Brandon Ables, UMBC HCC PhD Student

Dissertation Plans

I plan to write and edit my dissertation entirely through novel embodied interaction methods I develop, never once sitting and typing on a regular computer keyboard. I will document on video my writing and editing of the dissertation and post it online incrementally as performance art. I will also incorporate and document the embodied peripheral reading methods I have developed for reviewing notes and editing the dissertation. Using the technology I am testing/documenting to write a paper about that technology has precedent in the field as it was done in Bernstein et. al (2019) Soylent.

My motivation for this project is that conventional word processing programs were originally designed to separate the process of composing text from that of typing, as a secretary would sit and type what was dictated to them from their boss (Hoffman, 1999). The boss may have been engaged in some embodied activity while the composition was occurring, like pacing around the room, rocking back and forth in a chair, or even twiddling their thumbs while their feet were up on the desk. As a result of these conventional word processing programs still being in use, many people sit at their computer keyboards to both compose and type text and lose out on the advantage of composing through their bodies. As Bruckman (2014) and Bardzell (2010) note, the artifacts we use every day are embedded with ethics that shape and constrain our human experiences. With this dissertation I hope to create new artifacts that augment thought composition, creativity, and reflection in ways that conventional word processing interaction techniques limit and discourage.

This dissertation will work best as a combination of autoethnography and research through design, a combination presented in Gamboa's (2022) paper Living with Drones, Robots, and Young Children. I will be using my novel text-entry interfaces to record my own reflections of my experiences with the technology along with using them to write the dissertation itself. I am developing text-entry methods that embrace the full spectrum of text entry speeds, from slow and inefficient methods to stenographic methods using chorded entry that can keep pace with the speed of human thought. Tracking and documenting thought is a concept Dadaist Tristan Tzara was curious about asking if he "could transcribe at top speed everything that fell, rolled, opened, flew, and continued" within his head (Caws 1970). I imagine the ability to track thoughts by transcribing them in real time will enhance reflective abilities and encourage deliberate presence. I hope to build the interfaces that will allow me to introduce the idea of "live autoethnography" in my dissertation where I use my embodied interaction methods to type my autoethnographic accounts as I am experiencing them live, rather than recalling them after the experience. I am about to begin a literature review of ethnographic and autoethnographic reflection times and methods.

The dissertation will touch on ideas of Slow Technology, experimenting with breaking up sequences of writing across activities throughout a day, week, or month to

hopefully aid in reflection and help me feel more immersed in the writing process (Hallnäs & Redström, 2001). The dissertation will also deal with embodied cognition and the extended mind regarding how physical actions and locations in the world can influence our thoughts (Paul, 2001). I hope to create interfaces that are enhanced by metaphor-based embodied interaction, so connecting language and gesture will also be important (Tversky, 2019). Kristina Höök's Soma Interaction Design will also be foundational (Höök, 2018). My early readings of Höök show that she separated rational language-oriented processes from more playful, mysterious, and artistic embodied experiences. With this dissertation I hope to bridge this divide and make language-oriented embodied interactions playful, novel, and metaphorically meaningful by tying the text content to the embodied activity. Ideas introduced in Technology as Experience (McCarthy & Wright, 2004) will also be a resource for my project as my novel interaction methods may include emotional, intellectual, and sensual aspects.

Interfaces In the Works

Originally, I had planned to develop multiple interfaces for different activities I engage in throughout the day. For example, I have a three-button iteration of my chin interface that I can use for text entry while I eat (Ables, 2024). While I still may have some activity specific interfaces, I now plan to have one main interface that can shift to different parts of the body depending on the activity. The main interface will be my "Embodied Braille" idea still in development. It will shift the six Braille cells to different areas of the body for interaction. For example, while sitting at my electric drum set, I can have sensors under each arm, assign drums to hit with each hand, and have two pedals to hit with my feet (see Figure 1 below). For other activities the Braille cells could be moved up on the body so blinking eyes, using my chin on a two-button wearable interface, and using underarm sensors could work for embodied text entry. More options also exist if I incorporate interoceptive techniques that use heartbeat and breath to allow for coherent chorded inputs with less overall sensors/buttons for inputs.
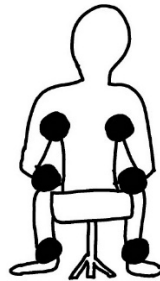
Figure 1. Embodied Braille – Braille cells laid out over man sitting on stool.

As part of my ongoing research for the dissertation I have been practicing stenography as an introduction to chorded text entry. This is helping me learn how to think

of words phonetically so they can be broken down into sounds and assigned a sound rather than a spelling. I am regularly practicing Morse code as an alternate input method. I am investigating both Gregg and Pittman shorthand methods to find ways to enter text more efficiently. I am even considering learning and using the Shavian alphabet, an alphabet created with the help of George Bernard Shaw to cut down on the inefficient spelling system of the English language. I can easily incorporate my interfaces with open-source stenography programs (like Plover) that I can adapt to my needs. I am currently finding the right sensors for embodied interaction, but have found some success with the BioAmp EXG Pill.

