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Advancing Project Management Education: A Hybrid Experiential-Simulation Learning Approach through Competitive Business Challenges for Student Engagement and Professional Readiness

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Abstract :
This study examines how a hybrid experiential–simulation learning approach can strengthen project management education by connecting theoretical understanding with practical application in higher education settings. The study is grounded in the recurring challenge that project management instruction often emphasizes conceptual knowledge, while students struggle to apply project management processes in dynamic, uncertain situations. To address this issue, a mixed-methods design was employed, combining quantitative measurement of learning improvement with qualitative exploration of students' experiences during a competitive simulation activity. The core learning intervention involved a competitive business challenge in which students managed real-time decision-making, resource allocation, teamwork coordination, and a profit reinvestment mechanism designed to create iterative learning cycles. Findings indicate consistent improvement across all PMBOK knowledge areas, accompanied by notable development in decision-making, problem-solving, and collaborative capabilities. Student reflections further revealed increased engagement and confidence, as well as the unexpected emergence of entrepreneurial awareness during the learning process. These results suggest that integrating experiential participation, competitive simulation, and structured reflection creates a learning environment that more closely resembles professional project practice. The study therefore shows that authentic, student-centered learning experiences can reduce the gap between academic instruction and workplace expectations, offering a practical instructional model for enhancing applied competence and professional readiness in project management education.

INTRODUCTION

Project management education continues to face a persistent challenge in preparing students for the realities of professional practice. Although universities increasingly adopt internationally recognized frameworks such as the PMBOK to structure instruction, learning often remains centered on conceptual explanation rather than applied execution (Dong & Wang, 2025; Pálvölgyi, 2022; X. Zhang, 2024). This condition emerges because classroom environments tend to simplify project processes into sequential theoretical stages, whereas real projects require simultaneous coordination of planning, communication, risk response, and decision-making under uncertainty. Prior educational observations suggest that students frequently understand project terminology yet struggle to translate that understanding into coordinated action when confronted with dynamic situations (Fujita, 2023; Hazler, 2022; Zucker, 2025). As a result, graduates may demonstrate procedural knowledge without developing the practical judgment required in real organizational contexts. This gap between theoretical comprehension and practical capability indicates that project management education

requires instructional approaches capable of recreating authentic learning conditions rather than relying solely on explanatory teaching models.

Scholars in management education have increasingly examined experiential and simulation-based learning as alternatives to traditional instructional methods. The central argument emerging from this body of research is that learning becomes more meaningful when students actively engage in problem situations that resemble professional practice (Cheung, 2024; Muller, 2025; Park, 2021). Experiential learning studies show that direct involvement in project activities encourages reflective thinking and deeper conceptual integration, while simulation research highlights improvements in engagement and collaborative performance (Bharathi S Padmavathi, 2024; Ingles & Retallick, 2025; Trinidad & Wung, 2023). Several studies report that students participating in applied learning environments develop stronger decision-making and teamwork abilities compared with those exposed primarily to lecture-based instruction (Li & Liu, 2024; Paleenud et al., 2024; Santos, 2025). However, existing research also reveals a recurring limitation: many simulations remain confined to controlled classroom exercises or digital scenarios that reduce the complexity and consequences typically present in real projects. Consequently, although experiential and simulation approaches demonstrate positive outcomes, they often fail to fully reproduce the pressures, accountability, and adaptive responses that characterize professional project environments. This suggests that further pedagogical development is needed to strengthen the authenticity of learning experiences in project management education.

Despite growing interest in experiential pedagogies, important gaps remain insufficiently explored. Much of the existing literature treats experiential learning and simulation as separate instructional strategies rather than examining how they might function as an integrated learning system. Moreover, previous studies frequently emphasize cognitive learning outcomes while giving less attention to how experiential environments influence professional readiness or entrepreneurial awareness. Another limitation concerns the operationalization of project management frameworks in educational settings; research rarely demonstrates how multiple PMBOK knowledge areas can be applied concurrently within a realistic learning scenario. These limitations indicate the need for an instructional design that combines experiential engagement, competitive interaction, and iterative learning processes within a single educational structure. The present study responds to this need by introducing a hybrid experiential–simulation model implemented through a competitive business challenge involving real financial decision-making and reinvestment cycles. By situating students within conditions that require continuous adjustment and collaboration, the study seeks to explore learning processes that remain underexamined in previous research.

