

# **Bridging the Training-Performance Gap: A Real-Life Study on the Impact of Low-End Virtual Reality on Experiential Learning in Hospitality**

## **1. INTRODUCTION**

The hospitality industry struggles with high staff turnover and labor shortages while maintaining service quality and accuracy remains critical. Consequently, there is a pressing need for efficient and effective training, since existing training approaches are disadvantageous (too costly for human-human training, too ineffective for e.g., paper-based training). Virtual Reality (VR) offers an accessible and scalable solution, enabling experiential learning through immersive, interactive environments. The diffusion of low-end VR training bears disruptive potential to significantly tackle training inefficiencies in service sectors, including hospitality.

Traditional training often fails to replicate real-world complexities, leading to gaps between learning and performative application. VR provides a safe space for employees to practice and refine skills in realistic scenarios (Cunha et al., 2023). While prior research highlights VR's potential, studies on its practical impact in hospitality remain limited (Bermejo et al., 2023; Kim & Jeong, 2018).

This study examines how low-end VR training enhances experiential learning in hospitality operations by addressing the question: *How does VR training impact experiential learning mechanisms, leading to performative learning outcomes?* A mixed-methods approach is used, combining quantitative measures (error rates, task completion times, knowledge retention) with qualitative insights from participant interviews. Findings inform how low-end VR training impacts experiential learning in applied contexts such as hospitality.

## **2. THEORETICAL BACKGROUND**

A realm of learning theories form the foundational basis for immersive learning. Constructivist learning theory views learning as a process created by the learner (Vygotsky, 2016). Situated cognitive theory sees context as being a crucial factor in learning (Lui & Goel, 2022). The Cognitive Affective Model of Immersive Learning (Makransky & Petersen, 2021) places emphasis on instructional methods in VR learning experiences relating to presence, agency, realism, control as well affective aspects such as interest, motivation and self-efficacy. Generative learning theory (Mayer & Fiorella, 2015) looks at how learners generate meaning when exposed to new information by organizing and integrating new information into what they already know (ie. connecting it to their prior knowledge). Generative learning focus on active cognitive work to construct meaning through processes like summarizing, mapping, teaching others and enacting (Mayer & Fiorella, 2014).

### ***RELEVANCE OF EXPERIENTIAL LEARNING FOR HOSPITALITY TRAINING***

Experiential learning, as conceptualized by Kolb (2014), emphasizes learning through concrete experiences, reflective observation, abstract conceptualization, and active experimentation. After having an experience and then reflecting on observations, abstract conceptualization involves identifying key concepts from the experience and analyzing the relationships between them. This involves building a supposed theory from observations in order to connect actions to outcomes and predict future interactions of a similar nature. This approach is particularly relevant in hospitality, where employees must integrate theoretical knowledge with real-world problem-solving (Ruhanen, 2005). Studies highlight experiential learning's effectiveness in engaging learners, improving knowledge retention, and developing job-relevant skills, yet challenges remain in measuring its direct

impact on learning outcomes. A review of existing literature reveals a gap on how experiential learning occurs or presents within the context of immersive learning experiences.

### *VIRTUAL REALITY TECHNOLOGIES AS ENABLERS FOR EXPERIENTIAL LEARNING*

Virtual Reality (VR) is defined as “an artificial, virtual, and viewer-centred experience in which the user is enclosed in an all-encompassing 3D space that is—at least visually—sealed off from the physical environment” (Rauschnabel et al., 2022, p. 13). VR offers unique opportunities to enhance experiential learning by providing immersive, interactive environments that simulate real-life hospitality tasks, thereby offering a safe space to practice complex procedures. However, much research on VR in education has focused on conceptual frameworks or prototype evaluations rather than real-life studies, limiting the ecological validity of existing research (Fromm et al., 2021). Simultaneously, low-end VR, such as self-recorded 360-degree videos with text annotations, has been shown to deliver similar learning outcomes as high-end VR systems (Selzer et al., 2019), while requiring minimal ramp-up efforts.

Despite the highlighted potential of VR training, recent studies conclude missing research on a.) field studies of VR hospitality training, and b.) the performative outcomes of VR training (Kim & Jeong, 2018). This study addresses that gap by exploring the mechanisms and outcomes of low-end immersive VR training in real-world hospitality operations.

