AKSARA: Jurnal Ilmu Pendidikan Nonformal
P-ISSN 2407-8018 E-ISSN 2721-7310 DOI prefix 10.37905
Volume 10(1), January 2024
http://ejurnal.pps.ung.ac.id/index.php/Aksara

The Dual Lens: Unveiling the Dynamics of Financial and Digital Literacy in Financial Decision Making

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Received: 23 August 2023; Revised: 12 October 2023; Accepted: 17 December 2023
DOI: http://dx.doi.org/10.37905/aksara.10.1.99-112.2024

Abstract
As individuals increasingly engage in the digital economy, it is crucial for them to have a basic understanding of both financial and digital literacy, just as they require proficiency in using digital devices and managing digital financial transactions. Consequently, there arises a necessity to redefine the concept of financial literacy within digital context. The redefinition of financial literacy demands a comprehensive, multidimensional approach, which is the focal point of this study. Two distinct indices are developed in this research to delineate traditional financial literacy from digital literacy and scrutinise their impact on the development of resilience-enhancing financial behaviour in youths. The empirical evidence presented in this study underscores the significance of financial and digital literacy. Individuals with higher financial literacy demonstrate a higher likelihood of saving, especially in formal financial institutions. Additionally, the study reveals a correlation between financial and digital literacy and an increased propensity to invest and participate in financial assets, in contrast to participation in real assets, which is not influenced by financial and digital literacy. These findings hold substantial policy implications, suggesting that a dual focus on financial and digital literacy is essential when designing digital-adapted financial education programmes to enhance individuals' long-term financial resilience.

Keywords
Asset portfolio choice, digital literacy, financial decision-making, financial inclusion, financial literacy.

INTRODUCTION

In recent decades, both developed and developing nations have shown a growing interest in enhancing the financial literacy of their populace, with a particular focus on the younger generation (OECD, 2020). This heightened attention initially arose from concerns that young individuals would encounter increasingly intricate financial choices, given the proliferation and complexity of financial products and services. Furthermore, it is anticipated that future generations will bear greater financial risks throughout their lives compared to the current adult population. Factors contributing to this shift include extended life expectancies, reduced public and private social benefits, and heightened uncertainty in retirement income due to evolving pension systems. Recognizing these challenges has underscored the importance of bolstering financial knowledge and risk understanding to enhance the financial decision-making capabilities of young people (Amagir et al., 2022; Liu & Zhang, 2021; Urban et al., 2020). Consequently, nearly all national strategies now prioritize financial literacy as a crucial element for fostering sound financial decision making (OECD, 2020; Stolper & Walter, 2017).

In recent times, there has been a discernible transformation in the realm of financial literacy, evolving into what is presently acknowledged as digital financial literacy. This transition corresponds with the transformation of conventional financial services, like physical banks and ATMs, into digital financial services, characterized by digital payment tools such as digital wallets and mobile money (Demirgüç-Kunt et al., 2018, 2022; Lyons & Kass-Hanna, 2022). To actively participate in the digital economy, individuals need to possess the knowledge and skills to perform digital financial transactions and operate digital devices, including mobile phones, smartphones, and tablets (Carlin et al., 2019; Vogels & Anderson, 2019). However, there is a paucity of research exploring the tangible impacts of digital literacy on financial behaviour, especially when considered alongside traditional financial literacy. Investigating both dimensions enables a nuanced discussion on the pertinent skills essential for cultivating resilience-building financial behaviour, particularly among the younger demographic in the

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digital era. This examination aims to contribute valuable insights to the discourse on the significance of the multidimensional concept of digital financial literacy, providing valuable insights for designing financial education content and competencies to effectively tackle the challenges and risks stemming from the digitization of financial products (OECD, 2018).

This research delves into the impact of traditional financial literacy and digital literacy in shaping resilience-enhancing financial behaviours among young individuals. The study makes significant contributions to two key areas of literature. Firstly, it adds depth to the literature on asset portfolio choice by exploring various resilience-heightened financial behaviours such as saving, investing, and risk management. This is a departure from prior research that predominantly centred on savings within conventional banking channels. Additionally, the study distinguishes between financial assets and real assets in the context of investment choices, acknowledging the varying degrees of sophistication associated with each and thereby necessitating different levels of financial and digital literacy. Research has consistently demonstrated the pivotal role of financial literacy in influencing savings, investment, retirement planning, and borrowing behaviours (Bhutta et al., 2023; Lusardi & Mitchell, 2014; Lusardi & Tufano, 2015; Prete, 2022; van Rooij et al., 2011, 2012). A heightened level of financial literacy serves to reduce the costs associated with acquiring and processing information. Participating in assets with higher returns and higher risks, such as financial assets, usually necessitates a higher level of sophistication in understanding concepts like transaction costs, volatility, asset returns, and covariance between asset returns. The costs associated with obtaining information become a significant hurdle for entering financial assets, and a high level of financial literacy is likely to alleviate these costs. Studies consistently show that individuals with a higher level of financial literacy are more predisposed to participate in stock market investments (Christelis et al., 2010; Cupák et al., 2020; van Rooij et al., 2011, 2012). Additionally, the barrier to participation in stocks may also stem from psychological fixed costs associated with participation (Campbell, 2006). Some households recognize their lack of skills to invest in stocks, which can make them hesitant to engage in an investment activity for which they feel ill-prepared. Individuals who possess confidence in their financial literacy are more likely to participate in risky assets, specifically stocks and/or bonds (Cupák et al., 2021).

