

The Role of Financial Education in Shaping Investment Behavior and Business Decision-Making Skills of Management Students

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ABSTRACT:

The present study aims to investigate the role of Financial Curriculum and Simulation Learning in moderating the Investment Behavior of management students of Pakistan through the process of Decision Competence. The study builds upon the premise from Human Capital Theory, Experiential Learning Theory, and Student Engagement Theory to create a moderated mediation model. Financial Curriculum and Simulation Learning significantly increase Decision Competence and Investment Behavior, where Simulation Learning had the higher effect on Decision Competence.

The three variables, Decision Competence, Investment Behavior, and the educational pathways, are related in a way that Decision Competence is able to predict Investment Behavior, with significant mediation effects in both pathways. Learning Engagement enhances the impact of Financial Curriculum and Simulation Learning on Decision Competence. The model has good explanatory and predictive power, emphasizing the need for practical, engaging financial education to foster informed investment practices and business decision-making.

Keywords: Financial Curriculum; Simulation Learning; Decision Competence; Learning Engagement; Investment Behavior.

Introduction

While financial markets can be accessed online, it does not automatically mean that participants are well-informed. Young adults need to assess complex products, compare risk–return choices, and make investment decisions in the context of information overload, behavioral biases and technological change. These demands are

especially significant for students in management programs, where they require some financial skills to invest themselves and to manage the investments of their employers. Financial education must thus be seen as human-capital development, i.e., transferring knowledge gained in the classroom into good investment decisions and responsible financial behavior. A meta-analysis of 76 randomized experiments with over

160,000 participants found that financial education has positive causal effects on financial knowledge and downstream behavior, depending on program design and delivery (Kaiser et al., 2022).

This is particularly relevant in Pakistan, where students are increasingly being introduced to new opportunities through digital financial and investment platforms that can be greater than their real-life decision experience. Market uncertainty, financial knowledge differentials and religious influences on assessing the conventional and Islamic options also influence the environment. According to 686 investors in Pakistan, financial literacy positively influenced objective-oriented investment behavior and confidence in managing investments promoted financial literacy to action (Shah et al., 2024). This confirms the relevance of financial capability, but it does not tell us how universities can create education that will build decision-making skills prior to professional life.

One drawback of previous studies is that they have approached financial education as a mere exposure or financial literacy as a stock of knowledge. This ignores the difference between curriculum-based teaching and experience-based teaching. While Financial Curriculum conveys the practical and coherent character of the formal finance curriculum, Simulation Learning helps learners connect concepts to their practice using virtual portfolios, trading exercises, business scenarios and decision games. These mechanisms are important to consider separately, as they have different impacts on financial knowledge and stock-market participation (Hermansson et al., 2022). Furthermore, a multi-country randomized test with 2,220 students demonstrated that financial education using games enhanced the students' knowledge of money, with the advantage of an active and not exclusively didactic delivery (Cannistrà et al., 2024).

However, educational inputs do not necessarily lead to disciplined investment behavior. Decision Competence, the capacity to diagnose financial difficulties, compare options, navigate uncertainty and justify a decision, provides a

meaningful link between education and action. The evidence from management education suggests that using a game-based approach enhances business decision-making through the visualization of consequences, the ability to adapt assumptions, and to learn from feedback (Lee & Yu, 2025). These benefits however are not necessarily equal. Students who work cognitively harder, are more active and more persistent in their attempts to do the harder things should gain more competence from curriculum and simulation activities. Learning Engagement thus has the potential of enhancing the impact of Financial Curriculum and Simulation Learning on Decision Competence.

For this purpose, this study explores the effects of Financial Curriculum and Simulation Learning on Investment Behavior via Decision Competence in the context of management students in Pakistan and tests the role of Learning Engagement as a moderator variable between both sets of variables. Based on the integration of Human Capital Theory, Experiential Learning Theory and Student Engagement Theory, a conditional process model is developed to explain what students learn, how they practise the learning, when learning translates into competence and how this competence influences their investment behavior.

Theoretical Background

The objectives of this study are based on the Human Capital theory, Experiential learning theory, and Student engagement theory as the basis in explaining the process of the development of investment behavior of management students through financial education. Human Capital Theory suggests that education helps to improve people's knowledge, analytical and decision-making ability. The financial curriculum in this study is an educational investment for students, providing concepts on risk, return, diversification and planning. This type of knowledge should enhance Decision Competence, which is defined as the ability to consider alternatives and make informed financial decisions. There is evidence that well-designed financial education leads to enhanced

financial knowledge and subsequent financial behaviors (Kaiser et al., 2022).

Experiential Learning Theory builds on this idea by focusing on learning by doing, thinking, and feedback. Students gain experience in applying financial concepts by engaging in virtual trading, portfolio exercises, cases in business and decision games in Simulation Learning. These activities bring abstract knowledge to life, allowing learners to encounter real-life consequences and multiple decision cycles. Game-based or simulation-based learning has been proven to enhance financial literacy and management decision-making (Cannistrà et al., 2024; Lee & Yu, 2025).

There are reasons given in the Student Engagement Theory for the different impact of curriculum and simulations on students. Educational exposure is more likely to be translated into DC when students put forth cognitive effort, when they actively engage in the learning process, and when they persist in challenging activities. Therefore, it is expected that Learning Engagement will enhance the effects of Financial Curriculum and Simulation Learning in the area of Decision Competence. Overall, the three theories support a moderated mediation model with the education inputs leading to competence, competence leading to Investment Behavior, and engagement leading to the strength of learning.

Hypotheses Development

Financial Curriculum and Decision Competence

According to the Human Capital Theory, education is an investment, in which people gain knowledge and abilities that enhance their judgment and performance. Financial education has a curriculum that is well designed, and it introduces financial planning, diversification, financial appraisal of investment, financial risk–return, and financial alternatives to the learners. Financial Curriculum is not only an outcome of the exposure of students to financial courses but also an indicator of how financial content is presented by universities and whether the courses is relevant, coherent, practical and contemporary. A program that is linked to a real-world financial

issue should include the opportunity for management students to analyze information, make comparisons, identify potential issues, and make decisions.

There have been positive causal effects of financial education on financial knowledge and financial behavior, with the degree of these effects varying by program design and instructional quality (Kaiser et al., 2022). Furthermore, there is evidence that education may help to gain knowledge of finances and analytical skills related to finances. In the Pakistani higher-education landscape, a pertinent financial course could be of special significance for students as they have to choose what they should do in a market environment where volatility is widespread, digital investment products are available, information asymmetry is a common problem, and conventional financial products are available along with Islamic financial products. Students who believe their financial education is relevant and realistically applicable should build their Decision Competence.

H1: Financial Curriculum positively influences Decision Competence among management students.

