Bridging Social Critique and Design: Building a Health Informatics Tool for Transgender Voice

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ABSTRACT

This project aims to develop a voice training application for transgender people. Voice training is typically conducted by a speech therapist, and consists of personalized sessions that support individuals in changing their voices (such as modifying pitch, resonance, or speech patterns). The reasons why people may pursue voice training are varied, but often includes discomfort with voice being misaligned with gender identity. Training with a speech therapist may be inaccessible due to health disparities; thus, a technological solution, as I propose in my research, is necessary. This project will address existing constraints to design a novel voice training application in partnership with community members, using a participatory research methodology and combining the fields of speech science, feminist and queer theory, and HCI.

CCS CONCEPTS

• **Applied computing** → **Health informatics**; • **Human-centered computing** → *Empirical studies in HCI*; • **Social and professional topics** → *Gender*;

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KEYWORDS

Transgender health technology; feminist HCI; system evaluation.

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INTRODUCTION

I am a doctoral student in Personal Health Informatics at Northeastern University beginning my fifth year of study. In my dissertation, I will identify ways that interactive systems can directly benefit the health and wellness of transgender (trans) people [7]. Beyond that, I will build on current work in HCI, situating my research within a broader frame of feminist data visualization and design justice [3, 5, 6]. My motivation is to uncover the ways that interactive systems reinforce and reproduce harmful normative ideologies, and then to build better systems with that knowledge. Although the research I propose here is centered on gender, I want to contribute to HCI a robust, practical framework for combining sociocultural theory and critique (common in media and communication studies) and interaction design methodologies.

Institutional bias and discrimination routinely restrict trans people from receiving health care; they are also more likely to be victims of violence than the general population [8]. Trans people may find themselves held to a standard of what constitutes an appropriate voice and be judged and addressed incorrectly, or potentially harassed and assaulted. The proposed work focuses on voice training, a single element of gender affirmation.

For trans people, voice can be closely tied to survival in terms of both mental and physical health. Prior work supports the effectiveness of voice training for trans women, and indicates that average speaking pitch and resonance are linked to the largest vocal changes; however, the individual's needs should take precedence [4]. The goal of this project is to promote the self-determination of identity by developing a health informatics tool that takes social and personal contexts into account.

PRELIMINARY WORK & CURRENT CONTRIBUTIONS

I designed and published a qualitative study that explored the values and experiences of 10 transgender people regarding voice training and technology [1]. I conducted semi-structured interviews that included questions about how they used media and communication technology as they explored ideas about gender identity, their experiences with voice training, and what they imagine an ideal voice training app would look like. Social pressures to conform to dominant cultural notions of gender

Aim 1: Design a voice training app for Android.
(1) How should participatory design methods be tailored to the trans community?
(2) How can voice data be best measured, analyzed, and presented to participants in achieving their voice training goals?
Aim 2: Empirically evaluate the efficacy of the app using a mixed-methods design.
(1) Did use of the application lead to significant progress towards participants' voice training goals?
(2) Is participants' progress associated with application usage in terms of what functions were accessed and frequency or duration of use?
(3) What features of the application did participants find most helpful in working towards their goals, and how might it be improved or updated?
(4) How did application use affect participants' perception of their voice, and of training it?

Sidebar 1: Aims and Research Questions

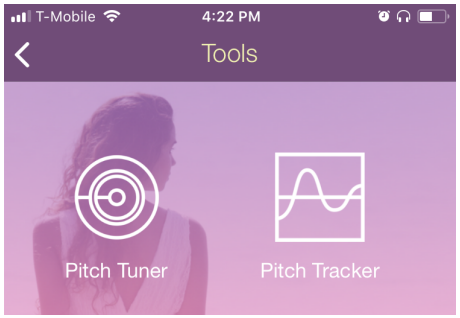

Figure 1: EVA, an app designed for transgender women [9]. ©VoxPop, LLC.

categories can complicate and influence one's own personal desire for a different voice. One participant was so daunted by the idea of being a "perfect" woman that she avoided coming out entirely.

Compounding these issues, many trans people experience voice training as self-defense against being identified as trans and potentially assaulted. Participants said that voice training "can be life and death," and that society "should just get comfortable with trans people, but like, obviously that's a lot messier of a task and [voice training] could be a lot easier and quicker path to safety. But I'm just kind of, like, angry." The fact that trans individuals must do substantial work to protect themselves was frustrating to many participants.

Participants noted that gender norms were often reinforced in current voice training resources. For example, some were urged to obtain a "perfect female voice" and "[assimilate] into mainstream society." This assumes not only that every individual is seeking a "perfect female voice," but also that trans individuals are deviant from the "mainstream" and must become invisible. Participants rejected the pressure to conform to a certain type of woman. One said, "I could try to transition and become the next Marilyn Monroe, but that's not who I am. That's not who I am." I interpreted her repeated use of the phrase "that's not who I am" as defiant, taking a firm stand on what her identity is, and as a refusal to compromise it for the sake of others. Participants reacted strongly to stereotypes and asserted their self-determination in the face of stereotypical notions of womanhood.

I concluded that potential designs must respect the sensitive position that trans people inhabit, both in terms of their own identities and their relationships with a potentially hostile environment. Participants also offered their thoughts on design requirements for a voice training app; these ideas centered on individualized and judgment-free goal setting, reflection, and actionable feedback. In addition to being valuable in the context of the proposed research, these design requirements demonstrate that health informatics tools must support user agency and self-determination.

