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Research on Influencing Factors in the Cultivation of Business Students' Professional Quality through Enterprise Competition Simulation

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Abstract: With the growing emphasis on experiential and practice-oriented learning in higher business education, Business Competition Simulation (BCS) projects have become a prominent pedagogical innovation. However, the mechanisms through which such competitive simulations enhance students' professional competencies remain under-explored. Drawing upon Experiential Learning Theory and Tournament Theory, this study develops a chained mediation model linking competition intensity, team interaction quality, and feedback effectiveness to students' professional competence via learning engagement. A quasi-experimental design was adopted with 188 undergraduate business students (94 experimental; 94 control) at a leading Chinese "Double First-Class" university. Pre-war and post-test survey data were analyzed using ANCOVA and structural equation modeling (SEM). Results indicate that: (1) Participation in BCS significantly enhances four core competencies—strategic decision-making, data analysis, teamwork, and stress adaptation—beyond traditional case-based teaching; (2) Team interaction quality and feedback effectiveness are the principal drivers of competence development, whereas competitive intensity shows no direct effect; and (3) Learning engagement fully mediates the effects of interaction quality and feedback effectiveness on competence improvement. The findings advance theoretical understanding of experiential business education and provide actionable implications for curriculum design and pedagogical management in business schools.

Keywords: Business competition simulation, Business students, Professional competence, Influencing factors, Learning engagement, Experiential learning.

1. Introduction

In the digital and global economy, business environments have become increasingly complex and uncertain, demanding holistic, practice-ready competencies from business graduates. Traditional lecture-centered models often fail to cultivate students' practical problem-solving abilities (Johnson ET AL., 2023). Consequently, educators have turned toward experiential learning methods grounded in learning-by-doing. Among these, the Business Competition Simulation has emerged as a powerful instructional form, integrating realism, interactivity, and strategic challenge.

BCS courses place students in a virtual marketplace where teams manage simulated firms through iterative decisions across product development, operations, marketing, and finance. These competitions engage students in strategy formulation and adaptive decision-making under dynamic conditions, thereby linking theory to practice (Kalb, 1984). National and international competitions now serve as benchmarks for assessing the quality of practice-based management education.

Despite wide adoption, empirical research on how and why BCS enhances competencies remains limited. Prior studies have mainly been descriptive or focused on single outcomes. Key questions persist: Which design elements most strongly influence learning? Through what psychological mechanisms do they operate? Addressing these gaps is essential for optimizing simulation-based curricula.

Focusing on business undergraduates' professional competence, conceptualized across four dimensions—strategic decision-making, data analysis, teamwork, and stress adaptation—this study integrates Experiential Learning Theory (ELT) with Tournament Theory (TT) to model how three core simulation factors—competitive intensity, team interaction quality, and feedback effectiveness—affect competence via learning engagement. A quasi-experimental Pre-war/post-design compares BCS with traditional case teaching to test these causal pathways.

2. Literature Review and Theoretical Foundation

2.1. Business Competition Simulation and Experiential Learning

Kalb's (1984) experiential learning cycle—concrete experience, reflective observation, abstract conceptualization, and active experimentation—provides the theoretical foundation. BCS environments naturally instantiate this cycle: students experience decision outcomes, reflect on performance reports, conceptualize theoretical insights, and experiment with revised strategies. Iterative cycles foster deep learning through trial, reflection, and application.

2.2. Professional Competence in Business Education

Professional competence denotes an integrated set of knowledge, skills, and attitudes required for effective performance in professional contexts. Based on AACSB (2020) and GMAC (2022) competency frameworks, four dimensions are emphasized:

(1) Strategic Decision-Making Ability: capacity to synthesize environmental, industry, and internal data to craft long-term strategies.

(2) Data Analysis Ability: evidence-based reasoning and

quantitative literacy essential for managerial decision support.

(3) Teamwork Ability: communication, coordination, and conflict-resolution skills enabling collective performance.

(4) Stress Adaptation Ability: resilience and flexibility under uncertainty and competitive pressure.

While simulation studies often assess isolated skills, few have examined these four dimensions as a unified construct—a gap this study addresses.