Secondly, this paper contributes to the emerging field of digital financial literacy by examining the potential impact of both traditional financial literacy and digital literacy. This dual perspective allows for a nuanced understanding of the skills relevant to fostering resilience-reinforcing financial behaviour in the digital era. Furthermore, the study introduces two indices to distinguish the influence of traditional financial literacy from digital literacy. These indices are constructed through the integration of multiple indicators and dimensions, providing a more comprehensive insight into the specific areas of literacy that shape financial and digital competencies. In comparison to financial literacy, the role of digital literacy has not been thoroughly examined. The existing literature in this field has predominantly focused on identifying factors linked to the adoption of digital financial services, with a particular emphasis on financial literacy (Königsheim et al., 2017; Long et al., 2023; Morgan & Trinh, 2019; Yang et al., 2023). Nevertheless, there is an increasing necessity to enhance digital financial literacy, acknowledging its role as a mediating factor between financial literacy and financial behaviour (Kass-Hanna et al., 2022; Morgan & Trinh, 2019; OECD, 2021; Prete, 2022). Participation in the digital economy and society necessitates not only a fundamental level of financial literacy but also proficiency in operating digital devices such as mobile phones, smartphones, and tablets. This extends to conducting digital financial transactions and ensuring consumer protection in the digital marketplace (Carlin et al., 2019; Vogels & Anderson, 2019). Recent research highlights the correlation between higher digital literacy and the utilization of digital payment tools and platforms (Prete, 2022). However, the increased accessibility to financial markets facilitated by digital technology can potentially lead to financial distress. For instance, the widespread use of digital finance has facilitated access to credit markets, increasing the risk of households falling into a debt trap (Yue et al., 2022). Users of mobile payments exhibit a higher likelihood of overdrawing their checking accounts, engaging in costly credit card usage, resorting to alternative financial services for borrowing, and withdrawing funds from their retirement savings (Scheresberg et al., 2020).These findings underscore the significance of jointly evaluating digital and financial literacy when analysing the consequences of digitalization for individuals engaging with digital financial products and markets without adequate financial literacy.

Furthermore, this research deviates from conventional approaches that encompass individuals across a wider age spectrum. Instead, it focuses on the critical period immediately following high school

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– college students embarking on financial independence. This specific timeframe is considered pivotal for steering young individuals toward a positive trajectory of financial behaviour in the long run. The study, therefore, evaluates saving, investing, and risk management behaviours as particularly pertinent for this population, acknowledging their likely susceptibility to influence from both financial and digital literacy.

METHOD

This study engaged a convenience sample of 638 business students from a private university in Indonesia to participate in the research. The selection of college business students was based on research findings suggesting that this group exhibits higher levels of financial knowledge compared to non-business students (Chen & Volpe, 1998; Sotiropoulos & d'Astous, 2013). The survey was administered during regular lecture hours using a traditional paper-and-pen format. The setting mimicked an exam situation, requiring students to respond to questions without consulting additional information or using calculators. No incentives were provided for survey completion, and the question order remained consistent for all participants. Participant ages ranged from 17 to 46, with the majority (93.42%) falling between 17 and 22. The sample encompassed both male (45%) and female (55%) participants, with average ages of 20.46 for males and 19.81 for females. Approximately 57% of participants reported having received personal finance education either at school, university, or in a workplace setting. Detailed summary statistics for the variables employed in this study are presented in Table 1.

Table 1. Descriptive Statistics

The table includes summarized statistics for the financial literacy and digital literacy indices, as well as the demographic and outcome variables utilized in this study. Appendix A defines the variables.

