies aimed at improving financial literacy across different population sectors.

Data availability statement

The original contributions presented in this study are included in this article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Written informed consent was obtained from the minor(s)' legal guardian/next of kin for the publication of any potentially identifiable images or data included in this article.

Author contributions

JB-G: Data curation, Writing – review and editing, Investigation, Writing – original draft, Conceptualization. GC-F: Writing – original draft, Formal Analysis, Writing – review and editing, Investigation, Data curation, Conceptualization. AM-L: Methodology, Writing – original draft, Investigation, Visualization, Data curation, Writing – review and editing. FQ-S: Supervision, Writing – original draft, Writing – review and editing, Investigation, Formal Analysis, Conceptualization, Data curation. AS-G: Visualization, Writing – original draft, Formal Analysis, Resources, Writing – review and editing, Project administration, Data curation, Methodology, Validation, Software. JM-C: Methodology, Writing – original draft, Software, Conceptualization, Investigation, Visualization, Supervision, Writing – review and editing, Validation, Project administration, Formal Analysis.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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