DREEM: Moving from Empathy to Enculturation in Disability-Related Human-Centered Design

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Figure 1: DREEM logo with imagery related to disability, close readings, empathy, crafted artifacts, and various forms of media

Abstract

Empathy-building, the first stage in human-centered design, often involves methods that inadvertently reinforce negative stereotypes and biases toward disabled communities. In this work, we introduce a new method: Disability-Related Empathy from Existing Media (DREEM). This method focuses on enculturation rather than traditional ideas of empathy. DREEM leverages media created by disabled individuals to facilitate a deeper, culturally informed understanding. Cultural content is rich with authentic perspectives and tacit design knowledge from people with disabilities. Our four-step process includes (1) discovering relevant media, (2) close reading, (3) reflective journaling, and (4) aggregation of insights. In this article, we present our process of creating DREEM using research through design in multiple research and education contexts. Our findings show that DREEM can be applied in both design classrooms and research contexts to foster a more nuanced understanding of disability for newcomers to the space.

CCS Concepts

• **Human-centered computing** → **Accessibility design and evaluation methods**; *User models*; Ethnographic studies.

Keywords

empathy, disability, design methods, human centered design, qualitative methods

ASSETS '24, October 27–30, 2024, St. John's, NL, Canada

ACM ISBN 979-8-4007-0677-6/24/10
https://doi.org/10.1145/3663548.3675642

ACM Reference Format:
Leya Breanna Baltaxe-Admony, Jared Duval, and Kathryn Ringland. 2024. DREEM: Moving from Empathy to Enculturation in Disability-Related Human-Centered Design. In *The 26th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS '24), October 27–30, 2024, St. John's, NL, Canada.* ACM, New York, NY, USA, 17 pages. https://doi.org/10.1145/3663548.3675642

1 Introduction

One of the essential parts of working in the field of HCI is the 'discovery stage' or the phase of empathy building -the process of "knowing the user" [21, 83, 116]. In this stage, practitioners uncover research questions and design problems. To do so, they "set aside their own assumptions" to understand a user's emotions, needs, wants, and objectives [83, 116]. This often proves challenging for practitioners who have vastly different lived experiences than the subjects of their research. For example, many approaches toward building empathy ask researchers to imagine the experience of living with a disability (i.e., empathy maps and disability simulations). This involves exercises such as simulation, which has been shown to cultivate negative perspectives and pity towards those with disabilities [78]: outcomes that are contrary to the goal of establishing empathy. Yet, when it comes to disability, this and other suboptimal (even counterproductive) empathy-building methods remain standard practice in our field and teaching practices.

In this paper, we report an emerging alternative method for building empathy. While we developed this approach for disability-related empathy, it could be extended to other user groups as well. The intended audience of this paper is anyone interested in doing accessibility or disability-specific work, regardless of disability status. Design researchers with disabilities may also find value through exposure to perspectives of disability communities outside of their own. DREEM (Disability Related Empathy from Existing

Media) centers content made by disabled creators [1]. The perception of disabled people as needing the help of designers rather than being problem-solvers themselves pervades design pedagogy and our field as a whole [40, 93, 97, 98, 108, 109, 117]. Instead, DREEM asks researchers to deeply engage with the cultural labor [25, 80–82] of disabled creators as a first step toward working with a community. DREEM is not intended to replace traditional participatory and user-centered methods. Instead, it is meant to support them by serving as a precursory step. We believe centering disabled creatorship from the beginning places epistemic power in the community: positioning disabled people as knowers, makers, and storytellers [40] instead of needing help [67]. Seeing disabled people through a deficit view risks encouraging saviorism and technosolutionism in research projects [12, 51, 73]. This research article reports the process of developing DREEM, including chronological changes. Readers can find the final version in Section 5.

In this article, we explore how immersing oneself in the content created by disabled individuals can be used to build empathy. DREEM is a way to begin understanding communities before engaging directly with community members during later stages. Taking on this investigation of the community before (but not as a substitute for) working directly with users builds a basis for appropriate future interactions. We believe designers can and should build authentic understandings of the experiences of populations with disabilities as a precursor to participatory or community-based work. Seeking understanding ahead of time could be a small step toward alleviating "the potential over-reliance and under-acknowledged use of people with disabilities for their 'access labor'..." [9, 64] (See Section 2.2.2). Indeed, standard research processes like iterative design ask a lot of participants, *especially* those who are already marginalized by our social systems [24]. We encourage researchers to both take on this labor and critically reflect on the spaces they design in by utilizing the stages of DREEM.

This paper examines how close readings of media produced by people with disabilities can lead to productive empathy building and the discovery of authentic, meaningful research agendas. DREEM is built off of prior development and critique in this space of empathy building with disabled populations [10, 83, 93, 116]. It works against tropes of ableism that come from traditional approaches to the empathy-building process. Our primary contribution is a novel 4-step method for building empathy with disabled people via media created by people with disabilities. We have included materials for using the method, as well as resources for educators who might wish to incorporate the method into design curriculum. We have included training material, data logging templates, and a tool for analysis (See footnotes).

2 Background and Related Work

2.1 Conceptualizing Disability

Over a decade ago, ASSETS scholars called for the use of a critical disability lens while designing and developing assistive technology for disabled individuals [67]. Until this point (and beyond), the standard framing of assistive technology was rooted in medical discourse rather than critical disability discourse. The medical model establishes disability as an inherent problem in the body to be "fixed" or "normalized" by intervention. As opposed to medical care (people need and deserve medical attention), the medical *model* upholds narrow ability norms to the point of disappearing disability. More socially-oriented framings emphasize the sociopolitical context and environment as *creating* disability by denying access to particular bodyminds [34, 53, 87, 105]. These framings tie the concept of disability to specific human-made constructs such as architecture (i.e., who do stairs and heavy doors exclude by default?) and political systems (i.e., what would disability be without a capitalist notion of productivity?). In addition to these framings, Disability can be a cultural identity [1, 53, 89, 112, 115]. As dominant medical discourse has historically influenced the design of assistive technologies, designers must intentionally extend beyond it. This paper emphasizes frames of thinking that legitimize and celebrate disabled ways of knowing. DREEMing can potentially offer a window into the sociocultural fabric of disabled communities.

2.2 Motivations

A recent survey of ASSETS and CHI accessibility work showed that only 16 methodological contributions (3.2% of all) have been made to the accessibility community since 1994 [64]. These methodological contributions include findings on how traditional HCI methods differ in use with disabled participants [45, 106]. In this section, we discuss the motivations and values behind developing a method from scratch. We were guided by the question: **what does it mean to create a method that values disabled contributions?**

Accessibility research too often remains separated from the authentic needs of disabled communities [32, 70, 98, 108]. Actionable processes toward addressing these issues have been called for [70]. We are developing DREEM to give researchers actionable steps to address contemporary critiques of accessibility research. DREEM is intended to support new scholars and those interested in contributing to the SIGACCESS field.

2.2.1 Responding to Critiques of Empathy. Methods for empathy building for populations with disabilities primarily include those described by Wright and McCarthy as "empathy through the imagined other." The most commonly used tool for disability-related empathy[2] is the disability simulation [3, 17, 18, 29, 57, 58, 78], in which a designer will attempt to try out having a disability for a short length of time (by wearing a blindfold, going out in a wheelchair, etc.) Proponents of these methodologies encourage designers to spend a day in another's shoes to discover pain points in their daily lives and how others interact socially with them. Interestingly, in their cornerstone paper on empathy in HCI, Wright and McCarthy *only* describe disability and illness as the use case for empathy through the imagined other.