The purpose of this study is to investigate how a hybrid experiential–simulation learning approach shapes students' understanding of project management concepts, practical application capabilities, and readiness for professional environments. Employing a mixed-methods design allows the study to examine learning outcomes from complementary perspectives. Quantitative measures provide evidence of changes in perceived competence and performance outcomes, while qualitative reflections capture how students interpret their experiences, negotiate team dynamics, and respond to uncertainty during the simulation. This combination enables a more comprehensive understanding of learning processes than either approach alone. Rather than evaluating learning solely through assessment scores, the study considers how knowledge, behavior, and decision-making develop simultaneously within an experiential context. In doing so, the research aims to extend current discussions in management education regarding how

instructional design can better align academic learning with professional practice demands.

This study is grounded in the argument that meaningful project management learning emerges when students encounter situations requiring them to plan, act, evaluate outcomes, and revise strategies in response to real consequences. The competitive simulation environment provides a setting in which theoretical concepts are continuously tested through interaction, negotiation, and resource management. By examining how students navigate these processes, the research seeks to understand how experiential pressure influences learning behavior, collaboration patterns, and adaptive thinking. Such an exploration is particularly relevant for understanding how higher education can cultivate competencies that extend beyond technical knowledge toward professional judgment and situational awareness.

RESEARCH METHOD

This study employed a mixed-methods research approach to evaluate the effectiveness of a hybrid experiential–simulation learning model in project management education (Edmunds et al., 2022; Jiang et al., 2022; Schoonenboom, 2024). The approach was selected because the study aimed not only to measure changes in students' conceptual understanding quantitatively but also to examine learning experiences, engagement, and the development of professional competencies emerging during the simulation process. The research was conducted with undergraduate students enrolled in a project management course over one academic semester, with the central activity implemented through a competitive business challenge carried out within the university environment to simulate authentic business practice. The use of a mixed-methods design enabled the integration of numerical data, such as survey outcomes and financial performance results, with qualitative insights derived from reflection and observational evidence. This approach was considered appropriate as the study sought to capture learning outcomes beyond cognitive achievement, including skill application, team dynamics, and students' professional readiness within an experiential learning context.

Data were collected using multiple techniques designed to capture different dimensions of the learning process. First, structured pre- and post-activity surveys were administered to measure changes in students' understanding and confidence in applying the 10 PMBOK knowledge areas and associated processes, using a 5-point Likert scale. The survey instrument was developed based on the PMBOK framework and underwent validation through expert review, pilot testing, and reliability assessment using Cronbach's alpha (Karakaya & Alparslan, 2022; Peethambaran & John, 2025; S. Zhang & Li, 2025). Second, quantitative data were obtained through performance metrics, including initial investment utilization, revenue generation, profit outcomes, and return on investment (ROI) achieved during the competitive simulation. Third, qualitative data were gathered through individual process implementation reports, written reflections, reflective journals, team debriefings, post-simulation focus group discussions, and instructor observations documenting team interaction and process integration. The use of multiple data sources enabled triangulation, ensuring alignment between students' self-reported perceptions and observed learning behaviors throughout the activity (Maxwell, 2022; Morgan, 2022; Tepetepe, 2022).

Data analysis combined quantitative and qualitative procedures consistent with the adopted mixed-methods design (Daidone et al., 2024; Hammersley, 2021; KILIÇ & DOĞAN, 2021). Quantitative data were analyzed by comparing pre- and post-survey results to identify changes in students' perceived competence and confidence in applying

project management concepts, alongside analysis of financial performance indicators, such as profit generation and return on investment, during the two-day simulation period. Qualitative data obtained from reflection reports, implementation documents, instructor observations, and focus group discussions were analyzed using thematic analysis to identify recurring patterns related to learning experiences, challenges encountered, and perceived educational value of the simulation. Integrating quantitative outcomes with qualitative interpretations enabled a comprehensive understanding of student development and a holistic evaluation of the effectiveness of the hybrid experiential–simulation learning model (Bazeley, 2024; Johnson, 2026; MacGregor & Cooper, 2022).

