robust enough. This feedback challenges us to find the correct level of abstraction to express the key characters of objects precisely, while creating models simple enough to minimize other trivial features. We will continue to refine our models and send out design probes to solicit more feedback.

From the highest level, this work was motivated by the desire to gain information about how and why people create tactile graphics and how 3D printing can facilitate these processes, in an effort to find ways to support parents and teachers of children with VI with emergent literacy needs. While pursuing the idea of developing an online library, and the content (books), the potential of using social media to access this hard to reach population became ostensible as an effective practice, as well as using these digital connections to direct people to our website and build a community of practice [4] around *"making"* with and for the visually impaired. By using this digital social networking tool, people were directed to our website, which enabled us to reach our intended user group in a way that suited their needs and motivations, as opposed to requesting them to break their routines. The use of the design probes and website provided a casual yet accessible communication channel between researcher and the community. We hypothesize that this approach will yield fruitful results in efforts to further understanding the need space and establish relationships by sharing their findings during interaction each other. Our aim is to help participants feel like they are contributing to their own community, while providing them a bank of growing resources to help in their self-directed endeavors (as opposed to research subjects). Considering the participants' time and resource limitations, we also aim to consolidate various disparate resources to build open virtual/online community in a forum they are already using (the internet and social media).

Throughout our work with this community, we have noted a value of openness in the exchange of information. This furthers our hypothesis that there is an opportunity to create platform where people can share ideas and further knowledge sharing. From scholars to TVI's, stakeholders readily share insight about the creation of tactile graphics. As one TVI said, "*We have some very talented Teachers of the Visually Impaired on our team that could both utilize what you have developed and hopefully develop programs to share back to your group."*

8. FUTURE WORK

In section 2 of this paper we displayed a holistic loop of our design ideas, by pursuing the *"Online Library"* design idea creating preliminary content for the library, we were able to gather important information from respondents. All of the information we obtain from respondents about their wants and need concerning using 3D printers for the creation of tactile graphics will contribute to the four designs indicated.

Using social media and online communication and design probes will continue to influence our method in how to reach participants. As we continue to refine our design probes, we hope that feedback will become more and more specific. We plan to embed solar sensors and/or conductive paint onto the surface of the 3D printed models to obtain immediate feedback (finger touch spots) about what part of the images attract a child's attention. These *"Sensing Tactile Pictures,"* will provide parents, teachers, and researchers feedback about their child's engagement with the book that may otherwise go undetected.

We will continue to explore how social media as well as in person communication can expand our reach and validate this work. We will include using more hashtags in our social media posting, contributing anonymous feedback from users on our site, providing direct responses to our respondents, and developing relationships to continue to understand the existing design practices. We will ask respondents to classify the types of experiences they have, as well as what learning milestones their activities were contributing to for a child. This metadata will further our analysis of how to create a *"Communication Device"* that shares ideas between parents and TVIs. Furthermore, have also started building the technical infrastructure for the 3D Tactile Library, which will start to host users feedback and make more books available on different smart devices. As we develop the "*Tactile Picture Synthesizer,"* we will confer with the findings above. In particular, we will consider the challenges of learning to use 3D modeling software and the 3D printers indicated by TVIs, which prints barriers of entry to many novice users.

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