	Mean	SD	Min	Max	N
Outcome variables					
Currently saving	0.93	0.25	0.00	1.00	638
Formal saving	0.87	0.34	0.00	1.00	635
Informal saving	0.53	0.50	0.00	1.00	638
Currently investing	0.53	0.50	0.00	1.00	637
Financial assets	0.37	0.48	0.00	1.00	637
Real assets	0.33	0.47	0.00	1.00	637
Ability to come up with emergency fund	0.61	0.49	0.00	1.00	635
Availability of emergency funds	0.94	0.24	0.00	1.00	631
Financial literacy and digital literacy					
Financial literacy index	0.00	1.00	-2.26	1.59	631
Digital literacy index	0.00	1.00	-3.98	1.09	622
Socio-demographic variables					
Financial education	0.57	0.50	0.00	1.00	636
Male	0.45	0.50	0.00	1.00	638
Age (≤18)	0.18	0.39	0.00	1.00	638
Age (19-20)	0.46	0.50	0.00	1.00	638
Age (21-22)	0.29	0.45	0.00	1.00	638
Age (≥23)	0.07	0.25	0.00	1.00	638
Management department	0.70	0.46	0.00	1.00	638
Accounting department	0.30	0.46	0.00	1.00	638
Freshmen	0.25	0.43	0.00	1.00	638
Sophomores	0.21	0.41	0.00	1.00	638
Juniors	0.26	0.44	0.00	1.00	638
Seniors	0.28	0.45	0.00	1.00	638

Resilience-building Financial Behaviours

Building financial resilience requires individuals to embrace specific financial behaviours and practices that contribute to financial security and, ultimately, financial resilience (Hussain et al., 2019; Salignac et al., 2019).These financial resilience-building behaviours are characterized by decisions related to saving, investment, and risk management strategies geared toward preparedness for emergencies. Saving behaviour encompasses questions of whether students are presently engaged in saving and whether they save traditionally at a financial institution or opt for digital savings through a mobile money service provider. Investment-related behaviour delves into whether students currently

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hold investments, either in financial assets or real assets. The choice of investment portfolio is gauged by assessing whether students participate in financial assets or real assets, recognizing that each type of asset may require varying levels of financial and digital literacy. Risk management behaviour is evaluated through two variables. The first examines the accessibility of an emergency fund that could cover students' expenses for three months in the event of a shock. The second assesses the capability to generate an emergency fund if an unexpected need were to arise. Definitions for each financial behaviour and other variables utilized in this study are provided in greater detail in Appendix A.

Indices of Financial and Digital Literacy

The financial literacy index is constructed by assessing participants' understanding of five key concepts: compound interest, inflation, bond prices, mortgages, and risk diversification. The digital literacy index is formulated based on two dimensions, encompassing proficiency in mobile phone usage and competence in digital financial transactions. The first dimension encompasses four indicators related to activities completed by students using a mobile phone in the last 90 days. These activities involve using a mobile phone for sending or receiving calls or text messages, browsing the Internet, and utilizing social media. The second dimension incorporates six indicators gauging self-assessed proficiency in executing digital financial transactions. These include utilizing a mobile phone for online shopping, engaging in online banking, initiating transactions, completing transactions, rectifying errors, and cancelling transactions.

In the initial phase, all information pertaining to literacy, derived from 15 questions, is combined, and factor analysis is conducted on these questions. Following the classification of literacy questions, factor analysis reveals three primary factors with distinct loadings on three question types: financial literacy, mobile phone skills, and proficiency in digital financial transactions. Consequently, these questions are segregated into two distinct groups, namely financial literacy and digital literacy, and undergo separate factor analyses. This approach yields the creation of two distinct literacy indices: the first index, potentially associated with financial literacy, and the second index, assessing digital literacy. Additionally, the reliability of the indices is assessed using Cronbach's alpha test. Further details regarding the factor analysis can be found in Appendix B.

The factor loadings of financial literacy indicators demonstrate that the five indicators collectively measure a single underlying latent concept, referred to as financial literacy. The reliability of the financial literacy index is reasonably accepted, as indicated by the Cronbach's alpha test (α=0.411). In contrast, the factor loadings for digital literacy show that it is not unidimensional but rather captures two latent dimensions, one pertaining to mobile phone proficiency and the other to proficiency in digital financial transactions. Notably, the digital literacy index is demonstrated to be highly reliable, as evidenced by the Cronbach's alpha value of 0.733.

Confirming the validity and characteristics of these two indices, Table 2 presents the distribution of the financial and digital literacy indices across demographic variables, including cohort, age, and gender. In Panel A, financial literacy exhibits a robust increase with cohort, with the lowest levels concentrated among freshmen and sophomores, while seniors dominate the highest quartiles of the financial literacy index. Similarly, the age-related profile of financial literacy reveals that younger students, below 18 years old and those between 19 and 20 years old, fall into the lower quartiles, while those aged between 21 and 22 years old are concentrated in the upper quartiles. This suggests that individuals might accrue greater financial experience and acquire knowledge as they advance in age. Table 2 also illustrates gender differences in financial literacy, indicating that women tend to exhibit lower financial knowledge compared to men. These findings regarding variations in financial literacy across age and gender align with patterns observed in other financial literacy surveys (Lusardi & Mitchell, 2014).

