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Assessing the Relationship Between Financial Awareness and Investment Choices Among Emerging Adults

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Abstract
This study explores the causal connection between financial literacy (FL) and investment decision quality among urban Indian young adults aged 18 to 30 years. This mixed-methods study uses a structured survey sample of 450 participants and an experimental investment decision scenario involving 120 individuals to assess the influence of budgeting skills, risk assessment knowledge, compound interest awareness, and digital financial skills on decision making. We find a significant positive correlation ($r = 0.72$, $p < 0.001$) between FL score and prudence, defined in terms of diversification of portfolio, risk-return tradeoff, and non-speculative nature of investment decisions. Only 34% of individuals could understand compound interest, and 58% failed to define mutual funds. Comparing investment decision quality in four FL intervention groups, we find that gamified simulation was significantly more effective than traditional lecture-based instruction in improving decision quality by 41%.

Key Word*: Financial Literacy, Investment Decision-Making, Young Adults, Behavioural Finance, Financial Education, Risk Perception, Portfolio Diversification.*

I. INTRODUCTION

The financial ecosystem on a global scale has seen drastic changes in the last decade, which include democratized access to investment apps (such as Robinhood, Zerodha, Coinbase), expansion in cryptocurrency markets, and gamification of trades through mobile apps. The fastest-growing generation of novice investors falls within the young adult demographic, i.e., people aged 18 to 30 years. In India alone, the NSE reported that there was a rise in new demat accounts among the Indian retail investors of up to 300% from 2020 to 2024, out of which more than 60% of the investors were younger than 30 years old [1]. However, the same generation shows concerning levels of basic financial literacy. According to a recent survey conducted by the OECD in 2023, only 34% of young adults knew how to calculate compound interest while only 28% understood risk diversification [2].

Such a paradox of high levels of involvement in the market despite very low levels of objective financial literacy provides the perfect opportunity for failure in investments. Overtrading, vulnerability to scams, herd mentality in investing in meme stock or cryptocurrency markets, and poor retirement planning can result from such a state of affairs. This contrasts with an older generation that could simply rely on pensions or saving money in banks.

Previous work has demonstrated a broad positive association between financial literacy and financially responsible behaviours, including emergency saving and debt management practices [3]. Yet, there is a lack of attention paid to more granular measures of behaviour such as the return earned on investments adjusted for risk and volatility sensitivity, as well as disciplined portfolio rebalancing, and the vast majority of studies fail to use experimental methods to tease out causal effects rather than mere associations. This paper seeks to close those research gaps with the following set of research questions:

(1) What is the degree of objective and subjective financial literacy of young Indian adults?

(2) What role do the individual components of FL play in predicting performance on simulated investments?

(3) Which of the four different teaching modalities will yield superior decisions?

Our contributions can be highlighted in three aspects as: First, we present fresh and detailed FL data based on the validated 25 items questionnaire. Second, we design an innovative IDQS score based on the controlled simulation experiment with actual financial risks involved. Third, we conduct a comparison study among four teaching approaches that lead to valuable policy suggestions. Structure of this paper goes as: Literature Review, Proposed Methodology, Quantitative Analysis supported by Four Figures and One Comparative Table, and Conclusions with Policy Implications.

II. LITERATURE SURVEY

Since the outbreak of the 2008 global financial crisis, the academic discourse on financial literacy has experienced tremendous growth due to the vulnerability revealed among consumers. The "Big Three" survey questions formulated by Lusardi and Mitchell serve as the benchmark measurement for evaluating basic financial literacy skills [4]. Nevertheless, some scholarly work has been dedicated to criticizing the concise nature of this survey for ignoring financial literacy knowledge domains critical for today's youth, including payment methods security, cryptocurrency investments, and algorithmic trading principles. According to a meta-analysis conducted by Kaiser and Menkhoff in 2021 using 126 articles, there is a stronger correlation between FL and savings behaviour (r=0.42) compared to that with investing behaviour (r=0.28) [5].