It has been previously pointed out that this approach to "trying on" disability doesn't work as well as it is intended [3, 10, 78]. Designers can only draw on their perceptions of the disabled experience and are likely to reproduce societal harms. Watching a classful of students try on disability with these results can be harmful to

[1]Person-first disability language (e.g., person with disabilities) and identity-first language (e.g., disabled person) are used interchangeably throughout this paper

[2]This is also the only disability-specific method for empathy building. All other methods are common ethnographic techniques [10, 116]. Though other common methods (i.e., empathy maps[42] based or personas[91]) share the issues discussed in this section [42, 100]

the 25% of disabled people who are also in that classroom. One empirical study showed that these design exercises actually worsen stereotyping, discomfort, and pity towards people with disabilities [78] The author, Nario-Redmond, notes that feelings like the freedom brought by mobility aids are not captured, only negative feelings of restriction. Nario-Redmond recommends engaging with real disabled people. Likewise, in "Why I won't try on disability and neither should you" Abreu notes that disability simulations didn't tell her as much as time spent with disabled friends and family [3]. These practices also don't seem to acknowledge that there are likely disabled students in the room. Disability simulations continue to be standard in design education.

As a whole, empathy as a design tool has been criticized for eliminating the empathized, putting the designer at the center of knowledge. Bennett and Rosner provide an in-depth critique of disability-related empathy in HCI [10]. They illustrate that not only are designer's conceptions of disability prioritized over real experiences in empathetic activities, but empathy is also used to take credit for disabled contributions to projects. Bennett and Rosner encourage researchers not to explore 'being like' but 'being with' disabled people [10]. We extend this position by giving designers and researchers a tool to learn how to be in community *with*.

DREEM encourages designers to conceptualize the empathy-building stage of human-centered design as one of enculturation rather than empathy. Enculturation is the gradual understanding and adaptation toward a new culture. It *"concerns the acquisition of those rules, understandings, and orientations that provide, among other things, contoured maps of the landscape of community life and heuristic guides for effective participation"* [84]. Enculturation effectively describes DREEM as it is a tool for preparing researchers and designers to engage in communities and a tool concerned with a particular culture. As discussed in Section 2.1, disabled populations can be viewed as individuals with deficits or cultural communities with values and practices as complex as any other cultural group. As a designer, it is tempting to take the deficit lens: framing individuals as problems to be solved fits the narrative of designing solutions (reinforced by ableism as the societal norm). DREEMers don't need direct access to disabled communities to find them online. As a method of enculturation, DREEM positions disabled people with agency: as creators themselves, not to be fixed but conspired and collaborated with.

2.2.2 Honoring Existing Cultural Labor. People with disabilities face extra labor and time costs in everyday life (see "crip tax" [46]). Although there are a multitude of ways that crip tax shows up, we have highlighted two areas of labor that we see as important considerations for the research and design process when engaging with disabled individuals and communities. We encourage researchers to work towards giving time back to disabled individuals and have structured DREEM with that value. We look hopefully toward a future where technology, policy, and society help everyone put their time into the things they want rather than simply survive in our existing systems.

Cultural labor Cultural labor is the organizing and creative work done to contribute to a particular culture, like disability culture [15, 81]. Cultural labor can be in many forms of advocacy including books (e.g., Nothing About Us Without Us [15]), media (e.g. cripple media [1]), or shared accounts (e.g., Resistance and Hope [113]). Existing cultural labor is what DREEM relies on.

Access labor refers to the work that people with disabilities are required to do in order to have their access needs met [9, 64, 81]. Access labor includes 'informant fatigue' (e.g., being asked too often to share repeated personal details [94]) and 'forced intimacy' (e.g., being required to divulge deeply private information in order to gain access [72]). This can also mean maintaining friendly relationships with caregivers [56], requesting accommodation (often needing to "prove" disability) [114], or the everyday work of living with a disability in an ableist world [41, 102]. We posit that DREEMing ahead of participatory sessions can alleviate access labor for participants and allow researchers to ask more meaningful questions rather than falling into the common trap of informant fatigue and forced intimacy.

Research engagement can be a form of access labor. Participants may use their time and labor to engage in research projects for access purposes. The research process can mirror broader social systems that already fail people with disabilities and multiply the harm [24]. For example, the exchange of private information for access is a common trade-off for people with disabilities [39, 72]. One perk of participation is often gaining access to otherwise expensive or unattainable data [75]. Another reason for choosing to put labor toward research studies is to have a needed technology that is still in development, participating in bringing it closer to fruition. Unfortunately, design research often does not make it to market [110].

2.2.3 Fighting Design Saviorism, Technosolutionism, and Internalized Ableism. The empathy-building stage helps designers find projects and research agendas that are more deeply meaningful to the communities or individuals at hand. It is important for technologists and designers to confront issues of ableism, sexism, racism, homophobia, etc., because we build and maintain worlds. As discussed in Section 2.1, technology development follows dominant ways of thinking. This is not by accident; technology is developed by humans who carry their own biases and beliefs at that particular time and place [111]. Because the artifacts we develop have politics [111], they often carry broader societal implications.

One underlying motivator that affects design is **internalized ableism.** Internalized ableism exists within everyone as a baseline and may be difficult to uncover. Internalized ableism is an individual's default belief that able-bodiedness is the better, more pristine state of being when really it is morally neutral. For disabled people, internalized ableism often comes out as a feeling of shame. More broadly *"Ableism is a system of oppression that favors able-bodiedness at any cost, frequently at the cost of people with disabilities"* - Stacey Park Milbern [7]. It is important to interrogate one's own internalized ableism when working in this space so that our designs don't reinforce this norm. Without consistently and consciously confronting our internalized ableism, we risk it leaking into our work practices and the technology we design. Confronting ableism is a core necessity for DREEM, and learning how to see it is a necessary first step. In media, Ableism might show up as inspiration porn [118], infantilization [22], solutionism (ie. "have you tried yoga?") [54, 95], and more [69].

Because ableism is ingrained in society, it informs what we see as problems to solve. The issues that receive our attention may not be problems or "solvable" at all. Many sociopolitical issues can't be addressed with technology alone, yet we often attempt to apply technology as a save-all. **Technosolutionism** happens when designers become excited about a technological advancement and then gallantly use it to fix problems they *believe* people with disabilities face [12, 15, 73]. Although it contradicts HCI's standard of working with users to solve their issues, it is still a frequent practice for marginalized participant communities. Irani et al. aptly describes a venture that takes this approach as *"a solution in search of users"* [51]. In her 2019 ASSETS keynote, Karen Nakumura highlighted smart white canes as one such example of something that already works well, yet HCI designers keep wanting to "fix" the technology despite no one asking for it [77].

By solving problems that may not actually exist, technosolutionism often leads to fruitless technologies. Technosolutionism may partially explain the high abandonment rate of assistive technologies [49]. Liz Jackson refers to useless fixes as a *"Disability Dongle: A well-intended elegant, yet useless solution to a problem we never knew we had"* [62]. **Design saviorism** is the view that, as designers, we can and should "rescue" or fix what we view as the problems of marginalized communities. It refers to an able-bodied person saving a disabled person from their challenges as charity [43]. Technosolutionism stems from the ableist trope of solutionism. Design saviorism stems from the ableist trope of tragedy and needing to be saved by someone more capable. Saviorism is tied to ideas of colonialism [51]. It is analogous to white saviorism [74] and voluntourism [79] in the way that the "savior" benefits from the narrative while potentially negatively impacting those they are trying to help.

We believe that understanding a user's true lived experience while interrogating our perspectives helps avoid technosolutionism and design saviorism. We believe DREEM is an effective way to start design with an understanding of lived experiences (through close readings of media) and uncovering our own biases and relationships with the topics at hand (reflexivity).

2.3 Influential Methods and Approaches

As mentioned in Section 2.2, there are relatively few methodologies designed specifically for use by the SIGACCESS community. Instead, the accessibility research community draws on existing research methods from many domains. In this section, we discuss the multidisciplinary methodologies that informed the creation of DREEM.

