Ethics and DEI

Bridging accessibility gaps in self-service environments with mobile conversational AI: A usability study W. Hong, A. J. Kim, J. Park, H. W. Ka, I.C. Moon, M. Choi. *Gerontechnology* 25(s*)*

Purpose The rapid proliferation of self-service kiosks in sectors such as foodservice, transportation, and healthcare has improved efficiency but has also exacerbated accessibility gaps for older adults and people with disabilities.[1] In South Korea, where kiosks have tripled in number within just two years [2], inconsistent interface designs and limited accessibility features have led to frustration, anxiety, and task abandonment, particularly among older adults and users with visual impairments. Existing interventions, such as adjustable layouts or physical modifications of kiosks, often rely on retrofitting and lack long-term scalability. Given the limitations of kiosk-centered solutions, this study aims to evaluate whether a conversational AI agent embedded in users' personal mobile devices could offer a more consistent, intuitive, and scalable alternative for accessible self-service ordering. **Method** The interdisciplinary research team at KAIST has developed an Android-based conversational AI agent called "Chaltteok" (meaning rice cake in Korean), which supports voice, text, and Braille interaction. The system integrates speech-to-text, text-to-speech, LLM-based dialogue management, and real-time APIs for menu navigation and payment processing. A total of 13 participants were recruited for this usability study using purposive sampling (4 older adults, 7 blind persons, and 2 persons with low vision). Participants completed six ordering tasks in a simulated café scenario. Usability was assessed using the System Usability Scale (SUS), perceived task difficulty using the Individual Prioritised Problem Assessment (IPPA), and task performance through completion status and time. **Results and Discussion** Chaltteok achieved a high SUS mean score of 84.8, rated between "Good" and "Excellent," indicating strong usability across participant groups. Older adults reported slightly higher overall usability than participants with visual impairments, particularly on items related to ease of learning, low perceived complexity, and minimal need for prior training. IPPA scores decreased from baseline to follow-up for all participants, indicating reduced perceived difficulty with the agent. Older adults showed smaller improvements, likely because they were already somewhat familiar with self-service kiosk operation at baseline. As a result, the primary benefit for this group lay in enhanced user experience rather than substantial reductions in task difficulty. In contrast, participants with visual impairments exhibited significantly greater improvements, eliminating baseline group differences and highlighting the agent's capacity to mitigate accessibility barriers. All participants independently completed all six tasks. Simple information-seeking tasks averaged under 30 seconds, while ordering tasks averaged about four minutes, with indications that times may decrease with familiarity. These findings demonstrate that a mobile conversational AI agent can offer a consistent, intuitive, and accessible alternative to kiosk interaction, particularly benefiting users who face sensory or physical barriers in public self-service environments. Limitations include a small convenience sample and scenario-based testing. Future work should therefore examine usability in naturalistic settings with population-representative samples.

References
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