Simulation Learning and Decision Competence

Experiential Learning Theory states that competencies are formed when people apply conceptual knowledge, watch the outcomes of their decisions, think about the outcome, and then make different decisions in the future. In Simulation Learning, students have the opportunity to trade virtually, build their portfolios, play investment games, undertake financial cases, and make business decisions. Simulations are different from passive instruction in that they involve choices made by students while giving them an environment that mimics the real financial market without any real financial consequences.

The study revealed that an online game-based financial education intervention had a significant impact on students' financial literacy, establishing the financial education value of interactive financial learning (Cannistrà et al., 2024).

Likewise, the study of management education has shown that gamification-based learning helps students grasp intricate business relationships and improve business decision-making skills (Lee & Yu, 2025). Thus, simulations can be useful to get students to go beyond memorizing financial concept to applying financial concepts in uncertain and dynamic contexts. Management students should be able to make decisions that are informed by evidence and structured as they continuously assess alternatives, gain feedback and correct unsuccessful alternatives.

H2: Simulation Learning positively influences Decision Competence among management students.

Decision Competence and Investment Behavior

Decision Competence is the individual's capacity to identify a financial problem, find information, consider alternative courses of action, deal with uncertainty, and choose a course of action. Investment Behavior is the disciplined usage of these skills in terms of goal setting, portfolio diversification, risk assessment, information evaluation and longterm investment planning. The decision competent students should be less likely to make decisions based on speculation, social pressure or incomplete information and more likely to think of the possible consequences of their decisions.

The relationship holds true in Pakistan more than any other country, as the younger investors are seeing more and more investment opportunities that are available online but may not be enough information for them to tell the difference between investing and speculating. The results of Pakistani investors indicated that objective-oriented investment behavior is influenced by financial skills and in terms of investing, confidence in financial skills plays a crucial role in converting it into action (Shah et al., 2024). The ability to apply understanding of finances to coherent investment practices should also be included in Decision Competence.

H3: Decision Competence positively influences Investment Behavior among management students.

Financial Curriculum, Simulation Learning, and Investment Behavior

Financial Curriculum can also have a direct impact on Investment Behavior since it offers students directives for saving, diversification, portfolio construction, and risk management. Financial information that is relevant and applied should help to promote students' ability to set investment goals, consider financial products and prevent impulsive behavior. In general, financial education has been found to have positive impacts on financial behaviors in followers, but the behavioral impacts have been seen to differ across financial education designs and populations (Kaiser et al., 2022). Moreover, it has been shown that the channel of financial knowledge acquisition has an impact on stock-market participation, which implies that the content and the communication of financial knowledge are important to investment outcomes (Hermansson et al., 2022).

H4: Financial Curriculum positively influences Investment Behavior among management students.

Simulations can also have direct impact on Investment Behavior because students can practice investment behaviors and experience the outcomes of these behaviors. With repetitive exposure to portfolio exercises, investment routines can be developed, familiarity with information about the market can be increased, and the hesitation to facing real financial decisions can be diminished. Business simulations have been found to trigger managerial decision making and enhance students' engagement of learning activities, and game-based financial interventions have been found to enhance financial learning outcomes (Cannistrà et al., 2024; Randall et al., 2025). Realistic investment simulations should be accompanied by increased Investment Behavior that is informed and disciplined.

H5: Simulation Learning positively influences Investment Behavior among management students.

Mediating Role of Decision Competence

Financial education does not automatically lead to financial practices as financial information does not guarantee that financial practices will be used when making a choice in a situation. Decision Competence is the mechanism that transforms learning in the classroom into action. Financial Curriculum provides pupils with organized knowledge, analysis tools and decision principles. They enhance their ability to evaluate risk and return, to consider investment options and to defend investments. It is then hoped that greater competency will inspire further meaningful Investment Behavior. Therefore, it is expected that Financial Curriculum has an effect on Investment Behavior in part through Decision Competence skills.

H6: Decision Competence mediates the relationship between Financial Curriculum and Investment Behavior.

Simulation Learning is similar but more related to application. Simulations involve making active decisions, feedback and reflection on effective and ineffective strategies in the context of an uncertain situation. The experiences build students' ability to address financial challenges and make informed choices. Based on the research about game-based learning, the following points can be concluded: Firstly, immersive experience and motivation in game-based learning become important factors that contribute to developing business decision-making ability (Lee & Yu, 2025). For this reason, Investment Behavior ought to be influenced by Simulation Learning, as it is the first step in a process that leads to the development of competence to make informed investment decisions.

H7: Decision Competence mediates the relationship between Simulation Learning and Investment Behavior.

Moderating Role of Learning Engagement

Student Engagement Theory suggests that learning resources are not all equally effective for every student. Their effectiveness is in part related to the mental, physical, emotional and

perseverative effort of students. Thus, Learning Engagement should be viewed as a boundary condition for the development of Financial Curriculum in terms of the achievement of Decision Competence. Highly engaged students will be more likely to pay attention, make the connection between finance and real-life issues, ask questions and consider the consequences of financial information. Students who are not engaging may, on the other hand, be able to learn the same curriculum without gaining the same decision-making skills. A recent study by Wu et al. (2024) indicates that active learning methodologies can foster engagement and higher-order thinking skills in management education.

H8a: Learning Engagement positively moderates the relationship between Financial Curriculum and Decision Competence, such that the relationship is stronger when Learning Engagement is high.

Learning Engagement should also enhance the connection between Simulation Learning and Decision Competence. Simulations need to be active, involved, experimental, and reflective. Highly engaged students should be making more careful choices for simulation, paying attention to feedback more carefully, and making changes in their strategies based on feedback after the simulation. Less engaged students might view simulations as a game or required classwork, rather than learning tools, and gain fewer competence-related benefits. The literature from introductory business education suggests that simulation can aid in student engagement and participation, which underscores the importance of student participation in experiential learning settings (Randall et al., 2025). Therefore, highly engaged students will have more competence in Simulation Learning.

H8b: Learning Engagement positively moderates the relationship between Simulation Learning and Decision Competence, such that the relationship is stronger when Learning Engagement is high.

Because Learning Engagement strengthens the two educational input–competence relationships,

the indirect effects of Financial Curriculum and Simulation Learning on Investment Behavior through Decision Competence are also expected

to vary across levels of engagement. The proposed framework therefore represents a first-stage moderated mediation model.

