FOSTERING WELL-BEING: Designing Technology to Improve the Psychological Well-being of Foster-Involved Youth

by

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B.A., University of Pennsylvania (2018)

Submitted to the Program in Media Arts and Sciences, School of Architecture and Planning, in partial fulfillment of the requirements for the degree of

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Abstract:

Over 600,000 youth in the United States experience abuse or neglect each year. Youth who are deemed to
be at risk of significant harm in their homes are often removed and placed in a temporary housing
situation known as foster care. Despite this system's goal of supporting youth, research suggests that
foster care can negatively impact youths' ability to heal and develop the skills they need to reach their
goals and avoid future traumatic situations. Given that very little has been done to explore how
technology might be able to help youth heal and learn coping skills, this project aimed to explore if and
how internet-connected technologies (such as smartphones and computers) might be able to support the
psychological well-being of youth in and transitioning out of the foster care system. We approached these
questions in three phases. In Phase 1, we conducted broad, semi-structured interviews with 16 current and
former foster-involved youth to understand their experience and explore if and how technology could
promote psychological well-being for foster-involved youth. Through this phase, we learned that young
people are especially concerned about the lack of social support youth have in foster care and see
opportunities for peer-to-peer technology to fill this need. In Phase 2, we built off these findings by
prototyping and testing multiple peer-to-peer support app designs with 24 current and former
foster-involved youth. Through this iterative process, we identified that a community-based, reflective
check-in system might allow youth to give and receive most types of social support in a safe and
comfortable environment. Finally, in Phase 3, we tested this system through a two-week mixed-methods
pilot study with 15 current and former foster-involved youth, collecting data to suggest that this type of
interface can provide youth with multiple types of social support and thereby improve their psychological
well-being.

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1 INTRODUCTION

In this section, we share the context that motivates the project, along with our primary research objectives. We end with a brief overview of the way in which this paper is organized.

1.1 Context

Each year, roughly 600,000 youth in the United States are flagged by the child welfare system for having experienced one or more types of neglect or abuse (U.S. Department of Health & Human Services, Administration for Children and Families, & Administration on Children, Youth and Families, Children's Bureau, 2023). Most commonly, youth enter the system because their needs for healthy food, a clean living environment, or emotional well-being are not being met (76% of cases) (U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau, 2021). After this reason, youth most frequently enter the system because they have experienced physical (16%) or sexual (10%) abuse (U.S. Department of Health & Human Services, Administration for Children and Families, & Administration on Children, Youth and Families, Children's Bureau, 2023). Youth in these situations often have caregivers who are living with domestic violence, drug abuse, alcohol abuse, disability, financial challenges, and/or inadequate housing (U.S. Department of Health & Human Services, Administration for Children and Families, & Administration on Children, Youth and Families, Children's Bureau, 2023). Youth who are deemed to be at risk of significant harm are removed from their homes and placed in a temporary housing situation known as foster care. Today, there are approximately 400,000 youth residing in foster care in the U.S. (Children's Bureau, Department of Health and Human Services, 2023).

Despite foster care's purpose to protect youth from harm, large-scale studies have shown that young people who enter foster care have significantly worse outcomes than young people who are comparably maltreated yet remain in their homes (Doyle Jr., 2007, 2008; "The Evidence Is in: Foster Care vs. Keeping Families Together: The Definitive Studies.," 2021). Nationally, 55% of youth who enter foster care find themselves in unfamiliar homes or institutional facilities, and 35% are required to move to new placements 2 or more times each year (Children's Bureau Administration on Children, Youth and Families, 2021; Children's Bureau, Department of Health and Human Services, 2023). The situation is worse in Massachusetts, where MIT is located, with 62% of foster-involved youth being placed in unfamiliar homes or institutional facilities, and 49% experiencing 2 or more placements each year (Children's Bureau Administration on Children, Youth and Families, 2021; Children's Bureau, Department of Health and Human Services, 2023). While the majority of foster-involved youth have at least one sibling in care (65 - 85%), it is estimated that 53 - 80% of youth with siblings are separated from at least one of their siblings while in foster care (Hegar & Rosenthal, 2011; *How Are Child Protection Agencies Promoting and Supporting Joint Sibling Placements and Adoptions?*, 2020; McCormick, 2010).

Youths' early traumatic experiences and the disruptions they experience in foster care can negatively impact their ability to form stable, supportive connections and their overall well-being. Recent research in California shows that over 40% of teenage foster-involved youth do not have enough people to turn to for social support (Okpych et al., 2018), and more than 50% have been diagnosed with a mental or behavioral health disorder (Courtney & Charles, 2015). Studies done in Indiana (Spencer & Knudsen, 1992), Oregon, Washington (Peter J. Pecora et al., 2005), and Maryland (Benedict et al., 1994) have also found that young people are much more likely to experience abuse than the general population while residing in foster care (National Coalition for Child Protection, 2022). Finally, older youth who are still in temporary care by the time they reach adulthood often find themselves exiting the system with unhealed trauma and without the support or skills they need to live independently, which may leave them vulnerable to future traumatic experiences (Cancel et al., 2022). Indeed, 20% of foster-involved youth in the United States have faced homelessness from age 17 - 19, and 29% from age 19 - 21 (Children's Bureau, Administration On Children, Youth And Families, Administration For Children And Families, U. S. Department Of Health And Human Services, 2016). Roughly 20% also report that they have been

incarcerated between ages 17 - 19 or 19 - 21(Children's Bureau, Administration On Children, Youth And Families, Administration For Children And Families, U. S. Department Of Health And Human Services, 2016).

With internet-connected technology such as smartphones and computers becoming more affordable and commonly used, it opens up promising opportunities to support the psychological well-being of foster-involved youth (Lehtimaki et al., 2021). A recent meta-analysis of 8 peer-reviewed publications describing foster-involved youths' experiences with internet-connected technology found that youth use technology to stay connected with family and friends (both those in their community and those that they no longer live close to), find resources (ranging from information to finding a temporary place to stay), feel a sense of connection with peers who are not in foster care, and engage in self-care (through music, pictures, and games) (Sage & Jackson, 2021). While exploration is in its infancy, researchers believe that technology can help foster-involved youth gain knowledge that increases competence and confidence, build and strengthen supportive connections, find a community and explore their identity, and provide them with opportunities to support others (Denby Brinson et al., 2015; Denby et al., 2016; Gustavsson & MacEachron, 2015).

At the same time, scholars and foster-involved youth worry that having access to internet-connected technology may increase youths' exposure to cyberbullying, harassment, predatory solicitations, and other forms of abuse utilizing their personal information (Gustavsson & MacEachron, 2015). Indeed, a small-scale study conducted with foster parents found that more than half of foster-involved teens interacted with unsafe people online, leading to rape, sex trafficking, and/or psychological harm (K. Badillo-Urquiola et al., 2019). The majority of foster parents in this situation did not know how to ensure foster-involved youths' safety online and resorted to removing technology access altogether (K. Badillo-Urquiola et al., 2019). This may in part be because there has been almost no research done on designing safe technology interactions for foster-involved youth, with existing research on designing safe technological interactions for teens focusing heavily on parental mediation which is often not applicable to youth in foster care (K. A. Badillo-Urquiola et al., 2017). In the few studies that explore youths' perspectives on this topic, youth say they mitigate risks by being careful about what they share online (i.e., only communicating with individuals who they know) and going to adults for help if needed (Sage & Jackson, 2021). To tackle the unique tensions posed by technology for foster-involved youth, some scholars advocate for more research to focus on how to design safe and helpful technology for foster-involved youth, prioritizing youth perspectives (K. A. Badillo-Urquiola et al., 2017; Wisniewski et al., 2017).

1.2 Contribution

The lack of adequate support for foster-involved youth and gaps in literature on how technology can be leveraged for this population has motivated us to explore how internet-connected technology (such as smartphones, computers, and tablets) can help support the psychological well-being of teenage foster-involved youth. Psychological research has explored multiple paradigms of psychological well-being, which underline the impact of environmental and cognitive factors on overall well-being (Fry et al., 2009; Huppert, 2009; Winefield et al., 2012). For clarity, we will define psychological well-being according to a foundational framework developed by Ryff, consisting of six core dimensions: purpose in life (having goals and a sense of meaning in life), autonomy (being able to act independently), personal growth (believing one is improving and expanding over time), environmental mastery (being able to adjust one's context to meet personal needs and values), positive relationships (having satisfying and trusting relationships with others), and self-acceptance (feeling positive about one's traits, identity and life experiences) (Ryff, 2014; Ryff & Keyes, 1995).

To investigate our research question, we started by conducting semi-structured interviews with current and former foster-involved youth to understand the challenges and strengths that exist in the foster care system; how youth currently cope with stressors, solve problems and work towards goals; how youth use technology; and what programs or tools youth wish existed to support them during and after foster

care (Phase 1). Based on the results of these interviews, we iteratively prototyped and tested potential digital interventions through semi-structured interviews and workshops with current and former foster youth (Phase 2). Finally, we conducted a pilot study to understand if and how current and former foster-involved youth use the proposed digital tool and evaluate its efficacy in supporting their psychological well-being (Phase 3). Across our research methodologies and design decisions, we prioritized human-centered, trauma-informed, and healing-centered approaches to ensure that the project's process and output are guided by the safety, needs, and perspectives of foster-involved youth (Dietkus, 2022; Ginwright, 2018; Soto-Aponte, 2021; Substance Abuse and Mental Health Services Administration, 2014).

1.3 Thesis organization

The following document is structured as follows. In Section 2, we provide an overview of relevant related work in the space, including what non-technological and technological systems currently exist to support foster-involved youth and what methodologies exist for engaging with and designing new tools for these communities. In Section 3, we explain the ways in which we have fostered community partnerships, which ground the three main phases of the project. In Section 4, we describe Phase 1 of the project, in which we conducted semi-structured interviews with current and former foster-involved youth in order to understand the challenges and strengths of the foster care system and opportunities for technology to support the psychological well-being of foster-involved youth, from the perspective of individuals with direct lived experience. In Section 5, we describe Phase 2 of the project, in which we gathered feedback on four prototypes developed based on the results of Phase 1. In Section 6, we describe Phase 3, in which we designed a pilot app based on the results of Phase 2 and conducted an in-the-wild pilot study to evaluate its usability and impact for foster-involved youth, as well as identify areas of improvement for the future.

2 RELATED WORK

In this section, we describe what currently exists to support the psychological well-being of foster-involved youth, primarily reviewing what programmatic and internet-connected technologies have been implemented and how effective they seem to be (with an emphasis on youths' perspectives when possible). We also describe the main methodological frameworks that guide the project, to contextualize the work described in the following sections.

2.1 Non-technological supports for teenage foster-involved youth

While outcomes indicate that foster-involved youth do not have adequate support in the system, there are multiple programs that provide some degree of support to youth. In 15 states, youth in the foster care system are entitled to a Bill of Rights, which generally includes the right to know why they are in foster care and what will happen to them in the system, and the rights to participate in outside-of-school activities, attend a school that fits their needs (with consistency), access guardians ad litem (described in more detail in the following paragraph), access mental, behavioral and physical healthcare, and communicate with siblings and family members (*Foster Care Bill of Rights*, 2019). By allowing foster-involved youth to build and maintain long-lasting connections with family members and others in their community (such as friends, teachers, coaches, friends' parents), these rights may improve their overall well-being (Collins et al., 2010). However, most of these rights are not guaranteed - they are contingent on what is deemed possible or appropriate by the youths' foster care team, which may come into conflict with what youth want or need (*Foster Care Bill of Rights*, 2019).

To advocate for youths' interests, most states have guardian ad litem (GAL) and/or Court Appointed Special Advocate (CASA) programs. With these programs, a lay volunteer or a legal expert (usually a volunteer) can be assigned to a youth's case by a judge. These adults are asked to get to know

the youth and their care team and advocate for the youths' legal and/or non-legal needs through recommendations to the court (Lawson et al., 2015). Some research indicates that these programs improve representation of youth in court decision-making processes and help youth reach a safe and permanent home faster (Berliner & Fitzgerald, 1998; Katz & Geiger, 2023; Lawson et al., 2015; Leung, 1996; Litzelfelner, 2008; Organizational Research Services [ORS], 2005; Weisz & Thai, 2003). However, evidence suggests that these adults may perpetuate racial inequities in foster care decision-making, prioritize adoption over reunification of children with their families, and make recommendations based on biased personal beliefs due to their lack of training or shared background with youth (Caliber Associates, 2004; Lawson et al., 2015; National Coalition for Child Protection, 2021; Osborne et al., 2019; Pitchal et al., 2010).

   Approximately 14% of foster-involved youth are also enrolled in a program called Comprehensive Foster Care (also referred to as Intensive Foster Care or Therapeutic Foster Care), which is only available to youth who have been deemed as having more intensive medical or emotional needs (due to past trauma or other factors) (Courtney Edge-Mattos, n.d.; *Foster Care Terms: How Is the Department of Children and Families (DCF) Structured in Massachusetts?*, 2020; *Massachusetts Department of Children and Families: Annual Report FY21*, 2021; Zerbe et al., 2009). In Comprehensive Foster Care, youth are placed in homes with fewer other youth (maximum of 3 rather than 5 other youth), live with foster caregivers who have been specially trained to meet their needs, and are visited weekly by an agency case manager (on top of the monthly government social worker visits that all youth receive) (Courtney Edge-Mattos, n.d.). A study conducted in Oregon and Washington indicated that youth in intensive foster care have significantly greater educational attainment, improved mental and physical health, and fewer substance use challenges (Zerbe et al., 2009). However, it should be noted that the program evaluated offered financial help with college expenses, which is not always the case for Comprehensive Foster Care programs (Zerbe et al., 2009).

   Foster-involved youth often have access to mental health services while in care. In fact, a recent study conducted with older foster youth in California indicated that 54% use counseling services (Munson et al., 2020). However, this use decreases by 50-60% once youth transition out of foster care (Villagrana, 2017; Villagrana et al., 2018). Recent research attributes much of this drop to foster youth feeling forced to attend therapy when they don't feel they need it (mental health service referrals are often mandatory, and youth do not feel they are given adequate explanations of why they are receiving these services), or feeling like mental health services were ineffective (Villagrana, 2021). This ineffectiveness may in part be due to youth not having a choice in their treatment plan, but also because frequent placement disruptions require them to repeatedly build rapport and understanding with new clinicians/counselors (Villagrana, 2021).

   Foster-involved youth sometimes have access to unrelated adult mentors, either through organically developed relationships (such as with a teacher or coach) or through programs where they are paired with an adult who provides them with support for a set period of time. A recent meta-analysis indicates that mentorship has a small-to-moderate effect on how quickly youth find a stable, permanent placement, their educational achievement, and their psychological state (e.g. feelings of self-determination and hope, traumatic stress symptoms, and anxiety and depression) (Poon et al., 2021). These programs may also reduce the number of traumatic experiences youth have, with an 18-month longitudinal study finding that youth who did not receive any therapeutic mentoring showed an increase in traumatic stress symptoms and an increase in traumatic experiences, while youth who did receive mentorship showed a decrease in both areas (in addition to an improvement in social functioning, school behavior, and achievement) (Johnson et al., 2011). Poon et al. highlight that the effect of mentorship programs for youth in foster care appears to be stronger than the effects of mentorship programs for more general youth populations, perhaps because targeted programs cater to the specific needs and experiences of youth in foster care (Poon et al., 2021). Furthermore, research indicates that programs where mentors were close in age to mentees (near-peer mentors) are more effective (Poon et al., 2021). This may be because near-peer mentorship programs tend to recruit mentors who have previous foster care experience, which might increase the credibility and relevance of their guidance (Austria & Peterson, 2017; Poon et

al., 2021). Poon et al. point out that there were only two studies of this nature, so the field would benefit from further analyses of how age and foster care experience influence the impact of mentorship for foster-involved youth (Poon et al., 2021). Studies also suggest that youth who experience emotional abuse are less satisfied with and gain less from mentorship programs, potentially because they have more difficulty forming trusting relationships (Blakemore et al., 2017; Poon et al., 2021; Weber Ku et al., 2021; Wilson & Scarpa, 2015).

Any support foster-involved youth have tends to fall away once they become adults. However, there are services designed to ease this transition and prepare youth for independence. At the age of 18, foster-involved youth can opt-in to continue receiving services (e.g. support with housing, employment, education, and counseling) until the age of 21 (or 23 in some states) to support them as they transition into adulthood, through a program called Extended Foster Care (Child Welfare Information Gateway, 2022; *John H. Chafee Foster Care Program for Successful Transition to Adulthood*, n.d.). Despite this, only approximately 25% of 18-year-old foster-involved youth remain in care until their 19th birthday (The Annie E. Casey Foundation, 2018). Based on a state-wide study conducted with 17-year-olds in California, transition-age youth who wanted to remain in care said they were motivated by a desire to pursue educational goals or receive material goods and housing support, while youth who did not want to remain in care cited wanting more freedom or not wanting to continue dealing with social workers as main reasons for opting out (Mark E. Courtney et al., 2014).

2.2   Technological supports for teenage foster-involved youth

Researchers and product developers have begun to explore how internet-connected technology can be used to support foster-involved youth (Miller et al., 2016). However, despite extensive searching and meeting with over a dozen different foster-support organizations, we have not come across tools that specifically aim to promote the psychological well-being of teenagers with foster care experience.

The majority of existing solutions focus on sharing resources and advice with current and former foster-involved youth. iFoster (*IFoster: Helping Kids In Foster Care Reach Their Full Potential*, n.d.-a), FosterClub (*FosterClub*, n.d.), Think of Us (*Virtual Support Services: Virtual Support to Bridge the Gap between the Needs of Foster Youth and Families and Community Resources.*, n.d.), Youth Matters: Philly (*YouthMattersPhilly*, n.d.), Know Before You Go (*Know Before You Go – B4UGo*, n.d.), and Our Community L.A. ("The WIN App • OCLA," n.d.) have created web or app-based databases to help foster-involved youth access relevant resources and guidance nationally or in specific regions of the United States. Another mobile application, FOCUS on Foster Families, hosts a library of video interviews conducted with foster-involved youth and caregivers sharing their experiences and advice, and a set of games to help foster-involved youth with stress reduction, understanding emotions, and sharing personal stories (University of California, Los Angeles, n.d.). This app holds promise for supporting the psychological well-being of foster-involved youth, although we could not find any formal evaluations of its impact.

There are also several generalized peer-to-peer platforms that are available to connect current and former foster-involved youth with others in their communities. Reddit and Facebook host numerous user-created groups for foster-involved youth and foster caregivers (Fowler et al., 2022). While these forums are moderated and have widely varying rules and moderator roles, they are public and may leave youth users vulnerable to predators or harassment (K. Badillo-Urquiola et al., 2019; Sage & Jackson, 2021). iFoster has also created an online community platform for care providers and transition-age and former foster-involved youth (*FosterClub*, n.d.). By providing a joint space for providers and foster-involved youth, this platform may help youth get more support from knowledgeable adults. However, the presence of providers might make youth feel uncomfortable seeking support related to challenges with foster care services. Creating a space exclusively for 18+ year-olds with foster care experience in L.A., Stepping Forward LA hosts a mobile online community and hires young adults with foster care experience to moderate interactions and share relevant resources on the platform. While this may create a comfortable space for youth to talk about personal experiences, most activity centers on

sharing resources, perhaps because youth do not know how to broach emotionally-charged topics on the platform (*Life Skills App*, n.d.).

There are over 200 apps on the market that purport to support teenager well-being more broadly, although experts believe that only 19 are actually appropriate for 13 - 18-year-olds, and only 11 have been evaluated through some form of research (Neary, 2022). Mental health apps for teens primarily use the medium of psychoeducation (understanding mental health symptoms, causes, and treatments), but some also utilize symptom tracking (tracking feelings and the factors that impact how users are feeling), games and/or chatbots (AI programs that can chat with users in real-time) (Neary, 2022). These apps tend to draw from meditation (mindfulness practices), Cognitive Behavioral Therapy (CBT), gratitude (recognizing and appreciating positive things in life), and/or Dialectical Behavioral Therapy (DBT) practices (Neary, 2022). Research suggests that web-based CBT interventions are as effective as face-to-face CBT treatment, but dropout rates are high and adherence is often weak unless mitigated by person-to-person interactions (with professionals, peers, or parents) (Lehtimaki et al., 2021). Although they hold promise, we do not yet have enough evidence to draw conclusions about the efficacy of therapeutic games, social networking sites, and mobile apps for teenage mental health (Lehtimaki et al., 2021).

2.3   Trauma-informed and healing-centered approaches to research and design

The Substance Abuse and Mental Health Services Administration (SAMHSA) states that individual trauma "results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life-threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being" (Substance Abuse and Mental Health Services Administration, 2014). Trauma can also be experienced collectively and transmitted across generations, originating from the oppression of a community or culture by a dominant group (Sotero, 2006).

Being trauma-informed or trauma-responsive in the field of research and design means adapting our methodologies to take into account potential trauma people may have experienced in the past or might experience through the work (Dietkus, 2022). This involves (Dietkus, 2022; Substance Abuse and Mental Health Services Administration, 2014):

1. Safety: taking into account the physical and psychological safety of everyone impacted by the project.
2. Trustworthiness and Transparency: building trust via transparent decision-making.
3. Peer support: providing opportunities for peer support and mutual self-help.
4. Collaboration and Mutuality: sharing power and decision-making across power hierarchies.
5. Empowerment, Voice, and Choice: recognizing and building upon individuals' strengths, experiences, and resilience.
6. Cultural, Historical, and Gender Issues: incorporating individuals' cultures and identities and addressing the effects of historical and intergenerational trauma.

This framework connects with Ryff's dimensions of psychological well-being, particularly in its emphasis of mutually supportive relationships (positive relationships), giving individuals power (autonomy), and being inclusive of diverse identities and cultures (self-acceptance) (Ryff, 2014; Ryff & Keyes, 1995).

Dr. Shawn Ginwright expands upon the concept of trauma-informed care by proposing an approach called Healing Centered Engagement (HCE) (Ginwright, 2018). This approach has significant overlap with trauma-informed care, with a few key shifts (Ryff, 2014; Ryff & Keyes, 1995; Soto-Aponte, 2021):

1. HCE recognizes that individuals can share a common experience of trauma, and healing often takes place through interactions with one's community.
2. HCE emphasizes that the best way to treat trauma involves taking into account the environmental factors that caused the harm in the first place (rather than just treating the individual).

3. Converging with Ryff's purpose in life dimension, HCE focuses on helping individuals reach their goals and self-determined markers of well-being, rather than focusing on reducing negative symptoms of trauma or promoting normative definitions of success and well-being.

We drew from the knowledge of trauma-informed and healing-centered scholars and practitioners to conduct this study in a way that prioritized safety, autonomy, and healing for the study participants.

3 PARTNERSHIP BUILDING

In this section, we introduce our main community partners for the project, along with the ways that we tried to build trust, transparency, and reciprocity along the way. This not only allowed us to engage with foster-involved youth (through the creation of strong partnerships) but helped ensure that we were doing so in ways that were appropriate and trauma-informed (through the development of clear and bidirectional communication pathways).

