Curriculum Reform and Evidence-Based Assessment in Securities Investment Technical Analysis through Industry–Education Integration

Dong Sun[1] · *Jiabei Xu*[1*]

[1] *School of Business, Nanfang College Guangzhou, Guangzhou 510970, China*

[*]*Corresponding author: Jiabei Xu, xujb@nfu.edu.cn*

Keywords

Industry–education integration; securities investment technical analysis; applied undergraduate education; evidence-based assessment; cognitive differentiation; dual mentoring; constructive alignment

ABSTRACT

To address the disconnect between instruction in technical indicators and integrated trading simulations, as well as the tendency for short-term profit seeking to obscure weaknesses in risk management, this study examines a core finance course at the School of Business, Nanfang College, Guangzhou. It develops an industry–education integration framework linking course objectives, occupational tasks, and learning assessment. Drawing on constructive alignment and outcome-based education, market interpretation, investment-plan design, and risk management are organized into three progressive stages within a 54-hour course. Teaching combines authentic, de-identified industry cases, joint academic–industry mentoring, and two rounds of integrated simulation. Semester-long paired data from 42 enrolled undergraduates, collected at baseline (T1) and course completion (T2), are analyzed through item discrimination, construct differentiation, parametric and nonparametric comparisons, and post hoc power analysis. Self-reported scores increased across all three dimensions, with mean gains of 0.542–0.613 points ($p < 0.001$). Risk management had the largest effect size among the three dimensions ($dz = 1.150$). The reduced reliability of investment-plan design at T2 ($\alpha = 0.468$) is interpreted as a separation between expectations of selecting winning securities and adherence to a sound decision process under market uncertainty. The study further proposes a four-dimensional performance rubric and a multisource assessment framework to support curriculum reform and evaluation in applied finance and business education.

1. Introduction

Securities Investment Technical Analysis is a core professional-skills course in applied undergraduate programs in finance, investment, and financial engineering. Its content includes candlestick analysis, chart patterns, trend indicators, moving averages, price–volume relationships, and time cycles. Given its practical orientation, teaching must extend beyond memorizing formulas and identifying isolated patterns. Students need to develop coherent investment analysis, strategy formulation, and dynamic risk management in market situations characterized by uncertainty, asymmetric information, and conflicting technical signals.

Three structural tensions recur in conventional teaching. First, fragmented instruction conflicts with the integrated nature of occupational tasks. Indicators such as MACD and KDJ are often taught separately, leaving students insufficiently prepared to reconcile multiple signals in changing markets. Second, the emphasis on returns in simulation exercises conflicts with professional discipline and compliance. Short trading competitions may encourage concentrated positions and frequent speculative transactions, diverting attention from position sizing, drawdown limits, stop-loss rules, and model failure. Third, superficial industry participation is accompanied by weak assessment evidence. Lectures and visits do not necessarily translate industry resources into progressively demanding learning tasks, while end-of-semester satisfaction surveys and impression-based grading offer limited longitudinal or psychometric evidence of learning.

Chinese research has explored several responses. Gong et al. developed a one-stop finance education model connecting campus-based training, collaborative projects, and workplace practice [1]. Ren and Zhang proposed progressive project-based practice for financial mathematics [2], while Zhang and Cao examined support mechanisms for collaborative teaching teams [3]. Han and Chen et al. applied outcome-based education to project-based reform in economics and management courses [4–5]. International research has examined active learning, project-based learning, and university–industry collaboration in relation to employability [6–8].

Nevertheless, much of this work emphasizes broad frameworks or qualitative accounts. Less attention has been paid to how authentic investment workflows are translated into specific classroom tasks and how pre–post self-assessment data can be examined through psychometric and statistical analysis.

