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Enhancing Human-Robot Interaction via Task Experience Maps & Personas

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This project uses the User Experience Driven Innovation (UXDI) framework and the Socio-Technical Systems (STS) theory to identify opportunities for innovation with employee-robot collaborations. The former provides insight for developing user-centered smart products [Sankar et al., 2023], and the latter highlights the interplay of social and technical factors that can impact the effective use of organizational systems [Walker et al., 2008]. Using the UXDI-STs theory, we developed a tasks-first approach to persona development, identifying key user/employee attributes and creating worksheets for task experience maps and employee personas. We tested the effectiveness of these materials via a 90-minute interview with our project sponsor that revealed two critical tasks suitable for robotics teleoperation. We crafted task experience maps and personas from this data to identify opportunities for innovation in employee-robot collaboration. A follow-up interview with our project sponsor validated our identified opportunities, thus supporting the efficacy of our developed material. Further insight came from a 90-minute interview with an operator who performs one of the identified critical tasks, leading to the refinement of our maps and personas and uncovering more opportunities for innovation. We plan to continue our data collection process until saturation. A key finding thus far is the need to integrate AI-driven Decision Support Systems (AI-DSS) with teleoperation interfaces. The real-time actionable insights generated by these systems can enhance teleoperators' situational awareness, often a key factor in making accurate decisions during teleoperation, especially for specialized mission-critical tasks completed in highly stressful conditions. Thus, the integration of AI-DSS with teleoperation interfaces offers a promising area for future UX research that aims at improving employee-robot collaboration and its relevant organizational outcomes.

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