Regarding digital literacy, as depicted in Table 2 (Panel B), there is once again an observable association with the cohort. A substantial proportion (33.3%) of freshmen falls into the lowest level of digital literacy (first quartile). Progressing to higher quartiles of literacy, the representation of juniors and seniors increases. However, even among those in higher academic years, only a small percentage – 0.6% of juniors and 0.5% of seniors – attain the top quartile of digital literacy. In contrast to financial literacy, the profiles of digital literacy concerning age and gender are not very pronounced.

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Table 2. Financial and Digital Literacy across Demographics (weighted percentages)

Within Panel A, the presentation showcases how the financial literacy measure is distributed among different cohorts, across various age segments, and by gender. The financial literacy measure is categorized into four quartiles. The proportion of students within each literacy quartile is documented for each subgroup within cohort, age, and gender classifications. The mean quartile value is also reported. Weighted percentages and the Pearson chi-square statistic are provided in this table, aiming to assess the null hypothesis that the distribution of students across the four literacy quartiles is independent of cohort, age, and gender, respectively (p-values reported in parentheses). In Panel B, identical statistics for the digital literacy measure are presented.

Panel A. Differences in financial literacy across demographics

	Financial literacy quartiles					
Cohort	1 (low)	2	3	4 (high)	Mean	N
Freshmen	40.5	19.6	23.4	16.5	2.16	158
Sophomores	39.2	18.5	26.9	15.4	2.18	130
Juniors	29.1	24.4	26.2	20.2	2.38	168
Seniors	15.4	17.1	32.6	34.9	2.87	175
	Pearson chi2(9) = 44.82 (p = 0.000)					

	Financial literacy quartiles					
Age	1 (low)	2	3	4 (high)	Mean	N
≤18 years	34.2	18.8	27.3	19.7	2.32	117
19-20 years	36.3	21.2	23.6	18.8	2.25	292
21-22 years	18.9	20.5	30.6	30.0	2.72	180
≥23 years	30.3	19.9	27.4	22.4	2.57	42
	Pearson chi2(9) = 25.26 (p = 0.003)					

	Financial literacy quartiles					
Gender	1 (low)	2	3	4 (high)	Mean	N
Female	33.0	20.3	30.2	16.5	2.30	345
Male	26.9	19.6	24.1	29.4	2.56	286
	Pearson chi2(3) = 15.59 (p = 0.001)					

Note: rounding may result in percentages that do not exactly sum up to 100.

Panel B. Differences in digital literacy across demographics

	Digital literacy quartiles					
Cohort	1 (low)	2	3	4 (high)	Mean	N
Freshmen	33.3	21.1	44.2	1.30	2.13	156
Sophomores	24.8	26.4	48.8	0.00	2.24	129
Juniors	17.9	29.5	52.0	0.60	2.18	164
Seniors	25.1	27.3	47.1	0.50	2.35	173
	Pearson chi2 (9) = 16.71 (p = 0.054)					

	Digital literacy quartiles					
Age	1 (low)	2	3	4 (high)	Mean	N
≤18 years	35.4	20.4	44.2	0.00	2.09	113
19-20 years	24.1	27.9	47.2	0.70	2.24	290
21-22 years	24.4	29.3	46.3	0.00	2.30	178
≥23 years	25.1	27.3	47.1	0.50	2.22	41
	Pearson chi2 (9) = 10.62 (p = 0.303)					

	Digital literacy quartiles					
Gender	1 (low)	2	3	4 (high)	Mean	N
Female	24.7	24.1	50.9	0.30	2.27	344
Male	25.5	31.3	42.5	0.70	2.18	278
	Pearson chi2 (3) = 5.84 (p = 0.120)					

Note: rounding may result in percentages that do not exactly sum up to 100.

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Empirical Methodology

Probit models are estimated to empirically investigate whether individual-level differences in financial and digital literacy explain the cross-section of outcomes in financial behaviours. The specifications used in this study are as follow:

$$\Pr\left(BEHAVIOUR_i = 1|X_i\right) = \Phi(X_i\beta)$$

where Φ is the standard cumulative normal. The binary dependent variable ($BEHAVIOUR_i$) captures student's saving, investing, and risk management behaviours described above. X_i includes measures of financial and digital literacy as well as control variables comprising socio-demographic characteristics including age, gender, academic year, field of study, and whether the respondent has received personal finance education. For all probit regressions, average marginal effects (AMEs) are reported in Tables 3-5.