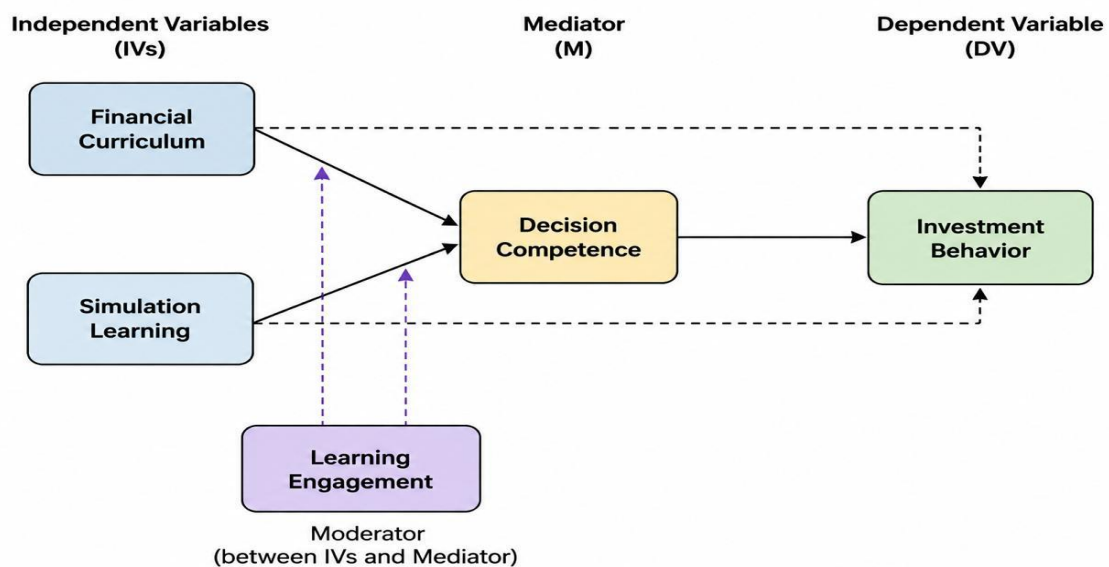


Figure 1: Conceptual framework

Methodology

Research Design

The study used a quantitative, explanatory, three-wave time-lagged research design to investigate the relationship between Investment Behavior (IB) and Decision Competence (DC) as well as the moderating role of Learning Engagement (LE) between the two educational inputs (Investment Behavior, FC and SL) and Decision Competence. A research design was designed to reflect the gradual process of how students' exposure to financial education and simulation learning was transferred to improving decision competence, and then to more systematic investment behavior. To achieve the temporal separation of the predictor, mediator, and outcome variables, a three-wave design was used. Financial Curriculum, Simulation Learning, and Learning Engagement were measured at Wave 1. The measures for Decision Competence and Investment Behavior were measured at Wave 2 and Wave 3, respectively. This temporal separation facilitated the respondents to see only partial concept 'snapshots,' and minimized the chance that observed relationships were confounded by simultaneous measurement of the

predictors, mediator, and outcome. Temporal separation was also an important procedural method to minimize potential common method concerns if the data were collected from the same respondents (Kock et al., 2021).

The three waves were separated by five-week intervals. Wave 1 followed a minimum of four weeks of a course or courses related to finance and/or investment; it required that students be exposed to the statement of learning and related learning activities. Wave 2 five weeks later aimed to measure Decision Competence following further academic and experiential learning. After another 5-week period, Wave 3 was administered to determine Investment Behavior. Selected time intervals allowed for learning processes and decision-making capacities to progress without adding too many unnecessary dropouts across the three data-collection points.

Research Context and Population

The study was carried out among an undergraduate and postgraduate student of management in the recognized universities of Higher Education Commission of Pakistan. Academic programs eligible for the scholarship were BBA, BS Management Sciences, BS

Accounting & Finance, MBA and related business & management programs. The management students were the right population to study since they were exposed to financial knowledge, financial investment principles and business decision making in their academic programs. Furthermore, these students were an important emerging cohort of prospective managers, entrepreneurs, investors, and financial decision makers whose education may impact their future financial and investment practices. To participate in the study, students had to be 18 years or older, have completed or be taking at least one finance, investment, financial management or finance or portfolio related course and have had at least one applied learning activity. These activities were business cases, investment exercises, portfolio simulations, virtual trading activities, financial decision games or similar experiential learning activities.

Students in the first semester without prior financial-related coursework were not included as they were unlikely to have enough experience to be able to assess the relevance and usefulness of the financial curriculum or simulation-based learning activities.

Sampling Strategy and Sample Size

To get participants from different geographical and institutional contexts in Pakistan a multistage stratified sampling has been used. In the first phase, universities were segmented based on geographical region and ownership of the university. The geographical strata comprised of Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan and Islamabad Capital Territory. Institutions were also classified as public and private universities. The identified strata were then approached at the universities based on the accessibility of the institutions and permission for the study. The second stage involved identifying business and management-related programs and finance-related courses, in the participating institutions. The third phase involved inviting students to participate by the various departments, program offices and course instructors who met the specified prerequisites.

A priori power analysis was used to determine the sample size needed for the study and not the usual ten times rule. The sample size determination considered the smallest theoretically meaningful structural effect, the presence of two interaction effects in the proposed model, the desired statistical power (at or above .80), and the alpha level (.05). Since the interaction and mediation relationship needed to be carried out more statistically stable than the simple direct relationship, the study aimed at least 450 matched full responses in three waves. Therefore, 650 students were approached at Wave 1, anticipating that some students might drop out at Wave 2 and Wave 3. Respondents whose identification codes were successfully matched across all three waves of data collection were only included in the final dataset for hypothesis testing purposes.

Data-Collection Procedure

Prior to the data collection, the relevant university authorities, department heads, program coordinators and course teachers were contacted and asked for permission. All participants were provided with an information sheet outlining the purpose of the study, the voluntary nature of the study, confidentiality measures and the right to withdraw from the study without consequence to their academic studies. Students were told that their involvement would not impact their grades, attendance, assessment results, or academic status. Responses to questionnaires were not provided to course instructors.

The Financial Curriculum, the Simulation Learning and the Learning Engagement were administered at Wave 1. The same students took part in Wave 2 five weeks later, when the students' Decision Competence was measured. After another 5-week period, participants filled out the Investment Behavior measure (Wave 3). To match participants across the three waves, a self-generated anonymous identification code was used. The coding process was based on data the participants were able to replicate during the different administrations of the survey without identifying themselves in the data. All future

survey invitation contact information was kept separate from questionnaire responses. To minimize longitudinal attrition, reminders were sent throughout each data collection time period. Furthermore, the questionnaires included attention checks and minimum completion-time requirements that were determined in pilot testing to pick up any potential careless or inattentive answering.

Instrument Development and Pretesting

The questionnaire was first drafted in English given the fact that English was the major medium of instruction in the business and management programs in Pakistani Universities. An Urdu version was also prepared to make sure that the students who were more comfortable in Urdu did not miss out on participating. The questionnaire was translated into Urdu by two bilingual experts independently and then back-translated into English by two different bilingual experts. The research team checked for differences between the original and back-translated versions, paying attention to both conceptual and contextual equivalence, but not to word-for-word accuracy. This first instrument was then tested by a panel of 8 specialists, all of whom have expertise in finance, investment, management education, educational psychology and quantitative research methodology. Relevance, clarity, cultural appropriateness and construct representativeness of items were assessed by experts.