DREEM utilizes media made by disabled creators to help designers engage with authentic stories: focusing on the designer's engagement with the media rather than using it as a data source for traditional analysis. SIGACCESS authors have previously used social media as a rich site for more traditional data analysis [2, 5, 26, 85, 101]. We hope to support and extend possibilities for this existing practice.

2.3.1 Close Readings. Close readings are the careful, deliberate observation and re-observation of an artifact with the goal of more deeply understanding it [13]. The method originated in literary studies and is typically conducted on text. Close readings can also be applied to non-textual designed artifacts such as games [107], software [68, 88], music [103], music videos and performances [61], film [36], images [37], and more. Scholars in the humanities most typically utilize close readings, but we believe technologists and designers can meaningfully leverage them.

In close reading, an observer will note what is and what is not there (i.e., *"What is in the background?"*, *"Why did they make this editing choice and not another?"*). They will situate the artifact within a broader context (ie. *"Who is the intended audience?"*, *"Why was this artifact made?"*). This attention to detail and context has the potential to help us understand the experience of living with a disability more deeply. Unsolicited by researchers, creators naturally present meaningful topics, reflections of their everyday experiences and themselves. Looking more closely, one might uncover the creator's worldview, intentions, constraints, and values. In short, close readings can help us understand creators and build empathy.

2.3.2 Netnography. Netnography is an online research method originating in ethnography and is often employed by social scientists and anthropologists [59]. Netnography is a subset of digital ethnography that focuses more on individual encounters across social media. Netnography maintains many of the characteristics of traditional ethnography without focusing on typically embodied phenomena (i.e., body language). Instead, netnography primarily concerns the context of online media such as text and multimedia [8].

Netnography uses spontaneous data and conducts observation without intruding online users, it is regarded as more naturalistic than other approaches such as interviews, focus groups, surveys and experiments [60]. These online community members often share in-depth insights into themselves, their lifestyles, and the reasons behind the choices they make [59]. DREEM adopts concepts of netnography to uncover the experiences of disabled creators online. While DREEM could feasibly be extended to include relations within social networks, we do not adopt that focus of ethnography.

2.3.3 Participatory Design and Codesign. These related design approaches strongly emphasize a need for user involvement in all stages of design. When addressing the next generation of issues that matter, all stakeholders should participate in the design of the technology they will use [14]. From exergames for wheelchair users [33] to speech therapy [27], virtual reality for teaching people with developmental disabilities to identify emotions in others [104], and robots for physical rehabilitation [76], technology can effectively be designed with people with disabilities to serve their needs. It is clear that participatory design has been commonly adopted in the SIGACCESS community. Codesign goes a step further by bringing members onto the research team in full. Similar to these ideas, Goodley describes knowledge production in disability studies as a continuum containing non-participatory research (researcher-led), participatory research (researcher invites participants into research), and emancipatory (co-researchers) [38]. Because interacting with community members via participatory design, codesign, and more is a standard within our domain, researchers must understand how to be in community with disabled populations. DREEM fits within the larger umbrella of participatory methods by leveraging existing cultural work to educate researchers prior to co-design

sessions so that they can be more effective and appropriate. DREEM is a precursor to participatory work.

2.3.4 Reflexivity and Autoethnography. Reflexivity and autoethnography are two qualitative research strategies that produce knowledge via the interrogation of personal experience. We have found practices relating to these strategies to be an essential part of DREEMing because they have the potential to reveal the writer's evolving understanding and internalized assumptions and biases relating to the data. We see this as necessary for understanding any community more deeply, but especially for those who have been historically marginalized. See Section 2.1 for a deeper discussion of the necessity of deconstructing internalized ableism.

Reflexivity is the practice of "awareness of one's own subject position and relationship with a research project" [96]. Positionality is one form of reflexivity but relates to the whole context of all stakeholders in a research project rather than just one person's understanding of their relation to the project [96]. Reflexivity has been taken up by and called for by many within the domain of human-computer interaction [23, 66, 92] including feminist HCI scholars [6] and scholars working toward social justice [16, 30].

Reflective journaling is a reflexive tool conducted by intentionally relating one's own experiences and contexts to the material one is investigating. This strategy "actively engages the student with the content in an intensely personal way" [47]. Reflective journaling helps learners construct their own knowledge rather than passively absorbing it [48]. This work in critical self-reflection is already highly present in the HCI design community [23, 66, 90] and has been noted as especially important for crip-affirming futures [110]. They function as a space to congeal ideas that are forming while in this exploratory stage.

Autoethnography is a type of ethnographic work that is conducted on one's own experiences and contexts. "Autoethnography is a theoretical, methodological, and (primarily) textual approach that seeks to experience, reflect on, and represent through evocation the relationship among self and culture, individual and collective experience, and identity politics and appeals for social justice" [44]. The results of autoethnography then "represent [the autoethnographer's] thoughts, emotions, collective experiences, and social processes associated with an identity or issue and then contextualize them in broader, societal-level phenomena" [86]. This approach may employ a standard written essay format, a diary log, or handwritten annotations, as well as more artful forms such as plays, art, music, and poetry. Some examples of autoethnography conducted in access contexts can be seen in [4, 43, 52, 65].

Memoing is a tool that many ethnographic and autoethnographic researchers employ. Memoing is a flexible strategy that qualitative researchers at any level of experience may choose to apply. Like reflective journaling, the process generally includes note-taking and journaling to connect ideas. Memos can take any form the researcher deems fit: journaling, scrapbooking with data, audio recordings, etc. Memos are also similar to field notes but do not only relate to field observations. Instead, they can be a space for researchers to amalgamate a breadth of different ideas, whether they are related to personal experience or observation. This notation process can help researchers to make connections and situate data within a broader context [11].

Beyond revealing internal processing and bias and serving as a space for connecting ideas, these practices are representations of generative intermediate-level knowledge [50]. Intermediate knowledge is an outcome of design research, which is neither a generalizable theory nor a design instance (i.e. annotated portfolios and guidelines). In our case, recognition and articulation of patterns and social circumstances could inform later research practice.

The concept of self as a tool for data to filter through and the techniques discussed herein are core to qualitative research more broadly [11]. Overall we see these strategies as well situated for developing new understandings of communities while connecting them to personal experience (two steps necessary for empathy building).

3 Methods

We took a research through design approach [31, 119] and employed DREEM while iterating on its implementation. These iterations, reported in Section 4, have helped form the method additively over the span of 5 years. We have successfully adapted DREEM to both research and classroom settings across multiple universities and course levels, from high schoolers to master's students. A final version of the method can be seen in section 5.

To develop the DREEM framework we began with these 3 steps:

(1) Discover Existing Media
(2) Close Reading
(3) Reflective Journaling

The initial three case studies were the most formative, and are reported most thoroughly in section 4.1. The particular methodological context of each application is stated in its corresponding section along with how it has shaped the resulting method (Section 5). Throughout these applications, various resources for applying DREEM in education have been developed and can be found in footnotes for those who wish to implement the practice in classrooms or research settings.

For each application, researchers and students took part in at least the 3 steps listed above either before beginning a research/design project or as a part of an introduction to community-oriented research more broadly. In each case they iterated on these steps individually or in groups. DREEMers were free to explore any media type, platform, or community — as long as a disabled person created the content. We collected anonymous pre- and post-survey data. These surveys included qualitative questions about the method and an adapted version of the Teach Access Survey. The Teach Access survey was developed by the Ability Project [55]. Questions on Web Content Accessibility Guidelines were removed due to their lack of relevance. The survey was chosen because of its intended audience and topic coverage (technology-oriented students). It consists of 11 items (reduced to 10) rated on a 5-point Likert scale. Eight items (reduced to seven) are self-reports of confidence in understanding accessibility concepts. Three are self-reports of interest in pursuing accessibility-related work.

