



# Designing for Inclusivity and Accessibility of Mental Health Technologies

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## ABSTRACT

Mental health has been a serious concern among university students, and minority students are known to be particularly vulnerable due to underutilization of mental health services and unfamiliarity with Western health care approaches. My research explores the accessibility and inclusivity of mental health technologies, mainly focusing on how the perspectives and experiences of university students of diverse cultural backgrounds, visible minorities, and international students can inform more inclusive designs. In my first study, I uncovered cultural and communication barriers that suggest that more scaffolding is needed for these students to engage with technologies for their mental health, including supporting storytelling and skill learning from peers as well as providing cultural support and representation. In my second study, I co-designed with campus mental health experts and international students to understand what features and support they desired in these technologies, discovering that stories once again featured heavily in their ideas. For the next two studies, I plan to build and evaluate prototypes that feature a novel storytelling peer support platform.

## CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in collaborative and social computing**; • **Social and professional topics** → *Race and ethnicity*; *Cultural characteristics*.

## KEYWORDS

mental health, university students, culture, minority students, international students, social support, peer support, inclusive designs, design thinking

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## 1 RESEARCH STATUS

I am at the outset of my fourth year of study at the University of British Columbia (UBC) as a PhD candidate in Computer Science. I

am approximately half way through my research. I have completed two studies and have planned for two more. I recently defended my thesis proposal successfully and am now planning my third study. My projected completion of my dissertation is August of 2024.

## 2 BACKGROUND AND MOTIVATION

Mental health and well-being have been found to be a serious concern among university students. However, among this population, research has shown that students of non-Western backgrounds, including international students and those from immigrant families, are particularly vulnerable. They experience factors such as language barriers, discrimination, homesickness, social isolation, and difficulty navigating cultural differences [10, 13, 24]. Further exacerbating these challenges, research has shown that minority students seek counseling and other mental health services at low rates, holding negative attitudes and stigma towards seeking treatment due to less familiarity with Western approaches to mental health care [3, 7, 15].

In Human Computer Interaction (HCI), much of the focus has been on understanding the use of technologies for mental health and creating effective designs for the general student populations. These include insightful investigations in online peer support [11, 18, 19] and self-management [9, 12]. Of late, there has been a growing momentum in HCI to explore the design of mental well-being technologies among those who do not align with the dominant Western understanding of mental health, including international students [10, 24] and those in developing countries in Asia [20, 26]. These studies have brought to light the additional barriers and conditions that those from non-Western backgrounds may face when using these technologies, including deep-rooted cultural stigma and underdeveloped mental health literacy. However, designing for mental health among minority students remains underexplored in HCI despite the very serious accessibility barriers they continue to experience [5]. There is also a sense of timeliness in my research. The well-being and mental health challenges experienced by students, especially minority international students, have only been made worse by the COVID-19 pandemic, making urgent the need to address the accessibility and inclusion gap [14, 25]. This is the space where I position my thesis research.

## 3 RESEARCH OBJECTIVES

My overall goal for this thesis research is to explore designs for mental health technologies that help to overcome the accessibility barriers that minority students typically experience. Here, I define accessibility to mean fostering more sensitive and welcoming experiences so as not to exclude certain populations. Specifically, my thesis aims to tackle the following:

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- Investigate minority students' practices around accessing and using mental health technologies
- Explore designs that can broaden the accessibility and inclusivity of mental health technologies
- Advance how social support can be designed and implemented to ease barriers to entry and adoption

## 4 RESEARCH APPROACH

My research methodology embraces the constructivist epistemological stance, from which I contribute to a shared subjective understanding with my research participants, my research collaborators, and other researchers. This is important to acknowledge because of my background as an international student of East Asian (Korean) heritage. I embrace this constructivist stance because my research has needed the richness inherent in qualitative methods. Furthermore, the studies highlighted in this thesis follow the Design Thinking model with a user-centered design approach [17]. Study One was an interview study conducted to understand how culture plays a role among East Asian students in Canada in how they use and perceive mental health technologies (Empathize stage). In Study Two, I brainstormed and sketched potential designs in participatory design sessions with international students and campus mental health professionals (Ideation stage). Of the potential designs, peer storytelling seemed the most promising to pursue, as it provided more approachable ways for students to learn about mental health. Thus, in Studies Three and Four, I plan to iteratively design, implement, and evaluate a novel storytelling social support platform that can help address the accessibility barriers minority university students typically face (Prototyping and Evaluation stages).