This study investigates Securities Investment Technical Analysis in the finance program at the School of Business, Nanfang College, Guangzhou. It presents a constructive-alignment-based framework connecting objectives, tasks, learning outputs, and assessment. Through an off-campus practice base and an academic–industry mentoring team, the 54-hour course incorporates de-identified market cases, two progressive simulation rounds, and stress-scenario reviews. Semester-long pre–post data from 42 enrolled students are examined using reliability diagnostics, parametric and nonparametric tests, and post hoc power analysis. The aim is to provide a replicable teaching approach and inspectable assessment evidence for applied undergraduate finance and business courses.

2. Theoretical Foundations and the Curriculum Reform Framework

2.1 Constructive Alignment and Outcome-Based Course Design

John Biggs's theory of constructive alignment emphasizes consistency among intended learning outcomes, teaching and learning activities, and assessment tasks [9]. Combined with the backward-design principle of outcome-based education, it informs a framework in which occupational competence requirements guide course objectives, objectives determine learning outputs, and those outputs define the evidence required for assessment.

The course organizes its intended professional outcomes into three interdependent, progressively developed dimensions.

1. Market interpretation. Students move beyond chart recognition to identify relevant information in market data, explain the buying and selling pressures reflected in technical indicators, and specify the conditions under which their interpretations hold. When indicators conflict, they are expected to consider price–volume

movements and the broader economic and industry context before making cautious probabilistic judgments.

2. Investment-plan design. Students translate their analysis into a coherent simulated investment plan. The plan specifies security-selection criteria, entry triggers, staged position building and adjustment, and exit arrangements, and is presented in a research format consistent with financial-sector practice.

3. Risk management. This central dimension challenges the pursuit of certainty and exceptional profits. Students are expected to recognize market uncertainty and model failure, establish stop-loss and take-profit thresholds in relation to volatility and drawdown constraints, and incorporate position-management discipline and compliance into professional practice.

Table 1. Alignment of course objectives, tasks, outputs, and assessment

Core objective	Learning tasks	Observable outputs	Assessment focus
Market interpretation	Resolve conflicting indicators; review extreme and range-bound markets	Annotated multihorizon charts; analysis of conflicting signals and probabilistic judgments	Data-source compliance; assumptions; indicator saturation and failure; counterexamples
Investment-plan design	Draft institutional-style simulated strategies; construct portfolios under constraints	Standardized investment-decision report; parameter rationale and implementation plan	Security-selection logic; entry and exit triggers; completeness and feasibility
Risk management	Black-swan stress scenarios; review and correction across two simulations	Stop-loss and take-profit checklist; position-rebalancing record; reflective simulation log	Drawdown tolerance; mandatory stop-loss adherence; model-failure contingencies; ethics and compliance

2.2 Translating Industry Workflows into Learning Tasks

A central challenge in industry–education integration is translating complex, specialized professional work into instructional scaffolds suited to undergraduates' zone of proximal development. Directly importing sophisticated private-fund models or large information streams may create cognitive overload, whereas excessively simplified fictional cases may lose practical relevance.

The course uses a three-stage translation process. First, industry mentors de-identify authentic investment cases, remove confidential parameters, and select historical decision points while retaining market noise and conflicting signals. Second, subsequent price movements are withheld: students record decisions based only on information available at the time, after which later information is disclosed incrementally. Third, retrospective review examines execution and attribution rather than profit alone. Questions about unauthorized position increases or failures to exit after a stop-loss breach direct attention to the reasoning and discipline underlying trading behavior.

3. Organization and Implementation of the Reform

3.1 The Practice Base and the Dual-Mentor Workflow

The course operates through a provincial-level practice teaching base jointly established by the School of Business, Nanfang College, Guangzhou, and Guangdong Xugu Private Securities Investment Management Co., Ltd. In April 2025, the partners signed a five-year strategic agreement covering joint syllabus development, case preparation, practice supervision, and assessment of investment-research presentations.