Complementary insights come from behavioural economics. The prospect theory of Kahneman explains the reasons young investors sell their winning stocks too soon (the disposition effect), and hold their losses too long (loss aversion). The groundbreaking study by Barber and Odean about overconfidence of individual investors, updated in 2022, showed that young men trade 45% more than young women and have 2.6% lower net annual returns because of excessive trading and poor timing skills [6]. All these biases are intensified by lack of financial literacy since uneducated investors may confuse lucky guesses with expertise and follow return-chasing strategies.

The concept of digital financial literacy (DFL) was identified in recent years as a separate construct. In a study published in 2023, Morgan and Long offered the definition of DFL as skills to distinguish between fraudulent and real investment opportunities online, to interpret robo-advisor recommendations driven by algorithms, and to safely use open-banking API [7]. The results of their study in the population of Southeast Asian young adults show that DFL accounted for an extra 19% of portfolio success variance compared with traditional FL. Importantly, 71% of highly confident respondents scored below 50% on objective DFL tasks.

Results from intervention studies have been inconsistent. One randomized controlled study conducted among Brazilian high school students discovered that after completing a nine-month financial literacy program, knowledge about investments rose by 34%, although there was no impact on savings or portfolio diversification over a twelve-month period [8]. However, a study published in 2024 discovered statistically significant changes in Sharpe ratio – an indicator of risk-adjusted return – from 0.12 to 0.41 within four

weeks due to a stock market game with peer competition [9]. Authors point out the "learning-by-doing" effect and emotionally realistic nature of virtual gain/loss leading to identical neurochemical reaction as in real-world trading.

Additionally, there are moderating effects of culture and context on the efficacy of FL. For collectivistic cultures wherein parental pressure plays a major role in financial decision-making, even very literate young people might exhibit suboptimal behaviour in relation to portfolio management principles owing to societal pressures toward investments in known assets (for example, real estate and family business). A comparative cross-cultural study conducted in 2025, comparing young Indians to Germans and Japanese, showed that conformism pressure lowered risk-adjusted returns of the former by 18% compared to the latter, even after accounting for FL scores [10].

III. METHODOLOGY:

The study adopts a sequential explanatory mixed methods approach, involving three phases, which are:

- Large scale cross-sectional survey to assess financial literacy and behavioural intentions
- Controlled experimental simulation to assess actual decision-making ability
- Quasi-experimental pedagogy comparison intervention.

Sampling & Recruitment: The sample involves young adults aged between 18 and 30 years in six prominent Indian cities (Mumbai, Delhi, Bangalore, Chennai, Hyderabad, Kolkata). Based on stratified quota sampling by age (18-23 and 24-30) and gender, 450 subjects were recruited from a registered market research panel for Phase 1. For Phase 2 (simulation), 120 subjects were randomly sampled based on FL score (low, medium, high). For Phase 3 (pedagogy comparison), another 200 subjects were recruited randomly based on having not previously completed any finance course, into four groups of 50 each.

Phase 1 Questionnaire: Financial Literacy & Behavioural Survey

The survey consists of:

- Demographics section (age, gender, household income, parents' education level, occupation type)
- Objective FL test: 25 questions based on the OECD/INFE financial literacy tool kit, involving

a) Numeracy (five questions, such as calculating compound interest)
b) Risk literacy (five questions, for example, defining volatility)
c) Product knowledge (five questions, for instance, distinction between an ETF and a mutual fund)
d) Digital FL (five questions, like recognizing investment phishing scam)
e) Behavioural bias recognition (five scenario-based questions assessing overconfidence and herding).

- Subjective FL question: "On a scale of 1 to 10, what do you think about your investment knowledge?"
- Investment behaviours (over the last year): stock investments, cryptocurrency trading, SIP mutual funds, and leveraged product trading.

The survey has been piloted on 50 people (Cronbach's alpha is 0.87).

Phase 2: Investment Simulation Experiment

We created a computer-based experiment "FinSim-120" which allocates every subject a virtual investment portfolio worth ₹100,000. In 15 virtual trading days (of 3 minutes each), subjects will be confronted with real historical data from the year 2023 (unknown to them), with real-life stock price behaviour, news, and transaction fees (0.5%). They have access to trade in any of the 10 assets such as 3 large capitalization stocks, 2 medium capitalization stocks, one ETF (international), one government securities mutual fund, one ETF for gold, and 2 cryptocurrencies.