3.1 Community partnerships

To responsibly engage with foster-involved youth, we partnered with five organizations that support current and former foster-involved youth. These organizations included: Justice Resource Institute's Foster Care program, Friends of the Children Boston, Stepping Forward LA, Communities for People, and Think of Us. We selected these partners because they shared an interest in collaborating with youth to explore the potential benefits of technology, and because they supported youth with diverse foster care experiences. JRI Foster Care provides Comprehensive Foster Care services to foster-involved youth across the state of Massachusetts. Friends of the Children Boston identifies youth ages 4 to 6 who experienced significant systemic obstacles and trauma and provides them with professional mentors that support them and their caregivers until they graduate from high school (*How It Works*, n.d.). Approximately 52% of youth served by Friends of the Children Boston have been impacted by the child welfare system by the age of 4 to 6, although not all of these youth enter or remain in foster care (*How It Works*, n.d.). Stepping Forward LA hosts a digital platform that delivers educational content and resource information to current and former foster-involved youth (18+) in Los Angeles, as well as provides them with an online community moderated by paid young adults who have foster care experience (*Life Skills App*, n.d.). Communities for People offers a range of programs in Massachusetts and Rhode Island, including family support and preservation, treatment foster care and adoption support, and a variety of small residential and independent living programs for teens (*ABOUT COMMUNITIES FOR PEOPLE (MA, RI)*, n.d.). Think of Us is a national research and design lab that pursues policy and tech projects to improve the child welfare system. They host an online platform called Virtual Support Services that connects youth in California, Georgia, and Boston with community responders to help them find resources (*Virtual Support Services: Virtual Support to Bridge the Gap between the Needs of Foster Youth and Families and Community Resources.*, n.d.). For all phases of the project, we recruited participants exclusively through our partner organizations, with staff sending engagement opportunities to any eligible young people they support. We also encouraged staff to share our opportunities with others outside of their organization, which led us to speak with a few adult participants who experienced foster care in their youth.

3.2 Input and transparency

Guided by the principles of trauma-informed design, we held regular meetings with our partner organizations to build trust and transparency throughout the research process (Dietkus, 2022). The cadence of meetings depended on each organization's desired level of involvement and the stage of the project, with our research team sharing information and checking in as frequently as possible (ranging from every week to every few months). Regardless of the cadence, we made sure to give our partner organizations opportunities to review and give input on all study plans prior to implementation.

3.3 Workshops

Figure 1: Creative Technology Workshop Image
Ila Kumar presenting context for a brainstorming activity in which youth were asked to think of magical ways to support young people when they're feeling sad or lonely.

Figure 2: Creative Technology Workshop Image
Participant designing an animated card to help a young person feel better when they're feeling low, using a prototype developed by MIT's Lifelong Kindergarten group.
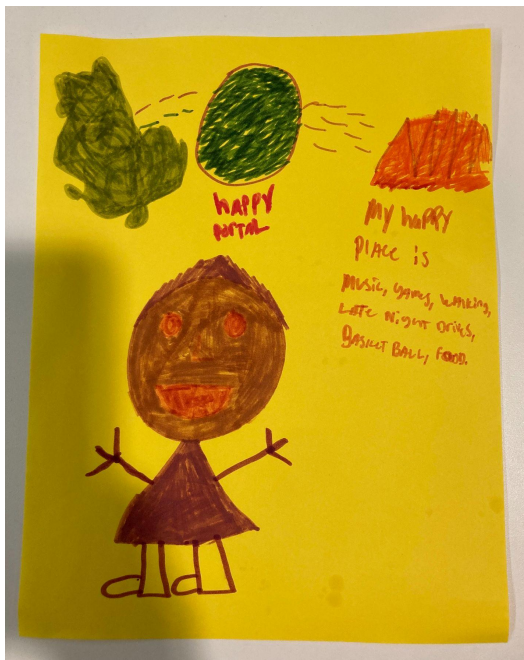
Figure 3: Creative Technology Workshop Artifact
Idea created by a participant, described as: An alternate dimension that you can enter when you're sad (via the happy portal). There, you can do things you enjoy without being bothered by anyone and without any time limits.
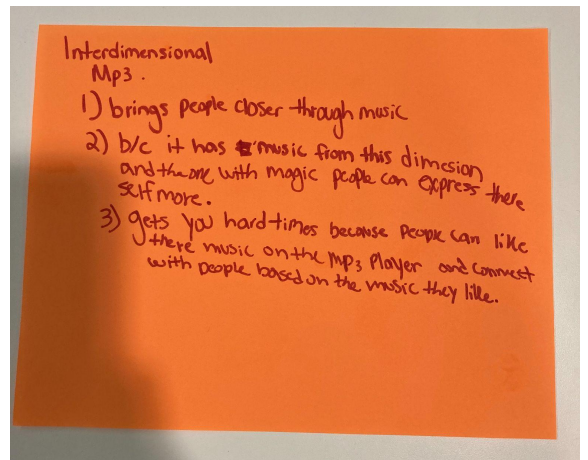
Figure 4: Creative Technology Workshop Artifact
Idea created by a participant, describing an interdimensional MP3 player which helps people express themselves and connect with others through music.

Figure 5: Music and Mental Health Workshop Image
Participant creating music using a prototype developed by MIT's Opera of the Future group.

Figure 6: Music and Mental Health Workshop Image
Participants creating instruments that express emotion, using Makey Makey, a product created at MIT's Lifelong Kindergarten group that converts everyday objects into computer interfaces.

Figure 7: Music and Mental Health Workshop Image
Participant performing a musical piece with their instrument.
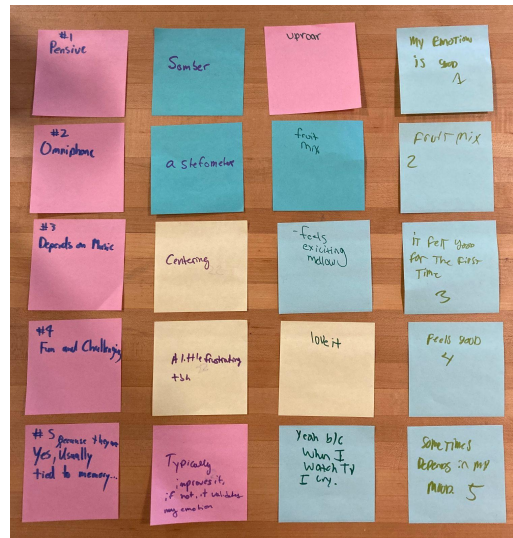
Figure 7: Music and Mental Health Workshop Artifact
Some participants' final reflections in response to the questions: (1) What would you call this instrument? (2) What does it feel like to listen to music? (3) What does it feel like to make music? (4) Does music impact your emotions? Why or why not?

Inspired by Healing Centered Engagement's focus on encouraging youth to think about their own definitions of success and well-being, we also offered all of our community partners the opportunity to

have their youth participate in workshops aimed at providing knowledge and inspiration (Ginwright, 2018; Soto-Aponte, 2021). Specifically, the goal of these workshops was to help young people explore what is possible in the field of technology and well-being, and give them tools to start to creatively imagine how they might design technology to support young people like themselves. We ended up running two workshops, the first of which was in collaboration with MIT Media Lab's Lifelong Kindergarten group. In this workshop, youth explored how to interactively design creative technology that can help vulnerable youth better understand and manage their feelings. The second was co-hosted by MIT Media Lab's Opera of the Future group and gave youth an opportunity to learn about and design music technology to improve the mental health of youth who may be going through a hard time.

4 PHASE 1

In this section, we describe the first phase of the project. Over a period of two months, we conducted semi-structured interviews to gather youths' perceptions of challenges they faced, strengths or assets they possessed, and opportunities for digital technology to support them. We asked about challenges and strengths to help youth think about technology in the context of their experiences. Additionally, given that no studies have asked youth for their views on how technology could support their psychological well-being, we felt it was important to start with this question before beginning to prototype any potential new interventions. This section concludes with an overview of the different types of support youth felt that they needed, along with their ideas of how technology might be applied to increase support.

4.1 Methods

All procedures, materials, and data management systems were reviewed and approved by MIT's Institutional Review Board prior to implementation.

4.1.1 Eligibility criteria

We spoke with participants ages 14 or older, as we felt this was an age where young people could understand the research study and therefore could consent to their own participation. We aimed to not rely on parent or guardian consent, as we believed it would both be difficult to obtain this for some youth and to protect any youth that did not feel that their foster caregiver was looking out for their best interests (a possibility given the high rates of abuse in foster homes) (National Coalition for Child Protection, 2022). Participants also needed to be English speakers to be eligible for the study due to the language limitations of the research team. However, we felt that we would still be able to meaningfully understand the experiences of foster-involved youth, as it can be estimated that over 80% speak English as their primary language (*Massachusetts Department of Children and Families: Annual Report FY21*, 2021).

4.1.2 Participant recruitment

For this phase of the project, we recruited participants through two of our Massachusetts-based community partners: Justice Resource Institute's Foster Care program and Friends of the Children Boston. Staff at each organization shared information about the study with individuals presently or previously involved with their programs who they had existing relationships with (see Section 9.1 for the recruitment flyer provided to staff). We also obtained a few participants using the snowball sampling method, by which participants gave us the information of other individuals they knew personally who were interested in participating (Parker et al., 2019). All minors involved were recruited by organizational staff with which they had an existing relationship because we felt that staff were better equipped to share the opportunity in a way that would make youth feel comfortable asking questions or expressing concerns.

4.1.3 Semi-structured interviews

All interviews were conducted via Zoom and took 45-60 minutes to complete. Participants were given the option to attend the interview alone or with their case manager or mentor present (if they were presently involved with an organization that supplied this resource) based on their comfort levels and access to technology. We chose to conduct individual interviews at this stage so that the conversation and structure could be guided by each participant's own preferences and interests.

At the start of each interview, we emphasized that participants were not expected to share any information that they did not wish to share. Here, we utilized a green, yellow, red metaphor for clarity (Baker Scott, 2022).

> "I like to start by saying that there are three types of information - green, yellow, and red. Green are things that I don't mind anyone knowing, like my name and what kind of pet I have. Yellow are things that I don't mind some people knowing, which could be how I felt in school. Red are things that I don't want people to know or don't want to talk about, like something sad that happened to me. Feel free to share green and yellow information, and keep red things to yourself. There is no pressure to talk about anything you don't want to share or talk about. Do you have any questions about this?"

We also reminded participants that they were free to take a break, leave, or turn off their cameras at any time during the interview, for any reason. We emphasized that we would not be offended if the participant did this, and the participant would receive their gift card regardless. We also purposely posed general questions (i.e., "What are the main challenges young people face in the foster care system?", rather than "What challenges did *you* face in the foster care system?") to avoid pressuring participants to share personal, potentially-traumatic information. In the interviewer role, we kept our camera on regardless of whether the participant had their camera on. This was done so participants could read our body language, to increase transparency and make participants feel more comfortable.

The interview questions were developed based on findings from previous literature and early conversations with leaders and staff at organizations that support young people who have experienced foster care (Cancel et al., 2022). In an effort to be non-extractive, we only asked for information that seemed necessary to answer our research questions and ultimately design a helpful tool for the community. The questions focused on identifying youths' strengths, goals, and their perceptions of what is helpful in their environment. This was not only to empower youth who participated in the study, but also to help guide us towards solutions that might amplify youths' strengths, goals, and existing positive factors in their lives. We asked a single negative-leaning question: "Based on your experience, what challenges do youth face in the foster care system? Why?". For every challenge raised by participants, we followed up with questions about whether any programs or tools would be helpful in addressing the issue, and whether they had any ideas for how technology could be helpful specifically. We also purposely posed this as a general question (i.e., "What are the main challenges young people face in the foster care system?" vs. "What challenges did you face in the foster care system?") to avoid pressuring participants to share personal, potentially-traumatic information. The majority of remaining questions centered on strengths and goals, such as:

1. What do you see as the most helpful types of services or supports for youth in the foster care system? Why?
2. What did you do if you had a problem or needed advice while you were in foster care?
3. Think back to any times when you may have felt sad, anxious, or lonely while you were in foster care. Was there anything that helped you in those moments?
4. Do you have any goals at the moment?
   a. If so, what are they? If not, why do you think you don't have a goal?
   b. Do you know what steps are needed to reach this goal? If so, what are the steps?
   c. Do you feel prepared to take the next step? Why or why not?

In general, we fostered a collaborative relationship with current and former foster-involved youth by framing them as experts and treating them as thought partners throughout the interviews. This manifested as asking participants directly about what they felt would make a desirable and impactful technology output: "Imagine we had a million dollars and the most advanced sci-fi technology you can think of. Is there a game, app, website, or other piece of technology that you wish existed to help youth in the foster care system?" Notably, many participants struggled to answer this question when posed broadly but had opinions about if and how technology would be helpful when asked in response to specific challenges they brought up during the interview.

4.1.4 Compensation

After each interview, participants were emailed their choice of a $35 Amazon, Uber, or Star Market gift card (participant's choice) as a thank-you for the time and effort they put into the interview. We provided gift cards to involved case managers/mentors as well because they often spent comparable amounts of time supporting with scheduling, electronic consenting, and setting up technology to ensure interviews with youth participants went smoothly.

4.2 Participants

Seventeen eligible individuals participated in Phase 1. Thirteen participants were 15 - 19 years old, with an average age of 17. Nine participants were presently in Comprehensive Foster Care, one was presently in kinship care, and three had been in foster care within the past 2 years. Four participants were 20+ years old and were previously in foster care. One former foster participant was presently working as a case manager.

4.3 Data analysis and positionality

Interviews were conducted using the Zoom platform, recorded, and transcribed. A bottom-up thematic-analysis approach was then used to construct a codebook and identify the prevalence of codes in interviews (Braun & Clarke, 2006). This method was employed in order to identify key themes in the data without relying on preconceived codes or theories (Braun & Clarke, 2006). Forty-three codes were derived from the data, describing types of external contexts/relationships (types of interactions in therapy, with foster caregivers, online, etc.), internal factors (coping mechanisms, personal goals, etc.), and technology recommendations (platform for advice/information sharing, building relationships, safety concerns, etc.). The research team then grouped codes into categories based on the underlying needs expressed (direct help, knowledge or advice, emotional support, motivation or inspiration, and social connectedness). These needs mapped onto the five main types of social support (tangible support, informational support, emotional support, social network support, and esteem support) that are described below in Section 4.4, which is organized by type of social support (Ko et al., 2013). To ensure clarity and consistency of codes, two members of the research team coded 25% of the data independently and Cohen's kappa (κ) was calculated to determine interrater reliability ($\kappa = 0.69$, substantial agreement) (Cohen, 1960).

The data analysis process was led by a graduate student, with assistance from two undergraduate research assistants and oversight by a faculty member. While the research team included some individuals who had personal experiences with the foster care system, there are many aspects of participants' experiences that were not shared by members of the research team (primarily, experience in foster care as a teenager and experience transitioning out of foster care after the age of 18). For this reason, we chose an analysis method that involved developing codes directly from the data (rather than molding the codes to a prior conceptual model) and had the results of the study reviewed by multiple current and former foster care providers (including case managers who worked closely with some of the participants). The research team engaged many of the same participants in subsequent interviews to get their feedback on prototypes

created based on this phase's findings. This helped ensure that we were designing and developing technological solutions that aligned with the needs and interests of foster-involved youth.

4.4 Findings

In our interviews, which focused on understanding youth's challenges, assets, and technology recommendations, participants primarily discussed how foster-involved youth do not receive adequate social support (n = 16) and surfaced ideas to address this gap (n = 15). Social support can be broken down into five main types: tangible support (providing direct help), informational support (providing knowledge or advice), emotional support (expressing care, concern, and empathy), esteem support (boosting one's sense of ability and value), and social network support (having a sense of belonging to a group with similar interests or experiences) (Ko et al., 2013). In this section, we elaborate on the challenges participants highlighted related to each type of social support, as well as their perspectives on how technology can provide additional social support. Although not all participants opted-in to having direct quotes shared publicly, we reference direct quotes from participants to center their voices as much as possible. Additionally, we have chosen to only provide age ranges of quoted participants to preserve their anonymity, given the specificity of community organizations engaged in this study.

4.4.1 Tangible support

Participants reported not receiving enough tangible support from social workers while in foster care, the adults who are employed to help youth while they are in care (n = 6) (*The Answer Book*, n.d.). Participants felt that social workers often weren't looking out for their needs, in part because they only visit youth once a month (or less) (n = 2). One participant (P19, 15 - 19 years old, former foster-involved youth) talked about how this infrequency made them feel like their social worker was going through the motions of the job and not actually caring about their specific needs: "I felt like my DCF worker didn't care. I felt like she was just there to be there because it was her job. No communication with her until it was time to buy me clothes or something like that… being talked to like every a month and a half, or almost 2 months [wasn't enough]."

This is exacerbated by youth feeling like their social worker was not picking up on their needs when they did visit, ignoring signs that they might require help (n = 2). One participant (P11, 20+ years old, former foster-involved youth) described their experience with social workers ignoring signs of abuse in the foster home: "... maybe if the social workers were a little bit more involved in asking questions… and looking for telltale signs, like looking for bruises and things like that, maybe it would have been a little different… I felt like they should have dug a little deeper into what was going on."

Participants also talked about social workers taking a long time to get back to youth when they reach out for help, with youth often waiting multiple weeks before hearing back and sometimes not hearing back at all (n = 2). One participant (P6, 15 - 19 years old, current foster-involved youth) explained how they sometimes make a request and then only hear back weeks later when the situation has changed. Another participant (P3, 15 - 19 years old, former foster-involved youth) describes that they were only able to combat this by repeatedly calling their social worker until they heard back.

Additionally, one participant (P18, 15 - 19 years old, current foster-involved youth) described how social workers often did not know enough about them or the foster care system to help them effectively, primarily because of the high turnover rate among social workers. Describing their frustration with the fact that they were on their 4th or 5th social worker in the last year and a half, they said: "... I get a lot of [social] workers and they end up leaving. And then you have to re-meet them and then retell them everything that's going on. Then they don't even know the case most of the time… and most of them are young and they don't know what they're doing."

Participants did not mention any ideas for how technology could provide additional tangible support to foster-involved youth.

4.4.2 Informational support

Participants mentioned instances in which they did not receive desired information or advice from adults or friends in their life because they did not have enough knowledge about foster care (n = 3). One participant (P4, 15 - 19 years old, current foster-involved youth) says that their friends and family sometimes give advice that feels "uncomfortable" because they haven't gone through similar situations, and so don't understand the problem and provide advice that doesn't fit their needs. Another participant (P18, 15 - 19 years old, current foster-involved youth) described situations in which they went to coaches for advice but found it to be unhelpful, explaining: "A lot of times people just don't even know what to say themselves. Some of them just go like oh, 'I'm sorry that you are going through this'... they don't get it."

Participants talked about how searching online is not very helpful for youth seeking information or guidance while in foster care because it requires them to sift through an abundance of information (which can dissuade them from continuing to search) or because it provides them with information that isn't relevant or reliable (n = 6). One participant (P18, 15 - 19 years old, current foster-involved youth) explained that they don't look online when they have a problem or need advice because "it seems like a lot of work… to look and read… You have to read, 'cause some of the stuff online gives dumb advice." Another participant (P6, 15 - 19 years old, current foster-involved youth) shared how searching online is "very hit or miss," elaborating by saying, "I mostly find foster parents who are talking about [the topic], and a lot of them are biased against the child."

When asked about how technology could support foster-involved youth, participants said that it would be helpful to get advice from others who have experienced foster care (n = 13). Participants talked about wanting a space to get guidance from others with lived experience about challenges and goals such as building social skills, navigating government systems (e.g. getting public services, a passport, a bank account, or a driver's license), or finding coping skills for when they feel sad, anxious, or have trouble focusing. One participant (P11, 20+ years old, former foster-involved youth) explained that it would be valuable to have an app that allowed current and former foster-involved youth to share things like: "this is what I did and this is what you can do," "this is the system that helped me," and "this is a path [you could take]..." Participants had questions that they would want to ask other foster-involved youth, such as "What do you do if you get triggered?" (P14, 15 - 19 years old, current foster-involved youth) and "When you get sad, what types of things [do] you do to calm yourself down and what helps?" (P4, 15 - 19 years old, current foster-involved youth). Participants talked about wanting to provide guidance or information to other foster-involved youth (n = 6) almost as much as wanting to receive it (n = 8). One participant (P4, 15 - 19 years old, current foster-involved youth) explained that they would want to help others because of an intrinsic desire to help: "I like helping people, and the more knowledge they have the [easier things are for them]." Another participant (P6, 15 - 19 years old, current foster-involved youth) said they would be specifically motivated to help others who had gone through similar situations: "Personally, if [I knew someone's] exact situation, then I feel like [I'd] be compelled to help the person through it 'cause it's like, dude, I've been there. That sucked. Here's how to make that not suck."

4.4.3 Emotional support

Participants shared stories of not receiving enough emotional support from adults and peers in their lives (n = 14). Although therapy is often prescribed to youth who are in need of emotional support, participants who had experience with therapy talked about how it did not feel like a safe or comfortable space to talk about their feelings. This was due to a variety of reasons, including feeling like they were being forced to be there, believing that what they shared in therapy could negatively impact their case, and feeling awkward or distrustful of talking to strangers. One participant (P1, 20+ years old, former foster-involved youth) described some of these challenges: "Therapy didn't work for me because I was told I had to do it… I also was always afraid of if I said the wrong thing, they're documenting it… then

[would be like] 'OK, we need to do something about it'… especially if [you are] in state care, you could be sanctioned… Like maybe you're having a bad day, and you just need to talk to someone about things, and then oh next thing you know, you're being tricked into going to somewhere else… I had a negative outlook on therapy because of those type of situations that happened to me."

Participants also talked about not having emotionally supportive relationships with their foster caregivers (n = 7). Some participants described their foster homes as abusive or uninhabitable, which led them to feel unsafe in general (n = 3). One participant (P19, 15 - 19 years old, former foster-involved youth), for example, described being in a group home in which they felt that the staff were antagonistic and uncaring: "Out of like 6 staff that come through and stayed overnight, I would say like one of them, maybe two, actually cared… And then, just being told, this is a good place, this is a good place, and then I have someone running up to my room, threatening me, accusing me of stealing…"

Participants further explained that having had to move between foster homes repeatedly made it difficult for them to form caring connections with their foster caregivers (n = 3). As one participant (P12, 15 - 19 years old, current foster-involved youth) explained, "To be moved around and not be able to form any kind of connection with an adult at home for years of a time is really difficult." Another participant (P2, 15 - 19 years old, current foster-involved youth) described the negative impact of this gap: "... You really get used to it, not having anybody there… being bounced around home to home. You feel like it's just you…against the world pretty much."

Some participants also mentioned feeling that their biological parents were not able to provide them with the emotional support they were looking for while in foster care (n = 2). One participant (P12, 15 - 19 years old, current foster-involved youth), for instance, shared that when they felt sad or stressed they would always try calling their mom, but 90% of the time she would not answer the call. A second participant (P21, 15 - 19 years old, current foster-involved youth) described feeling like their parents did not care about what was going on with them and only asked questions about their school and life because they felt like they had to.

