Empowering Older Adult Crafters to Electronically Enhance Artifacts for Health

Ben Jelen
Katie Siek
Indiana University
Bloomington, IN 47408, USA
bcjelen@indiana.edu
ksiek@indiana.edu

Abstract
Older adult crafters have many skills in creating their own artifacts that make them particularly well-suited to designing their own devices. In this paper, we explore what older adults would create to improve their health if they could integrate electronics into their crafting projects. We explore this topic using ethnographic-style observations of 5 different groups, a survey exploring how they craft and their interest in health and technology, and conclude with a participatory design workshop currently underway. Our study offers insights into older adult crafters’ practices and an understanding of what health devices they would create if they made them themselves.

Author Keywords
Older adults; crafting technology; health; maker technology; Arduino; crafts; participatory design; observations; survey

ACM Classification Keywords
H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

Introduction
There has long been an interest in the HCI community to support older adults’ health, whether through aging in place technologies [9] or supporting their health interests in technology [7]. Despite this long standing interest, there are still
many opportunities to support older adults by meeting their needs in a way that they find value in adopting a new technology [2]. For example, making technology is “invisible”, or not obvious that it’s a computer, makes it more likely to be accepted by older adults [2]. By designing technology to seamlessly integrate into their lives, we can personalize and contextualize assistive technologies to help older adults [8].

Recently, the research community explored supporting older adults’ creative activities in an art therapy setting [6]. Outside of a formal therapy setting, engaging in crafting activities, such as pottery and quilting, are associated with lower odds of mild cognitive impairments [5]. Creative activities give older adults an opportunity for personal growth, a sense of purpose, and a feeling of competence [4]. Through these activities, they accumulate skills in making artifacts with their hands, often with a particular goal in mind, such as donating a textured “fiddle quilt” to a local memory-care unit.

We have started exploring what older adult crafters would be interested in making if they could augment their crafts with technology (e.g. Figure 1), thereby creating their own personalized, context-fitting health technologies. Given the right tools and support, they could make sensing and tracking artifacts to seamlessly fit their needs and integrate into their lives. To do this, we observed several older adult crafting groups, collected a survey exploring health and crafting interests, and, at the time of writing this submission, are conducting a participatory design workshop to identify what older adult crafters are interested in creating. We will have 3-5 workshops completed (final number will be based on saturation of ideas) and analyzed before the workshop. Through our work, we will highlight the opportunities for older adults to make their own health sensing devices.

Our contributions to the WISH community are the following:

1. We present a better understanding of older adult crafters and their established crafting groups. These established groups offer opportunities to support older adults in learning digital crafting by catering to how many of them are already learning socially.

2. We offer a list of what types of devices older adult crafters would create with electronics if there were no limitations. We are encouraging them to create health-related devices, but increasing engagement in creative activities alone is valuable.

Related Work
Crafting and hobbyist groups are growing not only in communities across the world, but also in online communities [1]. Many older adults are already passionate about creating their personally meaningful artifacts [10]. They have the necessary skills, talents, and interests for experimentation and design with new technology [12]. Asking older adults their opinion on designing health technologies that cater to their needs can be very fruitful and can provide an array of ideas of how use some of the benefits of technology to improve their health [3].

Older adults who participate in senior center activities related to arts and crafts reported several health benefits for their well-being, including interactions with friends, self-growth, mental enrichment, and a sense of purpose [4]. This work also indicates that creativity contributes to active aging by fostering a sense of expertise, purpose, skill, and growth.

Methods
The goals of our methods were to better understand both how to build on older adult crafters’ skill sets and to explore their interest in managing their health. To accom-
To accomplish this, we conducted ethnographic-style observations to learn more about older adult crafting groups. We then conducted a survey to broaden our understanding of older adult crafters while beginning to explore their interest in health. Finally, we are actively facilitating participatory design workshops to brainstorm what types of electronic devices they are interested in integrating into their crafts. The studies were approved by Indiana University’s Institutional Review Board.

**Observations**

We recruited older adult crafting groups from Bloomington, Indiana and surrounding communities by contacting groups directly or reaching out to older adult-centric organizations. We defined our target population as groups with at least 40% of their members over the age of 65 and whose aim was to craft a tangible object (many appeared to be closer to 90%). We recruited 4 groups by showing up in person to ask permission, and a fifth, Quilt-Collab, via snowball sampling (Table 1). Only 1 of the 45 unique participants were male (Fiber-Mixed), and no incentives were provided.

Researchers introduced themselves and received verbal consent at the beginning of each crafting session. Over 10 weeks, we attended a total of 23 hours over 12 separate sessions. Researchers visited each group at least twice for an average of 2 hours at a time.

Three researchers, two not associated with observations, iteratively analyzed the observation field notes using an affinity diagram method.

**Survey**

To complement our observations, we conducted a survey exploring crafters’ habits, their interest in technology, and their interest in health. We recruited participants from the observation groups via paper surveys, and recruited for an online version through the researchers’ social media. For a comparison, we allowed anyone over 18 years old to complete the survey, and the only requirement was that they made something tangible. We collected 142 unique responses. Forty-one were over the age of 65 and 137 were female. The respondents had a wide variety of primary crafts, but most were knitters (65), sewers (22), crocheters (20), and quilters (11) (Figure 2).