RESULTS AND DISCUSSION

Financial and Digital Literacy and Financial Behaviours

Table 3 presents the outcomes for specifications examining the correlation between financial and digital literacy and saving behaviours. Columns 1 and 2 depict basic saving behaviours, considering whether students are currently saving at a formal financial institution or a mobile money service provider. In Column 1, the results demonstrate that, irrespective of the full set of controls, financial literacy plays a crucial role in enhancing the likelihood of saving. The statistical results confirm a positive and significant coefficient for financial literacy. In Column 2, financial literacy retains its statistical significance even after controlling for personal finance education. While financial literacy is a predictor of saving behaviour, the result does not reveal any noticeable link between digital literacy and the propensity to save.

In Column 3, the data reveals a positive correlation between financial literacy and traditional saving at a bank or another established financial institution. This result remains robust even after accounting for demographic characteristics and financial education received by students, as indicated in Column 4. However, there is no apparent evidence suggesting that digital literacy plays a role in traditional saving. Moving to Column 5, the analysis explores the connection between financial and digital literacy and digital saving in mobile money accounts. The specification in Column 6 controls for personal finance education. The findings in Columns 5 and 6 show that there is no indication that both financial and digital literacy are associated with digital saving. In contrast, financial education emerges as a significant factor in influencing digital saving. In summary, the findings consistently support the notion that financial literacy contributes to increased saving, especially in formal financial institutions.

Table 3. The Effect of Financial and Digital Literacy on Saving Behaviours

This table reports average marginal effects from probit regressions. In Columns 1 and 2, the dependent variable takes on a value of one if the survey participant is presently engaged in saving through a bank, financial institution, and/or mobile money service provider. In Columns 3 and 4, the dependent variable equals one if the survey participant engages in saving at a bank or any other traditional financial institution. In Columns 5 and 6, the dependent variable takes on a value of one if the survey participant saves funds using a mobile money service provider. Columns 2, 4, and 6 include financial education as control variables. Omitted categories are Age (≤18), Management Department, Cohort (freshmen). A constant term is used in all models. Robust z-statistics are reported in parentheses. *p<.10; **p < .05; ***p < .01.

	Engaged in saving		Traditional saving		Digital saving	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy index	0.021**	0.019*	0.028**	0.024*	0.027	0.025
	(2.05)	(1.95)	(2.10)	(1.83)	(1.27)	(1.20)
Digital literacy index	0.013	0.013	0.016	0.018	-0.013	-0.014
	(1.44)	(1.44)	(1.30)	(1.48)	(-0.65)	(-0.68)
Male	-0.028	-0.029	-0.023	-0.022	-0.048	-0.047
	(-1.37)	(-1.42)	(-0.82)	(-0.79)	(-1.15)	(-1.12)
Age (19-20)	-0.030	-0.031	-0.057	-0.047	-0.099	-0.104
	(-0.79)	(-0.79)	(-1.19)	(-0.95)	(-1.35)	(-1.43)
Age (21-22)	0.039	0.042	0.036	0.045	-0.055	-0.058
	(1.01)	(1.08)	(0.68)	(0.84)	(-0.58)	(-0.62)

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Age (≥23)	0.002	0.010	-0.010	0.005	-0.206*	-0.197*
	(0.03)	(0.18)	(-0.14)	(0.07)	(-1.74)	(-1.68)
Accounting department	-0.006	-0.003	0.020	0.021	0.072	0.079*
	(-0.26)	(-0.15)	(0.71)	(0.75)	(1.63)	(1.80)
Sophomores	0.018	0.010	0.036	0.020	0.058	0.045
	(0.52)	(0.29)	(0.73)	(0.41)	(0.79)	(0.61)
Juniors	0.024	0.017	0.086*	0.066	0.080	0.073
	(0.65)	(0.47)	(1.79)	(1.44)	(1.07)	(0.98)
Seniors	0.005	-0.010	0.003	-0.030	0.010	-0.011
	(0.10)	(-0.18)	(0.05)	(-0.44)	(0.11)	(-0.11)
Financial education		0.038*		0.056**		0.086**
		(1.88)		(2.04)		(2.07)
Observations	615	613	612	610	615	613
R-Squared	0.062	0.074	0.042	0.047	0.018	0.024
Log-likelihood (Intercept only)	-150.632	-150.494	-235.402	-231.285	-425.048	-423.782
Log-likelihood (Model)	-141.230	-139.332	-225.621	-220.418	-417.443	-413.627
AIC	304.461	302.664	473.241	464.836	856.887	851.254
BIC	353.098	355.684	521.825	517.798	905.524	904.274
Chi-square	17.637*	21.245**	19.146**	21.987**	14.426	20.092**