Few participants had experiences interacting with other foster-involved youth, and those that did brought up challenges that made it difficult for them to form caring relationships with other youth in care (n = 3). Two participants talked about how youth in care felt like they needed to turn inwards in order to get through, rather than forming relationships with others. One participant (P11, 20+ years old, former foster-involved youth) described how this manifested in an abusive group home they were in: "We were pretty much just looking out for ourselves. We had one kid who got beat really bad, and he'd tried to kill himself in the foster home… I talked to him a few times, had a few heart-to-hearts with, but it was never any in-depth conversation… it was like you were just more worried about yourself." Another participant (P1, 20+ years old, former foster-involved youth) described meeting other youth at foster care service locations but not being able to form connections "because the kids didn't really want to be bothered… they were there for services." Two participants said that they were able to form some supportive friendships while in foster care, but they lost touch because they moved frequently or because these friends reminded them of negative foster home memories (n = 2).

When prompted to consider how technology could benefit foster-involved youth, some participants advocated for a system that allowed foster-involved youth to provide emotional validation and empathy to one another (n = 3). One participant (P12, 15 - 19 years old, current foster-involved youth) explained, "I think the talking about things with people who've shared experiences is good because they are able to validate the way that you feel… I also think that just voicing your feelings out loud helps you understand them better, and understanding them makes it easier to overcome them… [and] I think it's easier to talk to somebody who understands the way that you're feeling."

4.4.4 Social network support

Participants talked about feeling different or disconnected from their peers because of their foster care experience (n = 8). Three participants described how moving between placements makes it difficult to form friendships with non-foster-involved peers at school because of having to constantly start over in

new schools and/or regions. Participants explained that forming friendships was further inhibited by the restrictive rules that govern youth in foster care (n = 2), specifically mentioning a rule requiring Massachusetts Criminal Offender Record Information (CORI) checks to be done on any adults that spend extended periods of time with foster-involved youth or that legally reside in a house that a foster-involved youth spends time in (*Massachusetts Criminal Offender Record Information (CORI)*, n.d.). This means that if a young person in foster care wants to go to a friend's house for a sleepover or join a friend's family on vacation, they generally have to reveal that they are in foster care and have their friend's family go through CORI checks. Participants said that these checks often mean that youth are not able to see their friends after school like other non-foster-involved teenagers. Describing this challenge, one participant (P18, 15 - 19 years old, current foster-involved youth) put it: "I have wanted to see my friends [after school] but like I never like asked because I'm sick of [how it goes]... [most of my friends' parents] just feel like [the CORI check is] an invasion of their privacy if they do it…"

Three participants also talked about how friends they made at school did not understand their foster care experiences. As a result, youth often refrained from talking about challenges they faced in foster care within their regular social groups, which could add to feelings of isolation amongst their peers. Participants explained that young people in foster care generally know few or no other youth who have been in foster care, which likely exacerbates these feelings of difference (n = 6).

When asked to consider the potential role of technology, participants advocated for a platform that allows foster-involved youth to connect with others who have had similar experiences to help them feel less alone (n = 9). One participant (P12, 15 - 19 years old, current foster-involved youth) talked about how this would make up for the disconnect that they feel with their friends: "I don't live in an area where there's a whole lot of people being put into foster care, and I don't personally know anyone other than myself and my brother who are in foster care. So, I have a lot of friends but they're never going to understand this experience… [it would be] nice to just have friends that understand." Another participant (P1, 20+ years old, former foster-involved youth) explained that the existence of the network itself would be comforting, so that "always in the back of your head you know that there's other people out there as yourself."

4.4.5 Esteem support

Participants had clear goals that they were working towards while in foster care (n = 13). Eleven discussed having education-related goals (e.g., getting good grades, preparing for standardized tests, graduating high school, applying to and navigating college); six said that they have job-related goals (e.g., getting a job, moving up in a job, reaching career goals like becoming a veterinarian); six described working towards living independently (e.g., social skills, hygiene skills, cooking, budgeting, building credit, renting an apartment, applying for public assistance services); and four mentioned having car-related goals (e.g., having your own car, getting a permit/driver's license, completing driving school). Four participants shared that they had difficulty coming up with goals and were either living day-to-day (e.g., just trying to get by) or mainly had large, vague goals (e.g., be successful or have freedom).

Thinking about how technology could support foster-involved youth, participants felt that it could be helpful to have digital tools that focus on motivating and inspiring foster-involved youth as they work towards their goals (n = 5). One participant (P21, 15 - 19 years old, current foster-involved youth) said that simply connecting youth who are working towards similar goals would be helpful, explaining that it would be motivating to "surround yourself with people who are working on their goals too" so that "if you're struggling with something, you can talk to someone who's also trying to figure it out." Participants also talked about how it would be inspiring to read stories of foster-involved youth reaching their goals (n = 2). One participant (P6, 15 - 19 years old, current foster-involved youth) expanded on this, saying, "I feel like posting about what's positive is really good for motivating people who are low on motivation like me. I have really bad motivation issues sometimes and seeing other people who are like me going through that just, like, compels me. I'm like, well shoot. If they're doing it, I can do it." Participants felt that a space for foster-involved youth to share more general positive messages and quotes with one another

would also be empowering (n = 3). One participant (P4, 15 - 19 years old, current foster-involved youth) suggested combining personal stories with motivating messages, reporting that it would be helpful for current and former foster-involved youth to share "what they went through and how they achieved [goals], and how anyone can do it but they have to keep their mind on it."

4.4.6 Safety considerations for technology

Despite expressing an overwhelming desire for tools that connect foster-involved youth and allow them to share social support with one another (n = 15), participants said foster-involved youth did not use existing social platforms such as Quora, Reddit, Instagram, and Facebook for this purpose (n = 9). Participants hesitated to ask questions about foster care on forums or social media platforms out of concern that they would be bullied or pitied (n = 3). They also talked about how social media platforms tend to be too negative, which leads them to not want to utilize these applications when they need support or inspiration (n = 2). Additionally, participants felt that existing social platforms were too general, so did not provide support that was relevant to young people dealing with challenges related to the foster care system (n = 3).

Likely as a result of negative social media experiences, participants had strong opinions about safety features that need to be part of any tool that allows foster-involved youth to interact (n = 12). Participants felt that it was important for users to be anonymous by default because they were concerned that someone could use their information to harm them, or because they might share personal experiences on the platform that they do not want people in their "real" lives to know about (n = 9). For this reason, they also preferred having the platform be separate from other social media apps they use. Some participants stated that they may want to reveal their identity to particular people who they felt comfortable with, but in a one-on-one capacity (n = 3). One participant (P11, 20+ years old, former foster-involved youth) reflected on why they would want to remain anonymous: "... you feel a sense of shame when you're in the system, in foster care, or whatever it might be… like nobody, none of my coworkers, except for maybe one, knows that I was even in foster care…That's not something I discussed because it's shameful."

Participants said that the platform would need to be monitored, to prevent and remove inappropriate posts (n = 5). One participant (P7, 20+ years old, former foster-involved youth) explained why this is necessary: "People are going to share their stories or share their thoughts, and some people are going to sympathize with them, and some people are going to call them wimps. It's a whole different diverse world with kids who enter foster care and the experience they have… There's always going to be difficulties sympathizing between these kids, and I think it's important to keep that in mind." Multiple participants felt that this monitoring should be automated (n = 3). One participant (P12, 15 - 19 years old, current foster-involved youth) shared why they believe this monitoring should not be performed by humans: "I just think that if people are going to try and connect over something like [foster care], a lot of the things that they're going to be able to connect to each other with are the experiences they wouldn't want random people knowing [who] aren't the people they are trying to connect with. So, if you're trying to read the conversation to make sure that the person is not saying something ridiculous or doing something ridiculous, you run the risk of reading something that was absolutely not meant for your eyes."

Participants spoke about how it would be helpful to have community norms on the platform, especially related to making sure the community centers positivity, safety, and non-sexual interactions (n = 6). Some participants also brought up the idea of a flagging system where inappropriate posts are reported by users and removed until they have been reviewed by a moderator (n = 2). These participants acknowledged that this would be an imperfect system and still might leave gaps for users to temporarily post inappropriate content, but they felt that they would still use the platform and that it would be significantly safer than existing social media platforms.

Type of social support	Challenges and needs surfaced by youth	Technology recommendation from youth	Primary mapping to dimension(s) of psychological well-being (Ryff, 2014; Ryff & Keyes, 1995)
Tangible support	Youth look to social workers for practical help, but feel like these individuals do not visit enough, pay enough attention to their needs, and are not responsive to their requests.	None.	Environmental mastery
Informational support	Adults, peers, and online sources do not provide relevant advice because they do not understand the foster care experience.	Create spaces for youth to share and ask for advice from others who have experienced foster care.	Autonomy Environmental mastery
Emotional support	Youth do not feel safe in therapy and also do not receive enough care and empathy from other adults and peers in their lives.	Build an environment for youth to provide and receive emotional validation and empathy from others who understand their experience.	Self-acceptance Personal growth
Social network support	Youth feel disconnected or different from peers who don't have experience with foster care, and they have little opportunity to interact with other current and former foster-involved youth in person or online.	Connect foster-involved youth (current and former) together so they can feel less alone.	Self-acceptance Positive relationships
Esteem support	Youth are often working towards education, job, independent living, and car-related goals while in foster care.	Provide opportunities for current and former foster-involved youth to read and share inspiring stories, quotes, and messages, and/or be in community with others who are working towards similar goals.	Purpose in life Personal growth

Table 1: Phase 1 Findings
Breakdown of what youth surfaced as challenges or needs about each type of social support, technology recommendations they had related to those challenges, and how both may impact the dimensions of psychological well-being (Ko et al., 2013; Ryff, 2014; Ryff & Keyes, 1995).

4.5 Discussion

Overall, this study's findings suggest that youth do not receive enough social support while in foster care (Table 1, "Challenges and needs surfaced by youth") (Ko et al., 2013). This is in line with previous research conducted in California (Okpych et al., 2018). While this prior work specifically solicited youths' experiences with social support, this study asked participants to identify the most salient challenges they faced while in foster care, revealing social support as a primary concern.

This study expands the literature by highlighting current and former foster-involved youths' recommendations for how technology can increase social support for youth (Table 1, "Technology recommendation from youth") (Ko et al., 2013). To our knowledge, no prior work has gathered lived experts' perspectives on how technology can be designed to support the psychological well-being of this population. Each challenge and recommendation surfaced by participants can be seen as impacting one or more dimensions of psychological well-being (Table 1, "Primary mapping to dimension(s) of psychological well-being"), suggesting that these are important considerations in the design of technology for youth psychological well-being (Ryff, 2014; Ryff & Keyes, 1995).

First, youths' experiences of not receiving the tangible support they request or need from social workers may make them feel helpless and deprive them of resources they need to manage their environment, which can negatively impact their feelings of environmental mastery.

Second, not receiving appropriate advice and information while in foster care may prevent youth from being able to reach goals and overcome challenges independently, which can negatively impact their sense of autonomy and environmental mastery. As such, participants' recommendation of creating a digital space for youth to share advice with others who have foster care experience could increase their sense of autonomy and environmental mastery by both providing them with needed information and making them feel that they have helpful knowledge to share with others.

Third, not receiving adequate emotional support from those around them may make youth feel like their emotions are abnormal or unhealthy, which can negatively impact their self-acceptance. Additionally, not having safe spaces to process their emotions can negatively impact their ability to develop healthy thought processes, a type of personal growth. Per participants' suggestion, having an environment in which youth can receive emotional validation from others who understand their experience could increase their self-acceptance by showing them they are not alone, and support their personal growth by giving them opportunities to self-reflect in the process of providing empathetic support to others.

Fourth, youth not knowing other foster-involved youth and feeling disconnected or different from their peers may make them feel like they are abnormal, which can decrease their self-acceptance and make it harder for them to form trusting and satisfying (i.e. positive) relationships. Participants' idea of connecting youth to others who have experience with foster care may make them feel like their experiences and reactions are normal, increasing their self-acceptance. It may also give them opportunities to bond with others who they feel understood by, increasing their positive relationships.

Finally, youths' experience working towards goals while in foster care impacts and is impacted by their sense of purpose and feelings of personal growth, and participants' suggestion of a motivating or inspiring digital space could help encourage youth to identify and work towards goals, supporting their sense of purpose in life. By allowing youth to share their own stories of growth or accomplishment, a technological tool could also support their sense of personal growth by making their progress explicit and allowing others to celebrate accomplishments with them.

Overall, participants advocated for platforms that connect young people in foster care with others who have had similar experiences (currently or in the past). However, participants also highlight that general peer-to-peer platforms (such as Quora, Reddit, Facebook, Discord, and TikTok) do not meet foster-involved youth needs because they are prone to bullying, negativity, and irrelevant content. Additionally, while a few foster-care-specific peer-to-peer platforms exist (such as iFoster and Stepping Forward LA), they were not mentioned as avenues for social support by participants, perhaps because they do not directly solicit socially supportive interactions like the ones recommended in this study (*IFoster: Helping Kids In Foster Care Reach Their Full Potential*, n.d.-b; *Life Skills App*, n.d.). Guided by Phase 1's results, we began Phase 2 with the intention to prototype and test various peer-to-peer platform designs, with a focus on designing a system that could safely facilitate community building and the sharing of advice, emotional support, and inspiring messages amongst young people who have had experience with foster care.

4.6 Limitations

Providing gift cards to the case managers/mentors who helped coordinate interviews could have incentivized them to pressure young people into participating. We mitigated this by emphasizing at the start of the interview that participants could stop the interview at any time and for any reason with no repercussions, and by limiting gift card amounts to $35. We also emphasized that participants did not need to share anything that they did not want to talk about and they could turn off their video if they liked, to relieve any pressure they were feeling to perform in the interview.

Additionally, this study was conducted with a small group of current and former foster-involved youth in specific regions of the United States. Thus, while the findings shed light on key perspectives and experiences of some foster-involved youth, they may not generalize to a broader population. Instead, we hope that this study can illuminate avenues for future research in diverse populations, which can verify and add nuance to the themes we identified in our data.

5 PHASE 2

In this section, we describe the second phase of the project. Over a period of six months, we prototyped and tested potential digital interventions to identify a design that may provide social support to foster-involved youth, with the goal of improving youths' overall psychological well-being. We describe each prototype along with our hypotheses about how they might foster social support, and then share the feedback received in prototype-testing interviews (with an emphasis on feedback related to social support). We end by describing the pilot application we designed based on the prototype-testing feedback and the ways in which we refined it based on two months of design workshops with former foster-involved young adults.

5.1 Methods

All procedures, materials, and data management systems were reviewed and approved by MIT's Institutional Review Board prior to implementation. The interview methods and protocol mirrored that of Phase 1 (see Section 4.1 for more details), with a few modifications. In the recruitment process, we prioritized transparency by trying to engage as many of the Phase 1 (Section 4) participants in Phase 2 as possible, to share out what we implemented based on their previous input and get feedback on whether we had left out anything that they felt was important.

Rather than asking general questions about their experiences and ideas (like in Phase 1, Section 4), we focused on asking participants to share their impressions of various prototypes. However, we first asked them a general question about whether they had any ideas, to counteract the bias that showing potential solutions could have on their opinions (i.e. "If you had magical powers, what would you create to support or inspire young people who have experienced foster care?"). Additionally, to encourage

honesty and foster collaboration with participants, we prefaced prototype testing with the following statement:

> "I'm going to show you an early idea for an app or website we could create to support young people like you. This is a very rough draft because we want to get your thoughts before we actually make anything, so please don't hesitate to say what you don't like or what you think should change! We want to know now, so we can actually make something you'd want to use. Also, there are no right or wrong answers - we are testing the app, NOT you."

We then showed participants various prototypes and asked them to share their first impressions, what they liked or disliked, and whether they found anything confusing or surprising. We also asked them what they would do or interact with on the screen being presented to them and what they expected to happen. We then interacted with the prototypes as they wished (i.e. pressing buttons or navigating to a screen that illustrated what would happen when they took a particular action). We made the decision to interact with prototypes on behalf of participants (rather than giving them prototypes to interact with themselves) because we felt that they might have difficulty opening a prototype and sharing their screen. This was in part because the majority of participants joined interviews from a smartphone (which often was that of their caseworker) and had varying degrees of familiarity with Zoom. We also felt that participants might find it confusing to interact with prototypes on their own because only some features were interactive. For this reason, we wanted to be able to scaffold their interactions with explanations when they tried to perform actions that were not possible in the prototype.

After analyzing the interview transcripts, we conducted a series of workshops with former foster-involved staff members from one partner organization, Stepping Forward LA, to facilitate more in-depth discussions of specific design decisions and codesign specific app features with individuals who have lived experience with foster care. We conducted five workshops, which were all held on Zoom. The length of each workshop varied between 60 and 120 minutes based on the agenda and participants' external workload that week. Workshops were held roughly once a week, with the exception of the second workshop which was held 6 weeks after the first, due to the timing of MIT and Stepping Forward LA's winter breaks. The workshops were co-facilitated by a member of the research team and the Executive Director of Stepping Forward LA, to help ensure that the activities fit the capabilities of participants and to take note of insights that could inform the development of Stepping Forward LA's own digital platform. Participants were asked to join from a location with a stable internet connection and keep their cameras on for the duration of the workshop unless they needed to take a break to take care of personal needs (such as getting water, going to the bathroom, or tending to a young child).

5.2 Participants

Twenty-four eligible individuals participated in the interview portion of Phase 2. Sixteen participants were 14 - 19 years old with an average age of 16. Thirteen participants were presently in comprehensive foster care, one was presently in kinship care, and two had been in foster care within the past 2 years. Eight participants were 20+ years old and were previously in foster care. One former foster participant was presently working as a case manager. Fourteen of the participants had previously participated in Phase 1 (Section 4) of the study (10 current and 4 former foster-involved youth).

Four individuals participated in subsequent design workshops. All participants were formerly in foster care and were 23 - 31 years old. Stepping Forward LA selected the workshop participants based on their diverse foster care experiences, interest in technology for mental health/foster youth, and their ability to engage in virtual workshops once a week for 5 weeks (based on factors such as whether they had stable internet access, a consistent schedule, and timely email responsiveness). Participants were encouraged to attend all workshops, with only one participant dropping out after workshop 3 due to personal circumstances that required them to resign from their position at Stepping Forward LA more broadly.

5.3 Data analysis

Interviews were conducted using the Zoom platform, recorded, and transcribed. A deductive coding approach was used to analyze the data, in which the main codes were pre-defined (Fereday & Muir-Cochrane, 2006). The codes (tangible support, informational support, emotional support, social network support, and esteem support) were derived from the framework of social support that arose from the data analysis in Phase 1 (Section 4) (Ko et al., 2013). The team conducted design workshops with a subset of interview participants (described in Section 9.3) to ensure that the results of the data analysis were being appropriately considered in the resulting app design (described in Section 5.5).

5.4 Prototypes and feedback

Through semi-structured interviews, we tested four prototypes, each of which presented a different digital interface designed by the research team to encourage foster-involved youth to interact and support one another. In this section, we describe each of the prototype designs along with our hypotheses for how they might provide youth with social support. We then elaborate on the feedback participants shared, with an emphasis on how they felt the prototypes might help them gain social support. Although not all participants opted-in to having direct quotes shared publicly, we reference direct quotes from participants to center their voices as much as possible. Additionally, we have chosen to only provide age ranges of quoted participants to preserve their anonymity given the specificity of community organizations engaged in this study.

5.4.1 Community forum prototype

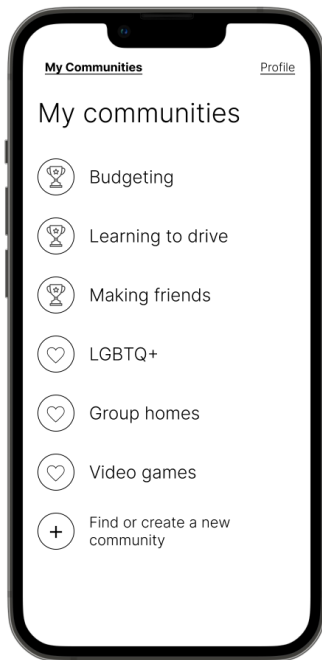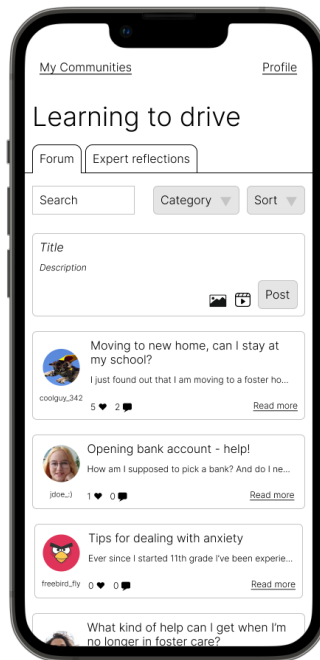Figure 8: Community Forum Prototype, List of Channels

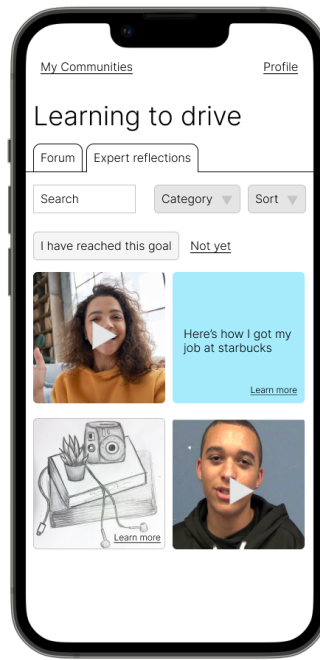Figure 9: Community Forum Prototype, Channel

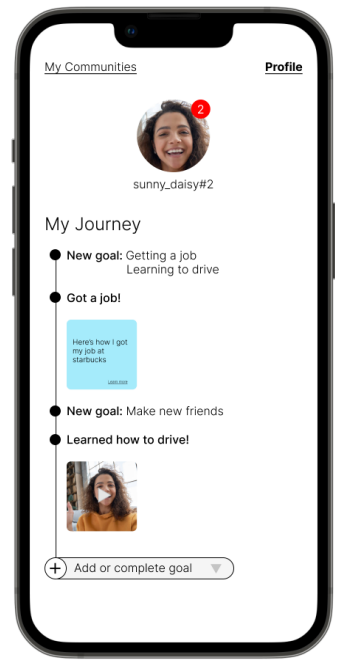Figure 10: Community Forum Prototype, Expert Reflections

Figure 11: Community Forum Prototype, Profile

This prototype presents a community forum for current and former foster-involved youth, with different channels related to different experiences, interests, and goals that users have (Fig. 8). Within

each channel, there is a forum in which users can post messages to the community and react/reply to other users' posts (Fig. 9). There is also a section for expert reflections, where users who identify as experts (have spent a lot of time on an interest, have made it through a challenging experience, or have reached a goal) can post a written or video reflection on how the experience was for them and what they are taking away from it, to help others who are currently going through similar things (Fig. 10). On their profile, users can see and add to their Journey, which includes experiences and goals that they have started or accomplished since joining the platform (Fig. 11). They can add items through their profile and mark them as completed. When they do, they are prompted to optionally write an expert reflection in the relevant community. Similarly, when users join a goal-oriented community, it gets added to their profile as a new goal, and when they leave a reflection, the goal gets marked as having been completed.

