Evaluating the effectiveness of remote digital tutoring through Illuminated Devices K.S. Steelman, T. Perr, T. Garnett, B. Bettin, L.C. Ureel, C. Wallace. *Gerontechnology* 25(s)

Purpose Community-based tutoring, as exemplified by our longstanding BASIC (Building Adult Skills in Computing) program [1], can give digital newcomers the personalized, interactive instruction they need to build competence and confidence in the digital world. But continuous in-person assistance is infeasible in most contexts, particularly for technical issues that are situated in learners' homes or workplaces. The Illuminated Devices project seeks to make technology tutoring more accessible, through a portal application connecting learners to tutors directly through common digital devices [2]. Using a participatory design process, we created (1) an Illuminated Device portal application aimed at low experience/low digital competence users; (2) an Illuminated Device management system for use at community locations; and (3) a "switchboard" system that connects learners to tutors, allows tutors to deploy "just in time" interface features, hosts a notes application for record keeping, and allows tutors to chat with one another. Here we present a user study of the Illuminated system that addresses the following research questions: (1) To what degree can a tutoring session using Illuminated Devices capture the experience of an in-person BASIC session; (2) What obstacles arise during use of the Illuminated system that hinder learning, and how can these be improved through the design of the technology or through specific tutoring strategies. **Method** Participants were recruited through two sites: a public library and a state workforce development organization. Twenty adults (10 per site; 7 men, 13 women; M_{age} = 71), all aged 50+ and self-identified technology novices, completed the study. Upon arrival, they completed digital competency inventories and tech anxiety and self-efficacy scales. Participants then engaged in a one-hour tutoring session on the topic of their choice. One site used a desktop version of the Illuminated Device portal; the other site used an iPad version designed to be checked out for off-site use. One author served as the remote tutor for all sessions; another was onsite with participants to observe and provide technical support. After tutoring, participants completed a usability scale, a brief debriefing questionnaire, and a semi-structured interview. Total participant time was under two hours. Each participant received a $50 gift card. **Results and Discussion** Nineteen of the twenty sessions were successfully completed; one ended early due to unstable site WIFI. Importantly, nearly all participants were able to independently begin remote tutoring sessions without direct instructions or assistance from the onsite researcher. In post-session surveys, 17 of 20 participants reported learning something new, 15 of 20 reported feeling more confident and 14 of 20 felt more excited after completing the tutoring session. Sixteen of 20 would recommend the Illuminated Device to others and 14 of 20 expressed interest in taking a device home for fully remote tutoring. We identified several opportunities to improve both the Illuminated Device system and the BASIC tutoring protocol. System improvements included (1) increasing camera visibility with clearer signage; (2) adding image stabilization to improve readability when learners hold up their phones to the camera; and (3) updating interface messages to reduce uncertainty when waiting for a tutor to connect. Tutoring protocol improvements include (1) starting each session with a brief orientation to the interface; (2) equipping tutors with an overhead camera for demonstration; (3) incorporating more frequent "show me your screen" checks; (4) having tutors pre-emptively enlarge on screen text and use a high contrast pointer; and (5) providing learners with a "what to bring" guide. Results of the usability study indicated that it is possible to provide effective tutoring remotely with low digital competency learners. Although many participants indicated a preference for in-person tutoring, most were interested in the option to access help from home and would recommend the system to others. Usability testing provided actionable suggestions that are being implemented into a remote tutoring guide to expand support for our BASIC tutor training program and will be integrated into future updates to the Illuminated Device System.

References

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