### **3. METHODOLOGY**

This study employed an iterative design-based research process (Reeves, 2006) combined with mixed-methods research. As Creswell and Creswell (2018) emphasize, such an approach enhances the richness and breadth of understanding complex phenomena, particularly in applied settings like hospitality training. Quantitative data included measurement of error rates, task completion times, and knowledge retention scores, while qualitative insights were gathered through in-depth think-aloud protocols and rich video observations. We deployed 2 pre-tests before conducting the main study:

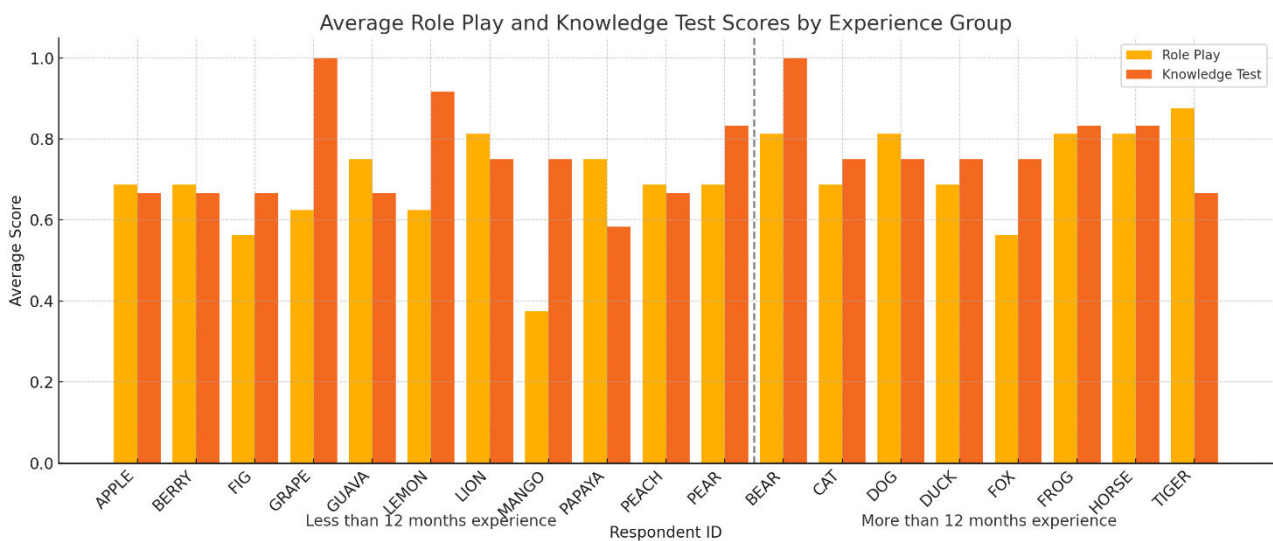
Two pre-tests compared low-end VR training with traditional video-based training for barista (n=26) and front office tasks (n=20). In both cases, we exposed participants to either of the two training formats and measured their task performance through subsequent role plays in real-life hospitality contexts (café, hotel reception). VR training resulted in lower error and increased participant confidence. Subsequently, we iterated on the VR training module based on the pretest learnings and focused solely on evaluating the impact of VR training for the main study.

The main study was conducted in real-life hotel settings, focusing on front-office operations. Participants, i.e., hotel front office staff (n=19), divided into novice and experienced groups, underwent a low-end VR training developed using a 360 video platform, featuring interactive, text-annotated 360-degree scenarios. We collected quantitative data through a.) observed performance (recorded during real-life task execution), b.) knowledge retention (through written test), c.) self-reported learning experience (survey based on validated constructs). We collected qualitative data through in-depth conversations, in which participants rewatched their recorded task performances with researchers, while discussing thought processes and challenges, structured around Kolb’s experiential learning model.

