

# Supporting Older Adults in the Use of Smart Devices for Personal Health Management

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## ABSTRACT

A rapid proliferation of specialized consumer tech gadgets (e.g., Fitbits) demands attention to the challenges that individuals face in learning to use them. Help Kiosk (HK) was initially conceived to support older adults in independently learning to use a smartphone, but it was only ever examined for this one context. Its design also required users to divide their attention between different areas of an augmented display and their smartphone. We introduce HK 2.0, which leverages a 40" tabletop display to integrate support into one visual space, while also supporting older adults in learning how to use multiple smart devices that must be configured to work together (e.g., a smartwatch synched to a tablet). Our new system also builds on the self-directed learning environment of the initial HK by introducing a collaborative learning feature to provide remote support by family and friends. We share the design of HK 2.0, including design requirements, features, and learning topics.

## Author Keywords

Older adults; seniors; learning; large display; smartwatches; tablets; user manuals; health; personal wearables

## CCS Concepts

Human-centered computing ~ Collaborative and social computing devices

## INTRODUCTION

Smartwatches and mobile health apps offer new opportunities for proactive health management that may be particularly valuable for maintaining health throughout one's later years. However, despite enthusiasm among older adults for activity tracking [1] and the potential such devices offer for managing health and wellness by monitoring personal information (e.g., heart rate, steps taken, sleep quality, and stress levels) [7][9], the overwhelming amount of information and features that come with such technologies can make them challenging to learn and adopt, especially for older adults who may not have the same opportunities and motivations for training (e.g., through work) as younger adults [5]. These challenges are further exacerbated by displays that are generally too small to provide effective interactive help [6][10].

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Prior work has explored older adults' interest in using technology to manage their personal health, including tracking their heart rate, maintaining an exercise diary, and monitoring stressful events [2]. While there has been an increase in technology applications designed to support people in personal health management, few studies have been conducted to explore older adults' use of smartwatches for health tracking [9]. In a six-week study involving 92 older adults (50+) and seven popular activity trackers [1], difficulties with the set-up process and frustration with the instructions dampened initially strong enthusiasm for activity tracking with only 42% planning to use the device past the end of the study. Other studies have explored how older adults have adopted independent learning techniques, such as instruction manuals, when using new technologies [3][4][6]. In particular, the initial Help Kiosk (HK) design was based on the concept of instruction manuals and provided a self-directed learning environment where older adults could control their speed and learn basic tasks on mobile devices via an augmented display [6][11]. However, as older adults have become more comfortable with basic tasks on mobile devices (such as the ones targeted by HK [6][11]), challenges remain with more complex ones [5][9], including configuration tasks like the ones needed to use smart devices. Moreover, while independent learning is important, many enjoy or prefer learning collaboratively with their spouses, other family members, and friends [5][6].

In this paper, we build on our work for HK, creating a new design by combining the learning of multiple devices within a single large interactive tabletop display and exploring this within the context of smartwatches and tablets. As technologies progress, we anticipate that large displays will become more common in households. As such, HK 2.0 would be valuable in helping older adults learn how to manage their health information. We also extended our exploration from an independent learning approach to include a collaborative learning approach where older adults can receive support from family members. Our research goal is to build an accessible technology for older adults that supports the independent and collaborative learning of smart devices for personal health management.

## THE DESIGN OF HELP KIOSK 2.0

Building on the initial HK design [11], the new HK 2.0 integrates HK's instructions, videos, and feedback into a single tabletop display on which users place their smart devices. Through a navigation menu that lists key learning topics, instructional information (e.g. videos, images, and text) are displayed around each device so that users can explore and