Twenty management students were then interviewed to conduct cognitive interviews. The interviews were useful in identifying potentially ambiguous terminology, unclear instructions, inappropriate contextual assumptions and problems in interpreting the scenarios of decisions. After this, an independent pilot study was conducted with 150–200 management students from institutions outside of the main study. The pilot study evaluated item clarity, item reliability, variability of responses, time to complete the questionnaire, and appropriateness of and difficulties with the Decision Competence tasks. Observations from the pilot study and were not used in the final data set. Hypotheses for the studies, inclusion and exclusion criteria, decisions

on measurements, and the main analytical procedures were decided prior to analysis of the final dataset. All of these procedures limited the flexibility in analysis and thus increased the confirmatory nature of the study.

Measurement of Constructs

Financial Curriculum

Financial Curriculum was how students interpreted the meaning, consistency, timeliness and applicability of the content of the courses introduced in their academic programs that dealt with the financial aspects of life. The construct was designed to reflect how much formal financial education helped to develop the knowledge and perspectives students had on contemporary investment decision-making. A short preliminary measure was created based on a review of the financial education and curriculum design literature. The questions collected students' perceptions about the coverage of the relationships between risk and return, diversification, financial planning, modern investment options, digital financial products, traditional and Islamic investment options and the practical use of financial concepts. Representative items were: "In my finance curriculum, I compare alternative investment opportunities" and "The financial topics covered in my program are relevant to current investment decisions." Responses were made on a 7-point Likert-type scale 1 being strongly disagree and 7 is strongly agree. Financial Curriculum was designed to be a reflective construct since the indicators were seen as expressions of students' perceptions of the effectiveness of the curriculum.

Simulation Learning

Simulation Learning was defined as the students' perceptions of how well simulation-based and experiential learning activities afforded opportunities for students to make financial decisions, experiment, get feedback, and reflect. The construct included a range of activities, including virtual portfolios, investment simulation, trading games, business cases, financial decision exercises, etc., applied learning activities. About six items were adapted from the

literature on simulation and experiential learning. Selected items were: “I can make financial decisions without real risk in the simulation activities,” “Feedback from simulations helps in further decision making,” and “Financial theory is linked to real-life financial problems in simulations.” The answers were given on the seven-point Likert-type agreement scale from 1 (strongly disagree) to 7 (strongly agree). The reflective construct, Simulation Learning, was specified.

Decision Competence

Decision Competence was the ability to use appropriate principles when considering financial options and deciding on investments. Unlike other main constructs, Decision Competence was not only measured by subjective self-reports, but also by an objectively scored decision battery that contained items related to finance. The instrument was based on Adult Decision-Making Competence, the framework into four domains: Applying Decision Rules, Resistance to Framing, Consistency in Risk Perception, and Resistance to Sunk Costs. There were 24 brief decision scenarios in the finance-contextualized assessment involving portfolio selection, risk probabilities, prior losses in the financial sphere, investment fees, diversification, and comparing investment options. Responses were scored as 1 if they were correct or normatively consistent and 0 if they were incorrect or inconsistent. The scores of each of the decision domains were calculated and standardized prior to the overall Decision Competence score. Standardization allowed the domains with varying numbers of questions to not have an unequal impact on the overall construct score. During the pilot testing, the difficulty, discrimination, response patterns and relationships between decision tasks and relevant financial knowledge indicators were considered.

Investment Behavior

The investment behavior was measured by the Objectives Oriented Investment behavior scale developed by Rastogi and Gupta 2020. The construct reflected planning an investment systematically, making an investment decision

according to financial aims, evaluating the information, evaluating the investment alternatives, and allocating financial resources properly. The same scale had also been used in a study conducted with Pakistani investors (Shah et al., 2024). The wording of selected items has been modified to suit the context of management students, including those students without experience of real-world portfolios but having experience of virtual portfolios, simulated investments or planned investment decisions. The items evaluated behaviors included setting investment goals and objectives, seeking information prior to investment decisions, evaluating potential returns and risks, allocating available resources to investments, and determining if investment decisions were still consistent with financial objectives. The responses were measured by a five-point frequency scale from 1 (never) to 5 (always). Investment Behavior was defined as a reflective construct.

Learning Engagement

Learning Engagement measured the level of involvement of the students in learning finance and investment in terms of cognitive, emotional, behavioral and proactiveness. Measured with the Higher Education Student Engagement in Learning Activities—Short Scale. There were four engagement dimensions represented by the instrument (cognitive, affective, behavioral, and agentic) with three items for each dimension. The content was adapted to the context of finance and investment but still retained the conceptual content of the items. The four engagement dimensions were conceptualized as an overall higher-order construct, Learning Engagement. The responses were collected on a 5-point Likert-type agreement scale. In the proposed model, Learning Engagement was the mediator variable and was supposed to moderate the relationships between Financial Curriculum and Simulation Learning and Decision Competence.

Data Screening

The matched dataset was screened prior to analysis to check the quality and integrity of observations. Duplicate submission, too few or

too many missing responses, failure to meet attention check requirements, straight-lining, inconsistently logical responses, and too brief an answer to the questionnaire were all addressed in the screening process. The cases that did not meet the predetermined quality criteria were excluded prior to the evaluation of the measurement and structural models. The final analytical data set included only the respondents who completed all three waves and were successfully matched on all three waves and who met the data quality criteria. Descriptive statistics were then computed to describe the characteristics of participants and the distribution of the constructs studied. Demographic characteristics were merely included to describe the sample and not fed into the proposed structural model.

PLS-SEM Analysis

Partial least squares structural equation modelling (PLS-SEM) was used to analyze the proposed research model. The relationships between Financial Curriculum, Simulation Learning, Decision Competence, Investment Behavior, and Learning Engagement, along with the proposed mediation and moderation effects, were estimated using PLS-SEM. There were three main stages to the analytical process. The quality of the measurement model was first determined. Second, the proposed structural model and hypothesized relationships were validated. Thirdly, the predictive relevance of the endogenous constructs was tested using the blindfolding procedure. In the conceptual framework only, those constructs were included in the PLS-SEM model based on the conceptual framework. The structural analysis was not performed with any control variables or marker variables.