RESULT AND DISCUSSION

Result

Learning Outcomes Assessment

The hybrid experiential-simulation learning approach was associated with observable improvements across multiple learning dimensions. Quantitative comparisons between pre- and post-challenge assessments indicated notable increases in students' reported understanding and application of project management concepts. Qualitative reflections further illustrated changes in learning experiences and perceived competence during the simulation.

Knowledge Acquisition and Retention

Table 1 presents pre- and post-challenge assessment results across the ten PMBOK Guide Knowledge Areas. The overall average score increased from 47% in the pre-assessment to 81.4% in the post-assessment, representing a 73% relative improvement. Among the knowledge areas, Project Integration Management showed the largest increase, rising from 39% to 76% (95% improvement). Similar upward trends were observed across all remaining knowledge areas, indicating consistent learning gains following participation in the competitive business challenge.

Table 1. Pre- and Post-Challenge Assessment Results Across PMBOK Knowledge Areas

PMBOK Knowledge Area	Pre-Challenge Score	Post-Challenge Score	Improvement
	Percentage (%)		
Project Integration Management	39	76	95
Project Scope Management	45	87	93
Project Schedule Management	53	89	68
Project Cost Management	38	71	87
Project Quality Management	42	71	69
Project Resource Management	48	86	79
Project Communications Management	61	94	54
Project Risk Management	52	76	46
Project Procurement Management	43	78	81
Project Stakeholder Management	49	86	76
Overall Average	**47**	**81.4**	**73**

Table 1 presents the pre- and post-challenge assessment results across the ten PMBOK Guide knowledge areas. Scores represent normalized mean responses derived from the 5-point Likert-scale survey assessing students' perceived competence across PMBOK knowledge areas. Overall performance improved following participation in the competitive business challenge, with the average score increasing from 47% in the pre-assessment to 81.4% in the post-assessment, representing a 73% overall improvement.

All knowledge areas demonstrated positive gains. Project Integration Management showed the largest increase, rising from 39% to 76% (95% improvement), followed by Project Scope Management, which improved from 45% to 87% (93%). Project Cost Management also increased from 38% to 71% (87%), while Project Procurement Management improved from 43% to 78% (81%). Moderate improvements were observed in Project Resource Management (48% to 86%, 79% improvement) and Project Stakeholder Management (49% to 86%, 76%). Project Schedule Management increased from 53% to 89% (68%), and Project Quality Management improved from 42% to 71% (69%). Project Communications Management, which recorded the highest pre-challenge score (61%), increased to 94% (54% improvement). Project Risk Management showed the smallest increase, rising from 52% to 76% (46%). Collectively, improvements were observed across all PMBOK knowledge areas following the experiential-simulation learning intervention.

Practical Application Capabilities

Students demonstrated an improved ability to translate theoretical knowledge into practical action within the competitive business challenge environment. Assessment of process implementation effectiveness indicated that 78% of students successfully applied their assigned project management processes in meaningful ways, while 73% demonstrated an understanding of how individual responsibilities contributed to overall project success. Additionally, 82% of participants reported enhanced decision-making capabilities under competitive pressure, and 71% exhibited improved problem-solving abilities when faced with unexpected operational challenges. These results collectively indicate substantial development of applied project management competencies, particularly in decision-making and process execution within dynamic and uncertain conditions typical of real-world project environments, as illustrated in **Figure 1**.