## 4. FINDINGS

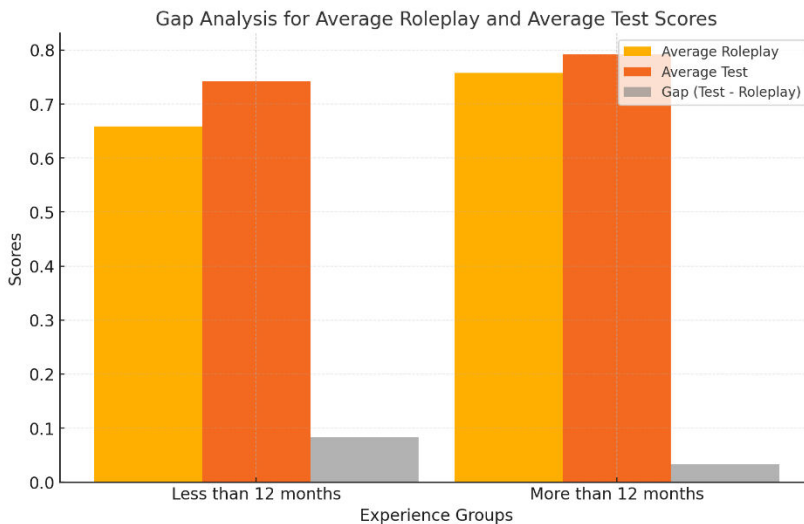
From the pre-tests, we observed a consistently lower error rate (17%) for the VR-trained participants, compared to the video-trained participants. Furthermore, we found that participants have higher levels of knowledge retention (measured through knowledge test), when reporting higher levels of details of the VR training ( $r = 0.46$ ,  $p = 0.045$ ), when perceiving the VR training as interesting ( $r = 0.56$ ,  $p = 0.013$ ), well-paced ( $r = 0.47$ ,  $p = 0.043$ ), and well-illustrated with examples ( $r = 0.54$ ,  $p = 0.016$ ).

The correlation between transportation (sense of being in the VR environment is stronger than sense of being the real world) and average roleplay showed a moderate positive relationship but not quite meeting the standard significance threshold ( $r = 0.44$ ,  $p = 0.057$ ).



The Inexperienced Group (less than 12 months experience) had an Avg. Knowledge Test score (0.74) & Avg. Role Play Application score (0.66) & a gap of 8%.

The Experienced Group (More than 12 months) had an Average Test score (0.79) and Average Role Play score (0.76) suggesting a gap of 3%. This small gap when comparing the two groups suggests that VR training could have a possible effect on knowledge-application between groups with different levels of work experience.



From the qualitative conversations, we find:

**VR simulates real-life** - VR training provided a realistic and engaging environment for simulating front office tasks. One participant noted, *“It felt like I was really at the check-in office... You see the registration form”* (Peach<sup>1</sup>). However, some experienced discomfort: *“I felt a bit dizzy when I turned around in the VR module”* (Mango). The structured nature of VR training helped participants understand the correct sequence of tasks: *“It was supporting to know what the sequence of steps is.”* (Peach).

**Connecting knowledge to application** - VR helped participants internalize procedural steps: *“It really helps you see someone doing it and then make it your own”* (Peach). One respondent discussed the importance of visual learning in comparison to reading about a procedure: *“I’m mostly a visual person so its easier for me to memorize when I see it in action. When theres a lot of information written, a lot of people are ignoring some details. With video its easier to understand better how its in real life, because I did the trainings before and the reality from reading it, it was different how to apply all these brand standards.”*

Another respondent discussed the importance of making connections between concepts, objects and sequence of tasks: *“Take this, do this, and then give the person this, that doesn't mean anything until you're actually behind the bar and seeing how to link the idea with an actual object. And you can already do that in VR.”* (Apple).

Respondents mentioned how they learnt by observing the consequences of the their choices made: *“By clicking on the options (in response to a situation) and also seeing your mistakes straight away, you learn from that directly.”* Another respondent spoke about how the VR experience helped him organize his knowledge on the new procedure: *“Since I'm just working here for a month, it really helps to see someone doing it, and then make your own story about it and follow those steps. It helps you remember the check-in procedure.”* (Peach)

Participants suggested improvements, such as real-time feedback: *“If, in VR, the trainer explained what went wrong, that would feel more like real life”* (Mango).

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<sup>1</sup> Anonymized participant name(s).

