Learning AI by Doing: A Pilot Study of Human – AI Collaboration and Employee Stress in Guest Services

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Introduction

The growing integration of artificial intelligence (AI) in hospitality operations is reshaping traditional workflows at hotel frontlines (van Riel et al., 2025). While AI contributes to efficiency, its impact on emotional labor remains less understood (Shi et al., 2025; Yang et al., 2025). This pilot study acts as a precursor to a bigger research project that aims to address the above gap. Specifically, the pilot focused on developing realistic front desk scenarios, testing multi-method measurement tools of stress, and refining lab-based experimental procedures to prepare for the formal empirical investigation. Conducted within the Cal Poly Experience Innovation Lab (https://www.eilcalpoly.org/), the pilot also tests how simulation-based experimental research can be embedded into "learn by doing", engaging the next generation of experience industry professionals in future-ready, hands-on exploration of human – AI collaboration.

Theoretical Foundation

Hospitality frontline presents unique challenges in today's reality, as increasing technological autonomy such AI and robotics reconfigures roles traditionally performed by humans (Ersoy & Ehtiyar, 2023). The current research is grounded in Job Demands–Resources (JD-R) theory (Radic et al., 2025) and Socio-Technical Systems (STS) perspectives (Yu, 2023). JD-R theory indicates that workplace stress is shaped by the balance between job demands (e.g., emotional labor needed in guest interactions) and job resources (e.g., technological support such as AI autonomy). Different levels of AI autonomy may either alleviate demands by reducing repetitive tasks or create new pressures by adding complexity. Meanwhile, STS theory emphasizes the joint optimization of social and technical systems, indicating the need for hospitality frontlines to carefully integrate AI alongside human employees to achieve both operational efficiency and employee wellbeing.

Methodology

To lay the preliminary work for formal data collection, we employed a mixed-methods approach in our pilot study including qualitative interview insights, physiological tests (i.e. Shimmer devices), survey measurement, and recorded observation. We began by conducting three qualitative interviews, each lasting approximately 30 minutes, either in-person or virtual, with Experience Industry Management (EIM) students who had at least 12 months of

hotel front desk experience. The practitioner-informed feedback was applied to create realistic scenario scripts, ensuring face validity in the tasks and stressing situations simulated. Building on the qualitative insights, we then piloted experimental simulations of hotel front desk operations under varying AI autonomy conditions (Hauptman et al., 2024). Specifically, AI collaboration during check-in was designed at three levels: low autonomy (minimal AI involvement), medium autonomy (AI assisting but with human oversight), and high autonomy (AI taking the entire responsibility for tasks). Stress responses and related perception questions were measured using (1) physiological measures with wearable Shimmer devices to capture skin conductance (Ronca et al., 2023), (2) self-report surveys, and (3) observational data of recorded interactions.

Pilot Results and Experiment Refinement

A recurring theme across the interviewees was the challenge of handling guest upgrade requests when the guest had booked through a third-party website. Participants described this situation as a frequent source of anxiety at check-in, particularly when the guest was a loyalty program member expecting benefits. The insight directly informed the design of the moderate-stress scenario. Besides that, two additional scenarios were included to reflect different levels of stress: a standard check-in to for a baseline situation and an emergency case for an extreme situation.

Pilot testing proceeded in two stages. Pilot 1 utilized convenience sampling with four EIM students to test and gather feedback of the initial three scenarios. Feedback indicated that the original AI autonomy levels needed revision to improve realism. The *low autonomy* condition was removed and replaced with a *no-AI* condition. Participants also agreed that the emergency scenario of incorporating AI during a fire alarm was unrealistic as staff would not rely on AI in crisis situations. To address this, we revisited the interview data and identified group check-ins as another highly stressful front desk situation as mentioned by two of the three interviewees. The new three stress conditions are standard, upgrade, and group check-in. Combining the three situational contexts with the three levels of AI autonomy produced a 3 × 3 experimental designs, enabling exploration of how different levels of stress and AI collaboration interact to influence employee stress.

Pilot 2 focused on refining the lab-based simulation setup and data collection logistics. In total, we collected responses from seven Cal Poly students, while also successfully training student research assistants to operate Shimmer devices and capture stress variation through skin conductance data. Survey items assessing scenario realism and manipulation checks all yielded high mean scores, further supporting the validity of the experimental

design. The laboratory environment replicated a hotel setting and incorporated a digital interface with the Nao robot alongside human employees (i.e., experiment participants wearing Shimmer devices).

Discussion and Next Steps

This pilot validated the feasibility of investigating AI autonomy and employee stress through simulation-based methods. Next steps include expanding the participant pool and formal data collection of physiological and self-report data. Importantly, the research engaged EIM student research assistants in designing and conducting the pilot and involved over ten students as the simulation participants, offering them hands-on experience with human-AI collaboration and exposure to cutting-edge technology in the Cal Poly Experience Innovation Lab.

Selected References

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