2.3. Core Competition Elements and Theoretical Bases

BCS is not merely a learning tool but a competitive process. Drawing on Tournament Theory and team process theory, three elements are salient:

(1) Competitive Intensity: Degree of performance-rank pressure among teams. Moderate competition can stimulate effort; excessive rivalry may provoke short-termism.

(2) Team Interaction Quality: Derived from Social Interdependence Theory (Johnson & Johnson, 2009); open communication, constructive conflict management, and shared responsibility enhance collective cognition and learning.

(3) Feedback Effectiveness: Dual-source feedback from system analytic and instructor coaching. Timely, specific, and diagnostic feedback links action to outcome, guiding reflection and improvement.

2.4. Learning Engagement as a Mediating Mechanism

Learning engagement—comprising vigor, dedication, and absorption (Chauffeur ET AL., 2002)—represents sustained, positive involvement in learning. We propose that BCS factors affect competence indirectly by fostering engagement: challenging yet supportive conditions enhance energy (vigor), commitment (dedication), and immersion (absorption). Deep engagement enables the internalization of knowledge into enduring competencies.

3. Research Model and Hypotheses

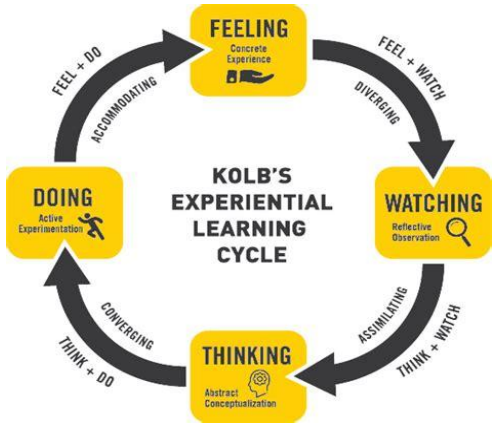

Figure 1. Kolb's doing experiential learning Cycle

The conceptual model posits that competition intensity, team interaction quality, and feedback effectiveness influence students' professional competence both directly and indirectly through learning engagement.

Hypotheses

(1) H1: Compared with traditional case teaching, BCS participation enhances overall professional competence.

• H1a–d: BCS improves strategic decision-making, data analysis, teamwork, and stress-adaptation abilities.

(2) H2: Competition intensity (H2a), team interaction quality (H2b), and feedback effectiveness (H2c) positively affect competence.

(3) H3: The same three factors positively influence learning engagement (H3a–c).

(4) H4: Learning engagement positively influences competence.

(5) H5: Learning engagement mediates the relationships between the three BCS factors and competence (H5a–c).

4. Methodology

4.1. Research Design and Sample

A quasi-experimental pretest–post test non-equivalent group design was employed.

(1) Experimental group: 94 juniors enrolled in the Business Competition Simulation elective course.

(2) Control group: 94 juniors taking Strategic Management (case-based).

Groups were comparable in demographics and GPA; pre-teen t-tests confirmed no significant baseline differences. The study ran over 16 weeks during the Fall 2024 semester.

4.2. Procedure

Pre-teen (T1): Week 1 survey measured baseline competence.

Intervention:

(1) Experimental group: participated in a 14-week BCS course using "Biz Sim" software. Sixteen teams (5–6 students each) managed virtual firms for eight simulated quarters, making integrated decisions across functional domains. Weekly debriefings with instructor feedback reinforced reflective learning.

(2) Control group: followed traditional lecture and case discussions under the same instructor team.

Mid-term measurement: Week 12 survey assessed perceived competition intensity, team interaction quality, feedback effectiveness, and learning engagement (experimental group only).

Post-test (T2): Week 16 survey repeated competence measurement for both groups.

To ensure data integrity, all surveys were anonymous, and course-credit incentives encouraged full participation. Of 376 responses, 178 matched pairs were valid (90 experimental, 88 control), yielding a 94.7 % effective rate.

4.3. Measures

All items used 7-point Like rt scales (1 = strongly disagree to 7 = strongly agree). Scales were adapted and validated for the BCS context.

(1) Professional Competence (Dependent Variable): 16 items across four scaleless, measured Pre-war and post-intervention.

