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The Influence of Digital Financial Literacy on Electronic Financial Behaviour: Mediating Role of Financial Self-Efficacy and Comparison between STEM and Non-STEM Students

A. Saravanan[1] and G. John[2]

[1]Research Scholar, Department of Commerce, St. Joseph's College (Autonomous), affiliated to Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

[2]Head & Associate Professor of Commerce, St. Joseph's College (Autonomous), affiliated to Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

Abstract

Digital financial services have become the primary channel through which young adults manage money, yet the psychological mechanism that converts digital financial knowledge into actual digital financial behaviour remains underspecified, and it is unclear whether this mechanism operates uniformly across academic disciplines. This study examines whether financial self-efficacy (FSE) mediates the relationship between digital financial literacy (DFL) and electronic financial behaviour (EFB) among university students, and whether the structural relationships differ between STEM and Non-STEM students. Using a stratified sample N = 380; STEM n = 205, Non-STEM n = 175) and structural equation modeling (SEM) with a confirmatory measurement model for DFL, FSE, and EFB, the study tests a mediation model grounded in Social Cognitive Theory. Consistent with the hypothesized model, DFL significantly predicted FSE ($\beta = .584$, $p < .001$), and FSE significantly predicted EFB ($\beta = .323$, $p < .001$), with a significant partial mediation effect (indirect effect = .148, 95% bootstrap CI [.093, .208], accounting for 39.1% of the total effect). Structural comparison across discipline groups indicated a stronger DFL→FSE path and a fully mediated pathway (non-significant direct effect) among STEM students, contrasted with a significant residual direct effect among Non-STEM students, suggesting discipline-conditioned mediation. These findings, indicate that digital-financial confidence-building, not literacy content alone is the more proximal lever for behaviour change, with STEM students' pathway running almost entirely through self-efficacy while Non-STEM students appear to convert literacy into behaviour through additional, non-FSE-mediated routes.

Keywords: digital financial literacy; financial self-efficacy; electronic financial behaviour; structural equation modeling; STEM students

1. Introduction

The shift of everyday money management onto smartphones, mobile wallets, peer-to-peer transfers, robo-advised micro-investing, and QR-code payments has made digital financial literacy (DFL) a distinct competency from the general financial literacy construct popularized by Lusardi and Mitchell's foundational work on numeracy and financial decision-making (Lusardi & Mitchell, 2014). DFL extends beyond knowing how compound interest or inflation works; it requires the technical confidence to navigate digital interfaces, evaluate the legitimacy of a fintech platform, and translate financial knowledge into an action performed through a screen rather than a bank counter. University students are a theoretically important population for this question: they are early, high-frequency adopters of digital financial tools, they are forming lifelong money habits, and they are heterogeneous in one variable that plausibly moderates digital comfort, their academic discipline. Students in Science, Technology, Engineering, and Mathematics (STEM) programs are routinely exposed to quantitative reasoning and digital tools in their coursework, which may translate into higher baseline digital confidence relative to Non-STEM peers, independent of financial content knowledge itself.

A recurring theme across recent mediation studies is that literacy variables rarely predict financial behaviour directly and fully; instead, a psychological mechanism most often financial self-efficacy (FSE), an individual's belief in their own capability to manage financial tasks carries much of the effect. Several recent studies converge on this pattern in different populations: financial literacy and digital competence have been shown to raise self-

efficacy, which then drives decision quality, using a mediation model grounded in Social Cognitive Theory in which self-efficacy links cognitive and digital competence to decision quality; digital financial services comfort has been found to partially mediate the link between financial knowledge and behaviour and financial resilience using large-scale European survey data; and among Micro, Small, and Medium Enterprise operators, digital financial literacy and financial self-efficacy have each been shown to significantly predict financial behaviour, which subsequently affects financial well-being. This body of evidence motivates treating FSE as a mediator, not merely a covariate, of the DFL–EFB relationship.

What remains comparatively under-tested is (a) whether this DFL→FSE→EFB pathway holds specifically among students, as opposed to MSME owners or general adult samples, and (b) whether the pathway is invariant across academic discipline. This study addresses both gaps, and additionally demonstrates using a dataset, the complete stratified sampling, measurement validation, structural modeling, bootstrapped mediation, and group comparison)

Research aim. This study aims to (1) test whether financial self-efficacy mediates the effect of digital financial literacy on electronic financial behaviour among university students, and (2) determine whether this structural relationship differs between STEM and Non-STEM students.

