

AI-supported Feedback, Team Dynamics and Coaching in Hospitality Management Simulation

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Abstract: Business simulation games are increasingly used in higher education to support experiential, applied and competency-based learning. However, in tourism and hospitality education, there remains a limited empirical understanding of how simulation-based environments contribute to the development of strategic thinking, decision-making capacity and professional confidence. This paper examines how AI-supported feedback, team dynamics and structured coaching are integrated within a hospitality management simulation learning environment. Rather than treating the simulator as a supplementary digital tool, the study conceptualises it as a dynamic learning environment in which students engage in iterative cycles of action, feedback, reflection and adjustment. The paper draws on experiential and collaborative simulation-based learning, together with research on feedback and coaching, to examine how students interpret performance outcomes and connect them to strategic decision-making. AI-supported feedback is understood as one component of this broader learning environment, supporting the interpretation of operational inconsistencies, market and performance indicators, and subsequent strategic adjustment. The empirical component is designed as a survey-supported case study. Data sources include simulator performance indicators, team ranking and accumulated gains, alongside a student questionnaire measuring challenge, perceived skills, absorption, enjoyment, motivation, perceived learning, satisfaction and skills development. The analytical strategy combines descriptive statistics, reliability analysis, Spearman correlations, exploratory non-parametric comparisons and thematic analysis of open-ended comments. The findings indicate high levels of satisfaction, challenge, perceived learning and skills development. Team dynamics showed the strongest association with perceived learning ($p = .705$, $p = .007$) and were also positively associated with perceived skills and skills development, whereas simulator performance showed limited relationships with perceived learning outcomes. The paper contributes to simulation-based learning literature by offering a process-oriented account of how AI-supported feedback can be embedded within team-based simulation and human coaching to support strategic learning in hospitality management education.

Keywords: Business simulation games, Hospitality management education, AI-supported feedback, Team dynamics, Simulation-based learning, Collaborative learning

1. Introduction

Higher education has increasingly moved towards active, student-centred and competency-based approaches, in which students are expected to assume a more active role in constructing knowledge and developing transferable skills (Estes, 2004). This shift has encouraged the adoption of game and simulation-based pedagogies, particularly in fields where learning requires integrating conceptual knowledge, decision-making, and applied judgment. Simulation-based learning is especially aligned with Kolb's experiential learning cycle, as students make decisions, analyse outcomes, connect results to theoretical frameworks and adjust subsequent actions (Kolb, 2014; Vlachopoulos and Makri, 2017). In hospitality management education, this pedagogical transformation is reinforced by profound changes in the industry itself. The rapid expansion of artificial intelligence, automated scheduling systems, service robotics and data-driven decision-making is reshaping the competencies required of future hospitality professionals. As a result, higher education institutions and industry stakeholders face increasing pressure to prepare graduates for a competitive, digitally transformed labour market, in which technical fluency must be combined with analytical capacity, professional judgement, interpersonal competence, and advanced decision-making skills (UNWTO, 2023).

Within this context, traditional pedagogical models, such as lecture-based teaching and descriptive case analysis, are increasingly insufficient when used in isolation. Although traditional approaches remain valuable for introducing concepts, theories and analytical frameworks, they are less effective in developing situational awareness, adaptive reasoning and operational judgement. These competencies are particularly important in hospitality, where graduates often enter the labour market with limited hands-on management experience and underdeveloped confidence in complex decision-making.

Simulation-based learning has therefore become a central component of contemporary experiential pedagogy. By providing authentic but risk-free learning environments, simulations allow students to manipulate complex operational variables, observe the consequences of their decisions, reflect on performance, and progressively

develop professional competencies relevant to hospitality settings (Chernikova et al., 2020). However, the pedagogical effect of simulation does not derive automatically from the technology itself. It depends on how feedback, coaching, reflection and assessment are embedded in the learning design.

This is particularly relevant for hospitality management education because the sector requires graduates to combine analytical reasoning with context-sensitive judgement. Hospitality decisions are highly interdependent: pricing affects demand, positioning shapes customer expectations, investment influences operational capacity, and human resource decisions affect service quality. Teaching strategy therefore requires students to understand the connections between decisions, outcomes and subsequent strategic adjustment.