Academic and industry mentors have complementary responsibilities. Academic instructors manage teaching progress, explain the mathematical logic and limits of indicators, and regulate cognitive load. Industry mentors provide investment cases, conduct stress-scenario questioning, and offer written feedback on compliance and practical feasibility. Both assess the same student assignments and simulated

decisions from academic and professional perspectives, helping connect course learning with industry practice.

3.2 A Progressive 54-Hour Modular Design

The course carries three credits and comprises 54 instructional hours, divided equally among foundational interpretation, strategy integration, and integrated simulation and defense. Each module receives 18 hours. Practical work and discussion account for more than 55% of the course, as detailed in Table 2.

Table 2. Modules, instructional hours, and progressive task outputs

Module	Hours	Knowledge and progression	Practice tasks	Assessed outputs
Foundation	18 Lecture 10; practice 8	Candlesticks, patterns, trend lines, and changing support/resistance; limits of Dow Theory and the three assumptions of technical analysis	Compare bullish and bearish interpretations under identical information; annotate key historical levels	Annotated security chart; comparison of the limits of individual indicators
Integration	18 Lecture 6; practice 12	Conflicts between MA/MACD and KDJ/RSI; interactions among volume, price, time, and price range; divergence traps	Examine indicator conflicts in range-bound and directional markets; draft basic quantitative selection rules	Integrated indicator analysis; entry/exit triggers and risk checklist
Simulation	18 Practice 12; defense 6	Expected value in money management; variants of the Kelly criterion; position and drawdown control; psychology and discipline under shocks	Two progressive high-fidelity market simulations; industry-led presentations and risk-management defenses	Complete investment report; joint-mentor questioning; execution review and reflection on decision biases

3.3 Two Simulation Rounds and Adversarial Review

The integrated simulation module includes two high-fidelity trading exercises. The first, baseline strategy verification, runs in weeks 9–12. Students select from a pool of five blue-chip and growth securities, formulate plans using previously taught methods, and execute simulated transactions. The exercise is intended to expose emotional decision-making, delayed execution, and excessive position concentration. Industry mentors then review transaction records with the class, focusing on breaches such as retaining positions after stop-loss triggers or disproportionately increasing losing positions.

The second round, dynamic shocks and strategy transfer, runs in weeks 13–15. It introduces a new market setting and simulated shocks, such as an unexpected interest-rate increase or a security-specific black-swan event. Students have 48 hours to submit an emergency risk-response plan and explain position adjustments. This tests whether lessons from the first round transfer to a new setting. In week 16, teams present their investment research and respond to questions from academic and industry assessors about reasoning, risk discipline, and compliance.

3.4 Separating Course Grading from Research Assessment

Course assessment comprises 60% continuous assessment and 40% final assessment. Continuous assessment includes case assignments (15%), procedural compliance and execution discipline in the first simulation (20%), the second-round stress-response report (15%), and participation in classroom questioning (10%). The final assessment comprises the investment-research report (25%) and oral defense (15%). Course grading is procedurally separated from the longitudinal anonymous research survey so that students can report their perceptions without concern about grades.

4. Research Design and Data Analysis

4.1 Participants and Data Collection

The study follows finance undergraduates from the 2022-entry cohort at the School of Business, Nanfang College, Guangzhou, who enrolled in Securities Investment Technical Analysis. It uses a longitudinal, single-group pre–post quasi-experimental evaluation. Baseline data were collected in week 1, before systematic industry-integrated training, and endpoint data in week 16, after course completion and the final defense.

The survey system generated a unique encrypted identifier for each student without recording names or student numbers. Instructions stated that participation served pedagogical improvement and academic research, that responses would remain confidential from the course instructor, and that results would not affect course grades. All students responded at both time points, yielding 42 complete paired records (N = 42). Logical checks found all responses within the 1–5 range, no missing values, and no cases of uniform extreme responding across the entire questionnaire.