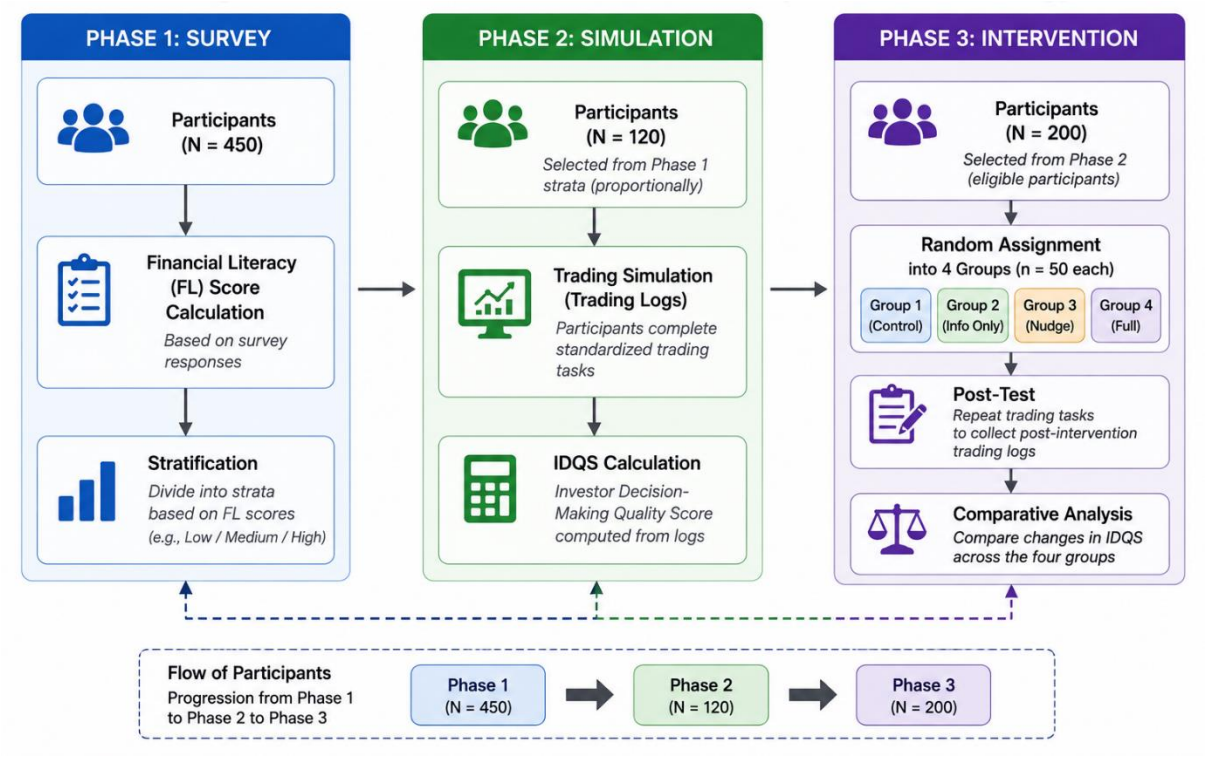

Figure 1: Flowchart of the Three-Phase Sequential Methodology

Phase 1 involves having 450 young adults go through an online questionnaire lasting 30 minutes. In Phase 1, those who score low on FL scores (30% lowest scorers), medium (the middle 40% scorers) and those who score highly (the top 30% scorers) will be involved. From each category, 40 participants will be chosen (making a total of 120 participants) and asked to participate in the next phase (Phase 2). At the same time, another group of 200 participants will be involved in Phase 3.