In this paper, the simulation is therefore approached as an integrated pedagogical setting rather than as a stand-alone digital activity. Its value lies in bringing together performance data, competitive comparisons, team discussions, lecturer coaching, and AI-supported feedback.

This paper examines the role of immediate AI-supported feedback, team dynamics and structured coaching in a hospitality management simulation. The study addresses the following research question: How are AI-supported feedback, team dynamics and structured coaching embedded in students' learning experience within a hospitality management simulation? Particular attention is given to the role of team dynamics in shaping how students interpret feedback and translate simulation outcomes into perceived learning and skills development.

The paper first reviews the relevant literature, then describes the pedagogical intervention and methodology, presents the results, and discusses the expected theoretical and practical implications.

2. Literature Review

2.1 Business Simulation Games and Experiential Learning

Business simulation games have become an important form of experiential learning in management education, as they allow students to make decisions in dynamic, uncertain, and competitive environments while receiving feedback on the consequences of those decisions (Chernikova et al., 2020; Vlachopoulos and Makri, 2017). This is particularly relevant in hospitality management education, where professional practice requires integrating strategic, operational, financial, marketing, and human resource decisions under uncertainty.

The educational value of simulations can be understood through Kolb's experiential learning cycle, which holds that learning emerges from the interaction between concrete experience, reflective observation, abstract conceptualisation, and active experimentation (Kolb, 2014). In simulation-based learning, students first engage in concrete experience by making decisions in the simulated environment. They then reflect on the outcomes obtained, conceptualise their causes by linking them to theoretical frameworks, and experiment again by reformulating strategies in subsequent rounds. This recursive movement is particularly appropriate in business strategy education, where students must understand how strategic choices interact with competitive behaviour and performance outcomes.

Serious games and business simulations may also enhance student engagement because they combine challenge, feedback, autonomy and perceived relevance (Arnab et al., 2015). When designed effectively, they create learning situations in which students are cognitively and emotionally invested in the outcomes of their decisions. This is consistent with evidence suggesting that serious games and simulations can increase motivation, involvement, knowledge retention and the development of complex competencies in higher education (Chernikova et al., 2020; Vlachopoulos and Makri, 2017). However, the same characteristics that make simulations pedagogically powerful may also make them difficult to learn from. Simulations involve multiple variables, delayed effects, interdependencies and feedback loops, requiring students to interpret complex causal relationships rather than merely react to immediate outcomes. Without adequate instructional support, students may focus excessively on short-term performance indicators and overlook underlying causal mechanisms. They may therefore draw superficial conclusions from complex simulation outcomes. Feedback, coaching and structured debriefing are consequently important for transforming simulated experience into meaningful learning (Capelo et al., 2025). Research also suggests that the balance between challenge and perceived ability may influence absorption, enjoyment and perceived learning in business simulation games (Buil et al., 2018).

2.2 Team Dynamics and Collaborative Learning

The team-based nature of business simulation games is also pedagogically significant. In team-based simulations, learning emerges not only from interaction with the platform but also from negotiation, explanation, disagreement and collective decision-making. Team processes therefore influence how students interpret information, distribute tasks, manage uncertainty and translate feedback into action (Hühn and Rausch, 2022). This is particularly relevant in business simulations because teams must coordinate decisions across several functional areas while responding to competitors and time pressure. In this sense, team dynamics are not merely a background condition; they are part of the learning mechanism itself.

In team-based simulations, group composition is also part of the learning environment. Randomly formed teams may increase the need for communication, role negotiation and coordination, because students cannot rely solely on pre-existing friendship networks or established working routines. Although this may initially create friction, it can also make collaboration itself a learning outcome, particularly in management education contexts where professional practice requires working with diverse colleagues under time pressure.

2.3 AI-supported Feedback and Coaching

Feedback is central to learning in simulation-based environments because it helps students identify discrepancies between intended and actual outcomes, recognise performance patterns and adjust future decisions. However, feedback must be calibrated to students' level of understanding. Rikhtehgar Berenji and Najmi (2026) suggest that detailed feedback may be more useful for higher-performing students, while general feedback may be more accessible for lower-performing students.