3.1 Positionality

All authors have been asked to engage in and/or teach disability simulations in higher education. The authors have found themselves having recurring conversations about the challenges of onboarding

new students into the space of accessibility research. We work in engineering departments at two academic research institutions in the US. The authors are early faculty and late-stage doctoral students. Onboarding and mentoring new researchers is vital to our careers as we create our labs and direct research projects. Our team comprises researchers with and without disabilities. Being disabled accessibility researchers impacts how the research community sees us and how we see *research about us*.

4 Iterations on DREEM

In the following sections, we report applying this emerging method to various contexts in order to develop it. Table 1 contains details of each iteration.

4.1 Building DREEM with Undergraduate Researchers

In this section, we describe the outcomes of employing DREEM with four undergraduate research assistants (RAs). Prior to recruiting undergraduate RAs, the senior research team, who designed the initial version of DREEM, completed steps 2 and 3 on *The Power of Choice* (https://www.youtube.com/watch?v=B1sWtT-wShI) independently before collaborating on adjusting our initial DREEM data collection process. We included our experience as an example in the training materials we developed. We recruited four RAs through department newsletters and by advertising in classes we teach [3]. We accepted all applications and hosted a 1-hour information and training session for the project.

The training described the motivations of the work, instructions on how to carry out the work, and expectations [4]. We asked undergraduates to reflect on their interests and confirm whether or not they wanted to participate as collaborators.

Over the course of 3 weeks, RAs used our close reading data collection DREEM form [5] to independently and asynchronously conduct steps 1-3. Researchers explored media freely. We had a recurring weekly check-in where we discussed progress, research directions, and reflections as a team. Our specific case studies were born from exploration and interest-driven directions led by the RAs. After 3 weeks, RAs participated in inductive data analysis of their findings. After an inductive analysis of all collected data, the close readings and reflections were sorted into 8 emerging non-mutually exclusive themes: ableism, aesthetics of personal expression, autism, traveling with a vision impairment, everyday tasks with a vision impairment, tourettes, mobility, and communication[6]. We present three themes which were useful in evaluating our initial version of the DREEM method. These include ableism, tourettes, and beauty products/aesthetics.

We present three exploratory case studies from this exploration that helped to form the DREEM framework. We then present a survey of researcher learnings from conducting these case studies.

[3]Our flier is included in an editable form in our supplementary materials at https://tinyurl.com/DREEMRecruitment

[4]An editable version of our training slides are available in the supplementary materials at https://tinyurl.com/DREEMTraining

[5]available in the supplementary materials as an editable Google form at https://tinyurl.com/DREEM-Form

[6]available in the supplementary materials at https://tinyurl.com/DREEMData

Key Takeaways: Attitudes towards disabled communities changed, and researchers were spontaneously exposed to key issues of systemic ableism and barriers to access. Inductive analysis was difficult for uninitiated researchers because it required training and practice. One of the case studies highlights that the method could benefit from focusing on one topic area from the beginning.

4.1.1 Case Study: Ableism. Three researchers close read five media sources, resulting in the topic of "ableism." Sources included two text-based articles, one TikTok video, and two YouTube videos. Each of these media addressed and described different aspects of ableism encountered by the creators. The content ranged from educational to emotional and personal.

The first article described the author's experiences during a year of lockdown due to the COVID-19 pandemic. The second article described the experiences of disability in a hospital setting. Both addressed the source and impacts of ableism on their respective experiences. For the second article, the researcher was unable to finish the close read as it was "really emotional," relating to their own experiences. They chose to put it away incomplete for the time being, but their partial close read and reflections still served as useful findings. We discuss the possible difficulties in doing this type of analysis in Section 5.2.2.

The YouTube videos were longer-form content, more educational, and explanatory in nature. One was about traveling in Paris with disability and the other was a video log (vlog) educating about ableism. The third video was shorter: at the time of viewing TikToks were constrained to one minute long. This was a personal description of how a student had experienced discrimination for both their gender and disability from their math professor.

Three reflective journals from different researchers were relevant to this set of media. Each was about the researcher's new understanding of disability and ableism after having close read the media. For example, one researcher wrote, '*'[a]bleism and other discrimination could stem from the lack of education."* Another researcher wrote, '*'systemic ableism does not disappear even when top officials try to implement a fair approach."*

The close reading of content about ableism allowed the researchers to analyze and reflect on discrimination against disabled people from embodied, firsthand sources (sometimes even capturing ableist instances as they happen). For example, in the video about the student experiencing discrimination from their professor, the researcher reflected on the situation and asked some rhetorical questions in their close reading. For this researcher, they reflected on the use of particular language by the creator,

> "The professor responses and belittles the creator whenever they make a make a mistake or a question. The creator also relates this situation to being treated like a child. Do they make this comparison because they feel like they are smaller or helpless? There are other ways to describe being condescended or put down, and them deciding to compare to how a child is treated by an adult is interesting."

While the discourse around those with disabilities being treated like children is common in disability communities (i.e., infantilization[53]), close reading illuminated this to the researcher, although they were

Section	Goal	Participants	Adjustments
4.1	Test and refine an initial iteration of the method	3 senior researchers & 4 new undergraduate researchers within varying programs	-
4.2	Apply DREEM as a design thinking tool: the first step toward design with a community	6 high school summer research interns over 8 weeks	(1) Applied in design thinking context (2) lo-fi prototype outcome (3) Harnessed social media algorithms to find new media.
4.3	Teach at scale using DREEM in coursework that utilizes the human-centered design approach	120 Undergraduates in an upper-division User Experience course, 32 Masters students in a game design course	(1) Topic area rather than open exploration. (2) Introductory stage disconnected from design ideation. (3) Formatted as a canvas module serving as the empathy-building stage of the project-based courses.
4.4	Use DREEM as a method of enculturation to introduce new researchers to communities they will be working with but may not have nuanced understandings of.	20 new undergraduate researchers in our research lab over the span of 2 years	(1) Not connected to a specific project. (2) The last step for aggregation is creating and sharing a piece of media.

Table 1: This table shows the goal, participants, and adjustments made for each of the 4 Iterations on DREEM found in Section 4

not familiar. Later in the same video, the researcher comments in their close read,

> "It seems ironic that this school has an Office of Disabilities, and yet this professor still acts this way, which points to the fact that the office has not yet action for this professor's behavior. Has no student or other staff reported the professor? I wonder why."

In this one minute TikTok video, the researcher has come upon a number of different effects of systemic ableism. In the context of design, this researcher has engaged with some of the barriers that those with disabilities face. Understanding these issues as barriers to solve is crucial in the context of design for disability. Defaulting to positioning the disabled person as a design problem is an unintentional but frequent occurrence for designers who don't know the community.

4.1.2 Case Study: Tourette's Syndrome Case Study. We include this case study because it offers perspective on how the affordances of various social media platforms can affect the types of insights DREEMing can offer. 65 out of 70 of the close readings and reflective journals related to tourettes across 7 media sources were completed by 1 highly motivated undergraduate researcher. The media sources include a personal website (including a blog, *Youtube* videos, tweets, and a shop promoting Tourette's awareness), 5 *YouTube* Videos, and 3 TikToks. The personal website, called *TicTastic!*, is written by a 14-year-old musician who attends school, surfs, blogs, bakes, and has Tourette's syndrome and Obsessive Compulsive Disorder [28]. Close reading a website that hosts a variety of media surrounding 1 individual's perspective offered a unique depth to this case study. In a reflection on the website, this researcher illuminated why it was important to engage with media made by disabled people:

> ''Seeing a new and darker side of her experience made me realize and remember that not all publicity/media coverages will correctly and fully represent a disability (or anything really)."