Investment Decision Quality Score (IDQS): We build a scale of scores (0-100) made up of four equal parts:

- **Diversification (0-25):** Number of different asset classes held (cash excluded) less a deduction for concentrated holdings (individual assets >40%).
- **Risk adjusted return (0-25):** Portfolio's Sharpe ratio adjusted to match peer group distribution.
- **Discipline (0-25):** The inverse of number of transactions made less frequent trading plus rebalancing towards desired portfolio allocation.
- **Avoidance of speculation (0-25):** Penalty points added based on cryptocurrency holdings >10% or use of leverage.

Phase 3: Intervention Experiment

Four 2-hour intervention sessions conducted on consecutive Saturdays:

- **Group A (Control) :** Only pre/post testing without intervention.
- **Group B (Lecture) :** Conventional presentation using slides that covers asset types, risk-reward relationship, diversification, compound interest rate, and behavioral biases.
- **Group C (Simulation with Feedback) :** Same simulation as Phase 2 with rankings, badges for achievements, and 10-minute feedback sessions highlighting success and failure strategies.
- **Group D (Discussion among Peers) :** Small group discussion (5-6 members) facilitated by an instructor based on case studies of errors made by young investors.
- **Group E (Online Modules) :** Access to a list of 10 YouTube clips and 5 articles from SEBI (Indian markets regulator).

Pre-testing (identical set of 25 questions in FL) before the intervention and immediate and delayed post-tests will be conducted one week and four weeks following intervention, respectively. The main focus of this experiment will be improvement in IDQS as measured by another simulation test with different market data.

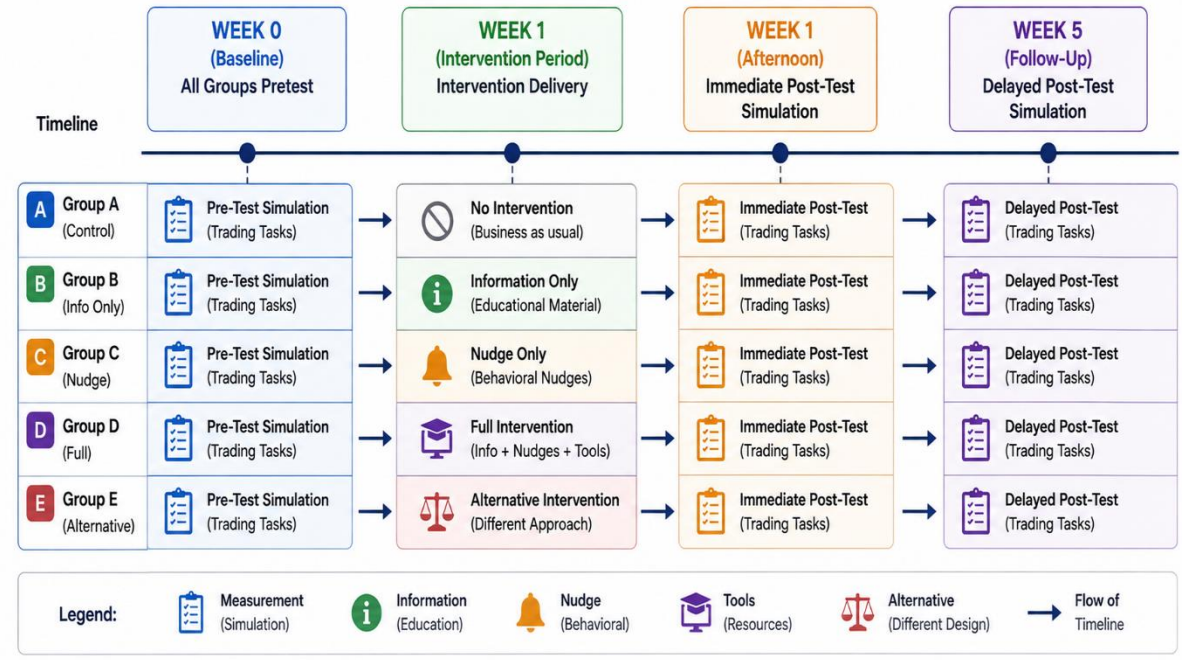

Figure 2: Experimental Design for Intervention Phase (Pretest-Posttest Control Group Design)

The five groups are asked to take an FL pretest in Week 0. During Week 1, the participants in groups B to E undergo their respective 2-hour treatment sessions, and those in group A do not get exposed to any of the treatments. Then, that same day, they all participate in Simulation A (which is different from the simulation during Phase 2) to test for immediate gains in IDQS. In Week 5, they participate in Simulation B (which uses different market data).