This is especially relevant when feedback is supported by AI-based or automated mechanisms. However, immediacy alone does not guarantee deeper learning. Students must understand why particular outcomes occurred, how different decisions interacted and which alternative courses of action might be considered. AI-supported feedback may therefore be most valuable when embedded in a broader instructional design that includes lecturer mediation and structured opportunities for discussion.

Debriefing can support the transformation of simulation experience into learning by promoting feedback, reflection and discussion (Capelo et al., 2025; Keiser and Arthur, 2021). In the present study, AI-supported feedback is therefore conceptualised as one component of a broader pedagogical architecture in which lecturer coaching supports interpretation, reflection and strategic sense-making.

3. Pedagogical Context and Simulation Design

The case concerns the implementation of a hospitality management simulation in a business strategy course unit of a hospitality management programme at a Portuguese higher education institution. The activity was organised as an intensive simulation bootcamp to support the transition from theory to practice (Pitic and Irimias, 2023). The format was designed to foster immersion, maintain continuity across decision rounds and focus students' attention on the evolving consequences of their strategic choices. It also approximated the time pressure associated with managerial decision-making. Twenty students participated in the activity.

One week before the boot camp, students attended an introductory presentation of the simulation. This session explained the purpose of the activity, the platform's logic, the main decision areas, and the type of performance information generated after each round. Students were also given access to the simulator during the week preceding the bootcamp, allowing them to explore the interface and test basic functionalities before the intensive decision-making phase. Although only a limited number of students used this opportunity extensively, this preparatory stage was pedagogically important because it reduced initial uncertainty and positioned the bootcamp as a structured learning experience rather than a first contact with the tool (Yasarcan, 2009).

Students were randomly assigned to teams to reduce potential selection bias associated with self-selected group formation and to increase heterogeneity in collaborative working arrangements. Random allocation also approximated professional contexts in which individuals are required to collaborate with colleagues with whom they have no prior working relationship.

Each team acted as a management board responsible for positioning, investment, marketing, human resources, operations, and overall strategic orientation. The simulation proceeded through successive rounds. After each round, students reviewed performance and market information, compared their results with

competitors and adjusted their strategy. The intensive format made the consequences of previous choices more visible and easier to act upon.

4. Methodology

4.1 Research Design and Participants

The study adopts a survey-supported case study design focused on a bounded pedagogical intervention in a real educational context. The aim is not statistical generalisation, but an exploratory understanding of how AI-supported feedback, team dynamics and structured coaching operate within a hospitality management simulation.

Respondents were 13 undergraduate students enrolled in a business strategy unit within a hospitality management programme at a Portuguese higher education institution, representing 65% of those who participated in the boot camp. The sample included seven male and six female students, most aged 20 or 21. None had previous experience with management simulators, and only two were employed in the hospitality sector. The respondents completed the questionnaire after the simulation experience. Participation in the survey was voluntary; students were informed that non-participation would not affect the assessment, and data were treated anonymously and reported in aggregated form.

4.2 Instrument

The questionnaire included validated constructs adapted to the context of a business simulation game. Challenge and perceived skills were measured using items from Novak et al. (2000). Absorption, enjoyment, and motivation were measured using items adapted from Khan and Pearce (2015). Perceived learning was measured using items based on Tiwari et al. (2014), while satisfaction was measured using items adapted from Kettanurak et al. (2001). The questionnaire also included skills development items covering decision-making, working under pressure, adapting to new situations, teamwork and applying theory to practice. Characterisation variables included gender, age, previous simulator experience, professional experience, hospitality experience, expected course average, grades in relevant curricular units and evaluation of team dynamics.

AI-supported feedback formed part of the pedagogical intervention, but the questionnaire did not include a stand-alone measure specifically assessing students' perceptions of the AI component. Accordingly, the study examines AI-supported feedback as an element of the broader pedagogical intervention rather than as an independently measured predictor of learning outcomes.

4.3 Statistical Treatment

Given the exploratory nature of the study and the small sample size, the statistical analysis was deliberately parsimonious. Composite variables were created by averaging the items associated with each construct. Descriptive statistics were calculated for all constructs, and internal consistency was assessed using Cronbach's alpha. Spearman correlations were used to examine associations between learning constructs, team dynamics and simulator performance indicators. Exploratory Mann-Whitney U tests compared students in first-ranked teams with those in other teams. These tests are interpreted cautiously and not as confirmatory evidence. Finally, students' open-ended comments were analysed thematically.