We hypothesized that this prototype may help foster-involved youth gain social support in the following ways (Ko et al., 2013): Users may easily gain information about specific challenges or goals they have, either by reading posts by other users or by posting a question and getting replies from other users who are or have in the past dealt with a similar situation (informational support). Channels related to interests may allow users to connect with one another and feel like they are part of a community (social network support). While the design may not explicitly encourage it, users could use the channels to ask for emotional support from other users who have been in similar situations (emotional support). Additionally, the Journey feature may motivate users by showing their own growth over time (esteem support). Seeing other users' Journeys may help users feel like they can also grow and accomplish their goals (esteem support). Finally, the expert reflections feature may solicit messages that encourage or reassure individuals who are still dealing with the situation and help them feel motivated (esteem support).

Eleven participants gave feedback on this prototype, with the majority talking about ways in which the app would be useful for informational support (n = 12). Three participants said they would want to read about other people's experiences as a way to help themselves navigate similar situations. When asked why they read other users' posts, one participant (P12, 14-19 years old, current foster-involved youth) said, "because that's helpful to listen to other people talk about experiences like the one you're going through to help you through the same experience." Four participants expressed interest in writing posts asking for informational support on a variety of topics, including:

1. "How do you study [for the permit test]?" (P13, 14-19 years old, current foster-involved youth)
2. "Is there any specific strategy you have for saving money more efficiently and still being able to buy all the stuff that you need?" (P13, 14-19 years old, current foster-involved youth)
3. "How people cope with what's going on. The issues that they're having in their life and what they do in the meantime to have fun… do they have a schedule?" (P21, 14-19 years old, current foster-involved youth)
4. "How do you start to build credit?" (P21, 14-19 years old, current foster-involved youth)
5. "…I am shy but kind of need a little bit of help making new friends. Do you have any tips?" (P5, 14-19 years old, current foster-involved youth)

Five participants had clear ideas of how they would help others who post messages asking for informational support, with one saying they would send links to regional services (P1, 20+ years old, former foster-involved youth), another saying they would want to provide advice based on personal experience (P11), and a third saying they would share tips on how to make friends (P5, 14-19 years old, current foster-involved youth). Three participants (P3, 14-19 years old, former foster-involved youth; P12, 14-19 years old, current foster-involved youth; P24, 14-19 years old, current foster-involved youth) generally expressed that they would want to read other users' posts and see if they could provide help, but did not have a clear sense of what types of posts they would actually respond to and what they would be comfortable saying. No participants said they wanted to write an expert reflection. One participant (P12, 14-19 years old, current foster-involved youth) explained that this was "because it says expert, and I don't think I will ever be good enough to consider myself an expert at anything." When asked whether they

would write a reflection if it were called something else, they still endorsed they would be unlikely to participate.

Six participants also talked about using the platform to gain social network support. Four participants liked the idea of being put into channels with others who have similar experiences or interests, so they could build connections/friendships. Two participants said that they would want to reply to posts from users who have been through similar experiences, as a way to connect/relate. When asked when they would want to comment, one participant (P11, 20+ years old, former foster-involved youth) stated, "situations where they say they had been through a similar experience… like DCF said that I was gonna go home this month, and now they postponed it another 2 months… Or even something like I love my social worker, she's really great…"

Two participants (P12, 14-19 years old, current foster-involved youth; P14, 14-19 years old, current foster-involved youth) said that the app could provide them with esteem support because it would be motivating to see their goals listed and have documentation of what goals they have completed. As P12 (14-19 years old, current foster-involved youth) put it, "I think that it's motivational to have a place where you can see your goals and when you achieve them. It makes it more rewarding to do something when you can see like physical proof that you've done it afterwards, or when you can check it off and say that it's like officially done." However, this participant also pointed out that it would be unclear when to check off goals that do not have a clear endpoint, such as budgeting or making friends, and they were not interested in setting more specific goals on the platform. These same two participants also indicated that they would want to leave groups as soon as they achieved goals or made significant progress. P12 (14-19 years old, current foster-involved youth) explained, "I would be like, okay, that's it, that's all I need and I'm done now."

5.4.2 Helper prototype
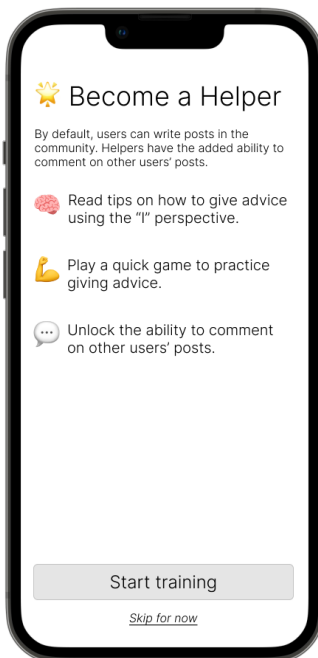
Figure 12: Helper Prototype, Helper Training
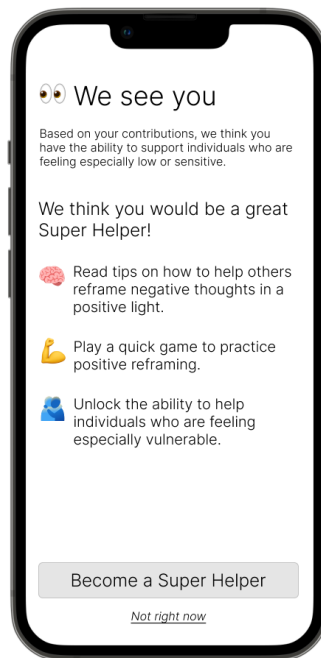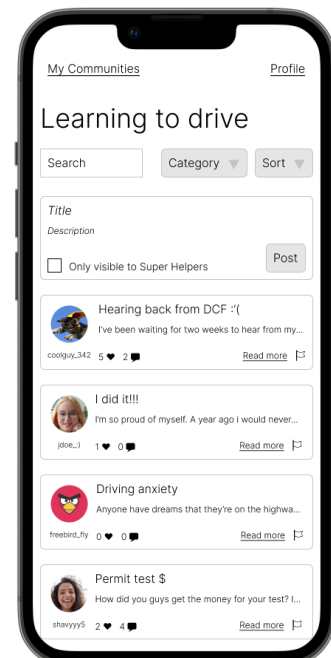
Figure 13: Helper Prototype, Super Helper Training

Figure 14: Helper Prototype, Community Forum

In the helper prototype, users indicate whether they are looking for support, want to provide support to others, or both. If they are interested in supporting others, they are guided through an empathetic support training to become a "Helper," which gives them the ability to reply to other users'

posts (Fig. 12). There are additional levels of "Helper" that users can reach if they are active on the platform and do additional trainings (Fig. 13). These levels can give them special abilities like being able to see posts marked as higher risk/more sensitive. If users are interested in gaining support, they simply have to write a post and indicate whether they would like it to be visible to all users or just to Helpers (Fig. 14).

We hypothesized that this prototype may help foster-involved youth gain social support in the following ways (Ko et al., 2013): Users may easily gain information about specific challenges or goals they have, either by reading posts/replies by other users or by posting a question and getting replies from Helpers who are or have in the past dealt with a similar situation (informational support). This design may be more limited in its ability to provide informational support compared to the community forum prototype (Section 5.4.1) since only Helpers have the ability to reply to posts. While there is the risk that basic Helper training requirement for writing replies may lead to less community building (social support), it may also lead to more thoughtful replies as Helpers may have a higher intrinsic motivation to help others. Users may also feel safer asking for emotional or esteem support since they can ask for it privately from trained Helpers. Additionally, trained Helpers may be more likely to provide emotional or esteem support both because of the training and because they have been placed in the role of helper in the community.

Thirteen participants provided feedback on this prototype. In general, participants felt that the Helper training was not necessary for being able to provide social support, but could be helpful in creating an environment of safety and positivity on the platform. Nine participants said that they were interested in supporting others but already knew how and did not feel that they needed a special Helper training. When asked why, one participant (P1, 20+ years old, former foster-involved youth) said, "I think if you are able to talk to them in person, then you should be able to switch that over to the Internet." Another participant (P13, 14-19 years old, current foster-involved youth) put it, "Everyone either receives or gives advice at some point in their life. So, like, it's something that comes easy to a lot of people." One participant (P13, 14-19 years old, current foster-involved youth) explained that to support others online, they try to "get them in like a better state of mind, so they solve the problem" by distracting them if they are ruminating, offering solutions, or helping them come up with pros and cons on a decision they are unsure about. Participants said that they had learned how to support others from various people in their life, including friends, therapists/counselors, and family members.

Four participants said that they would not want to complete the training to become a Helper, either because the program seemed like a lot of work or because they did not feel equipped to support others. P3 (14-19 years old, former foster-involved youth) explained, "... I'm not doing this right now… [I'm] trying to do my job at school, I don't have time for [nothing] extra. I don't have time." Another participant (P21, 14-19 years old, current foster-involved youth) said they would not want to be a Helper because "I don't think I'm reliable… like I feel like it's a lot to take on. I think [it's better for] someone who's like overcome… and is in a better place." P18 (14-19 years old, current foster-involved youth) said they might be a Helper but were hesitant because they did not feel like they would be able to support someone who was in a situation that they had not been through themselves. They said, "If they're in the same situation I'm in then I could probably give them advice, but if they're in a worse situation or in a better situation than I'm in, I don't wanna just get up all up in their business and start assuming stuff…"

Ten participants thought that the Helper training would be helpful for ensuring that interactions are generally positive and safe on the platform. When asked what they felt should be included in the Helper training, four participants said they wanted the training to provide users with guidelines and examples of how to support others. P10 (20+ years old, former foster-involved youth) detailed, "... just laying down ground rules but also what would make a good helper - someone who's understanding and open and honest." Five participants felt that the Helper training would be useful to verify that users are intrinsically motivated to support others. As one participant (P18, 14-19 years old, current foster-involved youth) put it, "[If there was no training] I feel like some people would abuse it and just click Helper and then just start coming at people disrespectfully. So, I feel like it's a good thing to have on there." As an additional requirement, two participants suggested that people should only be eligible to be Helpers if

they have a good track record on the platform, helping a certain number of people or being active on the platform for a certain amount of time. Four participants felt that the Helper training should check that users have relevant experiences or skills before they are able to support others. One participant (P1, 20+ years old, former foster-involved youth) said this was important because "... that's how you would get the right information. For instance, if you are opening a bank account, you should get clear, concise information going in there and feel very confident and not leave defeated."

5.4.3 Weekly question prototype
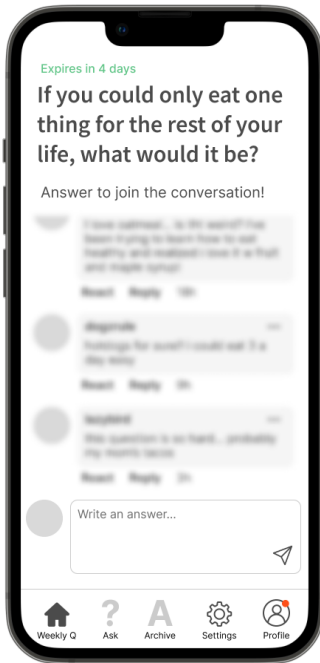
Figure 15: Weekly Question Prototype, Weekly Question
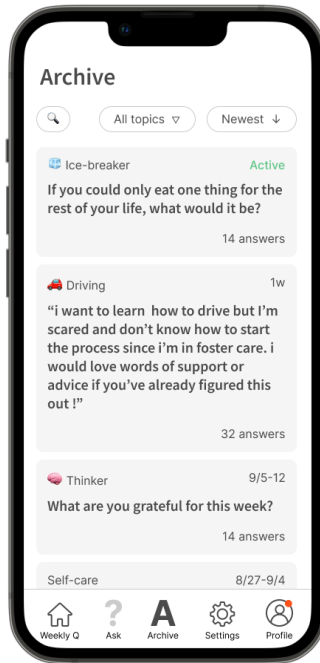
Figure 16: Weekly Question Prototype, Archive
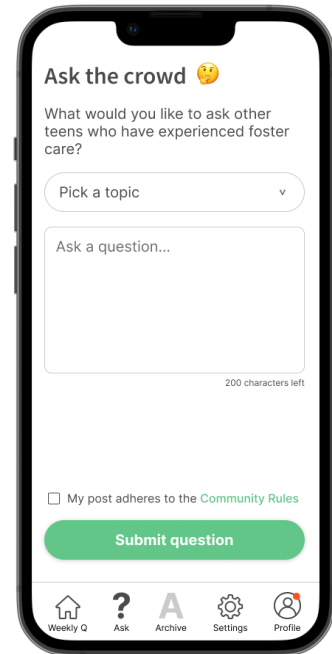
Figure 17: Weekly Question Prototype, Ask a Question

In the weekly question prototype, users see one question a week (Fig. 15). They can respond to this question for a week and can only see other users' responses after they submit a reply. After the week is over, the question moves to the Archive, where the question and all responses are viewable but no new comments can be left (Fig. 16). Users can also submit new questions, which go into a pool of future weekly questions (Fig. 17).

We hypothesized that this prototype may help foster-involved youth gain social support in the following ways (Ko et al., 2013): Users can ask for advice on challenges they are facing and provide advice to others by answering their questions (informational support). Users may also gain informational support by reading responses to current and past questions from users who have experienced similar challenges. App-provided icebreaker questions about youths' interests and preferences can help youth get to know each other and feel socially connected (social network support). Users may be able to get emotional or esteem support from other users by sharing their experiences and asking related questions. However, there is arguably less emotional or esteem support since users are encouraged to share a question rather than what they are currently going through.

Twelve participants gave feedback on this prototype, primarily sharing that they would find the app helpful for informational and social network support, but also providing conflicting feedback on the core features of the app. Eight participants said they would ask questions for informational support, including:

- "How do I find family members?" (P1, 20+ years old, former foster-involved youth)

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- "How do I get a drivers license when certain documents are lost?" (P1, 20+ years old, former foster-involved youth)
- "How do I navigate the foster care system?" (P11, 20+ years old, former foster-involved youth)
- "What are the pros and cons of foster care?" (P27, 14-19 years old, current foster-involved youth)
- "What is it like to sign up for extended foster care while in college?" (P27, 14-19 years old, current foster-involved youth)
- "How do I make friends?" (P30, 14-19 years old, current foster-involved youth)
- "What can I do and not do as a ward of the court?" (P33, 20+ years old, former foster-involved youth)
- "What do I do if I need clothes or personal care items while in foster care?" (P33, 20+ years old, former foster-involved youth)
- "How do I shave?" (P33, 20+ years old, former foster-involved youth)
- "How do I use a tampon?" (P33, 20+ years old, former foster-involved youth)
- "What's dorm life like in college?" (P6, 14-19 years old, current foster-involved youth)
- "How do you set up a college class schedule?" (P6, 14-19 years old, current foster-involved youth)
- "How do you cope with foster parents yelling at you?" (P26, 14-19 years old, former foster-involved youth)
- "What are your experiences getting a pet while in foster care?" (P13, 14-19 years old, current foster-involved youth)

However, two participants said that they would feel uncomfortable asking questions altogether because they were afraid of asking something dumb or asking other people for overly personal information. One participant (P24, 14-19 years old, current foster-involved youth) explained that they were not sure if they would ask questions "because I don't wanna ask something too personal and I don't wanna ask something stupid…"

Five participants also indicated that they would read through other users' answers to get relevant guidance related to challenges that they are experiencing. On the other hand, four participants said they did not think that they would read replies or respond to questions because they did not feel like the information would be useful for them. Two participants also asked for a database of resources to be built into the app and said that this would make the app more helpful for them than having user-generated information. P34 (20+ years old, former foster-involved youth) explained, "If I just ask the question, it could take me who knows how long until I get a response for that resource, but if there's a page full of resources where I can go and get school supplies, or I can set up an appointment for a clothing drive or something like that, then that would be really helpful."

In terms of social network support, eleven participants liked the example icebreaker question ("If you could only eat one thing for the rest of your life, what would it be?"), with six participants saying that they would feel comfortable answering because it was not too personal or serious, and five participants saying that they felt that it would encourage conversation and help them get to know other youth on the platform. Two participants said they would ask additional questions to build community like "What's your favorite foster sibling like?" (P13, 14-19 years old, current foster-involved youth), "What kinds of sports do you play and how did you get into playing that sport?" (P16, 14-19 years old, current foster-involved youth), and "What's your favorite video game and why?" (P16, 14-19 years old, current foster-involved youth). Five participants also said that they would be interested in reading other users' questions or answering questions as a way to connect with and get to know each other. P11 (20+ years old, former foster-involved youth) explained, "It would definitely give me a means to communicate with other people in my situation because I felt very alone. There was no one else that I knew except for my foster brothers and foster sisters… but when I was there it was like a revolving door, so you didn't really connect with individuals too much."

Participants were conflicted about the features of the app that differentiated it from a standard community forum - whether users can see others' responses before replying, whether questions expire or can be answered forever, and whether the number of posted questions should be limited per week. Eight participants were divided on whether users should be able to see others' responses before replying. Five participants liked that the answers are locked unless a user engages because it ensures that users' answers are not influenced by others and allows users to avoid seeing answers that could trigger them (they can skip the question altogether). On the other hand, four participants expressed a desire to see other users' responses before replying, so they could make sure their responses fit in with the rest and so they could avoid being the only ones answering a question.

Four participants said that they liked having questions expire because it ensured that there was a fresh topic and conversation each week. However, ten participants said that they did not want questions to expire, with six saying they wanted to be able to pick the topic or question they responded to, and seven saying they wanted to be able to answer older questions that they find in the Archive or reopen a question if it had already been asked but did not receive enough answers.

Three participants talked about how they would want their questions posted immediately, rather than waiting for them to become the question of the week. One participant (P26, 14-19 years old, former foster-involved youth) explained that this would be important "because if it was a question like, 'I'm getting a new sister, how does this work or how should I feel?', I feel like they should be able to get a response right then and there because they could be overwhelmed. It could be kind of nerve-racking. I feel like this app is to make them feel safe and make them feel heard, so I feel like they should be able to get a response."

5.4.4 Reflective check-in prototype
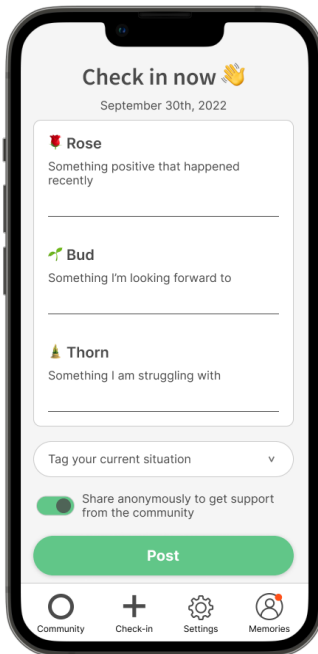
Figure 18: Check-in Prototype, Check-in Form
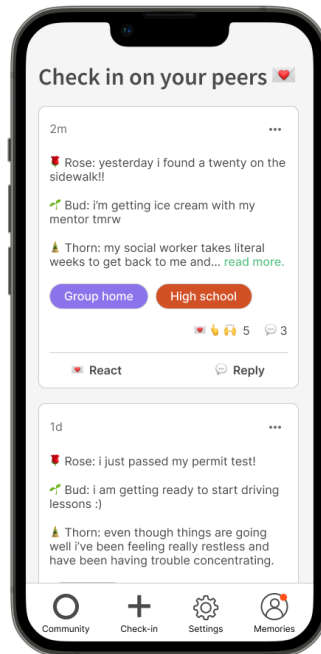
Figure 19: Check-in Prototype, Feed
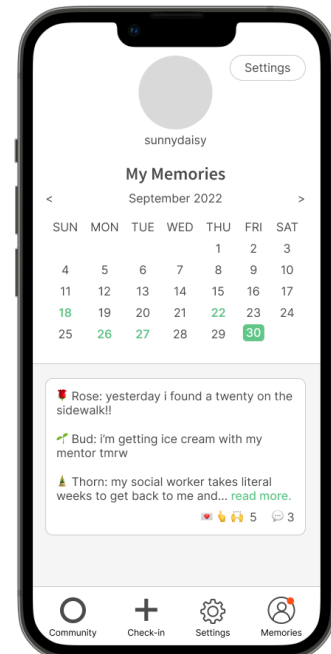
Figure 20: Check-in Prototype, Memories

This prototype asks users to complete a reflective check-in every day, which includes a rose (something positive that happened recently), a bud (something they are looking forward to), and a thorn (something they are struggling with) (Fig. 18). They can also optionally add tags to their check-in to describe the situation they are currently in, such as the type of foster care they are in or their

career/educational stage. They are given the option to share their check-in with the community or keep it private. Users can see others' check-ins as a feed, where they are able to react or reply (Fig. 19). Users can also see all their past check-ins in a calendar of "Memories" (Fig. 20). An optional notification system reminds users of past positive memories via push notifications.

We hypothesized that this prototype may help foster-involved youth gain social support in the following ways (Ko et al., 2013). Users could potentially learn about the process of achieving goals (informational support) by reading other users' check-ins, although this is arguably less present than in other prototypes. Users can see that others are going through similar situations, and so may feel more connected and less alone (social network support). By requiring them to share something they are struggling with, check-ins may open up more opportunities for users to receive emotional support from others. For esteem support, asking users to share something positive and something they are looking forward to may provide more opportunities for them to receive encouragement from others, as they are more likely to share goals they are working towards or have accomplished. Also, seeing other users' goals and accomplishments may inspire users to work towards goals or make them feel like their dreams are more achievable.

Sixteen participants gave feedback on this prototype and primarily expressed that they felt this design would help them regulate their own emotions (emotional support), feel encouraged to work towards goals (esteem support), and feel connected to others (social network support). Six participants felt that the check-in prompt would help them reflect and feel better about challenges they are facing (emotional support). As one participant (P13, 14-19 years old, current foster-involved youth) explained, checking in can give youth "time to pause and look back on the day, or at [their] life at that point." Another participant (P24, 14-19 years old, current foster-involved youth) added, "I like that it's not focusing on just the bad stuff or the good stuff…" with a third participant (P26, 14-19 years old, former foster-involved youth) elaborating that incorporating positive elements may allow youth "to look at a positive, even if [they're] going through something negative."