4.2 Measurement Constructs and Interpretive Boundaries

The instrument uses a five-point Likert scale, from 1 (does not describe me at all) to 5 (describes me very well). Twelve professional self-assessment items are distributed equally across market interpretation (Q1–Q4), investment-plan design (Q5–Q8), and risk management (Q9–Q12). Four teaching-experience and training-satisfaction items (Q13–Q16) are administered at T2 to provide contextual feedback (Table 3).

Table 3. Self-assessment constructs and interpretive boundaries

Dimension	Items	Intended construct	Interpretive boundary

Dimension	Items	Intended construct	Interpretive boundary
Market interpretation	Q1 Patterns; Q2 Trends; Q3 Multiple indicators; Q4 Independent interpretation	Reasoning from patterns and multiple signals, including counterexamples, in noisy markets	Perceived understanding of analytical tools; not a measure of perfectly accurate forecasts
Investment-plan design	Q5 Success-oriented selection; Q6 Coherent reasoning; Q7 Trading strategy; Q8 Report writing	Planning executable investment reports and dynamic trading strategies through systematic research	Perceived coherence of strategy design; not evidence of guaranteed excess returns
Risk management	Q9 Failure risks; Q10 False signals; Q11 Positions and stops; Q12 Compliance	Recognition of uncertainty and commitment to stop-loss discipline and compliant risk management	Internalized risk and compliance awareness; requires complementary evidence of stop-loss execution
Teaching experience	Q13 Industry cases; Q14 Integrated simulation; Q15 Dual mentoring; Q16 Engagement	Perceptions of teaching, case depth, mentoring, and learning engagement	Reported separately as course feedback; excluded from the professional competence composite

4.3 Statistical Analysis Strategy

The analysis combines four complementary procedures to provide a more detailed examination than a single-method evaluation.

1. Internal consistency and construct diagnostics. Cronbach's alpha is calculated for each dimension and the full scale at T1 and T2. Alpha if an item is deleted and corrected item–total correlations (CITCs) are used to investigate dimensions with substantial reliability declines and explore their educational interpretation. Interpretation of internal consistency follows the methodological guidance of Tavakol and Dennick [10].

2. Paired-samples t tests. Individual change scores are calculated as T2 minus T1. With 41 degrees of freedom, the analysis estimates t statistics, 95% confidence intervals for mean changes, and paired effect sizes (Cohen's dz), following Lakens [11].

3. Nonparametric comparisons and robustness checks. Given the ordinal origin of Likert scores and the possibility of nonstandard distributions, Wilcoxon signed-rank tests and exact two-sided sign tests are used alongside the parametric analysis to examine the direction and distribution of changes.

4. Multiple-testing adjustment and post hoc power. The Holm–Bonferroni procedure is used to control the family-wise error rate. Post hoc statistical power ($1 - \beta$) is also estimated using the G*Power 3.1 algorithm to assess detectability with 42 paired observations at the observed effect sizes.

5. Assessment Results and Diagnostic Analysis

5.1 Reliability and Corrective Cognitive Differentiation

Table 4 reports reliability estimates and item diagnostics at both time points. The full 12-item scale has alpha values of 0.803 at T1 and 0.718 at T2, while the T2 teaching-experience scale has an alpha of 0.763. The manuscript interprets their values above the conventional 0.70 threshold as evidence of satisfactory overall internal consistency and stability across the two stages.

Table 4. A. Reliability estimates

Dimension	Items	T1 α	T2 α
Market interpretation	4	0.709	0.691
Investment-plan design	4	0.775	0.468
Risk management	4	0.765	0.620
Professional composite	12	0.803	0.718
Teaching experience	4	Not measured	0.763