5. Results

5.1 Simulator Performance

Simulator performance varied substantially across teams. Five students belonged to first-ranked teams, five to second-ranked teams, two to third-ranked teams and one to a fourth-ranked team. Accumulated earnings after five rounds were available for 11 respondents and ranged from -€5,906 to €250,000, with a mean of €61,472.09 and a median of €27,585, indicating a positively skewed distribution. First-ranked teams recorded the highest mean accumulated earnings (€142,640.25), compared with €7,722.80 among second-ranked teams. However, simulator performance is interpreted here as an indicator of decision effectiveness within the simulated competitive environment, not as a direct measure of learning.

5.2 Student Perceptions of the Simulation

Students evaluated the simulation positively overall. Satisfaction, challenge, skills development and perceived learning recorded the highest mean scores, whereas perceived skills received the lowest rating. This suggests

that students valued the experience while remaining cautious about their own level of mastery. Internal consistency was generally satisfactory, though reliability coefficients should be interpreted cautiously given the small sample size.

Table 1: Descriptive statistics and internal consistency of the main constructs

Construct	Mean	SD	Cronbach's alpha
Satisfaction	6.38	0.76	.949
Challenge	6.06	0.93	.874
Skills development	5.88	0.77	.857
Perceived learning	5.69	0.68	.750
Enjoyment	5.52	1.22	.987
Motivation	5.20	1.20	.842
Absorption	4.98	1.72	.971
Perceived skills	4.40	1.09	.728

Note: All constructs were measured on seven-point Likert-type scales (1 = strongly disagree to 7 = strongly agree; N = 13).

These results indicate that the activity placed students in a zone of productive challenge rather than effortless performance, which is consistent with the theoretical relevance of challenge and perceived competence in simulation-based learning.

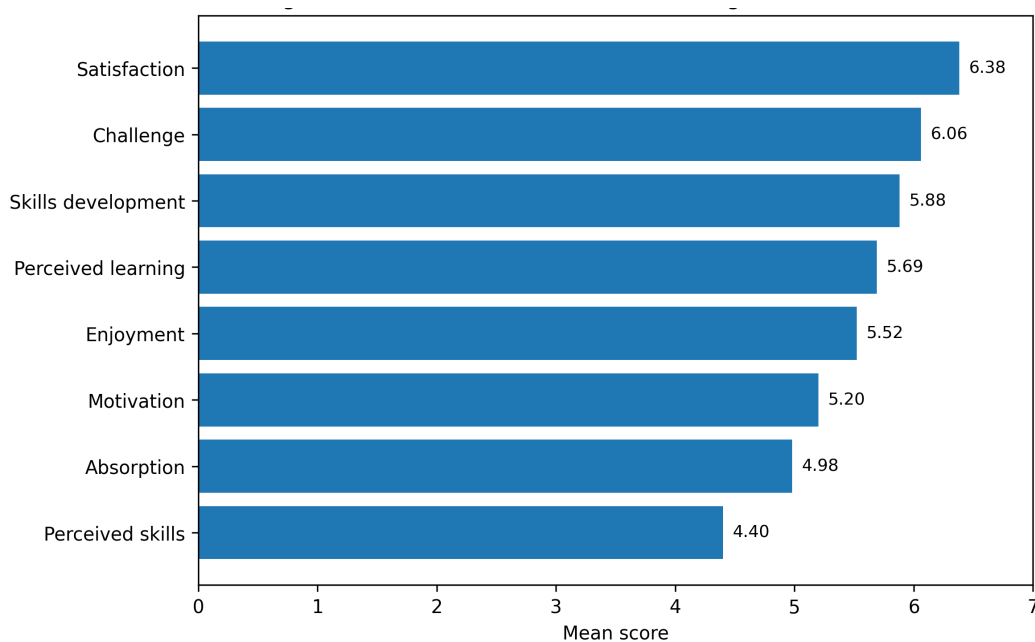


Figure 1: Mean scores of the main learning constructs (N = 13)

5.3 Relationships Between Performance, Engagement and Perceived Learning

Simulator performance was only partially associated with students' perceptions of the learning experience. Reverse-coded team ranking was positively associated with absorption, although not significantly ($p = .494$; $p = .086$). Accumulated earnings were positively associated with challenge ($p = .603$; $p = .050$), but not with perceived learning, satisfaction or skills development. This suggests that students' learning experience was not reducible to final financial performance.

