

The gap I found in relevant research literature involved a lack of understanding how to properly augment the process of craft while simultaneously allowing the user to retain their independence and sense of agency in engaging with a wide variety of handcrafts. Various augmentations of craft have involved increased accessibility to craft making practices for disabled artists or novel ways of enriching the craft, but few have delved into modifying the process of handmade crafting.

Borgos-Rodriguez, Katya, Maitraye Das, and Anne Marie Piper. “Melodie: A Design Inquiry into Accessible Crafting through Audio-Enhanced Weaving.” *ACM Trans. Access. Comput.* 14, no. 1 (2021): 5:1-5:30. <https://doi.org/10.1145/3444699>.

This study analyzes the existing practices at a weaving studio for people with vision impairment and the results of creating an audio-enhanced loom to support the practice. Many crafts have inherent barriers that can make the practice inaccessible, which results in the need for modern technologies, practices, or workspaces to accommodate for more accessible making practices. They designed Melodie, an audio-enhanced loom that would provide feedback to its users during the process. After giving Melodie to users and analyzing their feedback to using the loom, the study raised concerns on how technology can support or detract from accessible crafting experiences. Due to the intrinsic nature of craft, they had to consider the delicate balance of giving the crafter enough agency while still augmenting the design process. They concluded that due to the limitations in which Melodie was evaluated in their study group, further long-term study would have to be done to thoroughly analyze Melodie’s potential naturalistic use, but overall, the study was insightful to the potential of audio-enhanced crafts and related artifacts. They believed that there must remain an attentiveness to the interdependent nature of creation, which potentially suggested the conception of technology that would shoulder the burden of tedious and difficult tasks, while still maintaining an individual’s independence in the process. This research project, in its study and creation of technology to augment craft, provides insight into the difficulties and potential issues of trying to balance user agency with modern technology in craft. Additionally, it implies that further studies could be done in a similar way of utilizing audio feedback when augmenting other craft-forms.

Rosner, Daniela K., and Kimiko Ryokai. “Spyn: Augmenting Knitting to Support Storytelling and Reflection.” *Proceedings of the 10th International Conference on Ubiquitous Computing* (New York, NY, USA), UbiComp ’08, Association for Computing Machinery, September 21, 2008, 340–49. <https://doi.org/10.1145/1409635.1409682>.

This study discusses the ways that “invisible” interfaces can augment creative practices to enhance the act of sharing in a creative process. They created Spyn, a system that allows knitters to imbue their works with different meanings via means of recording, playing back, and sharing how they created the work and the process involved in its creation. Spyn was designed to capture information during the knitting process and then allow for retrieval of information afterwards through the finished knit product itself. Unlike other research done to augment a craft’s creative process, Spyn was created with the intention of enriching the craft while maintaining the artifact’s look and feel. Due to the short duration of their evaluation sessions, this round of Spyn’s investigation resulted in an exploration of Spyn’s use during the creation of artifacts rather than its influence after it was finished. Additionally, the system was not evaluated on other forms of fiber arts, such as crochet or embroidery, only having been limited to knitting within this study. Overall, the study provides a new outlook on this gap in research through its the creation of an artifact that was not necessarily for augmenting but enriching craft.

Flanagan, Patricia Jean. “NEEDLE WORK-Revealing Relational Agency Aesthetics of Craft through Human/Robot Interaction.” *Proceedings of the 15th Conference on Creativity and Cognition* (New York, NY, USA), C&C ’23, Association for Computing Machinery, June 19, 2023, 235–38. <https://doi.org/10.1145/3591196.3593363>.

This study investigates new models of teaching cultural practices through the interpretation and recording of gestures in craft. The authors used computer vision techniques to track micro-scale craft gestures, which were then transformed into light drawings. Overall, the experience of translating craft gestures into three-dimensional robotic light drawings informs human-robot interaction, the exploration of generative choreography as a result of this experiment, and a story that is told from the resulting choreography and light drawings. This study raised an interesting perspective towards another method of, not augmenting but, enriching craft, similar to Rosner’s study on Spyn. This study raised an interesting method of capturing detailed movements in order to teach the technical process of creating but also capturing micro-movements in order to express them in another creative medium.

Although this study was a primarily interpretational project, it provides another perspective to the research gap in craft augmentation through a new method of recording and documenting current forms of craft.

Das, Maitraye, Darren Gergle, and Anne Marie Piper. “Symphony: Enhancing Accessible Pattern Design Practices among Blind Weavers.” *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (New York, NY, USA), CHI ’23, Association for Computing Machinery, April 19, 2023, 1–19. <https://doi.org/10.1145/3544548.3581047>.

This study focused on the creation of a system, Symphony, to aid visually impaired weavers in the process of fabric pattern design in weaving. Similar to Melodie, the system augmented the process of weaving and accessibility to the maker practice, but the purpose of Symphony was for the stages before weaving takes place. Symphony is a draft designing tool that uses auditory and tactile feedback to help blind weavers in creating, perceiving, and modifying fabric patterns. After evaluating the Symphony system with their study group, they found that the blind weavers were able to successfully utilize Symphony in ways that allowed them to engage in forms of personalized learning. However, the system is grounded in a vision-centric form of framing pattern design and was low cost and not technologically advanced. This research project provided another perspective on augmenting the craft process through improving the accessibility of the making process through weaving, although it's limited to only one form of fiber arts and its execution was not fully fleshed out in a technical artifact.

Stefanidi, Evropi, Nikolaos Partarakis, Xenophon Zabulis, Ilia Adami, Stavroula Ntoa, and George Papagiannakis. “Transferring Traditional Crafts from the Physical to the Virtual World: An Authoring and Visualization Method and Platform.” *J. Comput. Cult. Herit.* 15, no. 2 (2022): 35:1-35:24. <https://doi.org/10.1145/3484397>.

This study proposed a novel methodology for modeling and visualizing the motions and movements related to craft via the analyzation of weaving and the use of a loom. Their goal was to create an efficient way of visualizing the craft processes within virtual environments for craft presentation, education, and thematic tourism. They transferred crafts from the physical to the digital world through a tool called MoViz, where individual motions in a craft are segmented into individual activities to be carried out, similar to a video game. Users were evaluated on their ability to

author and craft given the associated motions and actions for a craft. MoViz is a unique take on the preservation and visualization of craft motions. It provides a unique augmentation to learning and teaching a given craft. However, the embodiment of the craft outside of physicality and into the virtual world removes the tangibility for the physical augmentation of craft practices.