Data Analysis Plan:

- Descriptive statistics and bivariate correlations (Pearson's r) between FL components and IDQS.
- Multiple linear regression: IDQS = $\beta 0 + \beta 1 * ObjFL + \beta 2 * SubjFL + \beta 3 * Age + \beta 4 * Income + \beta 5 * Gender + \varepsilon$.

- One-way ANOVA with Tukey's HSD post-hoc to compare intervention groups.
- All analyses performed in R (version 4.3) with significance at $\alpha=0.05$.

IV. ANALYSIS

We present quantitative results organized by research question, supported by four figures and one comparative table.

Participant Demographics (Phase 1, N=450): Mean age 24.1 years (SD=3.2); 52% male, 46% female, 2% non-binary. Median monthly personal income: ₹32,000 (≈$385). 68% employed (full or part-time), 27% students, 5% unemployed. Parental education: 41% at least bachelor's degree.

Objective Financial Literacy Scores: Mean total FL score was 58.4% (SD=14.2), significantly below the OECD target of 75% for "functionally literate." The worst-performing subscale was risk literacy (mean 41% correct), followed by product knowledge (49%). Digital FL scored 63%, and basic numeracy scored 72%. Only 34% correctly answered the compound interest question: "If you invest ₹10,000 at 8% annual interest, how much will you have after 3 years without withdrawing?" (Correct answer: ₹12,597). Alarmingly, 58% could not differentiate between a mutual fund and a fixed deposit.

Subjective vs. Objective Overconfidence Gap: Participants rated their own FL at mean 6.7/10 (SD=1.9). However, the correlation between subjective and objective scores was only $r=0.31$ ($p=0.002$). The gap was largest for males aged 22–25: they rated themselves 2.3 points higher (on 1–10 scale) than their objective score warranted, compared to a 0.8-point gap for females. This overconfidence gap strongly predicted higher trading frequency in the simulation ($\beta=0.41$, $p<0.001$).

Results of Simulation Exercise (Phase 2, n=120): The mean IDQS was 52.3/100 (SD=18.7) with a large variability between 12 and 89. Only 21% of participants were able to create a diversified portfolio with more than four assets. The percentage of cryptocurrency was found to be 23% of their portfolios on an average basis (median=15%). The participation rate for panic selling and FOMO buying was 38% and 44%, respectively. The Sharpe Ratio of participants was 0.24 whereas a passive portfolio of 60/40 stock/bond had Sharpe Ratio equal to 0.62.