Ten participants talked about how looking at their past check-ins would help them see how they have grown and overcome challenges, which would motivate them to continue pursuing their goals (esteem support). P36 (20+ years old, former foster-involved youth) explained, "When you see all the [things] you've accomplished for yourself… it gives you that extra push that you need, so you can see that, no, I am doing things. I am accomplishing things." Another participant (P11, 20+ years old, former foster-involved youth) said it would be inspiring to watch others overcome similar challenges at the same time as them so that later they might be able to look back and think, "We were both kind of lost and now we're doing a lot better." A third participant (P26, 14-19 years old, former foster-involved youth) talked about how seeing their progress would help users "build confidence [and a] sense of resilience." Four users talked about wanting to use the reply or react feature to celebrate positive things that have happened to other users, with expressions like "That's so cool" (P30, 14-19 years old, current foster-involved youth), "Good job" (P27, 14-19 years old, current foster-involved youth), or "Congratulations" (P36, 20+ years old, former foster-involved youth).

Ten users said that they would be motivated to make their check-ins public and read or interact with other users' check-ins because it might help them feel less alone in what they are going through (social network support). P26 (14-19 years old, former foster-involved youth) said, "I would like to read like everyone's check-ins… because it gives [insight into] how everybody's doing. Like if somebody else's bud was the same as my bud, I feel more so at ease like, 'Oh, I'm not the only one going through this.'" Another participant (P11, 20+ years old, former foster-involved youth) elaborated, "Nobody I went to school with was in the system… they'd be talking Friday night about going to Olive Garden with their family, and I'm having ramen noodles at home. So I felt very left out… I just didn't feel normal. I feel like this would really shine some light into [other users'] lives like being able to see, 'Oh my God, this person is struggling with this too…'" Two participants talked about wanting to react or reply to other users to say that they can understand where those users are coming from. P33 (20+ years old, former foster-involved youth) said that this was important so that users "know they're being heard."

Two participants said that they would seek or provide guidance through check-ins (informational support). One participant (P27, 14-19 years old, current foster-involved youth) said that if they saw a check-in where someone was saying their social worker was taking a long time to get back to them, they might reply with advice that they "maybe try to leave a voicemail." The second participant (P1, 20+ years old, former foster-involved youth) said that they might post about their desire to find their biological family, in hopes that it would turn into an interactive conversation that gave them tips on what to do.

Participants had suggestions for how to improve the design of the app. Five participants said that they would want to add the ability for users to write a question or message to other users in the community, to get to know them better (social network support), ask for guidance (informational support) or encourage others (esteem support). As one participant (P16, 14-19 years old, current foster-involved youth) put it, "... when you fill out your check-in, you would want to also type something in to get to know people… like what are some of your top interests in life…" Another participant (P27, 14-19 years old, current foster-involved youth) said that they may want to ask, "What are some positive affirmations to help you out?" One participant (P35, 20+ years old, former foster-involved youth) explained that they would want to add a question or message because "…sometimes I might just want to be like happy holidays or drive safe today."

Eight participants said that they liked the idea of being able to tag check-ins with the poster's age, region, foster care experience, current emotion/mood, and/or education or job status. One participant (P16, 14-19 years old, current foster-involved youth) explained that the mood tags would help them know how to support other users: "If they were sad or mad… then you can try to help the person out, or if [they were] happy I [would ask] them, 'Oh, Why are you happy? And like why are you feeling this way?'"

While eight participants liked the idea of being reminded of positive events that happened to them, three participants brought up important concerns about whether the feature might accidentally remind users of negative memories. As one participant (P13, 14-19 years old, current foster-involved youth) put it, a reminder of something positive they received "could remind them that they don't have that thing anymore." P35 (20+ years old, former foster-involved youth) elaborated with an example: "I'm getting a notification that I found a $20 on a sidewalk [or] I'm getting ice cream with my mentor tomorrow. Now it's 2 years later, and I don't have a mentor anymore and now I'm broke…"

Five participants felt that the check-in prompts would get repetitive if they were asked to answer them every day and suggested that the question analogy (rose, bud, thorn) change over time or have different self-reflection questions each day (either rotating for all users or randomizing for each user separately). P6 (14-19 years old, current foster-involved youth) explained, "... my days are very similar. It's the [same] stuff, different day so I feel like it wouldn't really help me to check in with like the same answers over and over. I'd start to lose engagement."

Prototype name	Community forum prototype	Helper prototype	Weekly question prototype	Reflective check-in prototype
Tangible support	None.	None.	None.	None.
Informational support	Receive informational support by asking questions or reading other users' responses to questions.	Use Helper training to check whether users have relevant experience or skills (to provide accurate informational support).	Receive informational support by submitting questions, although a resource database may be a more	Add a feature for asking and answering questions in the community, so users can share informational support.

	Provide informational support by answering advice questions.		helpful way to gain information. Provide informational support by answering advice questions.	
Emotional support	None.	None.	None.	Receive emotional support from the app through the check-in process, which encourages users to self-reflect and helps them cope with challenges by emphasizing the positives in their lives.
Social network support	Share social network support by interacting with others who have shared experiences or interests (via channels).	None.	Share social network support by getting to know and relating to others on icebreaker-style questions.	Receive social network support by reading check-ins from users who are going through similar experiences.
Esteem support	Receive esteem support by having progress on goals visualized, but not all goals are suited to being "checked off."	None.	None.	Receive esteem support through seeing accomplishments over time and through seeing others overcome challenges (through recorded check-ins). Add a feature for sharing messages with the community, so users can share encouraging messages.

Other feedback on the app design	None.	Use Helper training to provide guidelines and examples of how to interact on the platform, to ensure it is a safe and positive space (foundational to social support).	May be better to remove features that differentiate the app from a standard community forum - that users cannot see others' responses before replying, that questions expire after a week, and that one question a week is highlighted.	Notifications about past memories might be triggering. Check-in prompts may feel repetitive over time.

Table 2: Phase 2 Findings
Breakdown of what youth surfaced as benefits, weaknesses, and suggestions as they relate to receiving social support from each of the prototypes tested in Phase 2 (Ko et al., 2013).

5.5 Discussion and pilot app design

From the prototype testing interviews, the reflective check-in prototype surfaced as the concept that provided the most types of social support, and as the only option that may encourage youth to share emotional support (Table 2, "Reflective check-in prototype") (Ko et al., 2013). The community forum prototype was primarily geared towards informational support, with some amounts of esteem and social network support built in. However, participants did not see a clear way to share emotional support through this platform (Table 2, "Community forum prototype"). Although participants felt that the Helper training would ensure that the platform was safe and valuable for informational support, most participants did not feel that they needed training before supporting others. This casts doubt on whether users would actually complete the training to become Helpers, accentuated by the fact that some participants already indicated that they would find the Helper position unappealing because it seemed like too much commitment or responsibility (Table 2, "Helper prototype"). While participants felt that the weekly question prototype would allow them to share informational and social network support, participants had mixed feelings about the features that differentiated it from the community forum prototype (having answers hidden until users responded and having questions spotlighted every week). Like the community forum prototype, this prototype facilitates informational and social network support, but may not foster emotional or esteem support (Table 2, "Weekly question prototype"). On the other hand, the reflective check-in prototype creates a space for users to share emotional support and social network support, and with the addition of a question/message feature, could allow them to also share esteem and information support (Table 2, "Reflective check-in prototype").

Based on these findings, we decided to pilot the Reflective Check-in concept, with the following modifications based on participant feedback.

1. Replace 'rose, bud, thorn' check-in prompts with high, low, and a question/message to allow users to ask questions or share esteem support (Fig. 21). We decided not to add this to the 'rose, bud, thorn' model because we wanted to keep the number of input fields relatively low (three rather than four) to reduce the effort required to check-in.
2. Ask users to select an emotion to represent how they are feeling now, so others may be better able to support them (Fig. 21 & Fig. 22). Based on the "feeling wheel" exercise used in Skills Training in Affective and Interpersonal Regulation (STAIR) Narrative Therapy to help trauma-exposed

individuals learn to identify and label their feelings, users have to select a specific emotion within a broader emotion category (e.g. within Happy, selecting Content, Excited, Proud, Confident or Hopeful) (Cloitre & Schmidt, 2022). See Section 9.4.2 for the full list of emotion categories.

3. Remove the notification feature for past memories, because the risk of triggering users seems too high (even if we allow users to say which memories they want to remember/highlight, the likelihood of someone going back and removing a memory that later has a negative association is low).
4. Add a daily 6 pm local time notification to remind users to check in on the app.
5. Add push notifications for replies and reactions received to encourage users to interact on the app.
6. Redesign the user interface to be in dark mode, in keeping with feedback on visuals received from users across all prototypes (n = 5).

We also implemented the following safety-oriented design decisions:

- Community guidelines (shared with users in the app onboarding process) that prohibit content that may be triggering or put users at risk of harm by others on the platform (see Section 9.4.1 for the list of guidelines).
- Automatic review of all new posts and replies for content that violates the community guidelines (using machine learning models built by Belén Saldías, a Ph.D. Candidate at MIT's Center for Constructive Communication), along with a user flagging system. For both, posts are removed as soon as they are flagged and are only reposted once they have been reviewed by a moderator (Fig. 25 & Fig. 26). This aims to minimize user distress by hiding harmful or triggering posts immediately.
- All messages (i.e. check-ins and replies) are public to ensure that someone is not being taken advantage of or bullied in private (Fig. 23).
- The platform is entirely text-based (no videos or images are allowed). This ensures that inappropriate content does not slip in (as this would not be reviewed by the content moderation models operating on the platform).
- Inclusion of a continuously accessible resource page, where users can get resources or crisis support via call or text (see Section 9.4.3 for the resource page content).

We then worked to refine the design of the pilot app through a series of design workshops with former foster-involved young adults (see Section 9.3 for methodology details). This included adjustments to the visual design, modifications to the reactions users could add to others' posts, the feeling options users could select for their check-ins, and the tags users could assign to their profile and use to filter content in their feed. Some of the changes included:

- Making the colors brighter (while remaining in dark mode), as they originally felt dark and sad.
- Allowing users to react to highs and lows separately, because users may be responding to a specific part of a check-in (Fig. 23).
- Adding relatively neutral options within the emotion category (such as content, low, numb, curious, and thoughtful) because participants expressed that they often were feeling more neutral or disconnected from any strong emotion (see Section 9.4.2 for the full list of emotion categories).
- Adding "Working towards GED" and "Trade school" as options for the school status tag/filter, as foster youth take a variety of educational paths. See Section 9.4.4 for the full list of tags/filters. Note: Emotion filters were removed from the pilot app due to development constraints.

Below are a subset of screens from the final pilot app design.

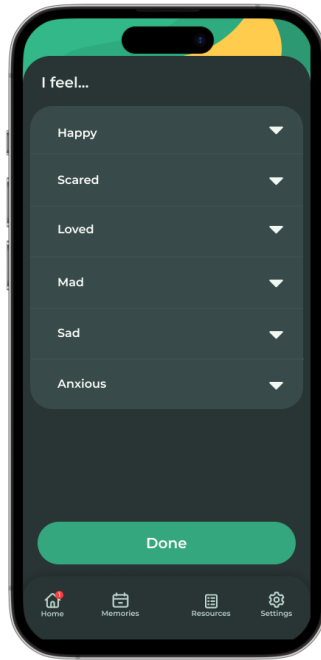Figure 21: Pilot App Design, Check-in Form

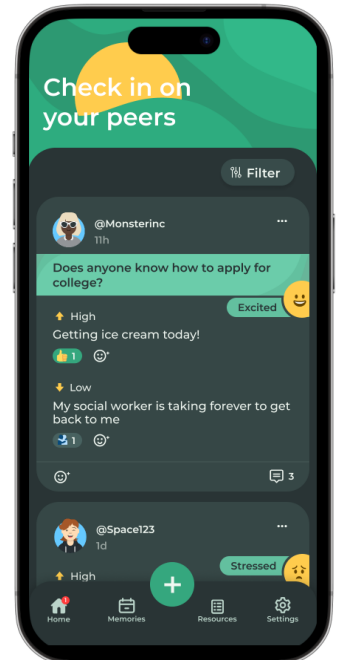Figure 22: Pilot App Design, Feelings Dropdown

Figure 23: Pilot App Design, Feed

Figure 24: Pilot App Design, Memories
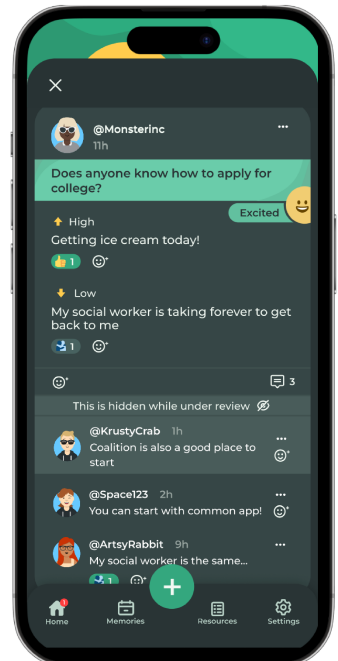

Figure 25: Pilot App Design, Flagged Check-in

Figure 26: Pilot App Design, Flagged Reply

5.6 Limitations

The same limitations mentioned in Phase 1 (Section 4.6) related to gift card incentives and small sample size are relevant for Phase 2. Additionally, the fact that we only shared 4 prototypes with participants may have limited the conclusions of the testing. We attempted to mitigate this limitation by asking participants if they had any other ideas for how technology could support the well-being of foster-involved youth. However, in the future, more prototypes should be explored with foster-involved youth to ensure that all possible types of interfaces/interactions are being considered. We also recommend that future efforts design prototypes with foster-involved youth (as opposed to bringing prototypes to youth for feedback), as this may lead to designs that the research team would not have otherwise considered. Enabling youth to visualize their ideas through collaborative prototyping may also help youth think through their ideas and come up with more detailed and creative interfaces. We hope to explore collaborative prototyping methods in future research we conduct with foster-involved youth.

6 PHASE 3

In this section, we describe the third phase of the study, in which we conducted a pilot study to evaluate the digital tool designed in Phase 2 (Section 5) of the project. We first describe the study design and then unpack the study's findings as they relate to different types of social support. We end with a discussion of how the app can be improved in the future to further support the psychological well-being of foster-involved youth.

6.1 Methods

All procedures, materials, and data management systems were reviewed and approved by MIT's Institutional Review Board prior to implementation.

6.1.1 Eligibility criteria

In order to participate in the study, individuals needed to be currently or previously involved in the foster care system. We felt that this was integral to the design of the pilot study because of the Phase 1 (Section 4) finding that current and former foster youth are interested in connecting and sharing support with others who have similar lived experiences, with foster care experience being particularly relevant. Additionally, individuals needed to be between the ages of 16 and 24 to be eligible for the pilot study. We decided that the minimum age should be 16 because all participants under the age of 18 were recruited from Massachusetts, where the legal age of consent is 16 (*Massachusetts Law about Sex | Mass.Gov*, n.d.). Although the platform was only intended for anonymous communication and nonsexual relationship building (and takes steps to prohibit other kinds of relationships from forming), some of our community partners advocated for this age minimum to account for this potential scenario. We originally intended to set the maximum age at 22, as this is the maximum age of involvement with the foster care system. However, some community partners advocated to raise the age limit to 24 because the difference in situation and development between a 22-year-old and 24-year-old who has been in the foster care system is negligible, and often does not directly correlate to their age (i.e. a 22-year-old may be further along in their development than a 24-year-old, depending on individual experiences and personalities).

As in Phase 1 (Section 4) and 2 (Section 5), participants needed to be English speakers to be eligible for the study. This was in part due to the language limitations of the research team, but also because the platform did not have a translation feature built in, and we wanted to make sure all participants could interact on the platform. Despite this constraint, we felt that we would still be able to obtain a realistic sense of foster youths' perspectives on the tool, for the reasons described in Section 4.1.1.

Finally, participants needed to have continuous access to an iPhone or Android device for the two weeks in which they would be asked to use the app. We made the decision to only include participants who already had access to a smartphone (rather than providing them to participants) because our community partners indicated that the barrier was less that current or former foster youth could not afford a smartphone but more that some were in settings (such as group homes) where they were not allowed access to a mobile device or the internet (Fathallah & Sullivan, 2021).

6.1.2 Participant recruitment

We recruited participants through four of our community partners: Justice Resource Institute's Foster Care program, Communities for People, Stepping Forward LA, and Think of Us. We expanded our partners for this phase to ensure that we could recruit enough participants, given that this study was a larger commitment than Phase 1 and 2 and we needed enough participants to test the social component of the tool. Additionally, we wanted to reach a wider community of current and former foster-involved youth to include individuals whose voices had not been included in the research thus far. Like in Phase 1 (Section 4) and 2 (Section 5), each organization shared information about the study with current and former foster youth presently or previously involved with their programs (see Section 9.7 for the recruitment flyer provided to staff). Minors were exclusively recruited by organizational staff with which they already had an existing relationship (see Section 4.1.2 for rationale).

6.1.3 Touchpoint 1: Consent and baseline questionnaire

Any interested individuals were asked to fill out the consent and baseline questionnaire (described in more detail below). The consent and baseline questionnaire contained three central components. First, it included a consent form, which described the study and encouraged participants to contact the research team if they had questions before signing. Like Phase 1 (Section 4) and 2 (Section 5), we asked minors directly for their consent to participate. As described in Section 4.1.1, we did not want to rely on parent or guardian consent, both because it would be difficult to obtain this for certain youth and to protect any youth that did not feel that their foster caregiver was looking out for their best interests (a possibility given the high rates of abuse in foster homes) (National Coalition for Child Protection, 2022).

Second, participants were prompted to answer demographic questions about race, gender, and sexuality. The questions were developed based on best practices created by Youth MOVE National. We also asked what kind of foster care participants had experience with since one's living situation can vary widely depending on the type of foster care they are in (i.e. foster home, group home, kinship care). Each of the questions included a type in "Other" option and a "Prefer not to say" option so that participants did not feel pressured to select one of the multiple-choice options.

Third, participants were directed to complete the Short Self-Reflection Scale and UBC Social Connection Scale. Based on the prototype testing results in Phase 2 (Section 5.5), we identified that the design was most likely to benefit users by encouraging them to self-reflect (as a method towards emotional self-regulation), helping them see how they have grown and motivate them to continue working towards their goals (providing esteem support), and helping them feel more connected to others (building social network support). For this reason, we decided to measure users' change in self-reflection and feelings of social connection over a two-week control period and then the two weeks of app intervention, using the Short Self-Reflection Scale and UBC Social Connection Scale (respectively) (Lok & Dunn, 2022; Silvia, 2022).

6.1.4 Touchpoint 2: Control questionnaire and app onboarding

Approximately two weeks after Touchpoint 1, participants were asked to complete a questionnaire consisting of the Short Self-Reflection Scale and the UBC Social Connection Scale in order to assess users' change in self-reflection and feelings of social connection after a control period (as

described in Section 6.1.3). Then, participants were asked to download the app on their smartphones and create an account using a unique ID provided to them by the research team. Participants were unable to access the app without an ID, in order to make sure that only eligible and consented individuals could view and use the platform. After participants completed the onboarding process, they were reminded that in order to be compensated, they were required to complete one check-in a day on the app (allowing for some missed days, as described in Section 6.1.8). Beyond this, they could choose how much or how little they wanted to do on the platform.

6.1.5 Intervention: Asynchronous app usage period

For approximately two weeks (between Touchpoint 2 and Touchpoint 3), participants asynchronously used the app. During this time, the research team reviewed any check-ins or replies flagged by the content moderation system as potentially in violation of the community guidelines. Additionally, the team seeded the platform with five check-in posts created in advance by former foster-involved young adults (through workshops, as described in Section 9.3), and added reactions to check-ins created by participants (at most one per post) in order to simulate a more populated platform and better assess the impact of the social components of the platform.

6.1.6 Touchpoint 3: Post-intervention questionnaire

Approximately two weeks after Touchpoint 2, participants were asked to fill out the post-intervention questionnaire. This questionnaire began with the Short Self-Reflection Scale and UBC Social Connection Scale (for the reasons described in Section 6.1.3). Next, participants were asked a series of multiple-choice and short-answer questions designed to gather information about their experiences using the platform. This included custom questions catered to the study's context and a modified version of the System Usability Scale (Brooke, 1995). Finally, the questionnaire asked whether participants were interested in participating in a 30 min follow-up video call to share more feedback about their experience for an additional gift card compensation.

6.1.7 Follow-up interviews

Follow-up interview methods and protocol mirrored that of Phase 1 (see Section 4.1 for more details), except that questions focused on participants' impressions of the pilot app (e.g. what they liked, disliked, or found confusing) and their ideas for how the app could be improved. We also asked a general question about what kinds of technology they felt would be helpful for supporting youth who are in foster care, to understand whether there was another direction they felt we should pursue in the future.

6.1.8 Compensation

We gave $100 Amazon, Uber, or Apple gift cards (participant's choice) to all participants who completed all three questionnaires and used the app for two weeks, completing a daily check-in the majority of the time (approximately 80% of the time). While we wanted to understand what participants naturally wanted to do on the app, we informed participants that they needed to complete check-ins most days because we needed there to be enough activity for participants to get a feel for the social elements of the tool. However, participants could still receive full compensation if they submitted all private check-ins, so they were not required to share information publicly with others on the app. Additionally, we emphasized that participants only needed to check-in in order to be compensated (they did not need to look at their feed or memories, or leave reactions or replies), so that we could understand what content/features they naturally gravitated towards. We gave participants an additional $20 gift card if they participated in an optional follow-up interview because we recognized that this required additional time and energy from participants.

6.2 Participants

Twenty-two eligible individuals completed Touchpoint 1 of the study, nineteen participants completed Touchpoints 1 and 2, and sixteen participants completed all three Touchpoints. Participants who completed the study ranged from age 17 to 24, with an average age of 21. 47% of participants were presently in foster care, and 53% of participants were formerly in foster care. Participants who were formerly in care indicated that they had left foster care between the ages of 17 and 21, with an average age of 18. 43% of participants had experience with group homes, 39% had experience with foster homes, and 11% had experience with kinship care. In terms of gender, 73% identified as women and 27% identified as men, with no participants identifying as non-binary or gender non-conforming. This may limit the generalizability of our findings, as it does not match the national breakdown of foster-involved youth, which is roughly 51% male and 49% female (Children's Bureau, Department of Health and Human Services, 2023). The participant pool was overrepresented in marginalized experiences across domains of sexuality and race, which may indicate that results speak to the perspectives of those who are most in need of support. 41% of participants identified as LGBTQ+, compared to national estimates that 30% of foster youth identify as LGBTQ+ (Baams et al., 2019; Matarese et al., 2021; Sandfort, 2019). In terms of race, 33% identified as Black/African American and 27% as Hispanic/Latinx, with only 33% identifying as White/Caucasian (compared to 43% of youth identifying as White/Caucasian nationally) (Children's Bureau, Department of Health and Human Services, 2023). Two of the participants (1 current and 1 former foster youth) had previously participated in Phase 1 (Section 4) and 2 (Section 5) of the study.