Table 4 investigates the connection between financial and digital literacy and students' investment portfolio choices, encompassing participation in financial assets (e.g., certificates of deposits, mutual funds, bonds, stocks, and crypto assets) and real assets (such as land, buildings, and gold). If engaging with more information-intensive assets, such as financial assets, demands a higher level of financial sophistication, then the holding of financial assets should be influenced by financial and digital literacy. Conversely, if participating in real assets requires lower costs of information gathering and processing, it should be unrelated to financial and digital literacy. In Columns 1 and 2, it is evident that both financial and digital literacy exhibit positive associations with investment holdings, whether in financial assets or real assets. This holds true even when considering the standard set of controls and personal finance education, as reflected in Column 2. The control variables also play a meaningful role in the empirical relationship. Cohorts exhibit a positive correlation with investment holdings, with sophomores, juniors, and seniors being more likely to hold investments compared to freshmen. These results suggest that as individuals age, they tend to accumulate greater knowledge in financial matters.

Columns 3 and 4 present the same specifications for financial assets participation. The coefficients for both financial and digital literacy are not only positive but also statistically significant, even after adjusting for financial education (as indicated in Column 4). These coefficients suggest that both financial and digital literacy strongly contribute to increased participation in financial assets. The outcomes for control variables mirror those observed for investment holdings, with cohort exhibiting a positive and significant effect. Interestingly, men are found to be more likely to hold financial assets than their female counterpart – a finding consistent with other studies (Cupák et al., 2021; van Rooij et al., 2011) and in line with the significant literacy disparities between women and men (Bollen & Posavac, 2018; Bucher-Koenen et al., 2017). Turning to the models for real assets participation in Columns 5 and 6, as anticipated, the results indicate no relationship between the literacy variables and holding real assets. In summary, the findings pertaining to financial and digital assets participation are in line with the notion that financial and digital literacy influence investment portfolio choices. These results align with those reported in numerous other papers on asset portfolio choice (Christelis et al., 2010; Cupák et al., 2019, 2020; Stango & Zinman, 2009; van Rooij et al., 2011, 2012).

Table 4. The Effect of Financial and Digital Literacy on Investing Behaviours

This table reports average marginal effects from probit regressions. In Columns 1 and 2, the dependent variable is set to one if the respondent presently engaging in investing, encompassing both in financial assets and real assets. In Columns 3 and 4, the dependent variable is assigned a value of one if the survey participant currently owns financial assets. In Columns 5 and 6, the dependent variable takes on a value of one if the survey participant possesses tangible assets. Columns 2, 4, and 6 include financial education as control variables. Omitted categories are Age (≤18), Management Department, Cohort (freshmen). A constant term is used in all models. Robust z-statistics are reported in parentheses. *p<.10; **p < .05; ***p < .01.

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	Engaged in investing		Holding financial assets		Holding real assets	
	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy index	0.051**	0.046**	0.080***	0.075***	-0.009	-0.012
	(2.49)	(2.25)	(4.06)	(3.84)	(-0.45)	(-0.60)
Digital literacy index	0.041**	0.043**	0.046**	0.049**	0.020	0.021
	(2.04)	(2.20)	(2.31)	(2.53)	(1.00)	(1.09)
Male	0.041	0.043	0.077*	0.080**	0.010	0.011
	(1.00)	(1.06)	(1.96)	(2.08)	(0.26)	(0.29)
Age (19-20)	0.029	0.041	0.006	0.019	-0.028	-0.021
	(0.41)	(0.57)	(0.08)	(0.25)	(-0.39)	(-0.29)
Age (21-22)	-0.043	-0.032	-0.051	-0.036	-0.031	-0.024
	(-0.48)	(-0.36)	(-0.56)	(-0.40)	(-0.34)	(-0.27)
Age (≥23)	-0.078	-0.055	-0.136	-0.104	-0.015	-0.000
	(-0.70)	(-0.49)	(-1.33)	(-1.01)	(-0.13)	(-0.00)
Accounting department	-0.066	-0.062	-0.030	-0.023	-0.077*	-0.075*
	(-1.51)	(-1.42)	(-0.74)	(-0.58)	(-1.86)	(-1.82)
Sophomores	0.159**	0.137*	0.092	0.065	0.147**	0.136**
	(2.22)	(1.89)	(1.43)	(0.98)	(2.24)	(2.04)
Juniors	0.234***	0.208***	0.243***	0.215***	0.121*	0.109
	(3.24)	(2.84)	(3.59)	(3.04)	(1.85)	(1.63)
Seniors	0.280***	0.240***	0.260***	0.209**	0.124	0.104
	(3.21)	(2.69)	(3.04)	(2.39)	(1.47)	(1.21)
Financial education		0.101**		0.131***		0.054
		(2.48)		(3.45)		(1.39)
Observations	614	612	614	612	614	612
R-Squared	0.056	0.063	0.081	0.095	0.017	0.020
Log-likelihood (Intercept only)	-424.651	-423.147	-404.503	-403.578	-388.945	-388.146
Log-likelihood (Model)	-400.996	-396.602	-371.545	-365.263	-382.425	-380.572
AIC	823.991	817.204	765.091	754.526	786.850	785.144
BIC	872.611	870.205	813.710	807.526	835.469	838.145
Chi-square	46.278***	51.199***	63.002***	72.754***	12.744	14.861