The question of intent in representation stuck with this researcher. They were particularly puzzled by some media on TikTok. While there were sources of *''wholesome"* media on TikTok related to Tourette syndrome (e.g., *''a couple playfully forgiving each other after a tic caused accidental physical contact"*), there were also videos that made them ponder the disabled creator's intent. For example, one creator created a highlight reel of their tics while cooking pasta and *''many of the comments seemed offensive- why did the creator post this? Was it for comedic relief, authentic lived experience, visibility, or something else altogether?"* We see the researcher's questioning of representation, motivation, and social reception as illuminating both various societal contexts of perceptions of disability, and humanizing the poster as someone with agency and desire for reception.

TikTok's short videos offer quick flashes of insight - whether they are rants, humorous moments, or viral challenges - but they often leave use with more questions than answers, which is not counterproductive. Youtube, on the other hand, affords much longer videos and more content. Watching longer form content allowed the researcher to capture minute interactions that may not be displayed in other formats. In a reflection about discovering content on YouTube, they were surprised at the patience of the content creator's friends and family:

> ''It was great to see the positive reactions in the moments of accidents, and that showed that these people understood how and why tics happen."

When using DREEM on various platforms, it is important to consider each platform's affordances as well as the intended audience the content was made for (e.g., a video for fellow members of a disabled community or a video for the general public).

4.1.3 Beauty Products and Aesthetics. We include this case study because it discusses a specific topic agnostic of disability. Two researchers considered three sources: two videos and a makeup line release. The makeup line release was "Rare" by Selena Gomez, who has lupus and rheumatoid arthritis. The makeup line features products with spherical lids that allow a user to push down instead of squeezing to open.

The first video was a product review by Molly Burke, a YouTuber and makeup enthusiast who is blind. Through Burke's video, we learned the importance of organization, scent, and embossing for

her in any makeup palette. One researcher reflects on the impact of packaging in accessible design for makeup:

> "Watching this video taught me to focus more on the small but impactful details of makeup products that affect one's ability to utilize them effectively"

Burke calls out large makeup companies for not having inclusive design. Researchers discussed that more people with disabilities should be making design decisions in the beauty industry—just like Selena Gomez's new line.

The second video is about a morning routine for particularly anxious days made by Asia Jackson. Our main takeaway from this video was that jewelry and fashion can be used to ritualize self-care. The researcher reflects: *"Putting on your favorite jewelry before beginning a process you may otherwise struggle with can make it more approachable and fun. Fashion can be used in many empowering ways, even if no one but yourself can see it. It is important that fashion is accessible in general and for the purposes of self-empowerment."*

People with different disabilities will likely have different product needs - some of which conflict. They learned that *"scent would be a barrier to people with chemical sensitivities, but Burke benefits from Too-Faced's food scented products"*. We were encouraged that the researchers stumbled upon the topic of conflicting access needs just by exposure to the community.

4.1.4 Researcher Learning Survey. As we explored what could be learned from existing media with the undergraduate team, we discovered one of the primary contributions of the paper: Actively engaging with media made by people with disabilities can be an effective way for new researchers to learn about communities and common systemic barriers. Each of the four undergraduate researchers had never previously conducted accessibility-related research. We did not initially anticipate changing attitudes toward disability and only instituted a post-survey after discovering that it did.

The average response to each question of the Teach Access scale is illustrated in Table 2. It is no surprise that the team is highly interested in pursuing accessibility-related work (Q 8-10) as they self-selected for this research project. These outcomes are promising but don't offer much without a pre-survey (implemented in future applications).

In addition to the measures above, we asked the team to report on if and how DREEM has changed their perspectives, whether it was a good use of time for the effort, what was most difficult about it, and what impact (if any) DREEMing had on their knowledge of disability best practices. Researchers report better understandings of potentially ableist actions:

> "I understand better the importance of including into any conversation instead of trying to speak for [disabled people]"

The team found value in engaging intentionally with social media:

> "Instead of just doomscrolling or just scrolling in general, it gives me a focused reason to open social media and experiment with its algorithms to find communities I wouldn't normally find myself in. I feel that it's a good way to resist the algorithms that naturally filter us into niches."

And that there's still work to be done for access:

> "[DREEMing] taught me certain aspects of accessibility, especially in the beauty industry, are still not accessible to most people with disabilities"

All researchers report writing *"thoughtful comments"* being the most difficult part of the close reading process. As one researcher puts it *"I kept on double thinking myself about whether or not I was properly empathizing with the subject's needs"*

As a whole, researchers seemed to find the method worthwhile:

> "DREEM helped to broaden my perspective and taught me to look beyond what is portrayed."

4.2 DREEM with High Schoolers in a Summer Research Program

Based on our experiences with the case studies and student survey above, we found that DREEM had potential as a design thinking pedagogy tool for involving new students with communities they were unfamiliar with.

The aforementioned post-survey with 4 undergraduate research assistants showed promise for using DREEM as an empathy-building educational tool. To explore this potential further in a design context, we worked with 6 high school students over an 8-week Summer Internship Program. Students spent 10 hours per week DREEMing and 20 hours per week on other lab projects or doing social activities. For the first 6 weeks, students scraped content on TikTok from disabled creators. Students created new TikTok accounts and trained the curation algorithm on the "For You" page by following creators with disabilities and liking their content. Students logged daily reflection journals, logged content using the DREEM form, and inductively kept a log of themes to tag the data using a hashtag format. For the remaining 2 weeks, students applied design thinking to their learnings and created 21 low-fidelity paper prototypes for designs inspired by the TikTok videos they watched. Students completed this exercise after being taught the importance of working directly with the target populations. Some interesting prototypes include an origami-style foldable ramp made of lightweight materials, a wearable device that provides navigation instructions using directional haptics, a device that provides alternate forms of communication at museums, an anti-sloshing smart cup that beeps when full, a legislation idea requiring cars to have specific lights dedicated to honking, and a swimming headband that alerts users before bumping into the side of the pool [7]. Students reflected on how DREEM affected their perceptions of disability. Some of these quotes are included below:

> "I felt like I had a better understanding of "ableism" and how people with disabilities often do not wish to be treated in a way that signifies they need extensive help."

> "I got to see how best practices stem from a multitude of criteria. Seeing examples of best practices through researching assisting people with disabilities definitely helped enhance this."

[7] Prototypes can be found at https://tinyurl.com/HighSchoolerDREEM-Prototypes

Table 2: Teach Access Survey initial results

Q	On a scale of 1 to 5, how confident are you that you could do each of the following at this time?	Result
1	Give an example of a type of disability	5
2	Define, Accessibility as the term relates to technology and media	4.5
3	Give an example of inclusive or universal design	4
4	Give an example of how accessible technology is used by people with disabilities	4.5
5	Give an example of how assistive technology is used by people with disabilities	4.25
6	Give an example of a technological barrier somebody with a disability might face	4.25
7	Define the purpose of the Americans with Disabilities Act	2.75
8	Learning more about designing or developing technologies for and with people with disabilities	4.5
9	Pursuing a job or career in accessible technology	4.25
10	Pursuing research in the development of accessible technologies.	4.5

When asked about whether DREEM was a good time investment:

> "Yes. I felt like I got to see the intersection between technology and disabilities. I also got the see how factors like the media and social norms affect such assistive tech. Devoting time to self-reflect also helped me to design prototypes that might be useful to people with disabilities."

When asked about the challenges of DREEMing:

> "At first, it was hard to analyze my own assumptions and biases of certain aspects of disabilities objectively. During self-reflection, I had to spend more time on that and challenge myself to view the daily lives of people with disabilities in different ways."

As mentors, we saw marked improvement in student knowledge and empathy towards populations of people with disabilities. Each student seemed to gravitate towards a particular community they were interested in learning more about and building partnerships with.

Key takeaways: Students had specific areas of interest (i.e., swimming) they were interested in media for. Outcomes included things like policy change but generally resulted in hackathon-esque ideas for design pursuits. DREEM did not prove substantial enough to generate full research agendas; rather, it appears to be a method suited as a first step of engagement as enculturation.