In a related project [2], I explored current voice training apps designed for trans people using a social scientific approach guided by feminist and queer theory. Consistent with the qualitative study described above, we found that these apps convey normative ideas of gender (see Figure 1). For example, one app categorizes a user's recorded speech by the percentage of time it falls within predefined pitch ranges; the output would be, for example, 70% male, 30% female. Another app shows pitch as a continuous spectrum, with typical masculine/androgynous/feminine ranges overlaid as hues of the same color. Theorizing gender as a spectrum, rather than binning users into discrete categories, seems to more closely fit the expressed needs of the participants in the qualitative study described above.

NEXT STEPS & EXPECTED CONTRIBUTIONS

Although examining current digital tools and conducting interviews provided valuable insights, extensive work must still be done to finalize, implement, and evaluate the system. I completed a

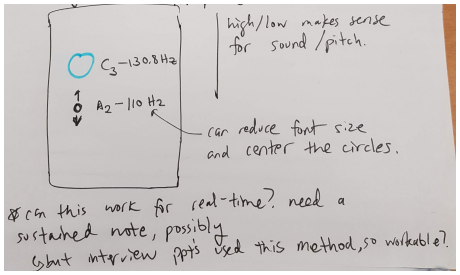

Figure 2: Excerpt from design ideation. Sketch shows a potential way to visualize the user's voice metric (for example, the solid point could indicate a mean pitch) in relation to a set goal (blue open circle).

Table 1: Excerpt from task analysis using Munzner's Taxonomy of Abstraction [10].

Tasks	Goals
"Where am I now?"	**Produce**: Generate voice data and calculate metrics
"How am I doing?"	**Discover, Enjoy**: Sentiment, sense of self, identity
"Where do I want to be?"	**Compare**: Trends over time, goal-setting
"How have I been doing over time?"	**Annotate**: Ratings and questionnaires

task abstraction analysis and exploratory sketches (see margin) with the help of my advisors and community volunteers. The participation of the latter is particularly important, given the diverse ways that individuals relate to their gender identity and voice training goals.

I plan to conduct a mixed methods evaluation study using both qualitative interviews and quantitative metrics as outcome measures. While some of my advisors urged me to collect quantitative data related to participants' voices (such as the degree to which their voices changed as a result of using the app), I responded that measuring their "progress" is problematic: basing the app's efficacy on user performance may reinforce rigid gender roles by "prescribing" acceptable or desirable outcomes for participants. Instead, I could collect usability metrics that measure the effectiveness of the design rather than the degree to which users are gender-conforming.

More work is needed to develop new technologies that address the unique concerns and challenges that trans people face. Beyond this specific domain, however, the current study will inform theoretical concepts and methods in HCI. Prior work has critiqued top-down prescriptive persuasion as a philosophy for developing health informatics tools; interactive systems that prescribe normative ways of being healthy may cause harm in complex and sensitive personal health contexts [1]. At the same time, more flexible and individually tailored systems may be more difficult to evaluate, as users have more varied experiences, goals, and trajectories. I intend to tease apart this issue, while exploring how social scientific critiques can impact the design and evaluation of health informatics systems.

REFERENCES

[1] Alex A Ahmed. 2018. Trans Competent Interaction Design: A Qualitative Study on Voice, Identity, and Technology. *Interacting with Computers* 30, 1 (2018), 53–71. https://doi.org/10.1093/iwc/iwx018

[2] Alex A Ahmed and Anna Lauren Hoffmann. 2018. Configuring the Trans Voice: Gender, Race, and Class in Mobile Voice Training Applications for Transgender People. In *The 19th Annual Conference of the Association of Internet Researchers.*

[3] Sasha Constanza-Chock. 2018. Design Justice: towards an intersectional feminist framework for design theory and practice. *Design Research Society 2018* in (2018).

[4] Shelagh Davies, Vikt Oria, Viktória G Papp, and Christella Antoni. 2015. Voice and Communication Change for Gender Nonconforming Individuals: Giving Voice to the Person Inside. *International Journal of Transgenderism* 16, 3 (2015), 117–159. https://doi.org/10.1080/15532739.2015.1075931

[5] Catherine D'Ignazio and Lauren F Klein. 2016. Feminist data visualization. In *Workshop on Visualization for the Digital Humanities (VIS4DH), Baltimore. IEEE.*

[6] Lynn Dombrowski, Ellie Harmon, and Sarah Fox. 2016. Social Justice-Oriented Interaction Design: Outlining Key Design Strategies and Commitments. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems* (2016), 656–671.

[7] Anna Lauren Hoffmann. 2017. Data, technology, and gender: Thinking about (and from) trans lives. In *Spaces for the Future.* Routledge, 15–25.

[8] S. K. Kattari and L. Hasche. 2015. Differences Across Age Groups in Transgender and Gender Non-Conforming People's Experiences of Health Care Discrimination, Harassment, and Victimization. *Journal of Aging and Health* (2015).

[9] VoxPop LLC. 2018. Exceptional Voice App. http://exceptionalvoiceapp.com/

[10] Tamara Munzner. 2014. *Visualization analysis and design.* AK Peters/CRC Press.