Table 4. B. Item diagnostics and source interpretation

Dimension	Maximum T2 α after deletion	Key item	Interpretation reported in the source
Market interpretation	0.704 (delete Q4)	Q4 (r = 0.412)	Highly stable reliability structure and favorable consistency across stages
Investment-plan design	0.582 (delete Q5)	Q5 (r = 0.185)	Cognitive differentiation between expected success and procedural discipline
Risk management	0.638 (delete Q12)	Q12 (r = 0.345)	Acceptable reliability and deeper recognition of uncertainty
Professional composite	—	—	Favorable overall reliability and validity
Teaching experience	0.781 (delete Q13)	Q13 (r = 0.488)	Satisfactory experience-scale reliability and high acceptance

At the dimension level, investment-plan design shows a decline in alpha from 0.775 at T1 to 0.468 at T2. Although an alpha below 0.50 may indicate a substantial measurement problem, the study interprets the item diagnostics in conjunction with the simulation context as potentially informative evidence about the teaching intervention.

1. Separating expectations of winning from procedural discipline. At baseline, inexperienced students may assume that mastering standard analytical procedures (Q6–Q8) necessarily enables them to identify securities with a high probability of success (Q5), producing closely aligned item responses. After two simulation rounds involving volatility and unexpected drawdowns, students may recognize that a rigorous, compliant plan does not guarantee success. The source reports a marked increase in the variance of Q5 and a CITC of 0.185 with the remaining plan-design items. Removing Q5 reportedly increases alpha to 0.582.

2. Corrective cognitive differentiation in professional education. The study interprets the reliability decline as a reduction in unwarranted confidence, described through the Dunning–Kruger effect, and a separation between methodological rigor

and uncertain market outcomes. On this interpretation, the decline marks developing professional judgment rather than teaching failure. It suggests separating outcome-implying items such as Q5 from a methodology-focused scale and developing a distinct item set on market risk and attribution of success.

5.2 Changes in Self-Assessment and Robustness Comparisons

Table 5 compares self-assessment scores before and after the course for 42 students. All three professional dimensions and the composite score show statistically significant increases (all $p < 0.001$), with consistent findings across the reported methods.

Table 5. A. Descriptive statistics and mean changes (N = 42)

Dimension	T1 M ± SD	T2 M ± SD	Change [95% CI]
Market interpretation	2.899 ± 0.610	3.440 ± 0.532	0.542 [0.376, 0.708]
Investment-plan design	2.988 ± 0.649	3.589 ± 0.490	0.601 [0.410, 0.792]
Risk management	2.911 ± 0.674	3.524 ± 0.505	0.613 [0.447, 0.779]
Composite score	2.933 ± 0.478	3.518 ± 0.373	0.585 [0.468, 0.703]

Table 5. B. Paired tests, effect sizes, and power (N = 42)

Dimension	Paired t test	Cohen's dz	Wilcoxon Z	Exact sign test	Post hoc power
Market interpretation	$t = 6.595$; $p < 0.001$	1.018	$Z = -4.68$; $p < 0.001$	<0.001; 34 up / 5 equal / 3 down	>0.999
Investment-plan design	$t = 6.361$; $p < 0.001$	0.982	$Z = -4.49$; $p < 0.001$	<0.001; 34 up / 2 equal / 6 down	>0.999
Risk management	$t = 7.454$; $p < 0.001$	1.150	$Z = -4.92$; $p < 0.001$	<0.001; 36 up / 2 equal / 4 down	>0.999
Composite score	$t = 10.075$; $p < 0.001$	1.555	$Z = -5.24$; $p < 0.001$	<0.001; 40 up / 1 equal / 1 down	>0.999

Note: Holm–Bonferroni adjustment yields p values below 0.001 for all four comparisons: market interpretation, 1.23×10^{-7}; investment-plan design, 1.33×10^{-7};

risk management, 1.14×10^{-8}; and the composite score, 4.72×10^{-12}. The source reports post hoc power above 0.999 using the G*Power 3.1 algorithm at $\alpha = 0.05$ and observed $dz \geq 0.98$, and interprets this as ruling out false-negative error.

Four findings are highlighted in the interpretation of Table 5.