4.3 DREEM in Upper-Division Design Coursework

Seeing the potential in both groups above, we extended this methodology to apply to several human-centered design courses at the upper-division undergraduate and master's levels at two universities [8].

Generally, reflective journals and close readings served as homework for the class. Project groups collaborated to find various media, and some appreciated doing close readings of the same media sources independently and being able to share.

Due to the length of the empathy module in the undergraduate course, this application was a shorter time length than any other. It lasted only about 2 weeks. This left students with less time to engage in communities meaningfully. Still, students found the short engagement meaningful: *It increases awareness of disability fast, especially as someone who has little contact with disabled people normally....It doesn't beat getting to know a person with a disability closely in terms of actual empathy in my opinion.*

In the master's level course, 32 enrolled students DREEMed weekly for 10 weeks with a different community of focus each week. For the last 6 weeks of the semester, students completed a larger speculative design project and presented their work at a poster competition. There were two awards for student work. The winning teams created a prototype for leading yoga exercises accessible to wheelchair users and a Twine game that supports mental health through interactive journaling.

It is clear that the method left students hungry to learn more about the communities. The above response came from a student who did not identify as disabled and rarely interacted with disabled people (less than every three months, the maximum for that question). Other students also indicated feeling like they wanted to engage more deeply with disabled communities after DREEM:

> "I think it is definitely good to do more research about people with disabilities, but I didn't really feel like I was helping anyone while doing it- seemed more like a way to change my own mind about different groups and uplift them doing different things, but not really help them in any way."

Indeed, the purpose of DREEM is to learn before engaging. Nevertheless, it is promising that this student felt individual change without directly engaging.

Instructors (the authors) found that using DREEM as an empathy module had students asking deeper questions about design within community contexts, disability-related or not. Reflective aspects helped students gain understanding: *I liked the reflection aspects of it- it helped me to really think about what I was researching*, but reflective journals (UX course) and game accessibility guidelines (game design course) were the only culmination of data gathered. In future iterations, students might benefit from a share-back.

Key Takeaways: DREEM was adapted to fit a large classroom setting in a short time span and still had a meaningful impact. Without the prototype ideation step, the practice lacked a formal closing of the exploratory period.

[8]Canvas modules can be found here: https://tinyurl.com/DREEM-CanvasModule

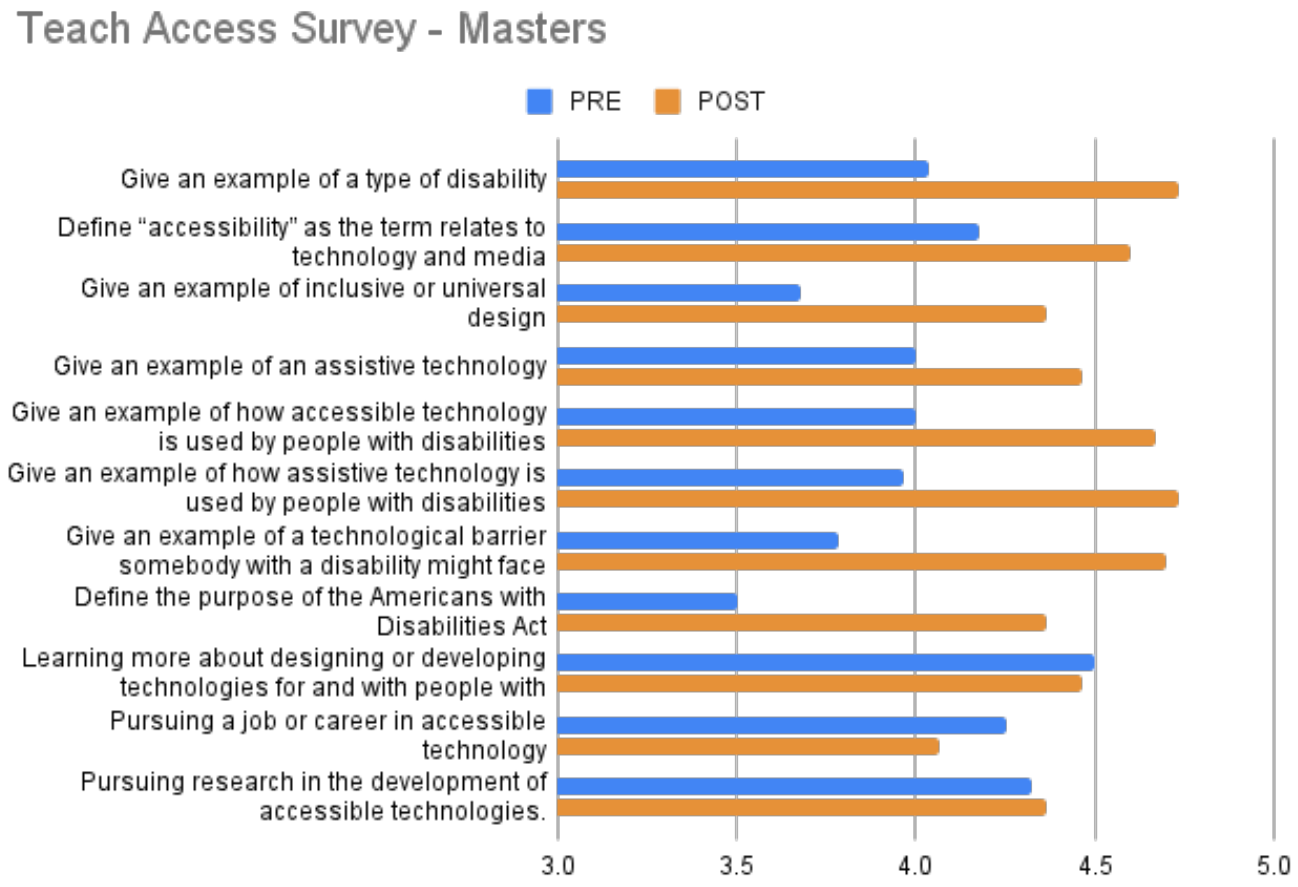

Figure 2: Teach access results with 28 student responses from master's level course

4.4 DREEM as onboarding for research assistants

While building DREEM with new research assistants, we saw all they gained by going through the process as their first foray into research (Section 4.1). Since then, we have continued to use DREEM to bring new undergraduate researchers into our lab. For the past two years, our labs have been utilizing DREEM as a first-step onboarding method for undergraduate researchers who enter the lab. DREEM is conducted over the span of 4 weeks, along with a primer on standard research practices within our lab and in HCI more broadly. This primer covers many aspects of research (i.e., What is the scientific process? How is research funded?). In this context, DREEM is not specifically tied to any project, community, or outcome. DREEM, then, serves as a complementary practice for them to become sensitized and encultured with disabled communities they are not yet familiar with - who they may or may not be working with when they join projects within the lab. Results of the Teach Access Survey from 8 undergraduate students can be seen in Figure 3

Unlike the initial foray with undergraduate researchers, we have undergraduates form teams based on areas of interest. We encourage that these areas of interest are not related specifically to disability and are something they are already interested in or knowledgeable of. DREEM Teams have ranged from topics as wide as 'XR' and 'Dance' to as specific as 'Jerma985 and his Fans with Autism and/or ADHD' (Jerma985 is a live streamer)[9]. Researchers appreciated this freedom to explore a particular area instead of their initial impulse to think of disability as a monolith:

> "One thing I like about DREEMing is how there are multiple ways to tackle the same general topic. For example, instead of all of us just doing disability as a whole, we got to be able to focus on a topic that disability heavily impacted.... a specific topic, I like how we were placed in groups instead of working by ourselves. I believe that working in teams is better than working by yourself since you can bounce

[9]Throughout this section, we discuss some of the Dance team's outcomes.