6.3 Data analysis and positionality

App usage data were collected through the digital platform, survey data was collected through Qualtrics, and interviews were conducted, recorded, and transcribed using the Zoom platform. A deductive coding approach was used to analyze the interview transcripts and free-response survey answers (Fereday & Muir-Cochrane, 2006). The predefined codes (tangible support, informational support, emotional support, social network support, and esteem support) were derived from the framework of social support that arose from the analysis of Phase 1 (Section 4.4) (Ko et al., 2013). To ensure consistency and accuracy of code assignments, two members of the research team collaboratively analyzed a subset of the data using affinity diagramming techniques. The team began by clustering the data based on related themes, then discussed and assigned labels to each theme, and finally tagged the themes based on their relationship to social support (using the predefined codes listed above) (Ulrich, 2003). Quantitative analyses of survey and app usage data were conducted using Qualtrics and R. The app usage data, survey data, and interview data were triangulated to better understand the impact and experience of the app for youth with experience in foster care, and add validity by assessing the app in multiple ways (Patton, 2002).

6.4 Findings

6.4.1 General trends

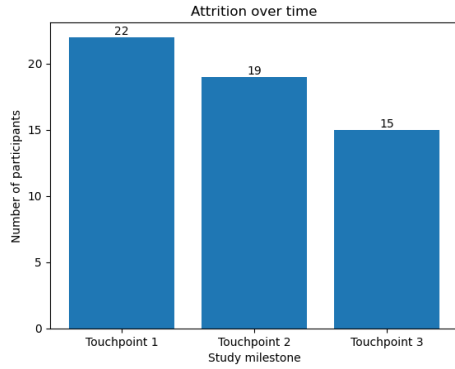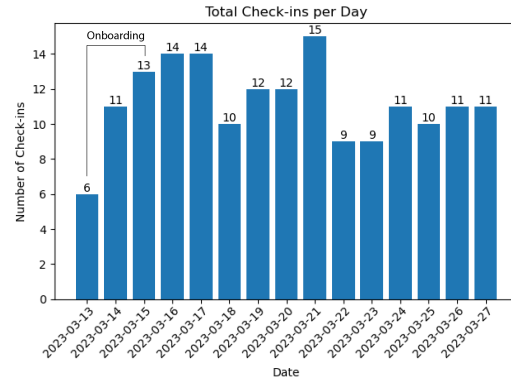
Figure 27: Attrition Over Time
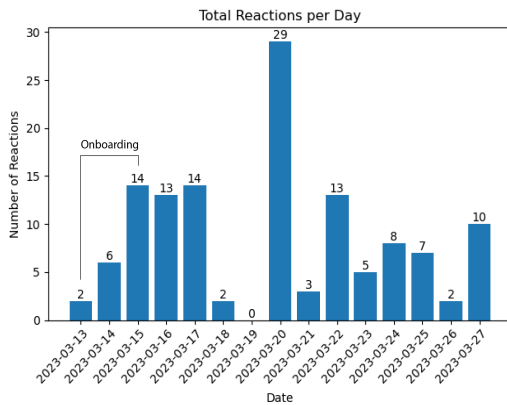

Figure 28: Total Check-ins per Day
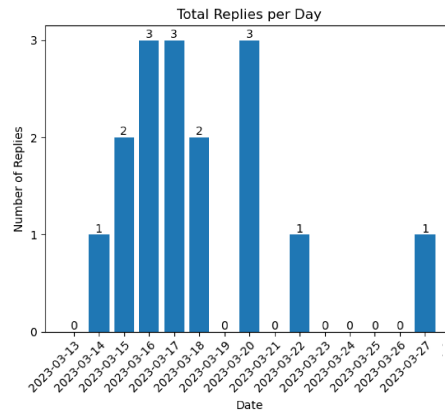

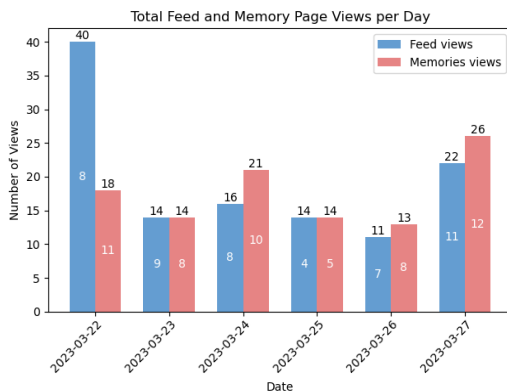Figure 29: Total Reactions per Day

Figure 30: Total Replies per Day

Figure 31: Total Feed and Memory Page Views per Day

Out of 22 consented participants, 15 (68%) completed all phases of the study, with 3 (14%) dropping out or becoming unresponsive after the first touchpoint (the consent and baseline questionnaire),

and 4 (18%) dropping out or becoming unresponsive after the second touchpoint (the control questionnaire and app onboarding) (Fig. 27). Participants who did not complete all three touchpoints have been excluded from the subsequent analyses as they were not compensated for their contribution to the study. Of the participants who completed all three touchpoints, 3 (20%) completed follow-up interviews as well. Over the two-week intervention period, the fifteen included participants contributed a total of 168 check-ins (Fig. 28), 128 reactions (Fig. 29), and 16 replies (Fig. 30) on the platform. On average, participants completed check-ins on 75.56% of the days (adjusted for differing onboarding dates). An average of 52% of participants (n = 7.83) checked the community feed page each day and 60% (n = 9) checked the memories page each day, although this finding is caveated by the fact that we only had view data for the last six days of the study due to development constraints (Fig. 31). As described in Section 6.1.8, compensation was based solely on completing surveys and daily check-ins, so we can assume that participants left reactions and replies and viewed their feed and memories out of an intrinsic interest in the app.

Overall, participants were generally satisfied with the experience of using the app. When asked how likely they would be to use the app in the future, 80% (n = 12) of survey respondents said they would be Likely (47%) or Extremely Likely (33%) to do so. Additionally, 80% (n = 12) of respondents said they would definitely recommend the app to current and former foster youth. When asked what their overall star rating of the app would be (from 1 to 5), the average rating given was 4.37, with a minimum rating of 3.50 (given by 20% of participants, n = 3) and a maximum rating of 5 (given by 47% of participants, n = 7). When asked to rate how much each feature of the platform motivated them to keep using the app (1 = Not at all to 5 = A lot), participants indicated that they were especially motivated by reading other people's check-ins (avg = 4.20, std dev = 1.33), selecting a feeling for their check-in post (avg = 4.07, std dev = 1.12), revisiting their past check-ins (avg = 4.00, std dev = 1.10), and writing highs and lows for their check-in posts (avg = 3.93, std dev = 1.57).

In terms of general usability, the app received an average score of 75.67 (std dev = 20.76) on our modified System Usability Scale (see Appendix for details). This put the app in roughly the 70 - 79th percentile range, as an average score is generally considered to be 68 (*Item Benchmarks for the System Usability Scale - JUX*, 2018). Looking at specific items from the scale, the majority of respondents thought the app was easy to use (86%, n = 12), felt very confident using the app (86%, n = 12), and felt that people would learn to use the app very quickly (87%, n = 13). The main negative feedback was that 34% of respondents (n = 5) found the app very cumbersome to use, although this was not corroborated in open-ended survey responses or follow-up interviews.

6.4.2 Informational support

Overall, the app did not provide participants with substantial informational support. On the post-intervention questionnaire, only 27% (n = 4) of participants said that the app helped them get useful advice or information most days (20%, n = 3) or every day (7%, n = 1). Additionally, when asked whether the app helped them get useful advice or information, five participants said that it did not. Four of these participants felt that the app was more focused on feelings and on self-reflection, with three explaining that it did not feel like there was an explicit place to ask a question. Three participants felt that they would be interested in asking questions if there was a clearer way to do so. One participant (P3, 20+ years old, former foster-involved youth) explained, "It was more feelings oriented… because there wasn't no section to just outright ask the question…" Indeed, an analysis of the app data showed that no participants added a question to their check-in (which they could have done within the message field).

Similarly, very few participants appeared to provide informational support to others on the platform. Only 13% (n = 2) of survey respondents said that they tried to give useful advice or information on the app most days (with none selecting "Every day"). Looking at the app data, only two participants shared informational support in response to other users' check-ins. For instance, when another participant talked about finding a mouse in their apartment, P51 (14-19 years old, current foster-involved youth)

replied with a tip, "If u have peppermint oil or anything peppermint just spray (or put) around the apartment they hate it."

In follow-up interviews, five participants said that they never tried to give advice or share information on the app. Two said they did not feel like they had enough relevant information to be able to provide guidance to other users. Three participants explained that they did not feel like it was their place to provide guidance because other users were mostly sharing how they were feeling rather than asking for advice. Two participants added that they would have provided guidance if other users had asked specific questions. P37 (20+ years old, former foster-involved youth) summed it up well, saying that they did not provide guidance because "I [didn't] think [it was] appropriate for the setting depending on what people were talking about… like for me to just share a resource, it's probably something they already know about… [they] know how to how to get help, how to talk to somebody… if they had a question… then I'd be able to answer it."

Four participants talked about wanting more ways to share resources on the app. In the post-intervention questionnaire, one participant (P45, 20+ years old, current foster-involved youth) wrote "Though I get that this app is more for foster youth to track their moods and perhaps meet other foster care-affiliated people, I think an app where users can go to find different kinds of DCF resources like foster youth-specific scholarships, internships, FAFSA how-tos, links and tips for general life things like doing your taxes or local resources in different cities… Foster youth could share their own experiences about how they navigated certain things." In follow-up interviews, two of the participants explained that they were interested in a clearer way to share resources because they wanted to pass along resources they knew of from other organizations they were part of. One participant (P37, 20+ years old, former foster-involved youth) said they would want to share resources "because in my job now, all I do is find resources created for all of us foster youth, so it'd be nice to share it with everybody else, because not everybody is in the position I'm in."

6.4.3 Emotional support
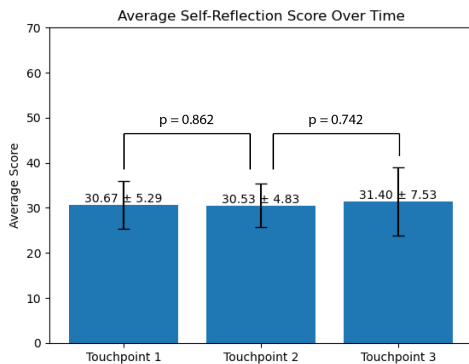
Figure 32: Average Self-Reflection Score Over Time
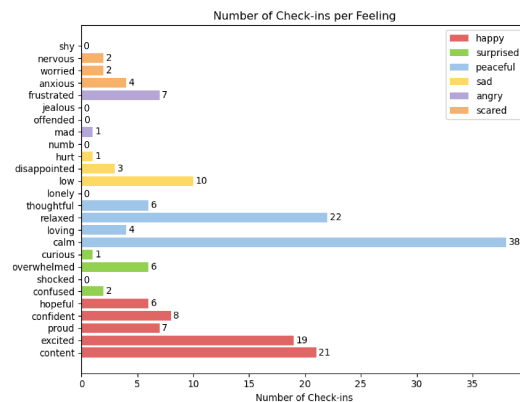
Figure 33: Sum of Check-in Feelings

The app appeared to provide participants with emotional support. On the post-intervention questionnaire, 67% of participants (n = 10) said that the app helped them feel understood or less upset about something most days (47%, n = 7) or every day (20%, n = 3). In the questionnaire, two participants added that the app "helps [you] cope with everyday life" (P47, 20+ years old, former foster-involved youth) and "...helps with dealing with your feelings" (P38, 20+ years old, former foster-involved youth). While many participants mentioned feeling sad/alone (n = 5), anxious/scared (n = 4), or frustrated/angry (n = 4) in their check-ins, check-ins were most commonly tagged with the feeling "Calm" (22.6%, n =

38), followed by "Relaxed" (13.1%, n = 22), "Content" (12.5%, n = 21), and "Excited" (11.3%, n = 19) (Fig. 33). This may have been in part because using the app makes users feel better.

Participants elaborated that reading other people's check-ins and receiving replies or reactions on their check-ins helped them feel emotionally supported. When asked to rate how much different features of the app helped them reflect on their feelings (1 = Not at all to 5 = A lot), participants generally felt that reading other people's check-ins was helpful in the self-reflection process (avg = 3.80, std dev = 1.42). In follow-up interviews, three participants talked about how receiving supportive replies (n = 1), reactions (n = 2), or reading other people's posts (n = 1) made them feel more understood or less upset. One such participant (P41, 20+ years old, current foster-involved youth) explained why reactions on their check-ins helped them feel better: "...if someone likes your check-in or something that you put up there, it's like, okay, they understand. They can relate."

Multiple participants tried to provide emotional support to other users either through reactions or replies. In an analysis of app content, three users responded to posts with empathetic responses, either relating to them or letting them know they care. In response to a check-in by P50 (20+ years old, former foster-involved youth) with a high of "I got a good job opportunity paying very good, and I'm excited to have the interview," a low of "My son doesn't feel quite well and keeps running a fever, so I might just end up in the hospital tonight," and an emotion tag of "Worried", one participant (P45, 20+ years old, current foster-involved youth) wrote: "Congrats on the job opportunity!! I hope your [son] feels all better very soon 💚." In another instance, when a participant (P40, 20+ years old, current foster-involved youth) indicated that they were relaxed and wrote a high of "I feel good I stay home" and low of "I was bored at home," P50 (20+ years old, former foster-involved youth) related by saying "Home brings peace it's just a little too much peace sometimes." In follow-up interviews, two participants also talked about using reactions as a way to provide emotional support, with one participant (P37, 20+ years old, former foster-involved youth) saying that if they noticed another user was upset about something, they would react to the post to show that "I would probably feel that way too if I was going through that."

The app also helped participants reflect and moderate their emotions. Participants showed a slight increase in Self-Reflection Scale scores over time, although the change was not statistically significant (p = 0.742) (Fig. 32). However, the qualitative feedback described below suggests that the app does promote self-reflection. In follow-up interviews, one participant (P51, 14-19 years old, current foster-involved youth) explained that the app "gives you a chance to reflect on yourself more than you would if you didn't have it," and another said that they thought it could even help younger kids "to start understanding [their] feelings and be more self-aware" (P41, 20+ years old, current foster-involved youth). Participants highlighted the check-in process as a main avenue for helping users reflect on their emotions and regulate their mood. When asked to rate how much different features of the app helped them reflect on their feelings (1 = Not at all to 5 = A lot), participants generally felt that writing check-ins (avg = 4.60, std dev = 0.80) and revisiting their past check-ins (avg = 4.67, std dev = 0.60) were very helpful in the self-reflection process. Through the post-intervention questionnaire and follow-up interviews, seven participants elaborated on the ways that the check-in process helped them self-reflect and cope with emotions. P41 (20+ years old, current foster-involved youth) said, "... it let [you] record your feelings in that moment, or your feelings that you carried throughout the day and really understand it. So I would say it does help you feel less upset [because] you're writing it out." Another participant (P38, 20+ years old, former foster-involved youth) added, "It made me think about my feelings more… I like to just suppress things and just keep going on, so I feel like it made me sit down [and actually think]." P44 (20+ years old, former foster-involved youth) gave an example of this: "I wrote one day a grown-up woman was acting like a 2-year-old, but just didn't realize that I didn't make the situation any better by making fun of her… After I wrote it, when I actually looked at the post, I was like, damn, you could have done better too."

Through follow-up interviews, three participants talked about wanting more ways to get emotional support on the app, sharing ideas like therapeutic games, in-app therapists that can provide ideas, or a feature where people can express their feelings through music. Four participants also specifically said they wanted the check-in form to include more feeling options or the ability to write in their own feeling. As P45 (20+ years old, current foster-involved youth) explained, "I think the feature for

using a word to describe your feelings should be more inclusive because almost every time I was selecting one there wasn't really something that fully described how I was feeling."

6.4.4 Social network support

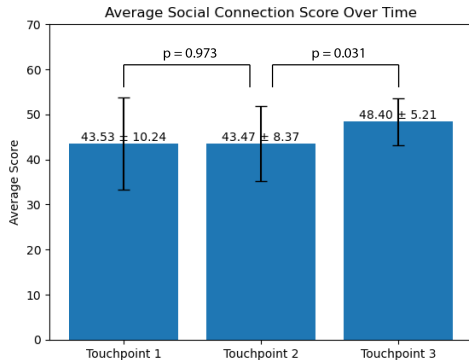Figure 34: Average Social Connection Score Over Time

Across many data sources, the app appeared to provide participants with social network support. On the post-questionnaire survey, 60% (n = 9) of participants said that the app helped them feel less alone or more connected to others most days (40%, n = 6) or every day (20%, n = 3). Additionally, participants showed a statistically significant increase in their Social Connection Scale score between Touchpoint 2 (app onboarding) and Touchpoint 3 (post-intervention questionnaire) (p = 0.031) (Fig. 34). In the questionnaire, participants added, "You don't feel alone [like you're] the only one going through these things" (P44, 20+ years old, former foster-involved youth) and "you rarely see any systems connecting foster youth together" (P45, 20+ years old, current foster-involved youth). Another participant (P37, 20+ years old, former foster-involved youth) wrote that they were extremely likely to use the app again "Because I felt connected to others."

During follow-up interviews, participants talked about how reading other people's posts made them feel less alone or more connected to others. When asked whether the app ever made them feel less alone or more connected to others, five participants responded affirmatively and pointed to reading others' check-ins as the main reason why. One participant (P38, 20+ years old, former foster-involved youth) answered, "Yeah. I read a lot of other people's posts… and I like that they can relate to me… I'm reading somebody's stuff [who has] been through the same sort of [things]." Another participant (P44, 20+ years old, former foster-involved youth) agreed and explained how feeling connected helped them feel better: "Yes, because you know you're not going through this stuff alone… because maybe you feel like you're the only one always having a bad day, your life is not going right. But everybody doing this makes you think like, 'Okay, everybody has a bad day, but it's like what you do about it.'" A third participant (P37, 20+ years old, former foster-involved youth) explained that the app made them feel more connected because it was not like social media platforms which are filled with "videos or things that people are trying to promote" but instead was "just seeing how people are feeling and thinking…"

Participants posted about many overlapping topics, which may be why they felt a strong sense of social connectedness on the platform. Analyzing the app data, we saw that fifteen users wrote check-ins about school or work (working towards getting a job, trying to get to work/school on time, doing well in assignments, feeling tired because of work/school, and taking time off). Twelve users wrote about sleeping too little or too much (often to catch up on sleep), or generally being tired. Nine users shared highs and lows related to others in their community (children, friends, family, significant others). Nine users described experiences with food (either being hungry, full, or eating something they liked). Nine users talked about doing or needing to do daily life tasks like cleaning, dealing with taxes/bills,

scheduling appointments, going shopping, and exercising. Eight users talked about experiencing physical discomfort (either being hurt or sick). Seven users wrote about being excited to go outside (to go shopping, walk in nature, or generally not be at home). Overall, these responses align with what current and former foster-involved individuals talk about on other social platforms (based on an analysis of a foster care-specific Reddit channel), especially topics of education, physical health, employment, and family relationships (Fowler et al., 2022).

Additionally, participants used check-in comments as a way to connect with others on the app. Five participants replied to others' posts with messages letting them know that they were not alone or expressing that they had similar interests. Sometimes participants replied that they were facing similar challenges, like one participant (P47, 20+ years old, former foster-involved youth) who wrote, "Me too" when someone else (P37, 20+ years old, former foster-involved youth) said, "I have a presentation today 🙃," or another participant (P50, 20+ years old, former foster-involved youth) who said, "I've been meaning to go to the gym too I've just been procrastinating" in response to a check-in about going to the gym. Participants also used comments to say that they liked similar things, like one participant (P45, 20+ years old, current foster-involved youth) who expressed that they resonated with the quote another participant had shared, "Ahh I really like this quote! I also like the fact that you added one, life feels just feels so much more manageable with the wisdom from quotes lol 🌞." In another instance, two participants (P38, 20+ years old, former foster-involved youth; P51, 14-19 years old, current foster-involved youth) connected over a television show they both liked. The participant who first mentioned the show in their check-in (P38) reflected in a follow-up interview that "talking about a show that we were watching… like the people in the show who we like" made them feel "understood."

> (P38) Check-in high: "Watching Baddies ."
> (P51) Reply: "But the real question is stunna or biggie💁🏻‍♀️"
> (P38) Reply: "Definitely Biggie !"
> (P51) Reply: "I know that's right!!"

Through the post-intervention questionnaire and follow-up interviews, six participants expressed interest in having more ways to interact with others on the app. Two of these participants (P40, 20+ years old, current foster-involved youth; P44, 20+ years old, former foster-involved youth) talked about wishing that they had received more reactions or replies. Both participants received some reactions but few or no replies, with P40 writing 9 posts and receiving 18 reactions and 1 reply, and P44 writing 12 posts and receiving 17 reactions and no replies. Two participants added that commenting and reacting alone did not feel like enough, saying, "It was slightly boring only was on it to check in not really relate with peers on there" (P41, 20+ years old, current foster-involved youth), and, "It's not very interactive, besides replying to others there not many other ways to connect" (P45, 20+ years old, current foster-involved youth). Three participants had suggestions of additions, with one saying, "Add video chat just in case we want to meet people" (P46, 20+ years old, former foster-involved youth), and the other two recommending incorporating things like games, app-generated daily/weekly questions, or more encouragement for users to ask each other questions.

6.4.5 Esteem support

Participants appeared to acquire esteem support from the app, with 53% (n = 8) of participants saying that the app helped them feel inspired or motivated to pursue their goals most days (20%, n = 3) or every day (33%, n = 5) on the post-intervention questionnaire. This may have been because the app provided users with a space to share the successes and challenges they faced while working towards their goals.

Indeed, an analysis of the app data revealed that many check-in posts centered around the sharing of big and small challenges and accomplishments. One major theme was related to life goals like paying bills, cleaning, grocery shopping/cooking, and building or maintaining healthy relationships. Two participants talked about facing challenges in completing life goals, with one participant (P47, 20+ years old, former foster-involved youth) writing as their low: "I have a whole lot of organizing and cleaning to

do. I need to stop procrastinating but can't seem to find the courage." Seven users shared moments when they were in the process of or had already accomplished life goals. As their high on two different days, P3 (20+ years old, former foster-involved youth) said, "I finally cleaned up my whole apartment it's nice and refreshing in here. I just have a couple things to finish tidying up." and "I got my food stamps card today so I did a big shopping trip. Also got my rugs and clothes nice and clean." Another participant (P50, 20+ years old, former foster-involved youth) talked about working towards relationship-oriented goals, writing "I have released a toxic relationship" as their high, and "I have to learn how to live without him" as a low they were still working towards.

Another major theme was related to performance at school or work. Two participants also shared lows related to not progressing in school or work tasks as much as they wanted. One participant (P38, 20+ years old, former foster-involved youth), for example, shared, "Didn't complete any school work so I'm a little disappointed." On the other hand, two users described accomplishments that they had at school. For example, as their highs, one participant (P39, 14-19 years old, current foster-involved youth) wrote, "I got a A+ on my test and my cat came to me when I got home," and another (P50, 20+ years old, former foster-involved youth) said, "I got a good grade on my assignment".