Measurement Model Assessment

The measurement model was evaluated prior to interpreting the hypothesized structural relationships. The indicator loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) were used to evaluate reliability and convergent validity. Indicator loadings of 0.70 or greater were regarded as

acceptable. Indicators with relatively low loadings were analyzed along with their theoretical significance and their impact on the reliability of the construct and convergent validity, instead of being dropped mechanically. Cronbach's Alpha and Composite reliability were used to check for internal consistency reliability. Values of 0.70 or above were regarded as satisfactory reliability. Further, composite reliability values were analyzed to assure that indicators were consistent in representing their respective latent constructs. The average variance extracted was used as an indicator of convergent validity. Constructs that had an AVE ≥ 0.50 were interpreted as having at least 50% of the variance of their indicators explained. The heterotrait–monotrait ratio of correlations (HTMT) was primarily used for evaluating the discriminant validity. The results showed that the constructs had an acceptable level of empirical distinctiveness (HTMT values below the accepted threshold). Variance inflation factor (VIF) statistics were also used to check for excessive collinearity to ensure the estimation of the proposed structural relationships. All of these procedures provided the reliability, convergent validity, discriminant validity, and overall adequacy of the measurement model prior to assessment of the structural model.

Structural Model Assessment

The structural model was then assessed for satisfactory measurement properties to test the hypothesized relationships. Direct relationships examined the effects of Financial Curriculum on Decision Competence, Simulation Learning on Decision Competence, and Decision Competence on Investment Behavior. The indirect effect of Financial Curriculum and Simulation Learning on Investment Behavior via Decision Competence was also tested using the model. In order to explore the moderating effect of Learning Engagement, two interaction terms were created: Financial Curriculum $\times$ Learning Engagement $\rightarrow$ Decision Competence and Simulation Learning $\times$ Learning Engagement $\rightarrow$ Decision Competence. A nonparametric bootstrapping procedure with 10,000 bootstrap resamples was used to determine the statistical significance of the structural relationships. The

hypotheses were evaluated using standardized path coefficients (β), standard errors, t-values, p-values and bootstrapped confidence intervals. The specific indirect effects of Financial Curriculum and Simulation Learning on Investment Behavior were assessed via Decision Competence. Any indirect effect that did not contain zero within its bootstrapped 95% CI was deemed to be statistically significant. This led to the direct effect being excluded from the assessment of mediation as it was not necessary to fail a separate significance test. Moderation was assessed using the two interaction coefficients and their statistical significance. A meaningful interaction between the two factors Financial Curriculum and Learning Engagement was found, with the interaction results in significant differences between the relationship between Financial Curriculum and Decision Competence depending on the Learning Engagement level of students. Likewise, a substantial Simulation Learning $\times$ Learning Engagement interaction was found, which showed that Learning Engagement moderated the effects of Simulation Learning on Decision Competence. Significant interaction effects were interpreted graphically, by looking at the combinations at low and high levels of Learning Engagement. The explanation ability of the structural model was checked by the coefficient of determination (R^2) which is obtained for the endogenous constructs of Decision Competence and Investment Behavior. Increased R^2 values were an indicator of a greater amount of variance explained by the hypothesized constructs. An effect size (f^2) was also tested to contrast the contribution of each of the predictor constructs to the variance in the endogenous construct. To evaluate the structural model, statistical significance, as well as the magnitudes and substantive significance of the hypothesized relationships were considered.

Blindfolding and Predictive Relevance

Blindfolding procedure was used to evaluate the predictive relevance of proposed model. The model was also blindfolded by systematically removing and then making predictions for the endogenous constructs. The procedure was then

used for the endogenous constructs in the proposed structural model: Decision Competence and Investment Behavior. Stone–Geisser Q^2 statistics were computed as a measure of redundancy between the endogenous constructs, cross-validated. Structural model showed predictive relevance for the respective endogenous construct with a Q^2 value higher than zero. Thus, the model proposed showed predictive relevance for the observations that were not covered by the model (positive Q^2 values), which confirmed its ability to replicate the omitted observations. The predictive relevance obtained for the endogenous constructs was also considered in the comparisons of the magnitude of the Q^2 statistics. The findings of the blindfolding results therefore supported the finding of R^2 whether the theoretical model proposed had predictive relevance besides explaining variance in Decision Competence and Investment Behavior.

Results and Analysis

Measurement Model Assessment

The assessment outcome of the measurement model for Decision Competence (DC), Financial Curriculum (FC), Investment Behavior (IB), Learning Engagement (LE), and Simulation Learning (SL) are presented in Table 1. In general, the results indicated an acceptable level of reliability in all indicators, and the internal consistency was satisfactory in all but one of the indicators. The convergent validity of all indicators was satisfactory, and the level of collinearity was acceptable in all but one of the indicators. The standardized factor loadings of all the factors were greater than the 0.70 required and ranged from 0.745 for LE3 to 0.876 for SL2. These findings suggest that all items do a satisfactory job of measuring the constructs they are intended to measure and none of the items had to be eliminated because of too low a loading. Inter-item reliability was also validated. Cronbach's alpha values ranged from 0.854 to 0.949 for the various scales, with the composite reliabilities between 0.901 and 0.955. Therefore, all constructs met the widely accepted criterion of a minimum acceptable reliability of 0.70, thus

having good consistency among their respective indicators. The average variance extracted (AVE) was used to verify convergent validity with the results were 0.639 for Learning Engagement and 0.733 for Simulation Learning. All AVE scores were greater than the recommended cutoff of 0.50, which meant that each construct accounted for more than half of the variance in its indicators. Also, the variance inflation factor

values were between 1.886 and 3.039. The values for all of the indicators were below the used threshold of 5.00, suggesting that problematic multicollinearity did not exist among the indicators. Overall, these results indicate appropriate reliability and convergent validity of the measurement model, thus justifying its use for the testing of the structural relationships and hypotheses.

Table1. Measurement Model Assessment

Construct	Indicator	Loading	Cronbach's α	CR	AVE	VIF
DC	DC_ADR	0.824	0.854	0.901	0.695	1.886
	DC_CRP	0.828				1.908
	DC_RF	0.833				1.920
	DC_RSC	0.851				2.061
FC	FC1	0.855	0.919	0.937	0.712	2.576
	FC2	0.837				2.320
	FC3	0.821				2.357
	FC4	0.860				2.803
	FC5	0.827				2.282
	FC6	0.861				2.679
IB	IB1	0.835	0.918	0.936	0.709	2.400
	IB2	0.867				2.759
	IB3	0.825				2.276
	IB4	0.865				2.736
	IB5	0.808				2.153
	IB6	0.850				2.451
LE	LE1	0.795	0.949	0.955	0.639	2.394
	LE2	0.810				2.545
	LE3	0.745				2.018
	LE4	0.796				2.356
	LE5	0.803				2.408
	LE6	0.806				2.392
	LE7	0.812				2.500
	LE8	0.810				2.487
	LE9	0.797				2.254
	LE10	0.832				2.690
	LE11	0.801				2.388
	LE12	0.784				2.276
SL	SL1	0.874	0.927	0.943	0.733	3.039
	SL2	0.876				2.992
	SL3	0.828				2.323
	SL4	0.854				2.600
	SL5	0.835				2.418
	SL6	0.870				2.862

Note: α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; VIF = variance inflation factor.