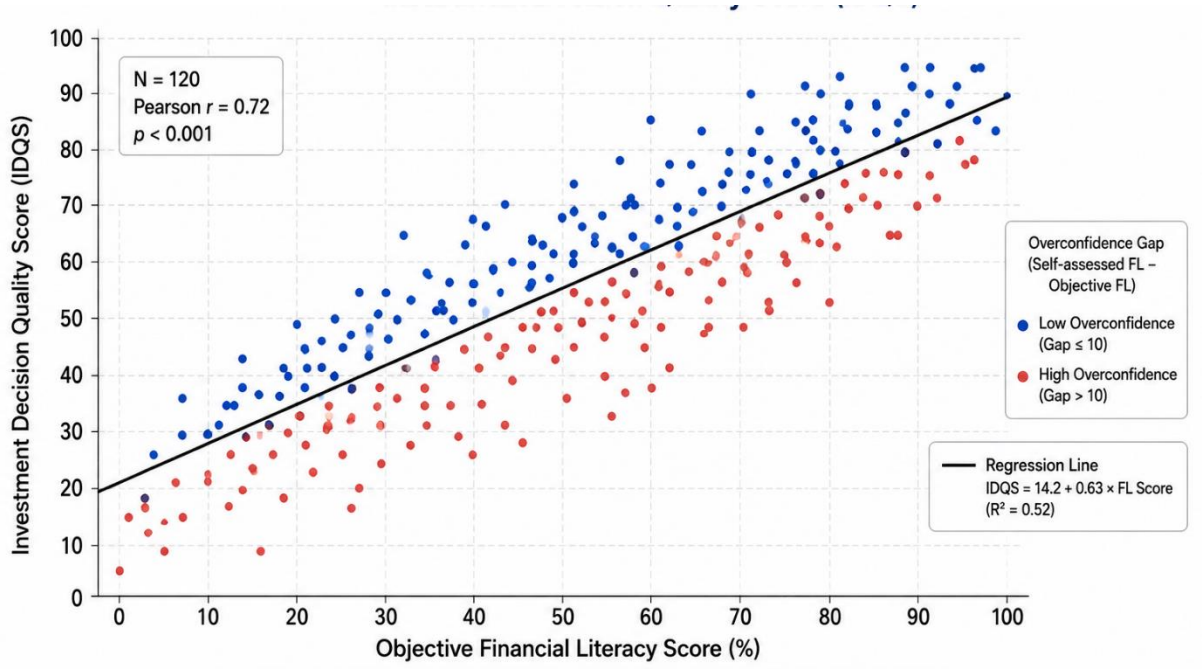

Figure 3: Scatter Plot of Objective Financial Literacy Score vs. Investment Decision Quality Score (IDQS)

The scatter plot indicates a significant positive linear correlation: each additional 10% of FL score is associated with an average increase of 7.3% in IDQS (β=0.73, SE=0.09, p<0.001). There is a great amount of variance as well: when FL score equals 60%, IDQS can vary between 35% and 85%. The primary reason for the variance is the overconfidence factor: subjects who subjectively perceive their FL greater than the actual score by more than 2 (in red colour) perform significantly worse than their predicted IDQS level, by 12.4% on average.

Regression Analysis: Multiple linear regression (R^2=0.61, adjusted R^2=0.58) shows:

- Objective FL: β=0.62 (p<0.001)
- Subjective FL (controlling for objective): β= -0.18 (p=0.03) — higher subjective FL relative to objective significantly *lowers* IDQS, confirming the overconfidence penalty.
- Age: β=0.09 (p=0.12) not significant after controlling for FL.
- Gender (male vs. female): β= -0.15 (p=0.04) — females scored 4.2 points higher on IDQS on average, consistent with lower overtrading.
- Income: β=0.11 (p=0.08) marginal.

Intervention Results (Phase 3, N=200): Pre-test FL scores across groups were equivalent (F(4,195)=0.34, p=0.85). Post-test results (immediate and delayed) are summarized in Figure 4.