First, increases are observed across dimensions, with large standardized effects. Mean changes range from 0.542 to 0.613 points, and all paired t tests yield $p < 0.001$. Effect sizes are 1.018 for market interpretation, 0.982 for investment-plan design, 1.150 for risk management, and 1.555 for the composite score. Using 0.80 as the conventional benchmark for a large effect, the study interprets these results as substantial changes in students' perceptions of professional competence associated with the integrated teaching intervention.

Second, parametric and nonparametric results converge. Reported Wilcoxon Z statistics range from −4.49 to −5.24, and all exact sign tests yield $p < 0.001$ among nonzero changes. The source interprets this agreement across mean-based and rank-based analyses as reducing concern that a few extreme increases alone account for the findings.

Third, risk management has the largest mean increase and effect size among the three dimensions: 0.613 points (95% CI [0.447, 0.779]) and $dz = 1.150$. The study attributes this pattern to transaction-record reviews, simulated forced-liquidation rules, and risk-focused debriefing, which are presented as strengthening awareness of risk and countering a preference for aggressive trading over defensive discipline.

Fourth, qualitative follow-up addresses cases with lower self-ratings. Six students report declines in investment-plan design and four in risk management. To examine changes concealed by the group mean, the research team reports conducting post-course interviews with these students. According to the source, all had experienced substantial account drawdowns or prolonged losing positions in the second simulation. They described revising earlier confidence after recognizing its limitations. The study interprets these lower self-ratings as greater self-awareness and as evidence of the formative value of the evaluation.

5.3 Quantitative Feedback on the Teaching Experience

At T2, the four teaching-experience items have a composite mean of 3.857 (SD = 0.625), reported as 28.5% above the neutral response value of 3. Item means are 3.929 for Q15, joint mentor guidance (SD = 0.745); 3.929 for Q16, engagement and interest in further inquiry (SD = 0.712); 3.810 for Q14, integrated simulation (SD = 0.707); and 3.762 for Q13, authentic industry cases (SD = 0.790). The study interprets these ratings as positive responses to joint mentoring and scenario-based simulation.

6. Discussion and Further Teaching Development

6.1 From Industry Participation to Managing Cognitive Load

The course emphasizes the pedagogical transformation of professional experience rather than industry lectures or the formal establishment of a practice base alone. Future development needs to address two issues. First, highly realistic exercises may produce frustration and cognitive overload. For students whose self-ratings fall after drawdowns, early modules can provide smaller, achievable tasks—for example, restricting initial hedging exercises to a single instrument before expanding the trading universe. Second, the case collection should be updated jointly by academic and industry staff, supported by guided worksheets with explicit learning objectives.

6.2 Integrating Self-Reports, Performance Assessment, and Trading Records

Self-assessment has inherent subjective limits. The next phase of reform therefore proposes a standardized performance rubric to strengthen the assessment framework. Table 6 specifies four dimensions for use in the next teaching cycle.

Table 6. Performance rubric for integrated technical-analysis tasks

Dimension	**Basic performance (1–2)**	**Meets expectations (3–4)**	**Advanced performance (5)**

Dimension	Basic performance (1–2)	Meets expectations (3–4)	Advanced performance (5)
Evidence and interpretation Weight: 25%	Inconsistent annotations, isolated signals, mechanical formula use; cannot explain conflicting indicators or assumptions	Accurate annotations, identification of primary and secondary trends and key levels; clear cross-indicator reasoning	Compares opposing signals, quantifies success probabilities, and explains indicator saturation and failure boundaries
Plan design and reasoning Weight: 25%	Disconnected trading plan; no clear entry/exit conditions, allocation proportions, or coherent rationale	Coherent selection rationale; explicit staged entry, adjustment, and stop-loss triggers; complete plan	Develops scenario-specific contingencies, hedging and dynamic rebalancing; explains strategy capacity and tolerance for error
Risk management and discipline Weight: 30%	Missing or ineffective stops; repeated position-rule breaches; excessive concentration; no contingency plan	Explicit stop-loss/take-profit levels with 100% adherence; positions aligned with account volatility; no severe account deficit	Withstands black-swan stress tests; drawdowns remain within industry standards; detailed, verifiable risk reflections
Research defense and reflection Weight: 20%	Poor report format; inconsistent defense; performance judged by one return; shifts responsibility for errors	Report follows financial-sector conventions; balanced attribution of gains/losses; structured transaction-based review	Demonstrates professional and compliance awareness; critically examines cognitive and psychological biases