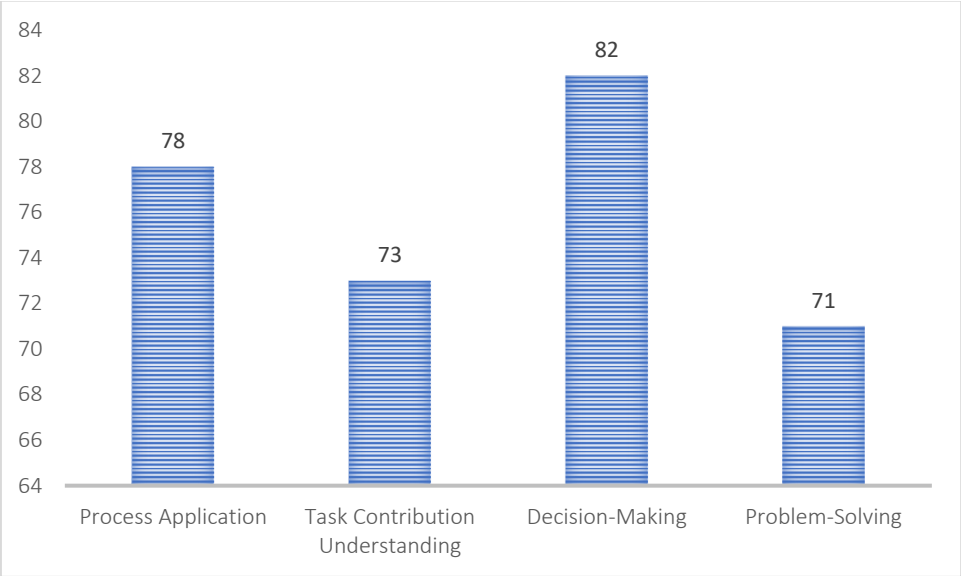

Figure 1. Practical Application Capabilities

The distribution of results shown in **Figure 1** suggests that experiential engagement particularly strengthened decision-making competence, which recorded the highest proportion of improvement among the measured capabilities. This pattern indicates that exposure to time constraints, financial risk, and real-time team

coordination encouraged students to make rapid yet informed judgments similar to those required in professional project environments. Meanwhile, slightly lower but still substantial outcomes in task contribution understanding and problem-solving demonstrate that collaborative awareness and adaptive responses also developed through iterative team interaction during the challenge. Collectively, these findings indicate strong development of practical competencies essential for real-world project execution.

Student Engagement and Professional Readiness

The competitive business challenge significantly enhanced student engagement levels and professional readiness. Qualitative feedback consistently highlighted increased motivation compared to traditional coursework: *"The real money and competition made everything feel important. I couldn't just memorize for a test—I had to actually understand how to make the processes work in a real business situation."* (Student Reflection) *"Having to compete against the other team and manage real profits forced us to think strategically about every decision. It wasn't just about completing an assignment—it was about succeeding in business."* (Focus Group Participant) Instructor observations confirmed dramatically higher levels of student engagement, with participants arriving early, staying late, and maintaining intense focus throughout both challenge days, demonstrating the effectiveness of the hybrid experiential-simulation approach in preparing students for professional environments.

Soft Skills Development

Qualitative reflections and post-activity feedback indicated observable development in several soft skill domains, particularly leadership and team management, communication and collaboration, and adaptability and problem-solving. While communication management is explicitly recognized within PMBOK frameworks, other interpersonal competencies such as collaboration, adaptability, and leadership emerged through students' reported experiences during the competitive activity. These skills were examined separately to capture applied behavioral outcomes that are not typically reflected in traditional academic assessments. Across reflection reports, students frequently described changes in confidence, decision-making behavior, and participation in team interactions.

Student reflections suggested movement beyond purely theoretical engagement. For example, participants reported learning to delegate tasks according to individual strengths, adapt strategies under time pressure, and participate more actively in discussions. One participant noted improved confidence in expressing ideas during group decision-making, while others described increased willingness to assume leadership responsibilities. These recurring reflections indicate patterns of perceived development in interpersonal and problem-solving competencies during the simulation.