• Strategic Decision-Making (4 items): e.g., "My ability to formulate long-term strategic plans has improved."

• Data Analysis (4): e.g., "I can interpret financial statements to diagnose problems."

• Teamwork (4): e.g., "I can communicate effectively to reach consensus."

• Stress Adaptation (4): e.g., "I can adjust quickly after a poor decision outcome."

(2) Core Competition Factors (Independent Variables):

• Competitive Intensity (3 items): e.g., "Our team faced fierce competition."

• Team Interaction Quality (5): e.g., "Members openly exchanged differing opinions."

• Feedback Effectiveness (4): e.g., "The simulation reports were helpful for next-round decisions."

(3) Learning Engagement (Mediator): short version of APRES-SKI (Chauffeur ET AL., 2002) with 9 items (vigor, dedication, absorption).

(4) Control Variables: gender, age, GPA, and pre-teen competence scores.

4.4. Data Analysis

SPSS 26.0 and AMOS 24.0 were used. Analyses included reliability and validity checks (Bernbach's α, CFA), ANCOVA for treatment effects, and SEM with bootstrapping (5,000 resamples) for mediation testing.

(Reliability and validity statistics: Bernbach's $\alpha = 0.845–0.951$; $\chi^2/d = 2.18$; GFI = 0.91; CFI = 0.94; TLI = 0.92; RMSEA = 0.065)

5. Results

5.1. Reliability and Validity Tests

Bernbach's α values for all constructs ranged from 0.845 to 0.951, demonstrating strong internal consistency. Confirmatory factor analysis (CFA) yielded satisfactory fit indices: $\chi^2/d = 2.18$, GFI = 0.91, CFI = 0.94, TLI = 0.92, RMSEA = 0.065. Standardized gloamings were all > 0.70, composite reliability (CR) values > 0.80, and average variance extracted (AVE) > 0.50. The square roots of AV Es exceeded inter-construct correlations, confirming convergent and discriminant validity.

5.2. Effects of BCS on Professional Competence (H1)

An ANCOVA was conducted using post-test professional-competence scores as dependent variables, treatment group as the independent variable, and pre-teen scores as excoriates.

Results showed that, controlling for baseline levels, the experimental group outperformed the control group across all competence dimensions—strategic decision-making, data analysis, teamwork, and stress adaptation (all $p < 0.001$). Thus H1 and sub-hypotheses H1a–H1d were strongly supported: BCS participation significantly enhanced professional competence relative to traditional case teaching.

5.3. Structural Equation Modeling (H2–H5)

A structural equation model (SEM) was estimated to test the hypothesized relationships among competition factors, learning engagement, and competence improvement. Bootstrapping (5,000 resamples) assessed indirect effects. Model fit was satisfactory ($\chi^2/d = 2.35$, CFI = 0.93, RMSEA = 0.068).

(1) Effects on Learning Engagement (H3): Team interaction quality ($\beta = 0.41$, $p < 0.001$) and feedback effectiveness ($\beta = 0.35$, $p < 0.001$) exerted significant positive effects on engagement, whereas competitive intensity was non significant ($\beta = 0.08$, $p > 0.05$). Hence H3b and H3c were supported; H3a was not.

(2) Effect of Engagement on Competence (H4): Learning engagement positively predicted competence enhancement ($\beta = 0.62$, $p < 0.001$), supporting H4.

(3) Direct Effects (H2): Competitive intensity ($\beta = 0.05$), team interaction quality ($\beta = 0.11$), and feedback effectiveness ($\beta = 0.09$) had no significant direct effects (all $p > 0.05$), thus H2a–H2c were not supported.

(4) Mediation Tests (H5): Bootstrapped 95 % AIs indicated significant indirect effects of team interaction quality (effect = 0.254, CI [0.168, 0.355]) and feedback effectiveness (effect = 0.217, CI [0.139, 0.308]) on competence via engagement, while competitive intensity's indirect path was non significant (CI [–0.012, 0.135]). Therefore, H5b and H5c were supported, H5a was not.

Overall, team interaction quality and feedback effectiveness influenced professional competence indirectly and fully through learning engagement, whereas competition intensity showed no significant effect.