**Active experimentation through applying VR learning to real life** - Participants applied VR training in real-life tasks: *“Without VR, I would have messed up. I would have just said hello and given a room card”* (Mango). However, gaps remained: *“I missed some things in real life, but I knew what I missed because of the training”* (Peach). Another respondent mentioned a lack of alignment between the written SOP, VR SOP and the real-life check-in: *“There was a discrepancy between what I have on paper, what I see in VR and what I have to do in reality”* (Apple). There were also suggestions for more real-time feedback: *“If I got direct feedback in VR, my confidence would have increased”* (Mango).

**Identifying gaps in learning performance** - Participants reflected on discrepancies between VR training and real-life applications. A respondent mentioned how the steps in the check-in procedure could have been more clearly communicated: *“It could have been more clear saying, Step 1, you start with this. Step 2...”* Another participant noted, *“In the role play, I didn’t ask the guest to pay... I just remembered a few things but didn’t apply them fully”* (Mango). VR training encouraged critical evaluation of habitual practices: *“Sometimes, in daily operations, you just go with the flow and don’t follow the steps”* (Peach).

One respondent mentioned how a real-life job shadow where you can ask questions can be more effective than a VR job-shadow: *“Maybe see it in real life, yeah, really seeing someone doing it again, standing next to it and explaining what they’re doing, instead of just seeing someone else through your eyes.”* (Mango). Another respondent mentioned the benefits of feedback from a real-life coach: *“I was doing the procedure and a colleague was just watching with me, and if I did something wrong, he helped, and he explained to me what I did wrong. And then it’s going just better and better every time I do it”* (Pear).

Another participant discussed how you can learn at your own pace in VR: *“And also you don’t feel that somebody who is training me is always doing it too fast. I can’t understand something. And later on, I wouldn’t remember that phase or something. With the VR, slowly, slowly, we can learn. We can go back as well to the same”* (Lion).

Cognitive load was a concern: *“It was a lot of information at once... I think you can learn better in two times instead of one”* (Mango). One respondent indicated that having more time with the VR glasses: *“It was a short time, maybe a bit longer and maybe separate days”* (Pear). This could be done either by learners training in their own time at work eg. during breaks or taking the headsets home for a self-directed VR learning experience. This could allow time for new information to be processed to enable thoughtful reflection.

## **5. CONCEPTUAL FRAMEWORK FOR VR SOP TRAINING IN HOSPITALITY**

Based on the above findings we suggest a tentative framework for hybrid VR SOP training procedure:

1. Explanation of written SOP by trainer
2. Learner reads written SOP with explanatory visuals/diagrams
3. Learner given opportunity to ask questions
4. Experience SOP in VR headset
5. Experience VR Assessment of SOP with detailed feedback from AI avatar
6. Real-life practice with coach present
7. Real-time feedback from coach

In relation to the finding of learners wanting more time to work with the VR experience, the following self-directed VR learning procedure after formal training is recommended:

1. More time to practice - Practice with VR headsets at home/during breaks (Experience)
2. Learning through Trial & Error - try out multiple options to observe consequences (Experiment)
3. Time to Process to connect action and outcomes (Reflective Observation)
4. Think and Reflect (Connect to Prior Learning, Abstract Conceptualisation)
5. Practice on the Job (Experiment in the real-world).

## 6. CONCLUSION

Similar to the study by Pribadi, Rahman & Silalahi (2024), this study demonstrates that VR training can elevate on-the-job performance despite previous work experience. In addition, the study supported findings that VR training reduces error rates in comparison to video-based training (Kennedy, Pedram & Sanzone, 2023). In addition, this study develops two procedural frameworks for VR hospitality training of SOP's on-site and post-training.

Furthermore, our study evidences how low-end VR training supports experiential learning by providing structured practice, fostering reflection, and encouraging real-life application. Our data suggest improvements in feedback and pacing of VR training to enhance learning outcomes. Thus, this study extends existing debates on experiential learning based on physical experiences. Our mixed-method field study provides insights into how learning can be reflectively extracted from immersive experiences, thereby closing a highlighted gap in experiential learning literature (Fromm et al., 2021).

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