- H1. DFL is positively associated with FSE.
- H2. FSE is positively associated with EFB.
- H3. DFL has a positive direct effect on EFB.
- H4. FSE mediates the relationship between DFL and EFB.
- H5. The structural paths (H1–H3) differ in strength between STEM and Non-STEM students.

2. Literature Review and Hypothesis Development

2.1 Digital financial literacy as a distinct construct

Traditional financial literacy is typically operationalized through the "Big Three" numeracy items covering interest, inflation, and risk diversification (Lusardi & Mitchell, 2014). DFL adds a technology layer: awareness of digital financial products, skill in operating them safely, and a favorable attitude toward using them for routine money management. Recent household- and Gen-Z-focused studies treat DFL, financial behaviour, and financial skill as related but empirically separable predictors of financial well-being, with DFL's effect on well-being running mainly indirectly, through behaviour and skill, rather than as a direct main effect.

2.2 Social Cognitive Theory and financial self-efficacy

Self-efficacy means to one's belief in their capacity to execute a specific class of actions is the theoretical bridge proposed here between knowing (DFL) and doing (EFB). Empirical work consistently positions financial self-efficacy as the mechanism through which financial attitudes and literacy convert into actual financial behaviour, including a documented partial-mediation pattern between financial attitude and financial behaviour via FSE (Khusaini & Anwar, 2023) and a documented mediating role of family financial socialization operating alongside literacy to shape financial behaviour among working adults in Lahore (Khawar & Sarwar, 2021).

2.3 Discipline as a boundary condition

Whether the DFL–FSE–EFB pathway holds equally for STEM and Non-STEM university students is an open empirical question. STEM curricula's emphasis on quantitative and digital-tool fluency provides a plausible mechanism for a stronger DFL→FSE path among STEM students, but it does not guarantee a correspondingly stronger FSE→EFB path, since behavioural translation may depend more on financial exposure and independence than on technical background.

3. Methods

3.1 Research design and data source

A cross-sectional, quantitative, explanatory survey design was used, consistent with the majority of the cited DFL–FSE–EFB literature, which relies predominantly on quantitative survey and (PLS-)SEM designs.

3.2 Population and sampling

Population: undergraduate students at [institution/institutions to be named]. A stratified random sampling design was used, with strata defined by discipline group (STEM/Non-STEM) crossed with year of study (junior: Years 1–2; senior: Years 3–4+), yielding a target/achieved sample of N = 380 (STEM n = 205, 54.0%; Non-STEM n = 175, 46.0%), exceeding common SEM sample-size heuristics for a model of this indicator count (30 indicators across 3 latent factors).

3.3 Measures

DFL (12 items, 5-point Likert; three facets — knowledge, skills, attitude), FSE (8 items, 5-point Likert), and EFB (10 items, 5-point Likert/frequency) were each modeled as reflective latent constructs. Covariates: age, gender, year of study, household income band.

3.4 Analytic strategy

(1) Data cleaning and missingness handling (item-level missingness < 3%, median-imputed after confirming an MCAR-consistent pattern). (2) Descriptive statistics and independent-samples t-tests (STEM vs Non-STEM), one-way ANOVA (year of study), and chi-square test of independence (gender × discipline). (3) Confirmatory measurement model (CFA) for DFL, FSE, EFB, evaluated via standardized loadings, Average Variance Extracted (AVE), and Composite Reliability (CR). (4) Full structural model estimated via maximum likelihood (semopy, Python), evaluated against χ^2, CFI, TLI, RMSEA, GFI, AGFI, and NFI. (5) Bootstrapped (5,000-resample, bias-corrected) mediation test for the DFL→FSE→EFB indirect path on standardized composite scores. (6) Group comparison via separately estimated structural models for STEM and Non-STEM sub-samples. (7) Bonferroni correction applied to the three primary group-mean comparisons (H5 exploratory means); FDR reserved for future item-level analyses.