Interestingly, seven participants wrote specifically about working towards the goal of getting to school or work on time. Four participants centered check-ins on struggling to arrive on time or accomplish everything they wanted to do before they left the house, with lows like "I got to work very late" (P40, 20+ years old, current foster-involved youth) and "Didn't have time to eat anything" (P41, 20+ years old, current foster-involved youth). Three users also expressed pride that they woke up and made it to school or work on time, with highs like, "I'm happy that I got to work on time" (P40, 20+ years old, current foster-involved youth), "I finally woke up on time for school" (P51, 14-19 years old, current foster-involved youth), and "...I'm proud of myself for being this awake at 8 am lol" (P45, 20+ years old, current foster-involved youth).

Three participants also talked about working towards getting a job (e.g. career courses, job interviews, job-related drug tests). P50 (20+ years old, former foster-involved youth) talked about anticipating an upcoming job interview but dealing with weather-related obstacles, writing as their high, "I got a job interview but very nervous" and "it started to rain and couldn't make it so I rescheduled" as their low, along with a feeling tag of "Disappointed."

Sometimes participants alluded to working towards goals without defining them explicitly. Five participants wrote about being behind generally, like P3 (20+ years old, former foster-involved youth), who wrote in their lows that "I have not been as productive to get my to do list done." and "I have a lot of stuff to do and get myself together to get back on track." Three participants shared that they were generally being productive, like the above participant (P3, 20+ years old, former foster-involved youth) who another day wrote, "I'm working on completing my to do list and being productive."

Participants provided esteem support to other users, primarily through check-in messages and replies. In an analysis of app data, six participants wrote check-in messages aimed at encouraging others to continue working towards their goals. These included:

- "Be great ! Be you !" (P38, 20+ years old, former foster-involved youth)
- "You got this!" (P45, 20+ years old, current foster-involved youth)
- "'Have a vision. Be demanding.'- Colin Powell" (P51, 14-19 years old, current foster-involved youth)
- "Remember that even the smallest bit of progress is still progress" (P51, 14-19 years old, current foster-involved youth)
- "'You cant cross the sea merely by standing and standing at the water' ~ Rabindranath Tagore" (P51, 14-19 years old, current foster-involved youth)
- "Everyone think Happy thoughts and always think good things like I can do this" (P39, 14-19 years old, current foster-involved youth)
- "YOU GOT THIS. KEEP GOING!" (P3, 20+ years old, former foster-involved youth)
- "You guys got this" (P44, 20+ years old, former foster-involved youth)

Additionally, two users wrote replies that tried to motivate others to overcome challenges they were facing. In response to P50's check-in (20+ years old, former foster-involved youth) about struggling to move on from an unhealthy relationship, P49 (14-19 years old, current foster-involved youth) provided encouragement by saying, "Don't give up!" When P50 (20+ years old, former foster-involved youth) wrote about being nervous for an interview and being disappointed that they had to reschedule it because of bad weather, another participant (P44, 20+ years old, former foster-involved youth) provided esteem support by saying, "You got this girl. I am cheering you on and I know your going to get this job. Send you positive vibes." In a follow-up interview, P44 shared that they had intentionally written an encouraging reply": "I just told her to keep her head up because she was nervous. I said she was gonna get the job… I feel like it's always good to empower other people."

Despite this evidence, only 26% (n = 4) of participants reported that they tried to help others feel inspired or motivated to pursue their goals on the app most days (13%, n = 2) or every day (13%, n = 2) on the post-intervention questionnaire. This may be because participants are not able to clearly differentiate this type of support from others.

6.4.6 Safety and comfort

Participants seemed to feel safe on the platform. In the post-intervention questionnaire and follow-up interviews, five participants said they liked that the app allowed them to express their emotions without fear of judgment. As one participant (P44, 20+ years old, former foster-involved youth) explained, "it got me a chance to let my frustrations out when I was mad" and let them share "what's going good about my day." Multiple said that this aspect motivated them to continue using the app and share it with others, with one (P46, 20+ years old, former foster-involved youth) writing, "I definitely would love to keep using the app going forward because it's a good way for me to express myself." nother (P3, 20+ years old, former foster-involved youth) indicated that they would definitely recommend the app to other foster youth "because it's always great to express how you feel."

Eight participants highlighted anonymity as a core reason why they felt comfortable using the app. Four participants felt that anonymity made it easier for them to interact with others on the platform. In the post-intervention questionnaire, one participant (P39, 14-19 years old, current foster-involved youth) stated, "I like talking to people and they actually do not [know] who you are," and another (P38, 20+ years old, former foster-involved youth) elaborated, "I love how we got to interact with people with out judging a book by its cover." A third participant (P50, 20+ years old, former foster-involved youth) also liked that what they shared would not be connected to their identity, saying "...I feel like [anonymity] gave another comfort because you can say something personal and not be pointed out too." On the other hand, in follow-up interviews, two participants expressed interest in being able to privately communicate with users they relate to, because it would make them feel more comfortable sharing personal information or make them feel less worried about being judged by others. This fear of judgment may be why there were relatively few check-in replies made during the intervention period (n = 16). Four participants also talked about how anonymity made it easier for them to express themselves in their check-ins, with one (P41, 20+ years old, current foster-involved youth) explaining in a follow-up interview, "What I really like [is that] it's anonymous, only because I feel like it was easier to do your highs and your lows… [it's] kind of private, but I'm still expressing how I feel."

As evidence of their comfort on the platform, participants seemed to share intimate challenges or feelings they were struggling with in their check-in posts. In their lows, five participants wrote about feeling sad or alone, with posts like, "Som[times] I feel single[d] out by the people I'm consistently around" (P47, 20+ years old, former foster-involved youth) and "I feel Sad because my aunt died" (P43, 20+ years old, current foster-involved youth). Four participants shared that they were feeling anxious or scared, for example, writing, "My anxiety was bad today" (P44, 20+ years old, former foster-involved youth), "I sometimes feel overwhelmed with my daily activities" (P47, 20+ years old, former foster-involved youth), "Still overthinking" (P50, 20+ years old, former foster-involved youth), and "I'm scared to trust again" (P50, 20+ years old, former foster-involved youth). Four participants also described

moments when they were feeling frustrated or angry, like one (P50, 20+ years old, former foster-involved youth) who wrote, "Child custody is a lot" and "still mad I'm going through this with my first kid." Four participants also wrote check-ins about personal struggles they faced with family or in romantic relationships. For example, one participant (P42, 20+ years old, current foster-involved youth) shared lows like "had to talk to my mum" and "almost [losing] a friend." Another participant (P50, 20+ years old, former foster-involved youth) wrote multiple check-ins about struggling with a "toxic relationship" and dealing with child custody challenges (like the posts shared in the previous paragraph). Two participants talked generally about having "family problems" or failed relationships" as well.

      Additionally, an analysis of app data suggests that no check-ins or replies were posted that violated the rules set up to protect users on the platform. Only 4.61% of check-ins (n = 7) and zero replies were auto-flagged by the content moderation system as containing potentially inappropriate content. When a content moderator reviewed these posts, zero were found to actually be in violation of community guidelines. Content was auto-flagged for mentions of a "drug test" that the user had to take for a job application (categorized as illegal activity), "binging" a television show (categorized as self-harm), a misspelling of having bought beats as "Bought some breasts for songs I dabble in" (categorized as sexually explicit), and the use of numbers and strings with periods in the middle like "to get.up" (categorized as potentially sharing identifiable information). Furthermore, no check-ins or replies were flagged by users as inappropriate. In spot-checking the data, the research team identified one check-in as needing to be removed as it said the same text for all three fields (categorized as spam), although it did not technically violate any of the community guidelines. The research team marked the check-in as private and left a comment to the original poster explaining the purpose of each field and encouraging them to repost following the appropriate check-in format. This poster subsequently followed the check-in format for the remainder of the intervention period. In a retroactive analysis of all the data, the research team determined that no other check-ins or replies violated any of the community guidelines.

Type of social support (Ko et al., 2013)	Impact	Primary mechanisms	Suggestions	Primary mapping to dimension(s) of psychological well-being (Ryff, 2014; Ryff & Keyes, 1995)
Informational support	App did not provide many opportunities for users to share or receive helpful advice or information.	None.	Provide more ways to share resources on the app.	Environmental mastery Self-acceptance
Emotional support	App helped users self-reflect and regulate their emotions.	Writing check-ins and revisiting past check-ins. Reading check-ins from other users who are going through similar challenges.	Provide ways to get emotional support, like therapeutic games, in-app therapists that can provide ideas, or a feature where people can express their	Personal growth Self-acceptance

		Receiving reactions or empathetic replies on check-ins.	feelings through music. Add more feeling options or allow users to write their own feelings into the check-in form.	
Social network support	App helped users feel less alone or more connected to others.	Reading check-ins from other users who have similar interests or are experiencing similar things. Connecting with other users through check-in replies.	Provide more ways for users to interact with each other, like video chat, games, app-generated daily/weekly questions, or a more defined way for users to ask each other questions.	Positive relationships Purpose in life
Esteem support	App helped users feel inspired or motivated to pursue their goals.	Writing about challenges or accomplishments in check-ins. Reading encouraging check-in messages. Receiving encouraging check-in replies.	None.	Personal growth
Safety and comfort	Users felt comfortable sharing their feelings and experiences on the app.	Anonymity (especially employing usernames and avatars).	Be able to privately communicate with other users in response to their check-ins.	

Table 3: Phase 3 Findings
Breakdown of what youth surfaced as the impact of the pilot app, the primary mechanisms of impact, and suggestions for improvement as they relate to receiving social support (Ko et al., 2013).

6.5 Discussion

An analysis of Phase 3's findings suggests that the pilot app provides current and former foster-involved youth with emotional, social network, and esteem support and fosters a safe environment for youth to share these types of support (Table 3). By promoting social support, the app has the potential to improve youths' psychological well-being more broadly (Ko et al., 2013; Ryff, 2014; Ryff & Keyes, 1995). Specifically, the act of writing check-ins and revisiting past check-ins may help youth better understand how they are feeling and learn to better regulate their emotions (emotional support, encouraging personal growth). Reading others' check-ins and receiving empathetic replies on their own check-ins may help youth feel more understood (emotional support, increasing self-acceptance). Seeing that other users are going through similar experiences (through reading their check-ins) may help youth feel less alone and more normal (social network support, increasing self-acceptance). Additionally, connecting over shared interests in check-in replies may help youth feel more connected to others like them (social network support, increasing positive relationships). With long-term use, posting challenges or accomplishments in check-ins may help users see their growth over time and allow others to celebrate with them (esteem support, increasing feelings of personal growth). Watching others work towards similar goals, reading inspiring check-in messages, or receiving encouraging replies on check-ins may motivate users to continue working towards their goals (esteem support, increasing sense of purpose). Finally, anonymity on the platform may help users feel comfortable sharing their feelings and experiences on the app, which likely facilitates the socially supportive interactions described above.

The findings also reveal important areas of future growth. While some participants gave advice on the app, many participants did not find the platform appropriate for sharing informational support. Participants suggested there be more clear ways for youth to find and share resources on the app, although more research is needed to understand whether youth would actually use this type of feature. Given other digital platforms focus on providing resources to foster-involved youth (*Life Skills App*, n.d.; *Virtual Support Services: Virtual Support to Bridge the Gap between the Needs of Foster Youth and Families and Community Resources.*, n.d.), future work could also try creating direct links between apps that provide resources with socioemotional support apps like the one evaluated in this study. However, this solution would not necessarily allow youth to share guidance with others (as other platforms tend to provide information to youth, rather than solicit advice or resources from youth). More work should be done to identify ways for current and former foster-involved youth to share informational support, as this has the potential to increase youths' sense of autonomy and environmental mastery by providing youth with information and also emphasizing that they have important wisdom to share.

Additionally, although participants valued the social aspect of the platform, few replies (n = 16) were posted over the intervention period. The fact that participants contributed a total of 128 reactions and 52% viewed the community feed page each day suggests that participants were interested in what others were posting but felt hesitant to make replies. This may have been in part because replies on the platform were public (and therefore more intimidating) or because formulating a reply felt like too much effort for youth. Evidence suggests that being a "lurker" (someone who rarely contributes) on peer support platforms is a form of participation and can be beneficial for individuals' well-being, so this behavior may not be indicative of a problem within the platform (Han et al., 2014). However, participants did have suggestions for how to make communicating more comfortable, such as allowing users to send private or anonymous replies. Participants also recommended adding more ways for users to interact with one another, such as through video chat, games, or daily/weekly questions (from the app or other users). Future studies could dig deeper into what makes some foster-involved youth hesitant to directly communicate with one another on digital platforms, and explore these and other ideas for making interactions feel safer, easier, and more engaging.

6.6 Limitations

The limitations mentioned in Phase 1 (Section 4) and 2 (Section 5) regarding small sample size are relevant here as well. As described in Section 6.2, the generalizability of the findings may also be limited by the fact the sample had a non-representative gender breakdown. Further research should be conducted with larger and more representative samples of foster-involved youth in order to validate the conclusions drawn here. Additionally, while the sample contained youth ranging from age 17 to 24, only four participants who completed the study were under the age of 20 (27% of all completing participants). Subsequently, only one of these participants agreed to take part in a follow-up interview. We consented seven participants under the age of 20 at the start of the study (32% of all consented participants), however, three did not complete all phases of the study and were therefore excluded from data analysis. Further research should try to include more participants between the age of 16 and 19 and identify ways to keep this population engaged in the research process. Because the current study limited participants' use of the app to two weeks, a longitudinal study is also needed to examine how youth use and are impacted by the tool over a greater length of time. Additionally, because we incentivized participants to check in on the app, it is unclear whether the app would retain users in the wild. Future research should investigate user retention and engagement on the platform by decoupling compensation from participants' use of the app.

Furthermore, the fact that the research team seeded check-ins and contributed reactions on the app may have skewed the perceived value of the platform for participants. However, the team only posted check-ins created by former foster-involved youth to ensure that all content on the platform was created by individuals with lived experience. Additionally, any reactions contributed by the research team were not linked to a user profile (participants simply saw that their post received a reaction) to avoid impersonating a real person but rather compensate for the small user base on the platform. When asked to rate how much "receiving reactions or comments on your check-ins" motivated users to keep using the app (1 = Not at all to 5 = A lot), the average score was 3.67 (std dev = 1.30). This suggests that receiving reactions may have caused participants to visit the platform more often, and therefore, our intervention could have led to more activity on the app. However, participants did not find receiving reactions to be very impactful for social support (with only two mentioning it as a way of receiving emotional support). Therefore, it is unlikely that the added reactions significantly skewed the study's findings on the impact of the app for social support.

Finally, we had limited data on what participants looked at or clicked on in the app. While we had some data on how often participants visited the community feed and memories pages, we only had this data for the last six days of the intervention period and did not have data on how long they spent on the page during each visit. Additionally, we did not have data on what check-in posts they clicked on (to see comment information), what user profiles they clicked on, or how often they went to the resource or settings pages. Future work should implement a more comprehensive activity logging system to understand more about how participants interact with the app.

7 CONCLUSION

In this work, we explored if and how internet-connected technology can be used to support the psychological well-being of teenage foster-involved youth. In a qualitative process that aimed to center youth voice, we identified that youth do not receive enough social support while in foster care and that there may be potential for peer-to-peer technology to bridge this gap and improve aspects of youths' psychological well-being. Through prototyping and testing multiple possible interface designs with current and former foster-involved youth, we determined that a system in which users can complete reflective check-ins in a community setting might provide youth with most types of social support (informational, emotional, social network, and esteem support). Finally, by conducting a mixed-methods pilot study with this type of application, we gathered evidence to suggest that this type of system is able to provide youth with emotional, social network, and esteem support, and through this, may improve aspects

of youths' psychological well-being (personal growth, self-acceptance, positive relationships, and purpose in life).

8 FUTURE WORK

Based on the findings and limitations of this project, we recommend that future work examine at the efficacy of similar applications over longer periods of time, with a more comprehensive activity logging system, without incentives tied to usage, and with larger and more diverse groups of foster-involved youth. We hope future research explores additional ways for youth to self-reflect and interact with one another, utilizing best practices from game design as well as art, music, and group therapy to create easy, engaging and therapeutic interfaces that increase youths' emotional, esteem and social network support. Researchers should also consider how to provide scaffolding for youth who want to get or provide support related to potentially triggering topics (such as past experiences with suicide/self-harm, disordered eating, and abuse), nudges or visualizations that help youth see growth and positive memories over time (without bringing up memories youth do not wish to be reminded of), as well as clearer ways for youth to share informational support with one another.

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10 APPENDICES

10.1 Phase 1 and 2 recruitment flyer

Massachusetts Institute of Technology

Participate in a **paid interview**
about your experience with the foster care system

You are a good fit if you are:

- 14+ years old
- **One or more** of the following is true for you:
    - You have been in foster care yourself
    - Your child has been in foster care
    - You have been a foster parent/carer

Reward: $35 Uber, Star Market, Walmart or Amazon gift card

Time: 60 minutes

Location: Zoom

We are conducting interviews to explore how new technologies might be able to support youth in the United States foster care system.

The interview will be recorded.

You will be asked to reflect on your experience with the foster care system. You will **not** be asked to describe any personal traumatic experiences.

Email **ilak@media.mit.edu** or
text **267-467-8618** to sign up.

10.2 Phase 1 interview protocol

[Optionally, the interviewer puts their pronouns next to their name in Zoom]

Introduction

Hi, my name is [name], and I am a researcher at MIT Media Lab. Thank you for taking the time to talk with me today.

How's your day going so far?

To give you some context, we are conducting interviews to explore how new technologies might be able to support young people in the Massachusetts foster care system.

This interview will last 60 minutes, does that still work for you?

I like to start by saying that there are three types of information - green, yellow and red. Green are things that I don't mind anyone knowing, like my name and what kind of pet I have. Yellow are things that I don't mind some people knowing, which could be how I felt in school. Red are things that I don't want people to know or don't want to talk about, like something really sad that happened to me. Feel free to share green and yellow information and keep red things to yourself. Do you have any questions about this?

The interview will also be video recorded. You have the right to review or edit the recording of yourself after this interview. If you want to do this, you can let me know at the end of this interview or you contact me after.

The data collected in this study will be stored on secure, password-protected computer networks at MIT. Only the research team will have access to this data. The recordings will be kept for a minimum of 3 years before being erased.

No information about you, or provided by you during the study will be shared with others without your written permission, except: if necessary to protect your rights or welfare, or if required by law. In addition, your information may be reviewed by authorized MIT representatives to ensure compliance with MIT policies and procedures.

If the results of this study are published or discussed in conferences, no information will be included that would reveal your identity.

My hope is that you will feel comfortable the whole time we are talking. However, if you feel overwhelmed or need to leave for any reason, you are welcome to turn off your video, click out of the meeting, or just let me know. You are welcome to take a break or leave anytime.

Do you have any questions or concerns? [After answering any questions/providing any necessary clarifications] Ok, I will start the recording now.

Interview questions

[During the interview, the interviewer will periodically remind participants that they can stop the interview at any time and that they don't need to answer any questions they don't want to answer, with no impact on compensation. The interviewer will also preface certain topics by asking the participant whether they would like to talk about the topic. If the participant indicates that they would like to skip any topic or question, the interviewer will do so without asking for justification.]

If you feel comfortable sharing, what was your experience with the foster care system?

Based on your experience, what challenges do youth face in the foster care system? Why?

Have you seen anything, even done at a very small scale, that has helped address some of these challenges?

What do you see as the most helpful types of services or supports for youth in the foster care system? Why?

What did you do if you had a problem or needed advice while you were in foster care?
- Ask about people, activities, physical items, apps/websites
- If you could wave a magic wand and wish for anything - what do you wish existed to help young people like yourself in those moments?

Think back to any times when you may have felt sad, anxious or lonely while you were in foster care. Was there anything that helped you in those moments?
- Ask about people, activities, physical items, apps/websites
- If you could wave a magic wand and wish for anything - what do you wish existed to help young people like yourself in those moments?

Do you have any goals at the moment?
- If so, what are they? If not, why do you think you don't have a goal?
- Do you know what steps are needed to reach this goal? If so, what are the steps?
- Do you feel prepared to take the next step? Why or why not?

While in foster care, did/have you have access to a smartphone or computer?
- Do/did you own these devices?
- Do you have wifi access at home? If not, where did/do you go to access the internet/use smartphone apps that require internet connection?
- What are the main apps or websites you use?
- Do you think others in foster care share your experience with technology? Why or why not?

Imagine we had a million dollars and the most advanced sci-fi technology you can think of. Is there a game, app, website or other piece of technology that you wish existed to help youth in the foster care system?

As we continue learning from the community, we may reach out to see if you have feedback on what we're learning/creating. This would look like another interview or survey where we share some of our findings and ask whether you think it resonates with your experience. Are you comfortable with us reaching out with this kind of optional interview or survey?

Closing

Thank you so much for your time and energy today. We really appreciate you sharing your wisdom and experience with us.

As a thank you for your time, we would like to give you a $35 Star Market, Uber, or Amazon gift card. Which one would you like?

We will send that over to you right after this interview, to the email you used to contact us. If you do not see it within 48 hours please reach out to us.

We acknowledge that talking about these issues can, at times, be uncomfortable. We want to ensure you have additional support if you choose, and share some resources that can help [share mental health resources in zoom chat].

If you have any feedback on the process of being in this interview today, feel free to contact us at ilak@media.mit.edu or 267-467-8618.

10.3 Phase 2 interview protocol

[Optionally, the interviewer puts their pronouns next to their name in Zoom]

Introduction

Hi, my name is [name], and I am a researcher at MIT Media Lab. Thank you for taking the time to talk with me today.

How's your day going so far?

To give you some context, we are conducting interviews to explore how new technologies might be able to support young people in the Massachusetts foster care system.

This interview will last 60 minutes, does that still work for you?

I like to start by saying that there are three types of information - green, yellow and red. Green are things that I don't mind anyone knowing, like my name and what kind of pet I have. Yellow are things that I don't mind some people knowing, which could be how I felt in school. Red are things that I don't want people to know or don't want to talk about, like something really sad that happened to me. Feel free to share green and yellow information and keep red things to yourself. Do you have any questions about this?

The interview will also be video recorded. You have the right to review or edit the recording of yourself after this interview. If you want to do this, you can let me know at the end of this interview or you contact me after.

My hope is that you will feel comfortable the whole time we are talking. However, if you feel overwhelmed or need to leave for any reason, you are welcome to turn off your video, click out of the meeting, or just let me know. You are welcome to take a break or leave anytime.

Do you have any questions or concerns? [After answering any questions/providing any necessary clarifications] Ok, I will start the recording now.

Interview questions

[During the interview, the interviewer will periodically remind participants that they can stop the interview at any time and that they don't need to answer any questions they don't want to answer, with no impact on compensation. The interviewer will also preface certain topics by asking the participant whether they would like to talk about the topic. If the participant indicates that they would like to skip any topic or question, the interviewer will do so without asking for justification.]

[If this is their first interview]

      If you feel comfortable sharing, what was your experience with the foster care system?

      Based on your experience, what challenges do youth face in the foster care system? Why?

      Have you seen anything, even done on a very small scale, that has helped address some of these challenges?

      What do you see as the most helpful types of services or supports for youth in the foster care system? Why?

      Do you have any goals at the moment?
- If so, what are they? If not, why do you think you don't have a goal?
- Do you know what steps are needed to reach this goal? If so, what are the steps?
- Do you feel prepared to take the next step? Why or why not?