Immersive Screenless Review Methods

Another aspect of the dissertation I am considering is how I can read and review what I have written without sitting and staring at a screen. One method I am considering is using the same Embodied Braille system I'm using for input, but instead of input sensors, using tactile transducers to vibrate for playback. This would encourage embodied awareness and a different level of focus. I can also use the Embodied Braille system for audio playback, assigning each of the 6 Braille cells to a music note and then creating different chord combinations from each letter. This would be an easy system for me to learn (as I have a music background) and would be like music interval ear training apps already in existence. Other options I am considering are morse code through flashing lights and building a mini semaphore telegraph tower to broadcast each letter. I am researching the drumming languages surveyed by Ong (1977) to study how rhythm has been linked with language historically since I am using bodily rhythms during activities to transmit my own messages. Hopefully I will develop multiple playback methods for reviewing what I have written that require different levels of focus so I can review while engaging in other activities. I plan to document these immersive and ubiquitous review experiences as part of my autoethnographic investigations.

Immersive Screen Presentation

I would like to design an interactive installation presentation of the dissertation that allows the reader to navigate the text through their own unique paths, making new connections not available to the linear navigation of printed texts or traditional documents on a screen. Ideally, I would present this in the Immersive Hybrid Reality Lab on campus. I have already developed a reading machine (see CHI 2025 Interactivity submission) and can iterate appropriate interaction methods for the content of my dissertation. As my research involves novel reading and writing methods, presenting the text in an interactive format requiring some of the embodied methods used for the composition of the text to enact the information would be a fitting conclusion. To do this I would need to research the history of the dissertation, its structure, and its evolution throughout history. I will also need to cite work on ergodic literature by Aarseth (1997) and navigating narratives in cyberspace by

Murray (1997). I imagine the visual structure of the dissertation displayed on the immersive screen would look like a mind map mixed with the graphic scores of Cornelis Cardew's *Treatise* (Cardew, 1970).

Conclusion

Kristina Höök states HCI should investigate autobiographical design methods rather than autoethnography (Höök, 2018). Many reviewers of my submitted papers have also directed me to researching American autobiographies to refine my interfaces for everyday activities and uncover how living as an activity can be examined. I hope my development and use of embodied interactive technology can be an example for crafting a life where interaction with information is not prescribed, but instead unfettered and open to possibility. Ben Shneiderman (2002) wrote "the old computing was about what computers could do; the new computing is about what users can do." My goal is to motivate others to explore innovative interactive methods to further enhance the potential of human cognition and experience.

References

Aarseth, E. J. (1997). *Cybertext: Perspectives on ergodic literature*. Baltimore, Johns Hopkins University Press.

Ables, B. (2024). Chin Interfaces for Peripheral Interaction. *ACM SIGGRAPH 2024 Labs*, 1–2. https://doi.org/10.1145/3641236.3664426

Bardzell, S. (2010). *Feminist HCI: Taking Stock and Outlining an Agenda for Design*.

Bernstein, M. S., Little, G., & Miller, R. C. (2010). *Soylent: A word processor with a crowd inside*.

Bruckman, A. (2014) Research Ethics and HCI. In: Olson J., Kellogg W. (Eds) Ways of Knowing in HCI. Springer, New York, NY, 449-468.

Cardew, C. (1970). *Treatise*. New York, Edition Peters.

Caws, M. A. (1970). The Poetry of Dada and Surrealism: Aragon, Breton, Tzara, Eluard, and Desnos. Princeton, Princeton University Press.

Gamboa, M. (2022). Living with Drones, Robots, and Young Children: Informing Research through Design with Autoethnography. *Nordic Human-Computer Interaction Conference*, 1–14. https://doi.org/10.1145/3546155.3546658

Hallnäs, L., & Redström, J. (2001). Slow Technology – Designing for Reflection. *Personal and Ubiquitous Computing*, 5(3), 201–212. https://doi.org/10.1007/PL00000019

Brandon Ables, UMBC HCC PhD Student

Hofmann, J. (1999). Writers, texts, and writing acts: Gendered user images in word processing software. In D. MacKenzie & J. Wajcman (Eds.), The social shaping of technology. New York, Open University Press.

Hook, Kristina. Designing with the Body: Somaesthetic Interaction Design (Design Thinking, Design Theory) . Cambridge, MIT Press.

McCarthy, J. & Wright, P. (2004). Technology as Experience. Cambridge, MIT Press.

Murray, J. H. (1997). *Hamlet on the holodeck: The future of narrative in cyberspace*. New York, The Free Press.

Ong, W. J. (1977). *African Talking Drums and Oral Noetics*. New Literary History, Spring, 1977, Vol. 8, No. 3, Oral Cultures and Oral Performances (Spring, 1977), pp. 411-429

Paul, A. M. (2021). *The extended mind: the power of thinking outside the brain*. Boston, Houghton Mifflin Harcourt.

Shneiderman, B. (2002). *Leonardo's Laptop*. Cambridge, MIT Press.

Tversky, B. (2019). *Mind in motion: How action shapes thought*. New York, Basic Books.