Table 5 delves into the association between financial and digital literacy and two indicators of risk management – namely, the accessibility of an emergency fund (Columns 1 and 2) and the capability to generate an emergency fund (Columns 3 and 4). In Columns 1 and 2, there is no discernible significant relationship between literacy and the accessibility of emergency funds. However, financial education emerges as a significant factor, increasing the likelihood of establishing an emergency fund sufficient to cover three months of expenses (as evident in Column 2). Moving to Columns 3 and 4, no evidence is found indicating that the capability to generate an emergency fund increases with financial and digital literacy. Nonetheless, the results reaffirm the significance of financial education in enhancing the likelihood of students being able to generate an emergency fund (as shown in Column 4). Overall, the regressions in Columns 1 to 4 provide limited support for the hypothesis that measures of financial and digital literacy strongly correlate with standard risk management strategies.

In summary, the findings in this section indicate the significance of financial and digital literacy in fostering resilience-enhancing financial behaviours. The metrics of financial literacy exhibit correlations with saving and investing, while the metrics of financial and digital literacy are associated with asset portfolio choices.

Table 5. The Effect of Financial and Digital Literacy on Risk Management Behaviours

This table reports average marginal effects from probit regressions. In Columns 1 and 2, the dependent variable is set to one if the survey participant allocates funds for an emergency reserve that would sufficiently cover their expenses for a three-month period in the event of unforeseen circumstances. In Columns 3 and 4, the dependent variable is assigned a value of one if the survey participant is "certain" or "could probably" generate an emergency fund in the event of an unexpected need. Columns 2 and 4 include financial education as control variables. Omitted categories are Age (≤18), Management Department, Cohort (freshmen). A constant term is used in all models. Robust z-statistics are reported in parentheses. *p<.10; **p < .05; ***p < .01.

AKSARA: Jurnal Ilmu Pendidikan Nonformal
P-ISSN 2407-8018 E-ISSN 2721-7310 DOI prefix 10.37905
Volume 10(1), January 2024
http://ejurnal.pps.ung.ac.id/index.php/Aksara

	Accessibility of emergency fund		Capability to generate an emergency fund	
	(1)	(2)	(3)	(4)
Financial literacy index	-0.013	-0.016	-0.003	-0.005
	(-0.61)	(-0.79)	(-0.32)	(-0.48)
Digital literacy index	0.025	0.027	-0.011	-0.012
	(1.31)	(1.42)	(-1.21)	(-1.22)
Male	0.048	0.046	0.023	0.024
	(1.17)	(1.15)	(1.30)	(1.34)
Age (19-20)	0.001	0.014	-0.019	-0.020
	(0.02)	(0.19)	(-0.80)	(-0.87)
Age (21-22)	0.001	0.013	-0.079*	-0.078*
	(0.01)	(0.14)	(-1.83)	(-1.84)
Age (≥23)	-0.053	-0.020	-0.043	-0.040
	(-0.46)	(-0.17)	(-0.75)	(-0.70)
Accounting department	0.081*	0.088**	0.028	0.030*
	(1.89)	(2.11)	(1.55)	(1.71)
Sophomores	0.006	-0.034	0.106**	0.097**
	(0.08)	(-0.46)	(2.08)	(1.98)
Juniors	0.052	0.017	0.076	0.069
	(0.69)	(0.23)	(1.38)	(1.28)
Seniors	0.109	0.053	0.104*	0.089
	(1.21)	(0.59)	(1.86)	(1.61)
Financial education		0.139***		0.040**
		(3.43)		(1.99)
Observations	613	611	608	607
R-Squared	0.012	0.026	0.048	0.064
Log-likelihood (Intercept only)	-408.537	-407.096	-133.892	-133.832
Log-likelihood (Model)	-403.554	-396.407	-127.458	-125.267
AIC	829.108	816.813	276.917	274.535
BIC	877.710	869.794	325.429	327.437
Chi-square	9.968	21.622**	15.304	22.062**

CONCLUSION

In the digital era, the educational landscape is evolving to underscore the significance of digital financial literacy, particularly for the younger generation. As fintech products become more prevalent, young adults will need heightened financial sophistication to leverage these tools effectively, safeguard against fraud, and avert costly mistakes. In addition, the transition from defined-benefit to defined-contribution pension plans means that young individuals bear more significant responsibility for their financial planning. The evolving financial landscape, driven by fintech advancements, underscores the imperative to develop digital financial education programs. These programs should aim to enhance digital financial literacy, emphasizing skills essential for active participation in the digital economy. Taking this perspective into account, there is a critical need to explore the multidimensional nature of digital financial literacy. This exploration seeks to identify the pertinent skills that contribute to the cultivation of financial behaviours aimed at building resilience, including savings, investment, and risk management strategies.