Leadership and Team Management

Reflection data indicated changes in leadership behavior among students assigned managerial roles. Participants described increased involvement in coordinating tasks, delegating responsibilities, and guiding team workflow under competitive conditions. Several students reported initial discomfort with leadership responsibilities but later described improved confidence in organizing team activities and making operational decisions. Reflections also highlighted experiences related to rapid decision-

making and conflict management, particularly when teams encountered time pressure or disagreement during operational planning.

Communication and Collaboration

Qualitative responses also pointed to improvements in communication and collaborative interaction. Students reported adapting communication styles depending on audience context, including interactions with teammates, customers, and suppliers. Reflections frequently referenced negotiation experiences, active listening, and clearer presentation of ideas during team discussions and sales activities. Participants also described increased confidence in presenting outcomes and coordinating information flow within teams throughout the challenge period.

Adaptability and Problem-Solving

Adaptability and problem-solving emerged as recurring themes across reflection reports. Students described responding to unexpected challenges such as fluctuating demand, limited resources, and operational constraints. Many reflections emphasized the need to adjust strategies quickly and make decisions despite incomplete information. Participants also reported learning from unsuccessful attempts and modifying approaches during subsequent stages of the activity, indicating iterative responses to changing conditions within the competitive environment.

Business Acumen and Entrepreneurial Readiness

Qualitative findings further indicated the emergence of business-related competencies during the competitive challenge. Students engaged directly with customer interactions, financial decision-making, and market-based constraints while attempting to generate profit. Reflection data highlighted experiences related to pricing decisions, customer needs assessment, budgeting considerations, and competitive positioning. Several participants reported increased familiarity with sales activities and greater confidence in interacting with customers following the exercise, suggesting shifts in perceived entrepreneurial capability.

Competitive Performance Analysis

Team financial performance outcomes varied substantially during the competitive business challenge, indicating clear differences in how teams translated project management practices into business results. The observed variation in return on investment (ROI) suggests that differences in planning, coordination, and operational decision-making influenced overall performance outcomes during the simulation. While both teams operated under similar constraints and resources, their financial results reflected differing levels of effectiveness in managing project execution within a competitive environment. A summary of the financial performance outcomes is presented in Table 2.

Table 2. Financial Performance Outcomes of Competing Teams

Team Performance Category	Return on Investment (%)	Performance Description
Winning Team	192	Highest financial return achieved over the two-day competition
Non-Winning Team	-2	Negative return recorded during the competition period

The results show a substantial performance gap between teams, with the winning team achieving a strong positive return while the non-winning team experienced a slight financial loss. Observational records indicated that teams demonstrating more structured implementation of project management processes generally achieved stronger financial outcomes. However, variations in creativity, market response, and entrepreneurial decision-making also contributed to performance differences, indicating that business success during the simulation was influenced by multiple interacting factors rather than project management practices alone.

Implementation Challenges and Educational Adaptations

Instructor observations, student reflections, and facilitator debriefings identified several implementation challenges during the competitive business challenge. These included time management pressures, balancing competitive objectives with learning goals, team coordination difficulties, and maintaining individual accountability within group performance structures. Following identification of these issues, adjustments were introduced in subsequent iterations of the activity.

Time constraints occasionally limited planning depth, prompting the introduction of structured checkpoints and clearer time allocation guidance in later implementations. Competitive dynamics sometimes shifted attention toward profit outcomes rather than process implementation, leading to refinement of assessment criteria to better balance learning and performance evaluation. Interpersonal conflicts were reported in approximately 30% of teams, resulting in enhanced role clarification procedures and conflict-management guidance. Additionally, peer-evaluation mechanisms and individual assessment components were strengthened to ensure clearer recognition of individual contributions within team-based competition.