The strongest associations involved team dynamics. Students' evaluation of team dynamics was positively associated with challenge ($p = .626$; $p = .022$), perceived skills ($p = .574$; $p = .040$), perceived learning ($p = .705$;

$p = .007$) and skills development ($p = .553$; $p = .050$). Challenge was also positively associated with absorption, enjoyment and perceived learning, while enjoyment and motivation were positively associated with satisfaction. These results are consistent with flow theory and suggest that students' engagement was shaped by the balance between challenge, perceived competence, immersion and positive affect.

Exploratory Mann-Whitney U tests did not reveal statistically significant differences between students in first-ranked teams and those in other teams. However, first-ranked teams reported higher mean absorption, with the difference approaching significance. This result is interpreted cautiously but may suggest that deeper immersion is associated with stronger competitive performance.

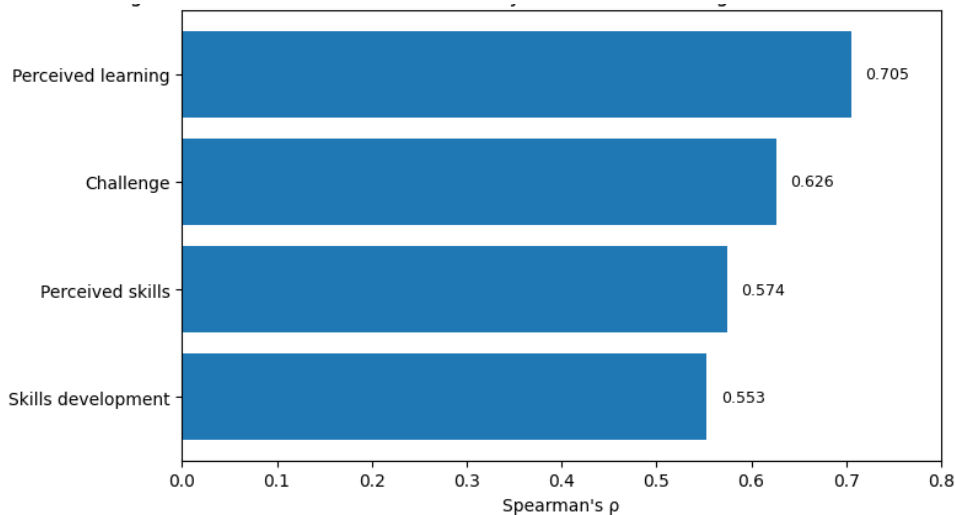


Figure 2: Associations between team dynamics and learning-related outcomes (N = 13)

5.4 Qualitative Insights From Student Feedback

The open-ended comments helped contextualise the quantitative findings. Three themes emerged: perceived pedagogical value, team dynamics and the simulator as a bridge between classroom learning and professional practice. Students described the simulator as *“a very powerful and effective tool for students aiming to develop management skills”* and as a resource with potential to be used more fully within the curriculum. This supports the high satisfaction and perceived learning scores.

Students also emphasised the importance of team interaction. One participant noted that *“if there are good chemistry and a shared mindset, the team communicates better, which can lead to better results”*. Others suggested that smaller teams could improve communication and reduce disengagement. Finally, students valued the simulation as an *“opportunity to explore most of the subjects taught throughout the course”* while approximating situations they may encounter in the labour market. These comments suggest that the learning experience was shaped by team communication, perceived professional relevance and students' ability to connect simulation outcomes with prior classroom learning.

6. Discussion

Three findings are particularly relevant. First, students reported high satisfaction, challenge, perceived learning and skills development. Second, simulator performance was only weakly related to perceived learning. Third, and most importantly, team dynamics showed the strongest association with perceived learning and was also positively associated with perceived skills and skills development. Taken together, these findings suggest that the pedagogical value of the simulation lies not only in competitive performance, but also in the social and collaborative processes through which students interpret simulation outcomes and adjust subsequent decisions.