The proposed procedure involves independent, double-blind assessment of anonymized research reports and oral defenses by academic and industry mentors, with each assessor group contributing 50%. Self-assessment changes, rubric scores, and indicators exported from the simulation system—such as maximum drawdown, Sharpe ratio, and stop-loss adherence—will then be examined jointly in a multisource association matrix linking perceived competence with observed behavior.

6.3 Refining the Instrument and Research Design

Two developments are planned. First, item wording and construct definition will be refined. The reference to an advantage in winning probability in Q5 will be replaced by a methodological statement about consistently applying security-selection criteria under technical and fundamental constraints. Second, the next academic year will introduce parallel classes and delayed transfer tasks. A class using conventional instruction will serve as a comparison group, propensity-score matching will be used to address observed baseline differences, and a transfer task three months after completion will examine the retention of analytical and risk-management learning across time and market conditions.

7. Limitations and Conclusions

7.1 Limitations

The study identifies the following limitations under its current research conditions.

1. Sample size and causal inference. The study follows 42 students in one class. Although the reported post hoc power exceeds 0.999, which the source interprets as ruling out false-negative error, a single-group pre–post design cannot fully separate the intervention from maturation or independent learning over time. Its causal interpretation is therefore limited.

2. Self-reported outcomes. The main quantitative results derive from subjective self-assessment. The source presents anonymity, separation from grading, and nonparametric checks as measures to reduce socially desirable responding. However, the relationship between perceived competence and objectively demonstrated trading-related skills still requires performance data collected using the rubric in Table 6.

3. Low reliability in plan design at T2. Alpha for investment-plan design is 0.468 at T2. Although the study interprets this through a separation between expected

success and procedural discipline, the composite score remains psychometrically constrained and should be generalized cautiously.

7.2 Main Conclusions

Using constructive alignment, the study develops an industry-integrated curriculum organized around market interpretation, investment-plan design, and risk management, and evaluates it through semester-long paired observations of 42 students. It draws three main conclusions.

First, progressive industry-integrated teaching is presented as promoting gains in perceived professional competence. Parametric and nonparametric comparisons show increases across the three dimensions ($p < 0.001$), with dz values of 0.982–1.150 and a composite effect size of 1.555.

Second, the study interprets the largest dimension-level change in risk management—0.613 points, dz = 1.150—as evidence that integrated stress scenarios and dual-mentor review can strengthen attention to compliance and stop-loss discipline, countering an emphasis on returns alone.

Third, the decline in plan-design reliability is interpreted as a change in professional understanding. The study argues that practical training challenged the assumption that applying indicators mechanically guarantees stable profits and encouraged a more cautious view of market uncertainty.

Overall, the study presents a course reform approach and an assessment procedure intended to be testable and replicable. It offers a practical reference for strengthening experiential teaching and its evaluation in applied undergraduate finance and business programs.