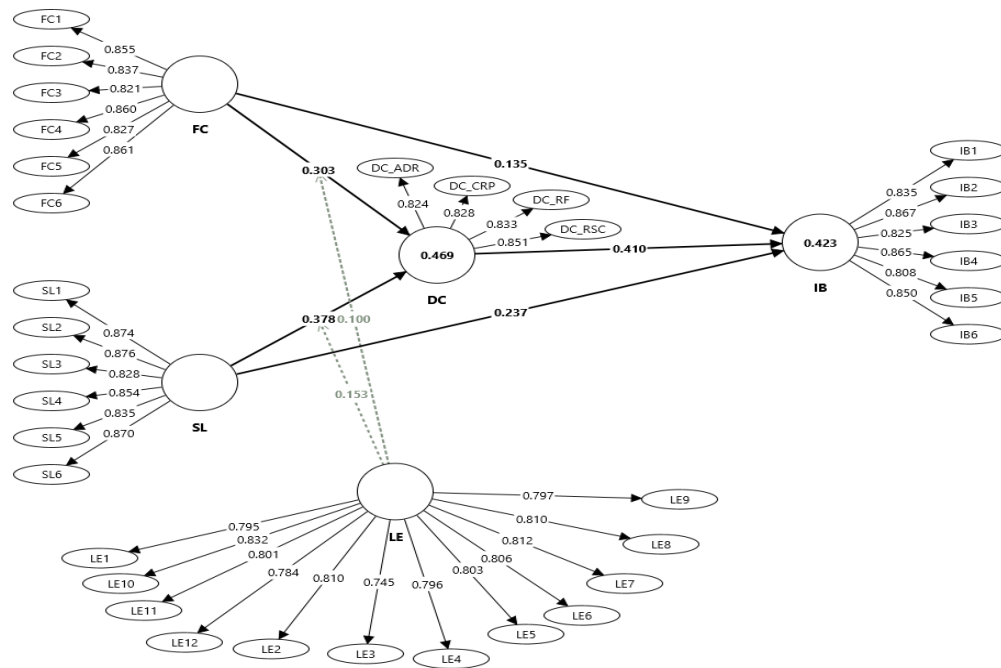


Figure 2: Measurement Model

Discriminant validity

Heterotrait–monotrait ratio (HTMT) was used to confirm the discriminant validity of the instruments between Decision Competence (DC), Financial Curriculum (FC), Investment Behavior (IB), Learning Engagement (LE), and Simulation Learning (SL). The HTMT values ranged from 0.259 to 0.677. Decision Competence and Investment Behavior (HTMT = 0.677), Decision Competence and Simulation Learning (HTMT = 0.596), and Decision Competence and Financial Curriculum (HTMT = 0.563) were the highest values. It was observed

that investment behavior and learning engagement showed the lowest association, which was 0.259. Importantly, all HTMT values have been lower than the accepted cutoff score of 0.85, which suggests that the constructs are empirically different from each other. Thus, findings support good discriminant validity and indicate that each of the constructs reflects a different conceptual dimension in the study framework. Thus, the measurement model meets the discriminant validity criterion and is suitable for further evaluation and testing of the structural model.

Table 2. Discriminant Validity (HTMT)

Construct	DC	FC	IB	LE	SL
DC					
FC	0.563				
IB	0.677	0.459			
LE	0.415	0.355	0.259		
SL	0.596	0.386	0.541	0.317	

Note: DC = Decision Competence; FC = Financial Curriculum; IB = Investment Behavior; LE = Learning Engagement; SL = Simulation Learning.

Structural Model

All proposed hypotheses are supported by the results from the structural model. The investment

behavior was most strongly linked with decision competence ($\beta = 0.410$, $t = 9.524$, $p < .001$) supporting H3. For Decision Competence, the

simulation learning had significant influence ($\beta = 0.378, p < .001$), and for Investment Behavior, simulation learning had significant influence ($\beta = 0.237, p < .001$), this supports H2 and H5. Financial Curriculum also positively influenced Decision Competence ($\beta = 0.303, p < .001$) and Investment Behavior ($\beta = 0.135, p = .001$) supporting H1 and H4. In line with H6 and H7, the indirect effect of Financial Curriculum through Decision Competence to Investment

Behavior was significant ($\beta = 0.124, p < .001$) as well as that of Simulation Learning through Decision Competence to Investment Behavior ($\beta = 0.155, p < .001$). Further, the relationship of the Financial Curriculum and Decision Competence was strengthened ($\beta = 0.100, p = .007$) and the relationship of Simulation Learning and Decision Competence was strengthened ($\beta = 0.153, p < .001$), which supported H8a and H8b.

Table3. Structural Model and Hypothesis Testing Results

Hypothesis	Path	β	STDEV	t-value	p-value	Decision
H1	FC $\rightarrow$ DC	0.303	0.037	8.160	0.000	Supported
H2	SL $\rightarrow$ DC	0.378	0.036	10.602	0.000	Supported
H3	DC $\rightarrow$ IB	0.410	0.043	9.524	0.000	Supported
H4	FC $\rightarrow$ IB	0.135	0.041	3.252	0.001	Supported
H5	SL $\rightarrow$ IB	0.237	0.042	5.584	0.000	Supported
H6	FC $\rightarrow$ DC $\rightarrow$ IB	0.124	0.021	6.019	0.000	Supported
H7	SL $\rightarrow$ DC $\rightarrow$ IB	0.155	0.021	7.285	0.000	Supported
H8a	LE $\times$ FC $\rightarrow$ DC	0.100	0.037	2.677	0.007	Supported
H8b	LE $\times$ SL $\rightarrow$ DC	0.153	0.039	3.961	0.000	Supported

Note: β = standardized path coefficient; STDEV = standard deviation. Hypothesis numbering follows the manuscript. Values are reproduced exactly as provided.