6. Discussion and Conclusion

6.1. Major Findings

This quasi-experimental study and Structural Equation Modeling (SEM) analysis yielded three core findings: First, Business Competition Simulation (BCS) effectively develops business students' professional competence. Compared with case-based teaching, BCS participants demonstrated significantly greater improvements in strategic decision-making, data analysis, teamwork, and stress adaptation capabilities. This evidence substantiates the value of experiential learning as an effective pedagogical approach in business education. Second, team interaction and feedback—rather than competition intensity—serve as key drivers of competence development. The widely assumed positive correlation between "higher competition intensity and better learning outcomes" was not supported; instead, process-quality variables (i.e., constructive team communication and meaningful feedback) proved decisive. This highlights the critical importance of learning process quality over competitive pressure. Third, learning engagement functions as the core psychological bridge connecting process variables to competence development. Engagement fully mediated the effects of interaction quality and feedback on competence, indicating that BCS enhances abilities by energizing students' learning motivation, promoting deep immersion, and guiding sustained engagement in deep learning cycles. This clarifies the mechanism underlying experiential simulations: their effectiveness stems not from external rewards but from fostering intrinsic learning engagement.

6.2. Theoretical Contributions

This study makes three distinct contributions to educational theory and management education research. First, it opens the "black box" of Business Competition Simulation (BCS) learning processes. By integrating Experiential Learning Theory with Tournament Theory, we develop and empirically validate a chained-mediation model that explains how BCS design factors translate into measurable competence gains. Unlike prior descriptive studies, our research delineates the underlying internal mechanism governing this relationship. Second, it extends Tournament Theory to educational contexts by revealing that extrinsic competition intensity is less impact than collaborative process variables in learning environments. This finding refines Tournament Theory by identifying critical contextual boundary conditions: competition enhances learning outcomes only when balanced with cooperative interactions and constructive feedback. Third, it internationalizes professional competence as a multidimensional construct, validated through a four-dimension scale (strategic, analytical, collaborative, and

adaptive capabilities). This psycho metrically sound measurement tool provides a reliable instrument for future quantitative research, thereby enhancing methodological rigor in management education studies.

6.3. Practical Implications

For business schools and instructors implementing Business Competition Simulation (BCS) curricula, three actionable recommendations emerge. Firstly, shift from result-orientation to process-orientation: overemphasis on rankings or financial outcomes may undermine deep learning, so course assessment should incorporate process indicators—including team cooperation quality, decision-report analysis, and reflective depth—to foster formative learning. Secondly, foster high-quality team interaction: instructors should guide team formation, clarify roles, and establish communication norms proactively, while periodic team-building and peer-assessment activities can strengthen collaboration and mitigate destructive conflict. Thirdly, build multidimensional feedback systems by integrating machine-generated analytic (immediate feedback), instructor coaching (diagnostic feedback), and peer feedback (reflective feedback); timely, specific, and constructive feedback loops will amplify student engagement and learning outcomes.

6.4. Limitations and Future Research

Several limitations of this study warrant cautious interpretation of the findings. First, the reliance on a single-institution sample may restrict the generalization of results; future research should therefore incorporate diverse university settings and cultural contexts to enhance external validity. Second, despite the preposterous design mitigating potential response biases, the use of self-reported measures introduces inherent limitations, and the integration of objective assessment tools would strengthen the validity of competence evaluations. Third, the cross-sectional nature of the data collection limits our ability to capture dynamic changes in competence development across multiple simulation rounds, highlighting the need for longitudinal tracking to examine temporal patterns. Fourth, individual difference variables—including personality traits such as achievement motivation, risk preference, and cognitive style—may moderate the observed relationships, representing promising avenues for future inquiry to refine the theoretical framework.

7. Conclusion

This study empirically verifies that Business Competition Simulation courses significantly enhance business students' professional competencies through engagement-based experiential learning. Team interaction quality and feedback effectiveness are critical pedagogical levers, whereas competition intensity plays a limited role. The research offers a comprehensive model linking competition design, psychological mechanisms, and learning outcomes, enriching both experiential-learning theory and management-education practice.

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