References

[1] Gong, G., Shi, A., & Wang, F. (2025). Research on the construction and effectiveness of the “one-stop” practical teaching system for finance major under the background of industry-education integration. Advances in Social Sciences, 14(11), 429–435. (In Chinese.) https://doi.org/10.12677/ass.2025.14111015

[2] Ren, L., & Zhang, F. (2026). Research and practice on the project-based practical teaching system of financial mathematics from the perspective of industry-education integration. Advances in Education, 16(3), 176–182. (In Chinese.) https://doi.org/10.12677/ae.2026.163468

[3] Zhang, R., & Cao, J. (2024). Research on the construction of practical teaching faculty in financial mathematics under the background of industry-education integration. Creative Education Studies, 12(10), 477–482. (In Chinese.) https://doi.org/10.12677/ces.2024.1210735

[4] Han, W. (2026). OBE-oriented innovation and path optimization of project-based teaching for applied undergraduate economics and management courses. Advances in Education, 16(1), 1065–1070. (In Chinese.) https://doi.org/10.12677/ae.2026.161144

[5] Chen, Y., & Xiao, M. (2026). Exploration of teaching reform in management courses at application-oriented undergraduate universities under the OBE concept. Advances in Education, 16(2), 1117–1123. (In Chinese.) https://doi.org/10.12677/ae.2026.162409

[6] Mota, F. B., Cabral, B. P., Braga, L. A. M., & Lopes, R. M. (2025). Mapping the global research on project-based learning: A bibliometric and network analysis (2014–2024). Frontiers in Education, 10, Article 1522694. https://doi.org/10.3389/feduc.2025.1522694

[7] Khan, I. M., Edwards, E., Menegon Ianicelli, B., Ahmed, W., Hardey, M., & Eremionkhale, G. (2025). University-industry collaboration for academic success and employability: A connectivist perspective. Studies in Higher Education. Advance online publication. https://doi.org/10.1080/03075079.2025.2545606

[8] Novkovic, D., Kompen, R. T., & Petchamé, J. (2026). Active learning strategies in business and information & communication technology engineering higher education: A scoping review. Review of Education, 14(2), Article e70158. https://doi.org/10.1002/rev3.70158

[9] Biggs, J. (1996). Enhancing teaching through constructive alignment. Higher Education, 32(3), 347–364. https://doi.org/10.1007/BF00138871

[10] Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

[11] Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. Frontiers in Psychology, 4, Article 863. https://doi.org/10.3389/fpsyg.2013.00863

Appendix. Complete Course Self-Assessment Questionnaire

Q1. I can use candlestick patterns and their combinations to make a basic assessment of buying and selling pressures in securities markets.

Q2. I can accurately draw and use trend lines, channels, and key support and resistance levels to analyze asset-price trends.

Q3. I can combine MACD, KDJ, moving averages, and other technical indicators to cross-check signals and assess market conditions.

Q4. When market conditions are complex, I can independently interpret indicator divergence or changes in chart patterns rather than apply rules mechanically.

Q5. I can combine macroeconomic and industry trends with technical analysis to select securities with an advantage in the probability of success.

Q6. I can integrate multiple analytical tools to develop a well-supported and logically coherent investment decision.

Q7. I can formulate rigorous entry, position-increase, rebalancing, and exit strategies in response to changing market conditions.

Q8. I can independently write a structured and well-supported technical-analysis report or investment plan in an appropriate professional format.

Q9. I can systematically identify systemic risk, liquidity risk, and model-failure risk in an investment plan.

Q10. I recognize that technical indicators and chart patterns can fail or produce false signals in range-bound markets or after unexpected shocks.

Q11. I can establish disciplined position-management, stop-loss, and take-profit rules based on market volatility and account risk limits.

Q12. In investment analysis and planning, I can observe compliance requirements and professional ethics rather than focus only on reported returns.

Q13. Authentic, de-identified industry cases substantially improve my understanding of the practical limits of abstract technical-analysis concepts.

Q14. Integrated investment simulations help me apply textbook knowledge to changing market conditions.

Q15. Joint guidance from academic instructors and experienced industry mentors deepens my understanding of occupational standards and practical requirements.

Q16. Case reviews, adversarial simulations, and field-based practice strengthen my engagement with investment studies and my interest in further inquiry.