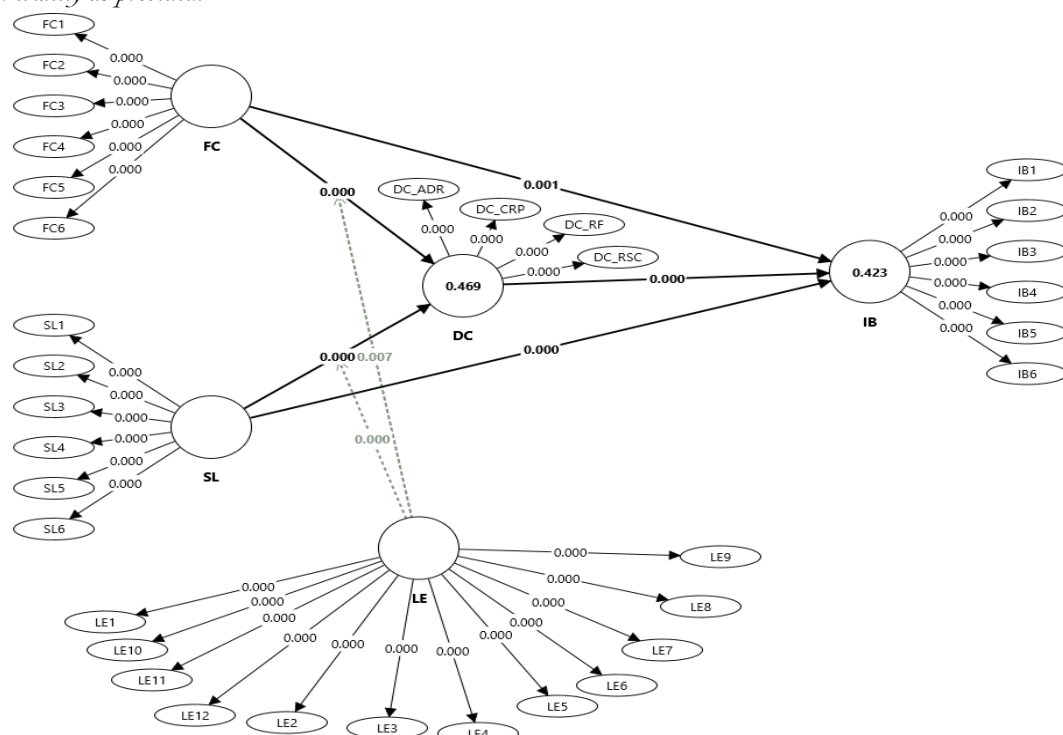


Figure 3: Structural Model

Structural Model Explanatory and Predictive Assessment

The structural model showed good explanatory and predictive accuracy. In Decision Competence (DC) the explanatory power of the

predictor variables was 46.9% ($R^2 = 0.469$ and adjusted $R^2 = 0.463$). The Investment Behavior (IB) model was found to have an R^2 of 0.423 and an adjusted R^2 of 0.419, indicating that the model accounted for 42.3% of the variance in Investment Behavior. When it comes to effect sizes, Decision Competence on Effects of Simulation Learning ($f^2 = 0.222$) showed the highest effect, followed by Decision Competence on Investment Behavior ($f^2 = 0.177$) and

Financial Curriculum on Decision Competence ($f^2 = 0.140$). Other effects were smaller; namely the effects of Simulation Learning on Investment Behavior ($f^2 = 0.069$), Learning Engagement on Decision Competence ($f^2 = 0.053$), and Financial Curriculum on Investment Behavior ($f^2 = 0.023$). In addition, the Q^2 values for DC (0.318) and IB (0.295) were both positive, indicating good predictive relevance.

Table4. Structural Model Explanatory and Predictive Assessment

Construct / Path	R^2	Adjusted R^2	f^2	SSO	SSE	Q^2
DC	0.469	0.463		1800.000	1227.891	0.318
IB	0.423	0.419		2700.000	1902.375	0.295
DC → IB			0.177			
FC → DC			0.140			
FC → IB			0.023			
LE → DC			0.053			
SL → DC			0.222			
SL → IB			0.069			

Note: R^2 = coefficient of determination; f^2 = effect size; SSO = sum of squares of observations; SSE = sum of squared prediction errors; Q^2 = predictive relevance ($1 - SSE/SSO$).

Discussion

The results indicate that Financial Curriculum and Simulation Learning have an effect on Decision Competence, and that Simulation Learning has a higher effect ($\beta = .378$ versus $\beta = .303$). The pattern indicates that greater effectiveness occurs when the students are repeatedly asked to make decisions under realistic conditions after being exposed to the concepts of financial education. This finding is similar to that of Cannistrà et al. (2024) who conducted a multi-country randomized trial on how a game-based financial education program positively impacted students' financial literacy; and Lee and Yu (2025) who examined how business simulation games impact decision-making learning among MBA students. As such, the greater effect of Simulation Learning lends additional support to the concept of Experiential Learning Theory, demonstrating that action, feedback, and reflection produce outside-of-the-classroom competence in addition to classroom content. The measure of Decision

Competence was the strongest direct predictor of Investment Behavior ($\beta = .410$), suggesting that the educational impact of financial knowledge is significantly related to students' ability to assess alternatives, uncertainty and consequences. This is consistent with the findings in Pakistan where financial literacy has been found to be a positive determinant of objective-oriented investment behavior for those who have confidence and capability in investment management (Shah et al., 2024). Financial Curriculum and Simulation Learning also had significant direct effects on Investment Behavior, with their indirect effects through Decision Competence being significant, suggesting partial mediation. There was increased learning engagement in both the education-competence relationships, and for Simulation Learning ($\beta = .153$) than for Financial Curriculum ($\beta = .100$). This result is consistent with Wu et al. (2024) who demonstrated that engagement promoting active learning leads to increased higher order thinking, and Randall et al. (2025), which revealed that business simulations

foster students' participation and managerial decision-making. The model accounts for 46.9% and 42.3% of the variance in Decision Competence and Investment Behavior, respectively, which indicates that curriculum quality, experiential practice, competence and engagement can provide a meaningful explanation of investment behavior among Pakistani management students. The positive Q^2 values also suggest that these relationships have predictive value.

Theoretical Implications

This study further extends the Human Capital Theory by demonstrating the behavioral value of financial education: that is, Decision Competence is a mediating variable that partially transmits the impact of Financial Curriculum and Simulation Learning to Investment Behavior. It builds on Experiential Learning Theory as Simulation Learning had a more significant impact on Decision Competence than Financial Curriculum, signifying that practice, feedback, and reflection play a crucial role in imparting financial capability. The results also add to Student Engagement Theory by pointing to the presence of Learning Engagement as a boundary condition to enhance competence development in the curriculum and simulation context. This fusion of views is what takes the study beyond the direct education–behavior explanations and provides a conditional process perspective that allows educational inputs to increase competence, competence to drive investment behavior, and engagement to influence the quality of the conversion of education inputs to capability.

Practical Implications

The results indicate that financial education in universities need to be changed to the content of the curriculum and financial education activities based on experience. Virtual portfolios, trading simulations, investment cases, risk–return comparisons and decision exercises must be integrated into the finance course, in addition to lectures. In the realm of assessment applied activities should be a substantive form of assessment and not an optional enrichment due

to the greater effectiveness that Simulation Learning had on Decision Competence. Universities should also provide formative feedback, reflection reports, and multiple rounds of decision making to give students insight into how investment decisions are successful or unsuccessful. Content of the curriculum in Pakistan should be based on the market realities, digital investment platforms, Islamic and conventional financial options and investor protection concerns. Institutions have the opportunity to track engagement and support non-engaged learners, and to make sure that financial education turns into actionable decision competence and responsible investment practices.