The absence of strong associations between accumulated earnings and perceived learning or satisfaction is particularly important. It indicates that students may learn meaningfully even when their teams do not achieve the best financial results. This reinforces the idea that simulation-based learning should not be assessed only through performance rankings. Lower-performing teams may still develop important competencies if they are supported in interpreting errors, understanding causal mechanisms and revising strategies.

The findings also show that team dynamics are a key condition for effective simulation-based learning. Stronger team dynamics were associated with higher perceived learning and skills development, suggesting that effective communication, shared interpretation and coordinated decision-making are important conditions within the simulation learning environment. These findings suggest that the social learning environment may condition how students interpret and act upon the feedback available during the simulation, including AI-supported feedback. The fact that teams were randomly formed may help explain why team dynamics became so salient in the results. Students had to build coordination mechanisms during the bootcamp itself, rather than relying on pre-existing working relationships. This made communication, shared commitment and role negotiation central to how feedback was interpreted and transformed into decisions. This finding complicates a purely technology-centred interpretation of simulation-based learning.

The analysis does not allow the independent contribution of AI-supported feedback to perceived learning to be isolated. Rather, it indicates that feedback was embedded in a broader learning environment characterised by team interaction, iterative decision-making and lecturer coaching. This helps explain why team dynamics were more strongly associated with perceived learning than with final simulator performance.

The qualitative comments reinforce this interpretation. Students described the simulation as both a technical and a social learning experience. Their comments highlight the importance of team chemistry, communication and group size. Poor coordination or uneven participation may limit students' involvement in decision-making and reduce the extent to which feedback is collectively interpreted. This has implications for the design of game-based learning. Under these conditions, even timely feedback may not translate into learning because it is not collectively processed.

The findings also suggest that failure or weaker competitive performance can have pedagogical value. In a simulation environment, lower performance can become a productive learning event when students are encouraged to analyse why a strategy did not work and how it could be reformulated. This aligns with the broader logic of experiential learning: students learn not only from successful decisions but also from errors, mismatches and unexpected outcomes. For hospitality management education, this is especially important because professional competence requires the ability to respond to uncertainty, diagnose problems and adapt decisions under pressure.

From a practical perspective, the results suggest three design implications. First, lecturers should avoid treating the final simulator ranking as the sole indicator of learning. Second, team composition and team size should be carefully considered, since poorly coordinated teams may reduce participation and weaken feedback processing. Third, AI-supported feedback should be complemented by structured coaching moments that help students move from performance indicators to strategic interpretation and professional judgement. The study therefore contributes by showing how AI-supported feedback can be embedded within a socially mediated simulation environment in which feedback, team interaction and human coaching operate as complementary learning mechanisms.

7. Conclusion

This paper examined the role of immediate AI-supported feedback, team dynamics and structured coaching in hospitality management simulation-based learning. The findings suggest that students evaluated the simulation positively, particularly in terms of satisfaction, challenge, perceived learning and skills development. However, simulator performance was not strongly associated with perceived learning or satisfaction. Instead, team dynamics emerged as a particularly important factor, showing strong associations with perceived learning and relevant associations with perceived skills and skills development.

The findings indicate that the educational value of the simulation depends not only on technological feedback or competitive performance, but also on the social and reflective processes through which students interpret outcomes and adjust their decisions. This is particularly relevant in hospitality management, where strategic judgement requires the integration of multiple business functions under conditions of uncertainty.

The study therefore supports viewing the simulator, AI-supported feedback, team interaction and lecturer coaching as complementary elements of a broader learning environment. The key pedagogical challenge is not simply to provide technology or feedback, but to create conditions in which students can interpret information collaboratively and translate it into strategic reasoning.

The study has limitations. It is based on a single pedagogical intervention at one institution, with a small sample size and self-reported measures. Future research could compare different cohorts, examine different

types of AI-supported feedback, include pre- and post-tests of knowledge acquisition and analyse decision logs across simulation rounds.

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Ethics Declaration: The study used anonymous student survey data collected for pedagogical research purposes. Participation was voluntary, and data were reported only in aggregated form. Formal ethical approval was not required by the institution.

AI Declaration: AI-assisted tools were used to support language refinement, structuring and editing. The authors reviewed, edited and remain fully responsible for the submitted paper.

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