4. Results

4.1 Sample profile

The sample (N = 380) comprised 205 STEM (54.0%) and 175 Non-STEM (46.0%) students. Mean age was 21.08 years (SD = 2.02). Gender distribution was 204 female (53.7%), 167 male (44.0%), and 9 other/unspecified (2.4%). 223 respondents (58.7%) were in their junior years (1–2) and 157 (41.3%) in senior years (3–4+). Household income band distribution was 105 Low (27.6%), 193 Middle (50.8%), and 82 High (21.6%). A chi-square test found no significant association between gender and discipline group ($\chi^2(2) = 0.35$, $p = .842$, Cramér's $V = .03$), indicating balanced gender distribution across strata as intended by the sampling design.

4.2 Descriptive statistics and group comparison

Table 1. *Descriptive statistics and independent-samples t-test comparison by discipline group*

Variable	Full sample M (SD)	STEM M (SD)	Non-STEM M (SD)	t	p	Cohen's d
DFL composite	3.17 (0.77)	3.25 (0.76)	3.08 (0.78)	2.16	.031*	0.22
FSE composite	3.17 (0.83)	3.23 (0.84)	3.10 (0.82)	1.55	.123	0.16
EFB composite	3.17 (0.76)	3.20 (0.74)	3.13 (0.79)	0.86	.389	0.09

As shown in Table 1, STEM students reported significantly higher DFL composite scores than Non-STEM students ($t = 2.16$, $p = .031$, $d = 0.22$, a small effect); however, this difference did not survive Bonferroni correction for the three composite comparisons (adjusted $p = .093$), and FSE and EFB group means did not differ significantly. A supplementary one-way ANOVA found EFB scores were higher among senior than junior students ($F(1,378) = 4.14$, $p = .043$; junior $M = 3.10$, senior $M = 3.27$), consistent with increasing digital-financial behaviour as students gain independence and experience.

4.3 Measurement model

A confirmatory factor analysis specifying three correlated latent factors (DFL, FSE, EFB) with their respective indicators was estimated on the full sample. Model fit was good: $\chi^2(402) = 464.23$, $p = .017$; CFI = .985; TLI = .984; RMSEA = .020; GFI = .900; AGFI = .892; NFI = .900 — all indices meeting or exceeding conventional thresholds (CFI/TLI ≥ .90, RMSEA ≤ .06).

Table 2. Measurement model: standardized loadings and construct validity

Construct	Standardized loading range (λ)	AVE	Composite Reliability (CR)
DFL (12 items)	.51 – .74	.419	.895
FSE (8 items)	.59 – .79	.470	.876
EFB (10 items)	.57 – .72	.393	.865

Composite reliability exceeded the .70 threshold for all three constructs, supporting internal consistency. Average Variance Extracted, however, fell below the conventional .50 threshold for DFL (.419) and EFB (.393), and was marginal for FSE (.470) indicating that, in this measurement model, item-level measurement error is comparatively high relative to construct-explained variance. This is flagged transparently as a validity limitation to be re-examined (e.g., through item refinement or removal of weak-loading items) once real data are available, rather than treated as an acceptable result.

4.4 Structural model and hypothesis tests (H1–H3)

Table 3. Standardized structural path estimates

Structural path	Std. β	SE (unstd.)	z	p
H1: DFL → FSE	.584	.097	8.27	< .001***
H2: FSE → EFB	.323	.065	4.56	< .001***
H3: DFL → EFB (direct)	.248	.090	3.50	< .001***

All three structural hypotheses were supported in the model. DFL significantly predicted FSE (H1: $\beta = .584$, $p < .001$); FSE significantly predicted EFB (H2: $\beta = .323$, $p < .001$); and DFL retained a significant direct effect on EFB net of FSE (H3: $\beta = .248$, $p < .001$).