Managerial Implications

The findings suggest that, for business-school leaders, program directors, and finance teachers, the focus on competence-based outcomes rather than simply completing courses is key to improving educational effectiveness. Program managers are able to set indicators for risk assessment, to compare portfolios, to use evidence to inform their decision on what to invest in and to assess the growth of students' learning over time. Simulations must be realistic, provide high-quality feedback and correspond to course goals. Faculty development to prepare faculty to handle debriefing, reflection and decision analysis following simulations. Managers should monitor participation, task completion, reflection quality, and interaction in applied activities, and intervene when participation is low, to ensure that both learning pathways are strengthened. Academic independence can be maintained by means of partnerships with banks, fintech companies, brokerage platforms and stock exchanges that offer realistic cases and market data.

Limitations and Future Research Recommendations

There are some restrictions to consider when interpreting and planning new research. First, the study is confined to the management students of Pakistan; hence findings may not be applicable to

other fields of study, countries and institutional settings. The framework should be tested in future studies on various cultures and with comparison to public and private universities. Second, the time-lagged design facilitates a separation in time, but requires non-experimental relationships to determine a causal relationship, and this would be better achieved with a randomized curriculum or a simulation intervention. Third, the data for Investment Behavior is based on reported behavior, which can vary from actual portfolio decisions. Brokerage records, incentivized investment tasks or longitudinal portfolio simulations could be used to enhance future research. Third, the results of the financial education could be different among the different investment experiences, socioeconomic backgrounds, digital financial literacy, risk tolerance, and religious investment preferences, which could be discussed as the boundary condition. Lastly, future research needs to examine moderated mediation at different levels of engagement and should explore if Decision Competence has enduring behavioral consequences after graduation or after starting professional employment.

References

- Aguinis, H., Li, A., & Cascio, W. F. (2024). The research transparency index. *The Leadership Quarterly*, 35(4), 101809.
- Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. *Journal of Personality and Social Psychology*, 92(5), 938–956. doi:10.1037/0022-3514.92.5.938
- Cannistrà, M., De Beckker, K., Agasisti, T., Amagir, A., Pöder, K., Vartiak, L., & De Witte, K. (2024). The impact of an online game-based financial education course: Multi-country experimental evidence. *Journal of Comparative Economics*, 52(4), 825–847. doi:10.1016/j.jce.2024.08.001
- Guenther, P., Guenther, M., Ringle, C. M., Zaefarian, G., & Cartwright, S. (2023). Improving PLS-SEM use for business marketing research. *Industrial Marketing Management*, 111, 127–142. doi:10.1016/j.indmarman.2023.03.010
- Hermansson, C., Jonsson, S., & Liu, L. (2022). The medium is the message: Learning channels, financial literacy, and stock market participation. *International Review of Financial Analysis*, 79, 101996. doi:10.1016/j.irfa.2021.101996
- Kaiser, T., Lusardi, A., Menkhoff, L., & Urban, C. (2022). Financial education affects financial knowledge and downstream financial behaviors. *Journal of Financial Economics*, 145(2), 255–272. doi:10.1016/j.jfineco.2021.09.022
- Kock, F., Berbekova, A., & Assaf, A. G. (2021). Understanding and managing the threat of common method bias: Detection, prevention and control. *Tourism Management*, 86, 104330. doi:10.1016/j.tourman.2021.104330
- Lee, Y.-I., & Yu, T.-K. (2025). Game-based learning enhances business decision-making learning for on-the-job MBA students: A case study of a dynamic systems-thinking course. *The International Journal of Management Education*, 23(2), 101140. doi:10.1016/j.ijme.2025.101140

Conclusion

This study illustrates that financial education influences the investment behavior of management students of Pakistan if the financial education is translated in practical Decision Competence. The financial curriculum and Simulation Learning had a positive effect on Financial Decision Competence and Investment Behavior, with Simulation Learning having a greater competence-building effect. Decision Competence was the most significant direct predictor of Investment Behavior and was partially mediating both educational pathways, reinforcing that knowledge of money is not enough without being able to use it systematically. It was Learning Engagement that further enhanced the impact of the curriculum and simulation on competence and indicated that active involvement of students is the key to financial education. The results justify an integrated approach, merging the perspectives of Human Capital, Experiential Learning and Student Engagement, and call on universities to embrace engaged financial education, based on practice and competences.

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- Randall, G., Wysong, S., Dilla, B., & Stodnick, M. (2025). Thrown into the fire: Do simulations in an introductory business course increase student engagement? *The International Journal of Management Education*, 23(2), 101149. <https://doi.org/10.1016/j.ijme.2025.101149>
- Rastogi, S., & Gupta, S. (2020). Development of scale to measure objectives-oriented investment behavior. *Journal of Behavioral Finance*, 21(3), 301–310. doi:10.1080/15427560.2019.1692346
- Shah, S. S., Qureshi, F., Memon, F. A., & Uddin, M. H. (2024). Financial literacy and investment behavior of individuals in Pakistan: Evidence from an environment prone to religious sentiment. *Journal of Behavioral and Experimental Finance*, 44, 100974. doi:10.1016/j.jbef.2024.100974
- Sharma, P. N., Liengaard, B., Hair, J. F., Sarstedt, M., & Ringle, C. M. (2023). Predictive model assessment and selection in composite-based modeling using PLS-SEM: Extensions and guidelines for using CVPAT. *European Journal of Marketing*, 57(6), 1662–1677. doi:10.1108/EJM-08-2020-0636
- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2021). Pre-registration: Why and how. *Journal of Consumer Psychology*, 31(1), 151–162. doi:10.1002/jcpy.1208
- Veiga, F., Reeve, J., Veiga, C. M., Wong, Z. Y., Martínez, I., Carvalho, N. A., & Pereira, A. (2026). Higher education student engagement in learning activities: Clarifying concepts and introducing a short-scale. *PLOS ONE*, 21(2), e0340391. doi:10.1371/journal.pone.0340391
- Wu, T.-T., Sari, N. A. R. M., & Huang, Y.-M. (2024). Integrating extended formative assessment in flipped jigsaw learning: Promoting learning engagement and higher-order thinking skills in international business education context. *The International Journal of Management Education*, 22(1), 100930. <https://doi.org/10.1016/j.ijme.2024.100930>
- Wu, T.-T., Sari, N. A. R. M., & Huang, Y.-M. (2024). Integrating extended formative assessment in flipped jigsaw learning: Promoting learning engagement and higher-order thinking skills in international business education context. *The International Journal of Management Education*, 22(1), 100930. doi:10.1016/j.ijme.2024.100930.
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