**Participatory Design Workshop**

We are utilizing the observation recruiting methods to recruit older adult crafters. The participatory design workshops will occur outside of their current crafting group times.

The workshops consist of a set of three two-hour sessions focused on 1.) understanding their crafting habits and practices, 2.) building up their knowledge of small electronics like Arduino, and 3.) prototyping ideas of how they would electronically enhance their craft (Figure 4).

In the first session, participants will teach the research team about their crafts by having a show-and-tell and focus group discussion on their crafting. We also will have them fill out a survey on demographics, crafting habits, and familiarity with technology.

After building up participants’ comfort level, the second session is focused on the research team teaching the participants skills relevant to small electronics. We do so with a paper circuit activity to teach them some basics of electronic circuitry [11], and they make their own birthday card. Next, we will show them some basic Arduino components and have them test out an activity using an already programmed Grove Kit from Seeed Studios (Figure 5). We will also do a pre- and post-test to evaluate their confidence levels in working with electronics.
Finally, the third session is where we will create low-fidelity prototypes based on their ideas. To facilitate idea generation, participants are encouraged between sessions to take pictures or videos of ideas in their own homes to share. These media will be shared in a brainstorming session to help inspire participants, after which they will create low-fidelity prototypes using office supplies, pre-cut shapes (e.g., an Arduino), and sample physical components like LEDs. We will conclude with a questionnaire asking for feedback on the workshop as well as specific questions about their health interests based on Davidson’s work [3].

Similar to the observation, the workshop will be analyzed using an affinity diagram to analyze themes. Also, survey data will have descriptive statistics, and the pre-post test for the second session will be analyzed using a paired t-test to validate whether or not the participants improved their understanding of electronics.

Results
Observations
Three major themes came out of the observations of older adult crafting groups – group structure, group support, and artifact sharing – which helped to inform how we can work with these groups in the future. Group structure was split into three categories defined by the overall function of the group – independent projects, collaborative projects, and class style. Quilt-Mixed, Fiber-Indiv, and Fiber-Mixed participants (Table 1) had varying skill levels and were mostly working on individual projects. Of these, Quilt-Mixed and Fiber-Mixed sometimes worked on collaborative projects, but primarily participants worked by themselves in a low-stress, social setting. Quilt-Collab was the only collaborative project group who was focused on submitting a quilt for a competition. Their meetings were much less social and more driven by the collaborative nature. Lastly, Pottery-Indiv was a class style group that relied on paid facilitators to lead the group through structured activities.

The way groups supported their members came in several different forms. The most common form of support was facilitating help between participants. Some groups had a show-and-tell style session that helped members elicit feedback from each other. Supporting beginner crafters was also a crucial function of these groups, but the groups differed in terms of who was expected to help. Pottery-Indiv’s facilitators were clear help, but other groups used the expertise of experienced members to support these beginners. Additionally, they shared several tools and resources differently between groups such as magazines, websites, and insights from television programs.
Each group shared artifacts they crafted differently, both within the group and to others outside of the group. Sharing within the group was often done to solicit feedback on a project and provide validation that a crafter belonged there. Externally, artifacts were given away as gifts or donations, submitted to a competition, or sold for others to enjoy. Giving them as gifts or donations was the most common, but interestingly, some participants described selling artifacts so others could enjoy them. One prolific quilter sold her artifacts at the cost of materials because she wanted others to enjoy them in spite of cajoling from other crafters trying to earn income from their sales.

Survey
There were three main portions of the survey – crafting habits, interest in technology, and interest in health. We learned a lot about older adults’ preferences in how they craft. One notable difference between older adults to those younger than 65 is that a higher percentage of older adults looked to magazines to help and they looked at online videos and social media less (Figure 6). After showing survey participants an example (i.e. Figure 1), few older adults were interested in integrating technology with their craft (Figure 7). Overall, older adults were not as interested as others in knowing more about their health with on average 15.6% interested in certain topics, but 30.9% of those under 65.

Discussion
In a presentation, the WISH community will learn about older adult crafting groups and how leveraging established groups could support teaching older adults new skills by reflecting how they currently create. Being sensitive to the way they structure their groups, support members, and share artifacts can help to create a supportive environment for older adults to learn new skills.

The community will also learn what older adults would create to improve their health if they could make something themselves. We are bridging the gap of understanding how they could create using electronics by focusing on a subset of older adults who are already creating things with their hands. This group can then take what they learn and design their own health-improving devices using what they already know. This can result in a series of devices that are more context-appropriate and personalized to individuals’ lifestyles. In addition, researchers can inform their own artifacts for older adults’ ideas. Therefore, the ideas they developed through this workshop will likely be novel and interesting for the WISH community.

This work is also an excellent example of a technical participatory design workshop where researchers are trying to build up participants’ technical skills before prototyping with them. We anticipate disseminating lessons learned and best practices from the workshop study.

Acknowledgements
We thank our participants throughout the Bloomington Area, including facilitators and contacts at local organizations who helped to make this possible. We also thank our collaborators who helped collect data and provide feedback, Leslie Liu, Tom Ongwere, Anna Baglione, Olivia Richards, Samantha Whitman, Harrison Carter, and Yaokun Zhang. This work is supported in part by the National Science Foundation Award IIS-1439241.

References
2362369