## 5 RESEARCH TO DATE

### 5.1 Study One: Interview study with students of East Asian heritage in Canada

I conducted an exploratory formative study to understand how the cultural backgrounds of East Asian students in Canada have impacted how they use and perceive mental health technologies for their well-being<sup>1</sup> [23]. My co-authors and I interviewed 20 Asian university students, both domestic and international from East Asian cultures (Chinese, Korean, and Japanese). We focused on their experiences with using technologies for mental health, including asking about their impressions of a short list of apps that we curated (e.g., Headspace [8], Happify [6]) in a method similar to Speed Dating [4]. We chose to interview East Asians because they are the largest visible minority group in North American post-secondary institutions [2].

We conducted a thematic analysis of the interview data and found that our participants' upbringing in East Asian cultural norms and their unfamiliarity with Western values of mental health have led to limited awareness about their mental health needs when they enter university, leading to considerable barriers to entry with mental health technologies. International students find it particularly difficult because they hesitate how and when to speak out for their needs and have difficulties adjusting to new expectations to fit in. We found that scaffolding is needed for more accessible and

inclusive interactions, including supporting skill learning to be a self-advocate for one's mental health, supporting storytelling to contextualize and understand how others are experiencing mental health, and providing cultural support and representation for a more relatable experience. The desire for reading and learning from other's experiences through stories were particularly highlighted by our participants. Their unfamiliarity with mental health and stigma due to growing up in a culture where it was not talked about, have led them to appreciate the valuable contexts and learning opportunities the stories can give them. As one participant noted: "I think for Asians, it can help normalize talking about it without it being too scary and too direct."

Our main challenge with this project was how to scope culture. We learned through our consultations with a cultural psychologist that culture would need to be scoped quite narrowly to uncover particular findings unique to that culture. However, we believed it would be too narrow to target one specific culture (e.g., Chinese) given that Canadian universities are so multicultural and have been welcoming international students at record rates [2]. In the end, the timing of the project influenced our decision to target students of East Asian heritage; at the time of the study (summer of 2020), news reports of anti-Asian discrimination had started to increase. Although we could not target a more broad population, we believe that the findings we did uncover produced meaningful implications for inclusive designs.

### 5.2 Study Two: Participatory design study with campus mental health experts and international students

Study One revealed that international students are more vulnerable and that they find adapting to a new country particularly difficult. Thus in Study Two, my co-authors and I extended the design lens to international students of non-Western backgrounds<sup>2</sup>. We leveraged Bronfenbrenner's ecological framework [1] to understand more holistically about students' social networks and their interactions with campus personnel and services, which have been shown to influence student mental health [21]. We conducted a remote participatory design study with 5 campus mental health professionals and 14 international students from diverse cultural backgrounds. Our goal was to understand how technology can be envisioned to help international students access the help they need for their mental health concerns. A participatory design approach was chosen for this study as it is known to actively welcome viewpoints from different stakeholders, including those from vulnerable populations [16].

My methods spanned several stages. First, we created an asynchronous activity for our participants to collaboratively develop personas. Second, we used the personas for a synchronous brainstorming and sketching activity with participants. Then, we analyzed the sketches and discussions to develop design dimensions that encapsulated a range of what our participants desired in mental health technologies. These dimensions consisted of types of support (self, social, professional), interactions (level of formality, frequency of use, level of planning required), and safety (anonymity, professional oversight). Based on these dimensions, we created four

<sup>1</sup>This work has been accepted at CHI 2022

<sup>2</sup>This work is under review at CSCW 2023.

medium-fidelity mockups embedded in storyboards highlighting different variations of the dimensions. We used these mockups to elicit further feedback from our participants via an online survey.

We found that the student participants negotiate matters of trust, comfort, and helpfulness as they consider which technologies they use for mental health. Types of support seemed to be the most critical variable, and our participants responded positively to designs where the three types of support were evident. Of the mockups presented, the design for a peer storytelling platform, which we call the Digital Human Library, seemed the most well-received, as it is a design that provides widespread support for users with different levels of mental health experience and stigma as well as cultural support. We also found that our method for collaborative persona development and the use of personas in the co-design sessions led to positive reactions from our student participants. They felt much more comfortable talking about their mental health via a hypothetical student. Thus, this method advanced the use of personas to support co-designing about a sensitive topic.