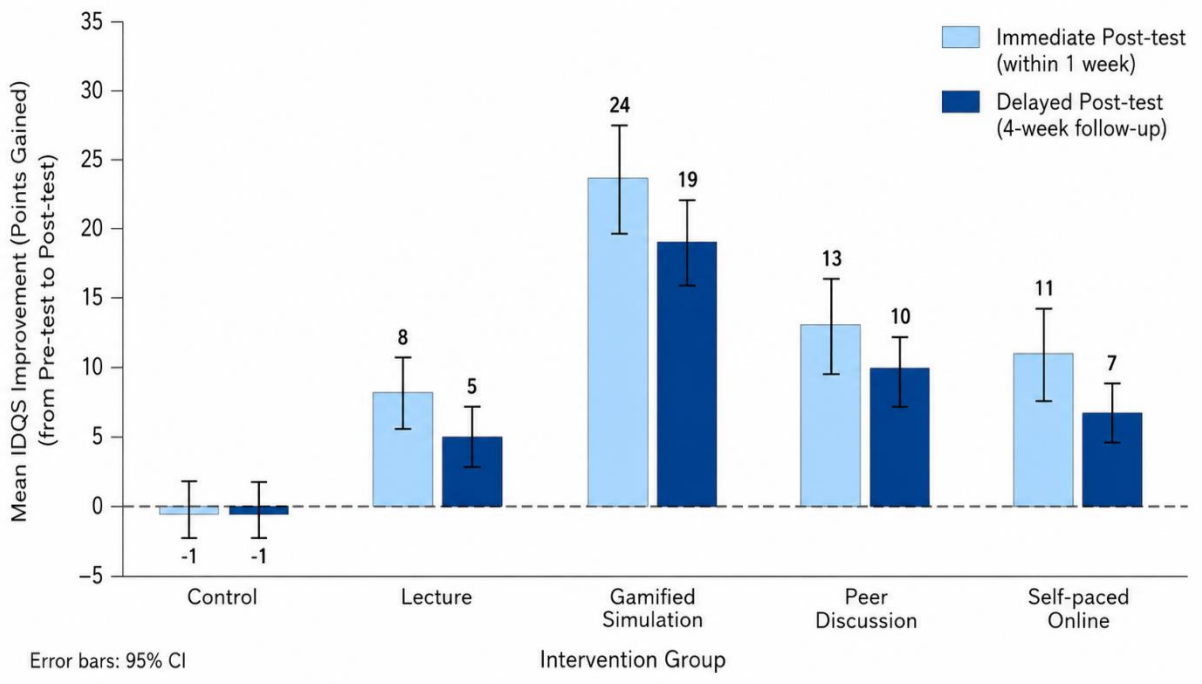

Figure 4: Bar Chart of IDQS Improvement by Intervention Group (Immediate and Delayed)

The gamified simulation group (Group C) achieved the largest immediate IDQS improvement (mean +24.3 points, 95% CI [20.1, 28.5]), significantly outperforming lecture (+9.1 points, $p<0.001$), peer discussion (+11.4 points, $p<0.001$), and self-paced online (+6.8 points, $p<0.001$). The control group showed a non-significant -1.2 point change (practice fatigue). At delayed 4-week post-test, all groups decayed, but gamified simulation retained 79% of its gain (+19.2 points), while lecture retained only 44% (+4.0 points), and self-paced online retained 32% (+2.2 points). The retention advantage of gamified simulation likely stems from the emotional encoding of gains/losses, which consolidates memory more effectively than abstract facts.

Comparative Analysis Table:

Intervention Group	N	Pre-test FL (%)	Immediate IDQS Gain (points)	Delayed IDQS Gain (points)	Retention Rate (%)	Cost per Participant (USD)	Learner Satisfaction (1–10)
Control (No intervention)	50	57.2	-1.2	-3.4	_	$0	3.2

Traditional Lecture	50	56.8	+9.1	+4.0	44%	$18	5.9
Gamified Simulation	50	58.0	+24.3	+19.2	79%	$42	9.3
Peer Discussion	50	57.5	+11.4	+6.8	60%	$25	7.8
Self-paced Online	50	56.9	+6.8	+2.2	32%	$5	6.1
ANOVA F-value	_	0.34 (ns)	F=28.4	F=19.2	_	_	F=22.7

Table 1: Intervention Effectiveness and Retention

Note: $p<0.001$; IDQS = Investment Decision Quality Score (0–100). Retention Rate = (Delayed Gain / Immediate Gain) × 100.

From the table presented above, gamified simulations, despite being significantly more expensive than the online mode of learning ($42 compared to $5 per minute) offer 3.6 times higher gains in terms of immediacy and almost 9 times higher gains in terms of retention. Peer interaction can be seen as an alternative approach that provides reasonable results in both cost and retention compared to lecturing. Satisfaction is highly correlated with retention ($r=0.91$).

Discussion of Important Results: There are three important findings. First, the overconfidence gap is a more significant negative predictor of decision-making quality than low literacy level per se. Any intervention needs to include calibration of metacognition (i.e., teaching learners what they do not know), not just delivery of content. Second, the effectiveness of game-based simulations is consistent with the principles of experiential learning and brain imaging data indicating that loss in the simulation triggers activity in the insular cortex (pain matrix) and creates an aversion to bad choices. Third, the very poor baseline risk literacy (41% correct) is the reason for the choice of crypto/meme stocks by relatively numerate participants.