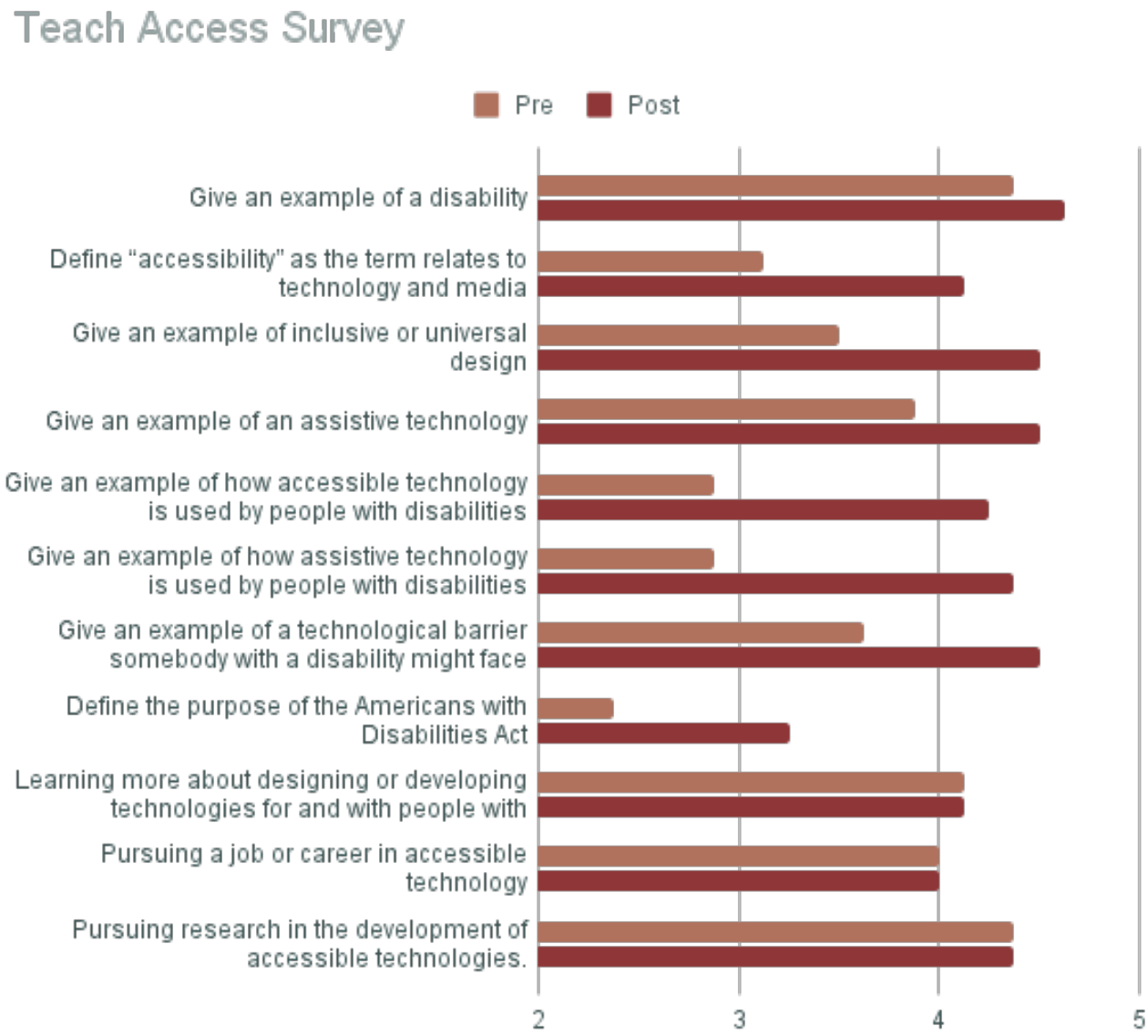

Figure 3: Teach access results with 8 new undergraduate researchers

off ideas off one another and able to reach a better conclusion."

Participants in this context seem to really appreciate collaborative work. One student valued social discussions over individual reflections and close readings:

> "I think perhaps examining the content and resources we found as a group and having discussions about them with our groups (similar to a Socratic seminar or fish bowl type discussion), would have been more interesting."

We did not account for the role group discussions play in aiding reflection. New researchers were able to learn from each other and from the senior researchers through our limited group discussions. For example, we conduct one close reading as a large group example, based on a team's topic area and gathered media [10].

> "Being able to deep read into different sources with the class/ more experienced researchers was really

[10]One example of this close reading was captured and converted into an informational miro page showing how to input data into the form: https://tinyurl.com/DREEMMiro.

Figure 4: One page of the aggregation stage made by a team focused on dance. Showing both cultural understanding and potentially ableist pitfalls.

> a highlight of the class. I wish we did more deep-reading as a group. Finding the sources and trying to analyze them through a researcher's lens was also very interesting."

The primary difference in this case of implementing DREEM is that students culminate the DREEMing process by creating some form of media in which they aggregate the information they have learned. We found students were excited about the various media they were close reading, so ending with a media-creation project to share with the lab at large seemed like an appropriate fit. These DREEM outcomes have ranged from presentations to videos to posters. Pages of one such illustrative piece are shown in Figure 4. Looking at the dance team's outcome, we see they learned mobility aids are *"an extension of a person's body"*. Still, they nearly fall into the common ableist trope of inspiration porn by highlighting people use dance to turn *challenges into opportunities*. While defaults still come through, the method has proven useful in getting undergraduates to think in nuanced ways about disability, and we have kept it as a standard onboarding practice in the lab.

Key Takeaways: Group discussions were valued in this context. The method could benefit from being taught in conjunction with anti-ableism training and other research methods. It's easy to fall into the trap of inspiration porn, for example, without guidance.

5 DREEM

In this section, we introduce the 4 resulting steps to DREEMing: (1) Discovering Relevant Media, (2) Close Reading, (3) Reflective Journaling, and (4) Aggregation. While these steps are somewhat sequential (find media before close reading it), there is a cyclical aspect. DREEMers can continue (1) throughout the process and will likely cycle on (2) and (3) as needed. Each step is discussed in detail with tips and insights derived from employing the method in the prior applications. Additionally, we include suggestions for presenting findings from DREEM and on benefits of DREEMing as a team.

5.1 Step 1: Discovering Relevant Media

As a first step, find content! We recommend finding several sources to begin with and adding more as you go through the DREEMing process. Any public medium is a potential site for DREEMing including online content (blogs, images, videos, films, tweets, posts, etc.) or offline content (live performances, talks, zines, flyers, etc.). We have focused on media that can be found online for ease of access. It is possible to close-read in-person performances, but having a recorded version allows one to sit with and return to the content. So far, participants have primarily chosen videos and text-based pieces. This method could reasonably be extended to any of the above (and more!).

5.1.1 Tips for Success. Finding media created by people with disabilities online can be surprisingly difficult. For example, when looking for content from creators with autism, searching for "autistic" might seem like a good place to start. Instead, YouTube's current top results are informational content made by clinicians, news outlets, and parents rather than perspectives from actual autistic people.

Finding relevant media may require some prior community knowledge (hashtags, vocabulary, etc.) that may be difficult to access for an outsider or someone yet to be enculturated. Finding doors and windows through hashtags, phrases, and snowballing was effective. Several examples and tips for success include:

- Search trend content with disability flavor: 'what's in my bag: chronic illness edition', 'amputee morning routine'
- Learn community hashtags and keywords : #ActuallyAutistic, #Spoonie, #CripTheVote, #ADHDTwitter
- Train the curation algorithm: Create a new social media account and follow only creators with hearing impairments as you find them.
- Snowball: Discover accounts that a creator you follow tags.
- Find collectives and anthologies: SinsInvalid, Disability Visibility Project

5.1.2 Important Considerations. There are several pitfalls to finding media on the web. We encourage DREEMers to carefully consider whether certain media sources need to be taken with a grain of salt, supplemented, or left out altogether. First, consider whether the media source perpetuates ableism and how. If you do not feel confident in detecting ableism or could use a primer, you might

Figure 5: Visualization of the 4 stages of DREEM

first consider seeking out media made by disabled people on how ableism appears (perhaps starting with Stella Young's "I'm Not Your Inspiration" [99]).