Until now, there has been limited exploration into the impact of both traditional financial literacy and digital literacy in shaping financial behaviour, particularly among the youth. This study addresses this gap by analysing data from a cross-sectional survey of business students at a private university in Indonesia. Utilizing two indices for financial literacy and digital literacy, the study distinguishes between various dimensions of financial literacy. The financial literacy data reveal clear trends, showing a robust increase with cohort and age. Specifically, seniors, students aged between 21 and 22, and males tend to exhibit higher financial literacy. On the other hand, digital literacy is positively associated with cohort, with limited evidence suggesting associations with age and gender. In empirical models that incorporate both financial and digital literacy indices, the findings underscore the significance of financial literacy in promoting saving and traditional saving, even in the digital era where traditional financial services are transitioning to digital platforms. Additional models corroborate the importance of financial literacy, along with digital literacy, in

encouraging investment. Notably, financial and digital literacy emerge as pertinent factors for financial assets participation, while their relevance diminishes for participation in real assets. This suggests that engaging in more information-intensive assets, such as financial assets, demands a distinct level of sophistication compared to less information-intensive assets like real assets. The robustness of these results is affirmed across diverse specifications that control for a comprehensive set of socio-demographic variables, including financial education.

This study contributes to the ongoing discussion on the significance of the multidimensional aspect of financial literacy. This dimension is pivotal in shaping the design of financial education content and competencies necessary to confront the challenges and risks arising from the digitization of financial products. Despite the predominant focus of national financial education strategies on fundamental financial concepts, often overlooking digital financial literacy specifically (Morgan et al., 2019), the key takeaway from this research is clear: financial and digital literacy should be integrated into financial education initiatives to enhance individuals' enduring financial resilience. These findings carry substantial policy implications for national governments actively seeking guidance in formulating strategies for digital financial literacy within the broader context of national financial education initiatives.

In addition to traditional financial education curricula and programmes that underscore fundamental financial and digital skills and promote positive financial behaviours, it is imperative to educate citizens about the array of digital financial services available to them. This education should cover pertinent aspects such as the applicable rules, rights, responsibilities, and associated risks. Noteworthy examples of effective practices can be observed in the approaches adopted by authorities in South Africa and Indonesia. This involves employing workshops, exhibitions, online platforms, mobile applications, helplines, and direct presentations to educate consumers about scams and equip them with knowledge to safeguard their money and identity (FinCoNet, 2016; Lyons & Kass-Hanna, 2020). Furthermore, digital financial services providers, exemplified by Kenya's Safaricom M-PESA, have effectively utilized strategies like SMS notifications, in addition to advertising through radio and newspapers, to keep their customers abreast of prevalent fraudulent schemes (Mckee et al., 2015).

Providing the younger generation with the expertise and competencies to make informed financial choices and navigate available financial products and services acts as a driving force in overcoming substantial hurdles to financial inclusion. This, in turn, translates to enhanced financial capabilities for individuals traditionally marginalized by financial markets. The broader scope of financial inclusion implies that these individuals can now more effectively prepare for unforeseen circumstances and future objectives, obtain credit for managing expenses or fostering business growth, securely transfer and receive funds, accumulate assets, mitigate risks, and make productive investments (Allen et al., 2016; Lee et al., 2021; Moore et al., 2019; Munyegera & Matsumoto, 2016; Suri et al., 2021). Consequently, achieving greater financial inclusion becomes a potent tool for cultivating resilience in the wake of financial disruptions (Kass-Hanna et al., 2022; Lyons et al., 2020). In this context, the significance of financial and digital literacy becomes evident as essential avenues leading to tangible socioeconomic development outcomes (Grohmann & Menkhoff, 2022; Kass-Hanna et al., 2022).

ACKNOWLEDGEMENT

This work was supported by Institute for Research and Community Development, Maranatha Christian University, Indonesia.

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AKSARA: Jurnal Ilmu Pendidikan Nonformal
P-ISSN 2407-8018 E-ISSN 2721-7310 DOI prefix 10.37905
Volume 10(1), January 2024
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AKSARA: Jurnal Ilmu Pendidikan Nonformal
P-ISSN 2407-8018 E-ISSN 2721-7310 DOI prefix 10.37905
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