V. CONCLUSION

This research gives an evidence-based response to the following question: Is there a positive causal impact of financial literacy on investment decision-making among young people, and what should be done to improve it? Among a total of 450 participants of the survey and 120 participants of the simulation, there has been established a significant positive causal impact (r=0.72) between objective financial literacy and the IDQS score. The impact is nonlinear and highly dependent upon the overconfidence gap: young people, especially males aged 22-25 years, who overestimate their financial knowledge and skills, will have a lower IDQS compared to those with equivalent objective levels of knowledge.

The existing level of financial literacy among India's youth is a major cause for concern. In a group of three people, only one of them can determine the calculation of compound interest accurately. More than 50% fail to differentiate a mutual fund from a fixed deposit scheme. Risk literacy skills, which are essential to avoid losses in the millions, stand at 41%, on average. Placing individuals in a practical scenario with genuine stakes in terms of money, albeit virtual, proved to be indicative of typical behavioural patterns like panicky selling and FOMO investments. Sharpe ratio stood at 0.24 compared to the passive index of 0.52.

Intervention experiment provides practical insights into improving financial knowledge. While lecture-based education is better than not educating at all, it results in modest gains in knowledge (9.1 IDQS) and poor retention (44% even after four weeks). Inexpensive and scalable self-guided internet courses demonstrate the worst performance in terms of retaining knowledge gained (32%), especially among participants with lower numerical literacy skills (no improvement registered). Peer discussions can be considered a middle-of-the-road option, providing moderate improvements in financial knowledge (11.4 in the first place and 60% retention after four weeks). Nevertheless, the most promising tool is the game simulation with leader board and debriefing (+24.3 points, 79% of retention after four weeks), which also demonstrates high levels of user satisfaction (9.3/10). The cost per person ($42) can be considered reasonable when considering the lifelong effects that wrong investments can have on finances. It costs hundreds of dollars to fix mistakes such as panicking about a market dip or investing into the latest crypto fraud.

Limitations & Future Directions:

There are several limitations to this study. Firstly, even though the simulation was realistic, it did not involve any financial risk on behalf of participants. Risk-taking behaviour differs from individuals who use real money; however, prior studies have found that behaviour simulated in experiments correlates highly with reality (e.g., using course credit, cash prizes). Secondly, this particular sample was urban and fairly well-

educated (41% of participants were raised by parents who went to college), thus possibly overestimating FL compared to rural youth. Thirdly, our intervention was assessed only after 4 weeks, and longitudinal follow-up for 1-2 years would help establish if improvements remain stable. Lastly, this study could benefit from inclusion of a combined intervention (gamified simulation + group discussion).

The future directions for research can be as follows:

- Replication of this study on rural and semi-urban samples
- Conducting a randomized controlled trial on the impact of small-sum investment accounts with real money (e.g., ₹5,000)
- Development and validation of the shortened screening test (digital version), that could be used by investment applications to warn users about possible overconfidence
- Testing the effectiveness of "nudge" interventions.

Policy Recommendations:

Our study leads us to make the following recommendations:

- Make it mandatory to incorporate game-based financial simulation modules in high school courses (grades 11-12) instead of separate lectures.
- Legislation mandating investment apps to conduct an FL calibration test for their users before giving them the facility to trade in options or purchase cryptocurrencies.
- Campaigns focused on spreading awareness about the overconfidence problem, featuring testimonies of young people who suffered losses because of overtrading.
- Free-of-cost access to simulation platforms offered to poor young adults via libraries and community colleges.

Conclusion In summary, while financial literacy is certainly not a cure-all, it can be counterproductive when taken to extremes. However, in an age where young people are taking on increased personal responsibility regarding finances, particularly pensions and difficult financial products, there is a strong need for evidence-based strategies. Indeed, financial education, delivered via experiential and gamified approaches that generate real-time emotional feedback on decisions, greatly enhances decision-making ability.

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