Second, media is not all-telling. It is made by humans who have their own agendas. Their views may not represent the community's. Disabled communities are multifaceted like any other. It is important to explore different perspectives. Third, anything that has been shared exclusively with a private network should probably be kept that way; be respectful of disabled people's privacy wishes. Fourth, different social media platforms have different affordances and cultures. Investigating multiple platforms will help increase the diversity of findings. Last, consider who the target audience is for the source (good practice for close reading). It is likely that the media wasn't made to be informational and may present ideas in a way that could be difficult for an outsider (i.e., use terminology or make light of certain subjects that wouldn't be appropriate for an outsider to use). Generally, looking at topic areas or platforms you are already familiar with is the best way to find media.

5.2 Step 2: Close Reading

Next, read or observe the media and sit thoughtfully with it as described in Section 2.3.1. We recommend working systematically and using standardized collection measures [11], which were designed to support both textual and non-textual media alike. Relevant details to log beyond the close reading itself include the source of the media, a short 1-5 word summary that makes skimming the data later easier, annotated screenshot(s), location in the media the close reading entry relates to (e.g., line number, time span in video), and keywords/tags. If textual, signed, or spoken content is chosen, it can be in any language the DREEMer chooses. We enter each "complete thought" as one unit -these could be a few words or a few sentences. We also logged questions we asked ourselves that arose during the close readings. You can immediately start logging your visceral reactions or enter close readings after you've been fully exposed to the media, but we recommend doing both.

[11]We include an editable Google form for DREEMing in the supplemental materials at https://tinyurl.com/DREEMForm

5.2.1 Tips for Success. Record your thoughts as they occur. These can directly relate to the video's content or be personal to your lived experiences. As you go, maintain a list of keywords and tag each recorded thought. These keywords can make indexing easier later. Our team took advantage of Google Forms and spreadsheets for this step. In general, take your time through this step. It may be useful to step away from the media and come back. Multiple reads may lead you in different directions.

5.2.2 Important Considerations. People with disabilities are not always in control. Ask yourself who is involved in the media and their roles and motivations. It is possible that the content will be emotional, provoking, or difficult to engage with, like it was for the researcher in the Ableism case study. It is okay to set a piece aside, take it slow, and even change directions. Reflections may help.

5.3 Step 3: Reflection and Empathy Building

Reflection is a crucial part of DREEMing. The primary aim of DREEM is to learn about communities in an authentic and lasting manner. Reflection creates the time and space to absorb your learnings and connect them with one another. Reflection is an important part of making sustainable perspective change [63]. We recommend doing a reflective journaling session after each analyzed media artifact. Maintaining a paper trail of your evolving thoughts also allows you to incorporate the learning process itself into the content analyzed via inductive thematic coding.

5.3.1 Tips for Success. We like using the following prompts for our reflections, but you do not need to follow a specific structure. You do not need to make each reflection similar in structure to the others, and you can choose or combine prompts as they seem relevant.

- What trends or patterns do you see emerging?
- Have you learned anything new about the community you are studying?
- What could you improve about your logging process?
- What is valuable or not valuable to you as an individual about your process?
- If working with others, what similarities and differences are you seeing in your logging or retrospective writings versus your peers?
- Have you learned anything that could inspire technology design?
- What questions will you explore next and why?

Participants sometimes answered all questions in one diary-style entry or elaborated on one of them. We keep these prompts at the top of our diary documents to inspire us.

5.4 Step 4: Aggregation of Learnings

After finishing iterating on the first 3 steps, we found it was helpful to collect findings as a final artifact that can be shared with others. This step allows the researcher to reflect on their findings and talk through them with others. This step can be done in a group setting as desired by participants and can take any form (presentation, video, artwork, etc.). If a more formal, less open-ended aggregation is desired, you may consider writing up your findings as traditional close readings that focus on a particular topic and discuss multiple sources. [20, 71, 112] are examples of such close readings.

5.5 How to Present DREEM Findings

DREEM findings can be presented as their own findings or as steps within a larger body of work. In each case, the work presentation will look slightly different. If DREEM is presented as the primary finding, the outcome may simply be what was created in Step 4. If DREEM informed a broader body of work, researchers can share important elements that are specific to the DREEM process, such as: links to media analyzed, keywords and their frequency, and highlights of the individual close readings and/or reflections.

5.6 DREEMing as a Team

DREEMing can be done on your own or as a team. If you plan to work as a team, we offer some insights based on our experiences.

We found that DREEMing has the potential to be an effective way for undergraduate research assistants and assistive technology newcomers to become acquainted with people with disabilities. DREEMing as a team offers the ability to discuss and build on each other's work. As has been discussed in other literature, teaching accessibility concepts to undergraduates continues to be a challenge [93]. We offer this as one framework for learning towards that goal.

Multiple team members are not required to do close readings of the same media. However, doing so can offer insights from multiple perspectives. We found comparing each other's notes led to fruitful conversations about the researcher's individual experiences and insights that might have been missed if everyone had worked independently. We recommend leaving time in your research process to read each other's close readings and journals and meet to discuss them. Teams should work together to find a logging process that works for everyone. Expectations for quality and length of passages should be set and continually talked about.

6 Challenges for Future Applications

DREEM has been developed specifically for design with various disabled populations, but the method could feasibly be used in the context of other communities. Future work is necessary to explore this possibility.

Two challenges with DREEM could be considered more deeply in future work. First, this method requires access to content created and posted online. Content creators with particular disabilities are relatively few on some mediums due to accessibility issues and societal barriers. Memes and GIFs, for instance, are often posted without alt text [35], so the participation of screen reader users with memes and GIFs may be lower.

Second, as discussed in Section 2.2.3, just because a creator is disabled does not mean they are free from internalized ableism. The challenge of training individuals to recognize and flag ableism and ableist tropes is ongoing. We have tried to mitigate this with our training and suggestions in this paper, but recognize this is a thorny issue that will need continual appraisal.

7 Conclusion

In summary, we have proposed DREEM, a 4-step nascent method for using close readings of media posted by people with disabilities

to become enculturated (rather than build empathy). Our primary contributions include materials for utilizing DREEM, including trainings, data logging templates, and a tool for visualizing close readings. We found that actively engaging with media made by people with disabilities is an opportunity for new researchers to learn about these communities and working with disabled people. The potential benefits of continuing this line of work include shared labor, authentic research problems, increased visibility of disability communities, and healthier partnerships with communities of people with disabilities.

DREEM surfaces and features existing work and labor of disabled people. The validity of research can be more rigorous if the source of inspiration is surfaced and credit is given where it is due. DREEM extends participatory design and community-based research from being inclusive on *how* something should be made to *what* should be made in the first place.

We were thrilled to see concepts of disability introduced by exposure to content (infantilization, conflicting access needs). Broadly, we have seen newcomers to disability move from ''for" to ''with" by using DREEM [10]. We have seen them adopt views and understand nuanced perspectives, viewing disability as culture rather than a design problem. We are hopeful that this method will help create a generation of designers who are Allies and Accomplices [19] in changing systems for the better.

Acknowledgments

Thank you to disabled cultural creators and to the students who DREEMed with us.

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A Online Resources

Canvas Module: In this module, we introduce pedagogy materials for a new method: Disability-Related Empathy from Existing Media (DREEM). In this module, we share example syllabi, readings, IRB documents, lectures, assignments, and additional resources that will be updated as the method evolves. The module can be accessed at https://tinyurl.com/DREEM-CanvasModule.