## 6 PROPOSED RESEARCH

Studies One and Two opened up a promising design direction for additional research, a platform for social support and peer storytelling, the Digital Human Library. I want to understand how such a platform can be designed to help with the accessibility and inclusivity of obtaining mental health support. Given the inherent challenges of designing an entire peer storytelling platform, we intend to segment the research to focus first on how to support students to effectively consume stories (Study Three), and secondly on how to support authors to write stories that will have an educational and therapeutic benefit (Study Four).

### 6.1 Study Three: Design, implementation, and evaluation of a peer storytelling platform – story consumption focus

In Study Three, my goals are to evaluate this design direction by assessing the impact of consuming mental health stories in the Digital Human Library. I have decided to scope the project to students of one campus, UBC (University of British Columbia, a large public university in Canada), as it will give a more intimate and thorough understanding of how the student user engages with the design amidst the ecology of campus life (including other students, mental health professionals, faculty, and advisors).

The main research questions I hope to answer are: (1) What types of stories and storytelling do story consumers want to read about? (2) How can stories invite community/peer interaction that can sensitively take into account users' stigma, cultural barriers, and unfamiliarity with mental health? (3) How should mental health professionals moderate the platform? (4) How effective and therapeutic are reading stories for learning on this platform? How does it fit into participants' overall strategies for their mental health?

The main contributions will be to develop design heuristics, essentially providing best practices and guidelines for designing for storytelling with therapeutic, educational, and inclusive content. I will then use the heuristics to iterate on a medium-fidelity prototype. The initial development of the design heuristics will be informed by various methods: a literature review, interviews with 5 campus

mental health professionals, and a preliminary authoring study. The authoring study will involve asking students who are already experienced in sharing their mental health journey via social media or online communities to contribute their stories. These stories (20–30 in total) will be used to develop the medium-fidelity prototype. Evaluations (via either a short diary study or an interview study) with 20 students of diverse backgrounds will round out the design heuristics.

The main challenge with this research plan is that the authoring study may result in stories that may not be preferred by our evaluation participants or just may not be a good fit. To help mitigate this limitation, I could recruit participants that would find the stories appropriate for their needs, though even then, it may not guarantee a good fit and may impact validity. I will consider this and other options as I move closer to the design of the evaluation part of the study. Another challenge with this project is to differentiate the design among countless other works on online health communities and peer interactions. However, I will strive to situate this project within the perspectives of minority students from Studies One and Two and also my own experiences as an international student.

### 6.2 Study Four: Design, implementation, and evaluation of a peer storytelling platform – story production focus

In Study Four, I will take the medium-fidelity prototype and the design implications from Study Three to implement a high-fidelity prototype using common web programming tools (CSS/HTML/Javascript). The plan for the design is to scaffold the authoring of stories, as research on online health community sites has shown that active engagement such as authoring could be beneficial for some users [22, 26]. I will then use the prototype as a probe to examine the design space of accessibility and inclusivity of mental health technologies for a deeper understanding of the needs and challenges of students. My goal is to recruit 20 UBC students for a period of 2–4 weeks, where they will be tasked to author mental health stories, read others' stories, and note their experiences along the way.

The main research questions I hope to answer are: (1) What types of stories and storytelling are students interested in sharing? What elements make for a good story? (N.B. Some of these details may come from Study Three design implications, but additional findings from the story producers in Study Four may supplement previous design directions.) (2) How can the generation of stories be scaffolded to help story producers create stories that are more effective for learning and therapeutic support? (3) How can anonymity be protected when story producers may reveal personal experiences through their stories? (4) How are story producers incentivized to post stories?

The scaffolding of authoring stories will mainly depend on the design implications from Study Three. However, I am tentatively considering several design directions, including the use of templates generated from users' posts or produced from mental health professionals. The challenges I am facing at the moment is whether and how professional moderation should be incorporated. Through my interactions with campus mental health providers, I am aware of their considerable workload and do not want to burden them with more. Yet, at the same time, findings from Study Two did indicate

that students would respond better if there is an assurance of their involvement. I will need to consider this carefully during the study design planning stage.

## 7 LONG TERM GOAL

My long term goal is to develop an implementation strategy for a possible deployment at UBC. My ongoing interactions and collaborations with students, mental health professionals, and student advisors of this campus have made me passionate about contributing a positive impact to the community. Unfortunately, the limited time and resources available to me in my PhD program will leave this to be future work, as a full implementation strategy will undoubtedly involve extensive participation from multiple stakeholders, including campus leadership, health and wellness departments, and the student body.

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