Discussion

The findings of this study demonstrate that the hybrid experiential-simulation learning approach implemented through competitive business challenges contributed to meaningful improvements in students' project management learning outcomes and professional readiness. Quantitative results revealed substantial increases across all PMBOK knowledge areas, indicating enhanced conceptual understanding following participation in the simulation. Beyond knowledge acquisition, students demonstrated strong development in practical application, particularly in decision-making, process implementation, and problem-solving under real-time constraints. Qualitative reflections further indicated increased engagement, confidence, and active participation, suggesting that experiential immersion promoted deeper learning compared to traditional lecture-based instruction. The competitive structure and reinvestment mechanism created authentic pressure conditions that required students to integrate planning, execution, and adaptive decision-making simultaneously. Financial performance outcomes, including significant variation in return on investment between teams, illustrated how project management effectiveness translated into measurable business results. Collectively, these findings suggest that combining experiential learning with simulation and competition enables students to move beyond theoretical comprehension toward applied competence development, supporting the argument that authentic learning environments can bridge the long-recognized gap between classroom instruction and professional project practice (Chang & Hwang, 2023; Depasquale & Gray, 2024; Orzhel, 2022).

The results align with prior research emphasizing the value of experiential and

simulation-based learning in management education. Studies by Cheloti (2023) highlight that traditional project management education often struggles to replicate the complexity of real project environments, limiting students' ability to apply theoretical knowledge. Similar to findings reported by Nojima (2023), this study demonstrates that simulation-based learning enhances engagement and supports the development of higher-order skills such as decision-making and collaboration. However, unlike many existing simulations that focus primarily on virtual scenarios, the present study incorporated real financial stakes and competitive dynamics, extending earlier work on business games (Druz, 2022; Paulino Arroteia, 2024; Schijven & Kikkawa, 2022). The reinvestment mechanism introduced iterative learning cycles that resemble agile project environments, thereby addressing gaps in the literature regarding limited exposure to adaptive project processes in academic settings. While previous studies have confirmed the benefits of experiential learning, this research advances understanding by showing how financial accountability and competitive pressure intensify learning engagement and foster integrated skill development, supporting Kolb's experiential learning theory while expanding its application in project management education contexts.

This study contributes to the field of management education by proposing a hybrid experiential-simulation learning framework that integrates experiential learning principles with competitive business simulation. The research extends existing pedagogical models by demonstrating how structured competition and reinvestment cycles can function as learning drivers that promote adaptive thinking, accountability, and strategic decision-making. Conceptually, the study advances experiential learning theory by introducing a reinforcement mechanism that links immediate performance outcomes to subsequent strategic adjustments, thereby strengthening iterative learning processes. In practice, the findings offer educators a scalable instructional model that simultaneously develops technical project management competencies and soft skills such as leadership, collaboration, and adaptability. The emergence of entrepreneurial competencies further suggests that project management education can serve as a bridge between management training and entrepreneurship education. By operationalizing PMBOK knowledge areas in an authentic business environment, this study provides empirical evidence for integrating experiential pedagogy into higher education curricula, contributing to ongoing discussions on how universities can better prepare graduates for dynamic, uncertain professional contexts.

CONCLUSION

This study shows that integrating experiential learning with simulation-based competition can strengthen project management education by connecting theoretical understanding with practical application. Through real-time decision-making, financial responsibility, and collaborative problem-solving aligned with PMBOK standards, students applied project management concepts in conditions that closely resembled professional practice. The results indicate that learning outcomes extended beyond conceptual mastery, supporting the development of interpersonal abilities, adaptive thinking, and entrepreneurial awareness. The emergence of entrepreneurial readiness suggests that experiential project environments can broaden the role of project management education, particularly in contexts where graduates are expected to navigate both employment and self-initiated economic opportunities.

From a theoretical standpoint, the study illustrates how PMBOK principles can function within an applied learning environment supported by a hybrid experiential-

simulation structure, including a reinvestment–iteration process that encourages continuous adjustment and reflective learning. In practical terms, the approach presents an instructional model that can be implemented without extensive technological infrastructure while fostering competencies relevant to contemporary professional settings. The findings also indicate that competitive learning environments require careful instructional planning, balanced assessment strategies, and structured reflection to maintain alignment with educational objectives. Taken together, the study suggests that project management learning becomes more meaningful when students engage directly with authentic challenges that require planning, action, evaluation, and adaptation within realistic learning contexts.

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