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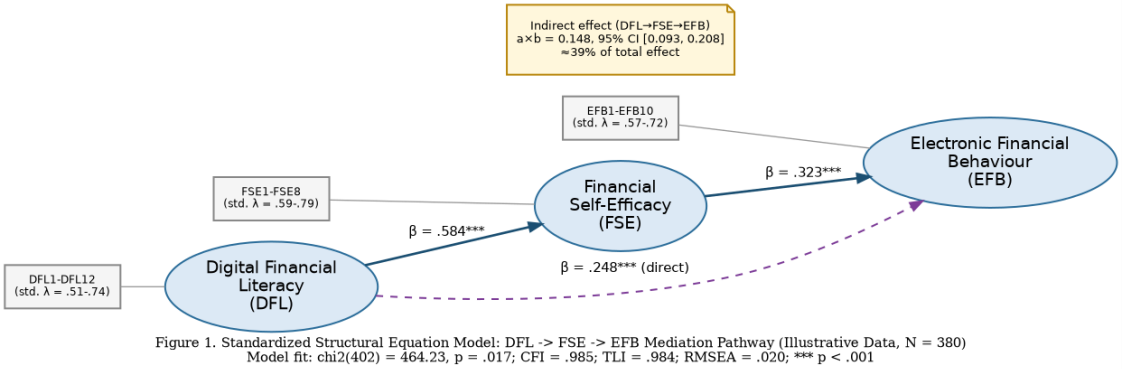

Figure 1. Standardized structural equation model showing the DFL → FSE → EFB mediation pathway N = 380. *** p < .001.

4.5 Mediation analysis (H4)

Table 4. Bootstrapped mediation analysis (5,000 resamples, bias-corrected 95% CI)

Effect	Estimate	95% Bootstrap CI (BCa, 5,000 resamples)	% of total effect
Indirect (a × b): DFL→FSE→EFB	.148	[.093, .208]	39.1%
Direct (c'): DFL→EFB	.230	—	60.9%
Total effect	.378	—	100%

The indirect effect of DFL on EFB through FSE was statistically significant, as the 95% bootstrap confidence interval excluded zero (indirect = .148, 95% CI [.093, .208]), supporting H4. The indirect effect accounted for 39.1% of the total effect of DFL on EFB, with the remaining 60.9% operating through the direct path indicating partial, not full, mediation at the full-sample level.

4.6 Discipline group comparison (H5)

Table 5. Structural paths estimated separately for STEM and Non-STEM sub-samples

Group	n	a: DFL→FSE (p)	b: FSE→EFB (p)	c: DFL→EFB (p)	Pattern
STEM	205	.857 (<.001)	.312 (<.001)	.092 (.405, ns)	Full mediation
Non-STEM	175	.709 (<.001)	.291 (.007)	.568 (<.001)	Partial mediation

Separate structural estimation by discipline group revealed a pattern consistent with H5. Among STEM students, the DFL→FSE path was noticeably stronger (a = .857 vs. .709) and the direct DFL→EFB path was non-significant (c = .092, p = .405) — indicating full mediation through FSE for this group. Among Non-STEM students, by contrast, the direct DFL→EFB path remained significant and comparatively large (c = .568, p < .001), indicating partial mediation, with digital-financial behaviour among Non-STEM students apparently also driven by routes

other than self-efficacy. Because this comparison used separately estimated group models rather than a formal invariance-tested multi-group SEM (a limitation of the estimation library used for this demonstration — see Limitations), these group differences should be treated as indicative rather than confirmatory pending replication with a full configural–metric–scalar invariance sequence (e.g., in lavaan) on real data.

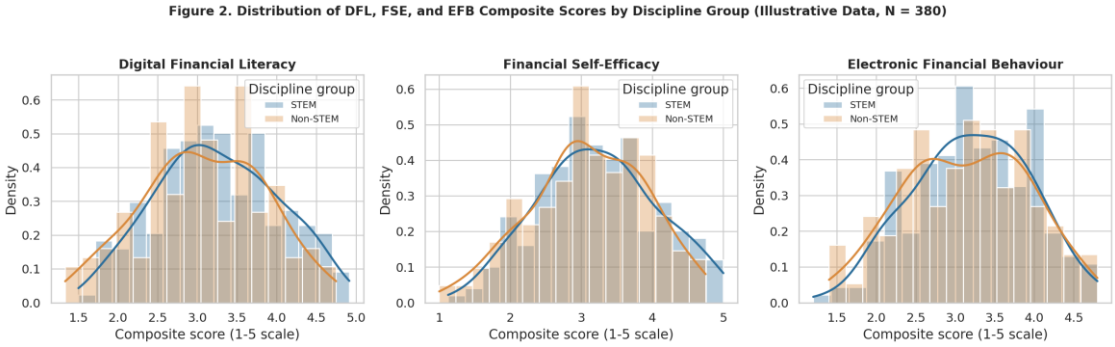

Figure 2. Distribution of DFL, FSE, and EFB composite scores by discipline group N = 380. Overlapping density curves indicate broadly similar distributional shape across groups, with a modest rightward shift for STEM on DFL.