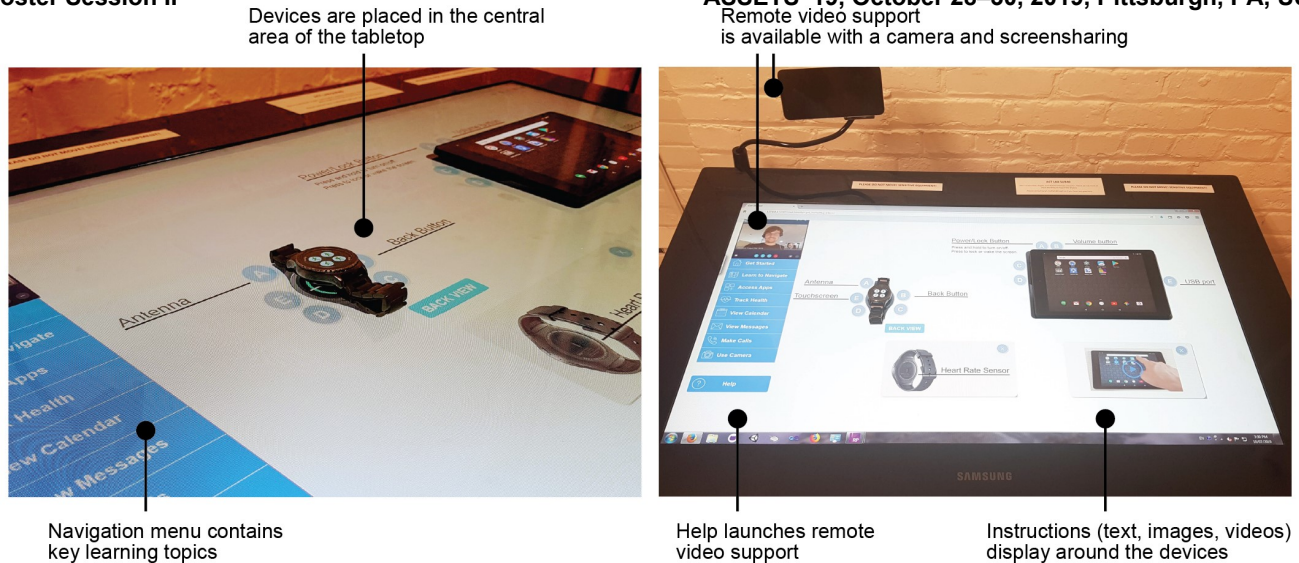


Figure 1: Design of Help Kiosk 2.0, including learning topics, remote video support, and interactive instructional information.

select elements more efficiently, reducing the need for divided attention seen in the original HK. The goal is to provide interactive, focused guidance that supports older adults in learning how to use their smart devices and to track their health information. Our prototype uses a Samsung Surface 40, the Samsung Gear 2 and Galaxy Tab 4; however, the core features should be adaptable to other similar devices.

### Design Requirements

From prior work on guidelines for older adults to support learning [3][5][6][7][11] and a review of the capabilities of surface computing (in general and specifically the Samsung Surface 40, the Samsung Gear 2 and Galaxy Tab 4), we derived three design requirements for our learning system.

#### Known Guidelines for Senior-Friendly Instructions:

Previous studies have found that older adults generally prefer learning independently at their own pace [4]. Our design assists older adults in self-directed learning by providing a large tabletop display upon which smart devices can be placed. This maximizes their attention between the instructions and devices and increases the legibility of all the content to be displayed [3]. This design also incorporates known guidelines for senior-friendly product instructions [3]. This includes detailing information that is relevant at each step, removing irrelevant content, using familiar words, and labelling key elements in figures [3].

#### Onboarding and Personal Health Management:

Setting up a device can be challenging; as such, the onboarding process is a key aspect of the user experience that offers instructional text and interactive materials to help new users learn an application's key benefits [8]. Our design includes key onboarding principles, including using an action-oriented approach and anchoring the tool in the task domain [8], supporting exploration, and selecting instructional activities that are real tasks. Additionally, help is also provided to support users in learning how to track steps, manage exercise, and monitor their heart rate.

#### Collaborative Learning and Social Connectedness:

Prior work has also found that the adoption of technologies was influenced by others in their social network, including

peers, spouses, and other family members where active engagement in social activities was important in maintaining healthy aging [7][10]. Our design includes a remote video support feature that offers an optional collaborative learning environment for older adults. This connects older adults with those in their close social network and facilitates screen sharing in order for friends and family to provide remote support during the learning process. Considering these design requirements, we then iteratively designed and developed HK 2.0, which contains three key features and eight learning topics.

### HK 2.0 Prototype: Key Features and Learning Topics

HK 2.0 combines the learning of multiple devices on a single large 40" interactive tabletop display. Our prototype of HK 2.0 was developed using Axure, a prototyping tool. There are three core components of HK 2.0: a remote video support feature (Help) integrated with Zoom; a navigation menu for eight key learning topics; and the central area where the devices (smartwatch and tablet) are placed (Figure 1 – left). The Help feature allows users to video chat and screenshare to ask for assistance from their family members. The key learning topics allow older adults to explore and understand the core functions of a smartwatch and tablet. These learning topics include: *Get Started*, *Learn to Navigate*, *Access Apps*, *Track Health*, *View Calendar*, *View Messages*, *Make Calls*, and *Use Camera*. Figure 1 shows the "Get Started" screen of the tabletop display. The central area contains all the instructions (e.g. text, images, and videos) to support learning how to use the devices. After placing the smartwatch and tablet on the tabletop, older adults can view main instructions around the devices (Figure 1 – right). Images and videos are also incorporated so that users can learn about features located on the front, back, and sides of the devices.

### FUTURE WORK

Next, we plan to conduct interviews with older adults and their family members to understand the challenges faced when learning (and supporting) the adoption of smartwatches and tablets using HK 2.0. We will also conduct observation studies to evaluate the HK 2.0 system with older adults so that we can iterate on the design and make modifications to improve older adults' learning experiences of smart devices.

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