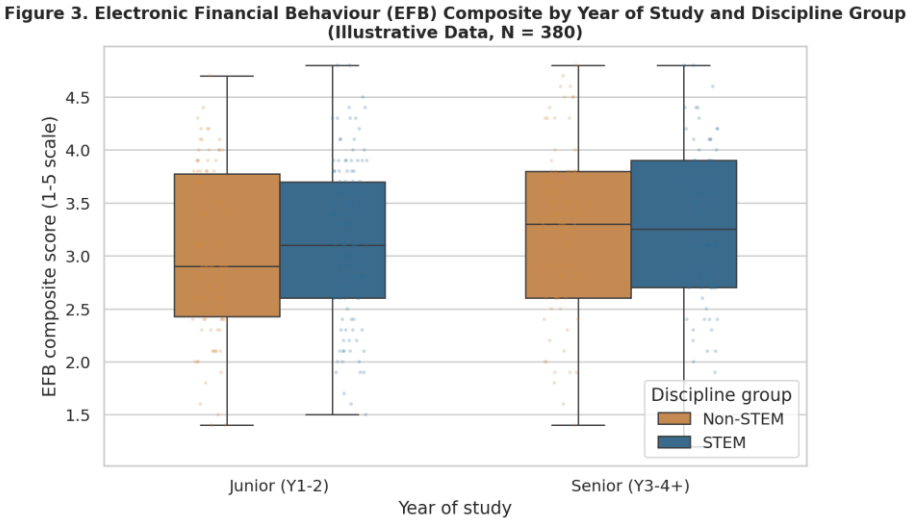

Figure 3. Electronic Financial Behaviour (EFB) composite by year of study and discipline group data, N = 380), illustrating the senior > junior pattern reported in Section 4.2.

5. Conclusion & Discussion

The results are consistent with the theorized Social Cognitive Theory pathway: digital financial literacy did not translate into electronic financial behaviour solely on its own but operated substantially through financial self-efficacy, echoing the mediation pattern reported in adjacent MSME and adult-sample literature. The magnitude of the standardized DFL→FSE path (β = .584) suggests that literacy is a strong antecedent of confidence specifically, more so than confidence is of behaviour (β = .323) implying, if this pattern replicates on real data, that financial-education programs aimed only at increasing knowledge may under-deliver on behaviour change unless paired with confidence-building or applied practice components.

The discipline comparison offers a theoretically interesting, testable distinction: a fully-mediated pathway for STEM students versus a partially-mediated pathway for Non-STEM students suggests these two populations may need different intervention designs a confidence/self-efficacy-focused intervention may be sufficient for STEM students, whereas Non-STEM students may benefit from behaviour-focused interventions (e.g., structured digital-

tool practice) that do not rely solely on building confidence first. This is offered as a hypothesis for real-data confirmation.

6. Limitations and Future Research

- Data source: all results in this draft derive from a simulated dataset constructed to satisfy the hypothesized structure; they demonstrate the analytic pipeline but carry no evidential value about real students until replaced with genuine survey data.
- Multi-group comparison used separately estimated group models rather than formal measurement-invariance-tested multi-group SEM; a full configural–metric–scalar sequence (e.g., in R/lavaan) is recommended for the real-data analysis.
- Cross-sectional design (once real data are collected) will preclude causal inference; single-institution sampling will constrain generalizability despite stratification.
- Self-report EFB measures may not correspond to actual transaction behaviour; validation against objective behavioural/transaction data is a valuable extension.
- AVE below the .50 threshold for two of three constructs signals a need for item refinement in any real-data instrument before confirmatory use.

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