      What are the main apps or websites you use?
- What do you do on those apps or websites?
- Do you post on the apps/websites or mostly just watch? If you post, how often? What kinds of things do you post?

I'm going to show you an early idea for an app or website we could create to support young people like you. This is a very rough draft, because we want to get your thoughts before we actually make anything, so please don't hesitate to say what you don't like or what you think should change! We want to know now so we can actually make something you'd want to use. Also, there are no right or wrong answers - we are testing the app, NOT you.

Imagine that your case worker tells you about a new website and phone app specifically designed to help young people who have experienced foster care connect and support each other.
- [Intro] You download the app on your phone (or open it on a computer) and this is the first screen you see.
- [For each screen]
  - What are your first impressions of this screen?
    - What do you like about it?
    - What do you dislike about it?
    - Is there anything that you found confusing or surprising?
  - What do you think this screen is asking you to do?
  - What would you click on/do from here, if anything?
- Now that you've seen the whole app, do you have any feedback on how we can make it more useful for young people who have experienced foster care?
- Would you actually use this app?
  - Why or why not?
  - Would you post yourself? How often?
  - Would you read others' posts? How often?
- Do you think this app would fill any need in your life?
  - Why or why not?
  - What do you think we could create that would fill a need in your life?
- What would you want this app to do that it doesn't do?

As we continue learning from the community, we may reach out to see if you have feedback on what we're learning/creating. This would look like another interview or survey where we share some of our findings and ask whether you think it resonates with your experience. Are you comfortable with us reaching out with this kind of optional interview or survey?

Closing

Thank you so much for your time and energy today. We really appreciate you sharing your wisdom and experience with us.

As a thank you for your time, we would like to give you a $35 Star Market, Uber, or Amazon gift card. Which one would you like?

We will send that over to you right after this interview, to the email you used to contact us. If you do not see it within 48 hours please reach out to us.

We acknowledge that talking about these issues can, at times, be uncomfortable. We want to ensure you have additional support if you choose, and share some resources that can help [share mental health resources in zoom chat or physically].

If you have any feedback on the process of being in this interview today, feel free to contact us at ilak@media.mit.edu or 267-467-8618.

10.4   Phase 2 workshop agendas

10.4.1   Workshop 1: Introduction

The goal of the first workshop was to introduce participants to the research team and the project. In this 60 min workshop, everyone introduced themselves, then the research team lead introduced herself and provided an overview of the research process thus far. All participants already knew one another due to their experience working at Stepping Forward LA, which meant that we focused on activities that would help them get to know the research team and the project. We then introduced the take-home assignment, which was to create a list of existing digital mental health tools and take notes on what seems like it could be helpful for foster youth. This assignment was designed to provide participants with context on what exists in the field of mental health technology and give them practice in thinking critically about the design of this technology and how it may or may not meet the needs of current and former foster youth. We also assigned this to participants because we had a significant gap between the first and second workshops (6 weeks), and felt that this would be a good asynchronous task to get participants in the right headspace for the subsequent workshops. Participants were also asked to participate in one-on-one prototype testing interviews (as described in Section 5.1) between the first and second workshops, to give them an opportunity to provide input on the app without risk of being influenced by their peers.

10.4.2   Workshop 2: Pilot app design

Between the first and second workshops (after all participants completed the prototype testing interviews), we synthesized the results of the one-on-one prototype testing interviews (as described in Section 5.4). We then used the findings to inform the design of a pilot app (as described in Section 5.5). The second workshop focused on gathering feedback on this pilot app design. In this 120 min workshop, we started by having all participants (including the facilitators) "check in" by sharing a high and low of their past week. This was in part to have participants practice the core exercise of the pilot app. We felt

that having the design team use the tool that we were designing would give the team a deeper understanding of what it would be like to be an end user of the app, which would enable them to provide better design feedback. We were also aware that staff members were dealing with various challenges in their lives (such as medical issues, being a young single parent, or unstable housing). By encouraging them to share what they were dealing with presently, the check-in activity also helped the group (and particularly the facilitators) be sensitive to one another's mood and provide support when needed. The facilitators participated in the check-in activity as well to model vulnerability and create a sense of equality amongst the group members (although we acknowledge that there were still power imbalances inherent to the team structure).

After the check-in, we presented each of the core screens of the pilot app design and then gave participants time to independently write down their feedback (specifically, what they liked, what they disliked, and what suggestions they had). After everyone had finished writing their feedback, we asked participants to share out their top feedback for each screen, giving them time to build off of each others' thoughts. We made sure to provide independent writing time prior to group discussion because we wanted to capture each person's thoughts before they might be influenced by others, and also to accommodate individuals who need some time to think before being ready to contribute. At the same time, we wanted to end with group discussion because we felt that participants might come up with new ideas or think of additional suggestions inspired by what others said. Additionally, we felt that it might be interesting for participants to hear what others thought, and might help them further develop their critical thinking and user experience design skills. We used the written and discussion feedback to iterate on the pilot app design.

10.4.3 Workshop 3: Feature deep dive, part 1

In Workshop 3, our goal was to codesign specific features of the pilot app design, given that the group was now very familiar with the core elements of the proposed app. At the start of this 120 min workshop, we first led the group through the same check-in exercise as in Workshop 2 (see Section 9.3.2 for details). Then, we presented two features to the group and gave them time to think about them and provide written input before opening the floor for a group discussion (for the reasons described in Section 9.3.2). The two features we focused on in this workshop were the reaction options for public check-ins, and the feeling options users could select when creating a check-in. We chose these features because they were underdeveloped at the time of prototype-testing interviews so had not received adequate feedback from current or former foster youth, and also because we felt that these were features that could benefit from group discussion and iteration based on the constraints of the platform.

10.4.4 Workshop 4: Feature deep dive, part 2

Like Workshop 3, Workshop 4 centered on codesigning specific features of the pilot app with participants. This 90 min workshop began with the same check-in exercise used in previous workshops (see Section 9.3.2 for details). Then, we shared the updates made based on the feedback received in Workshop 3. We asked participants if they had any questions or disagreed with any of the choices made, to hold us accountable and bring us closer to shared decision-making practices. There was one idea that was not implemented, so we made sure to provide rationale and open up a conversation about other alternatives, staying on the topic until everyone felt satisfied with the decisions being made. We then presented another feature for feedback - tags that users could use to describe their current environment and filter public check-in posts (to see content from others in similar situations). Like in past workshops, we gave participants an opportunity to reflect and write silently before opening the floor for group discussion (see rationale in Section 9.3.2). After this, we presented a take-home assignment, which was to write a check-in post every day for the upcoming week, following the same structure as in the pilot app. We assigned this to participants so that they could test out the core activity of the app (to do a daily check-in) and also create sample posts that could later seed the platform at the start of the pilot study.

10.4.5 Workshop 5: Pilot study design

In Workshop 5, we focused on having participants help design the pilot study questionnaires and recruitment materials, with the goal of creating content that would be accessible and relevant for current and former foster youth. This workshop was 60 min long and began with the same check-in exercise as previous workshops (see Section 9.3.2 for details). Then, we presented an overview of the study methods, to contextualize the study materials we wanted to work on together. After this, we had participants fill out draft versions of the questionnaires so that they could get a sense of what it would be like to be a participant in the study. Then, we hosted a discussion about what they liked and disliked, and what they felt could be improved. We planned to begin with silent writing like in previous workshops, but all participants said they preferred to jump straight into conversation, perhaps because they had already had silent reflection time when filling out the surveys or because they felt enough familiarity with the group and the study to share their honest opinions in a conversation setting. Finally, we shared the draft recruitment materials and had a similar discussion about what they felt should be improved about that. We used the input received to iterate on the study materials before beginning pilot study recruitment.

10.5 App content

10.5.1 Community guidelines

Be kind
- No name calling, trolling, threats, or insults

Be safe
- No asking for or sharing identifiable information
- No sexually suggestive content
- No discussion of illegal activities

Prioritize comfort
- No discussion of suicide, self-harm, abuse, or disordered eating
- No cursing

10.5.2 Emotion categories and options

Happy
- 😌Content
- 😃Excited
- 😁Proud
- 😌Confident
- 😊Hopeful

Surprised
- 🙁Confused
- 😱Shocked
- 😫Overwhelmed
- 🧐Curious

Peaceful
- 🙂Calm
- 🥰Loving
- 😎Relaxed
- 🤔Thoughtful

Sad
- 😶Lonely
- 😮‍💨Low
- 😔Disappointed
- 😣Hurt

Angry
- 😠Mad
- 😒Offended
- 😦Jealous
- 😤Frustrated

Scared
- 😰Anxious
- 😟Worried
- 😅Nervous
- 🥺Shy

10.5.3 Resource page content

If you are in crisis or need support with a serious mental health concern, contact an emergency service.
- National Suicide Prevention Lifeline: Call or text 988
- Crisis Text Line: Text 741-741
- The Trevor Project (LGBTQ crisis support): Call 1-866-488-7386 or text 678-678
- findhelp (resources/services): https://www.findhelp.org/
- TeenTalk (teen peer support): App Store or Google Play

10.5.4 User tags (and Community Feed filters)

Current relationship to foster care
- Formerly in foster care
- Currently in foster home
- Currently in group home
- Currently in kinship care

Current school status
- High school
- Working towards GED
- Trade school
- College
- Masters or PhD

Current job status
- Looking for a job
- Employed
- Taking a break

10.6 Developed app screens
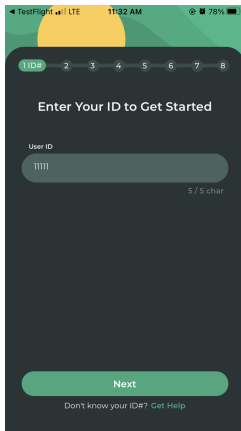
Figure 35: Developed App, ID Entry
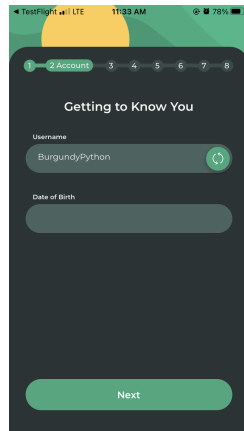
Figure 36: Developed App, Basic Info
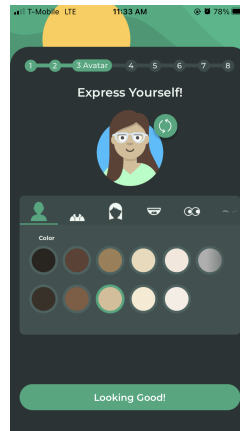
Figure 37: Developed App, Avatar Creator
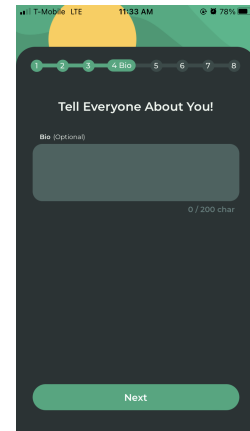
Figure 38: Developed App, Bio
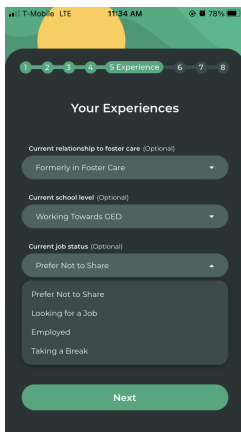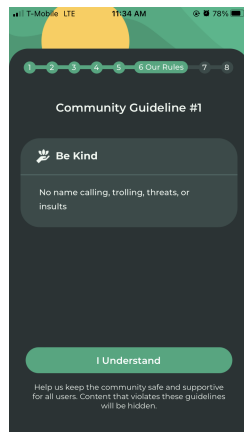

Figure 39: Developed App, Experiences

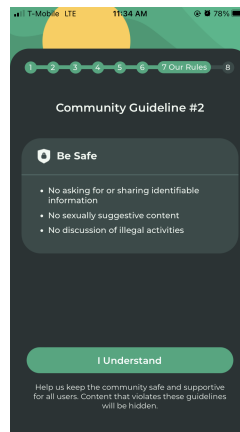Figure 40: Developed App, Community Guideline #1
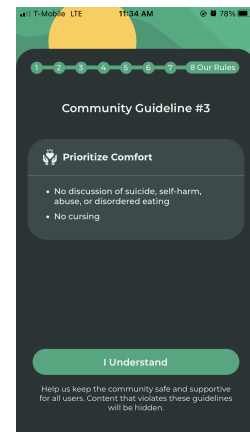

Figure 41: Developed App, Community Guideline #2
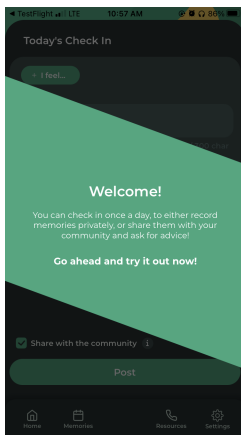

Figure 42: Developed App, Community Guideline #3

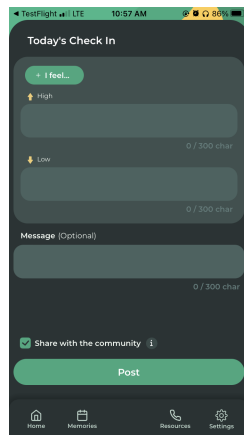Figure 43: Developed App, Welcome Banner
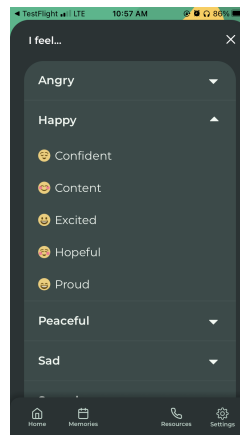

Figure 44: Developed App, Check-in Form

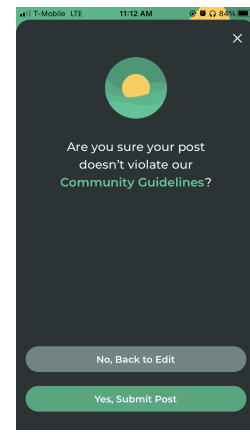Figure 45: Developed App, Feelings Dropdown

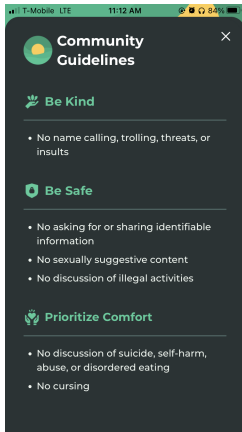Figure 46: Developed App, Flagged Content Pop-Up

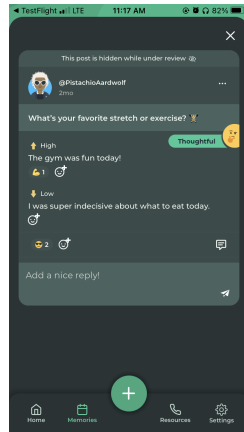Figure 47: Developed App, Community Guidelines Full List
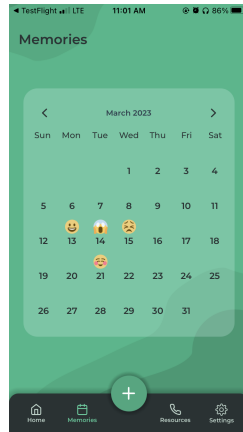

Figure 48: Developed App, Post Under Review

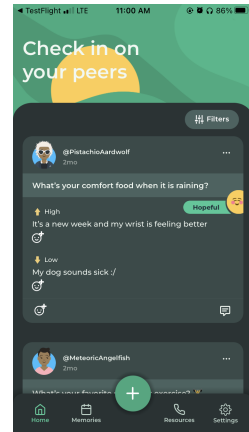Figure 49: Developed App, Memories
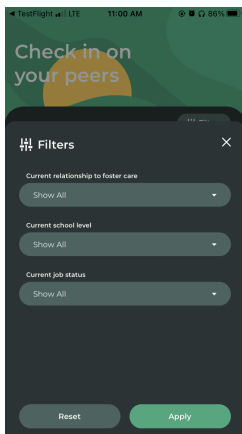

Figure 50: Developed App, Feed
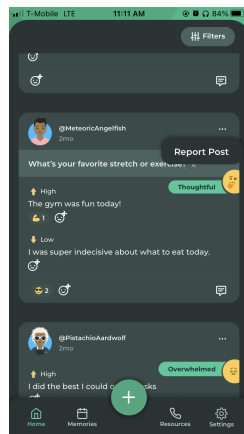

Figure 51: Developed App, Filters
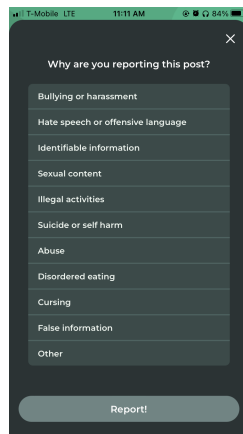

Figure 52: Developed App, Report Feature

Figure 53: Developed App, Report Reasons
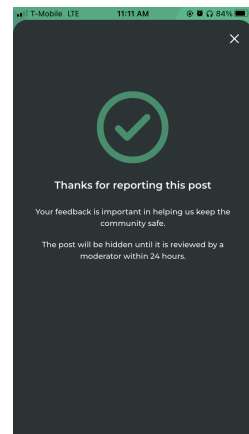
Figure 54: Developed App, Report Confirmation
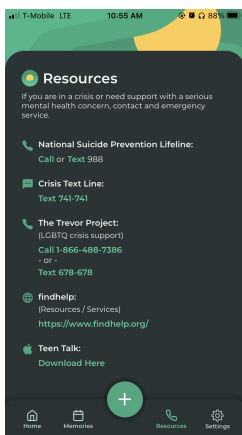
Figure 55: Developed App, Resources
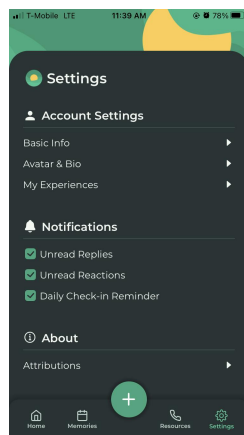
Figure 56: Developed App, Settings

10.7 Phase 3 recruitment flyer

Try a new app, get a $100 gift card!

MIT Media Lab* is running a study to evaluate how a new mobile app might be able to support young people who have experienced foster care.

Eligibility criteria

- 16 - 24 years old
- Currently or previously in foster care
- Has an iPhone or Android phone

We will ask you to

- Participate in **three 15-30 min study webinars** on the following dates:
  - Monday, Feb 27th or Tuesday, Feb 28th
  - Monday, Mar 13th or Tuesday, Mar 14th
  - Monday, Mar 27th or Tuesday, Mar 28th
- **Check in on the app once a day for two weeks**, from 3/15 to 3/28
- (Optional) Do a 30 min online follow-up interview for $20 more

Reward

$100 Amazon gift card, plus a $20 Amazon gift card if you are chosen to participate in an optional 30-minute follow-up interview
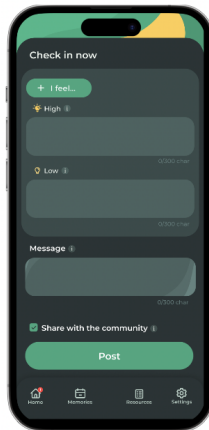
1. Check in on the app once a day**
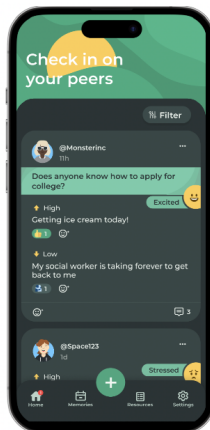
2. Connect with and get support from others in similar situations**

3. See how your feelings and thoughts change over time**

* The Media Laboratory at the Massachusetts Institute of Technology
** App still in development, screens subject to change

10.8 Phase 3 touchpoint questionnaires

10.8.1 Touchpoint 1 questionnaire

1. First name

a. Open response box
    2. Last name
           a. Open response box
    3. Email address
           a. Open response box with email validation
    4. How old are you?
           a. Open response box with age validation (must be positive, less than 120)
    5. What is your experience with foster care?
           a. I am currently in the foster care system
           b. I was previously in the foster care system
           c. Neither, I have not been in the foster care system
    6. Do you have a smartphone?
           a. Yes, an iPhone
           b. Yes, an Android
           c. No

[If they are eligible]

        Congratulations! You are eligible to participate in this study.

        In this study, you will be asked to:
          - Complete the rest of this form now
          - In two weeks, complete a second survey and download the app to your mobile device
          - Use the app at least once a day. You must post a check-in, but the rest is up to you.
          - Complete a final survey and share your opinions about the app

You will receive a $100 gift card if you complete a daily check-in on the app ~80% of the time and complete the study's short required surveys.

If you participate in an optional 30-minute follow up Zoom interview, you will receive an additional $20 Amazon, Uber, or Apple gift card compensation.

[If they are not eligible]

        Sorry, you are not eligible to participate in this study.

        If you find yourself feeling anxious, sad, or angry after completing this survey, or just want some extra support, here are some resources that can help.
          ● National Suicide Prevention Lifeline: Call or text 988
          ● Crisis Text Line: Text 741-741
          ● The Trevor Project (LGBTQ crisis support): Call 1-866-488-7386 or text 678-678
          ● findhelp (resources/services): https://www.findhelp.org/
          ● TeenTalk (teen peer support): App Store or Google Play

        <end of survey>

CONSENT TO PARTICIPATE IN RESEARCH FOR ADULTS AND MINORS
Designing Technology to Support the Psychological Well-being of Teenage Foster-Involved Youth: Pilot Study

You have been asked to participate in a research study conducted by Ila Kumar, BA and Rosalind Picard PhD from the Media Laboratory at the Massachusetts Institute of Technology (M.I.T.). The results of this study will contribute to Ila Kumar's Master's Thesis.

You were selected as a possible participant in this study because you have experience with the United States foster care system.

<div style="border:1px solid black; padding:1em;">

The information below provides a summary of the research. Your participation in this research is voluntary and you can withdraw at any time.

Purpose
The goal of this study is to explore if and how a novel mobile application might be able to support youth in the United States foster care system.

Study Procedures
You will first be asked to complete a short questionnaire, either in a webinar or on your own. In two weeks, you will be asked to join a 15-30 min study webinar, in which you will be asked to complete another short questionnaire and then will be guided through the process of downloading a digital application that has been created for current and former foster youth. You will then be asked to check in on the app for 2 weeks, at least once a day. Afterward, you will be asked to join another 15-30 min study webinar, in which you will be asked to complete a third questionnaire. If you are unable to attend the second or third webinar, we will send you the relevant questionnaire/steps to complete on your own by a specific date. Upon completing these steps, you will receive a $100 Amazon, Uber, or Apple gift card as compensation for your participation. You may be invited to participate in an optional 30-minute follow-up interview as well, for an additional $20 Amazon, Uber, or Apple gift card compensation.

Risks & Potential Discomfort
You may feel anxious, sad, and/or angry as you remember or share about your past experiences. You do not need to answer any question that makes you uncomfortable, and you can stop your participation at any time. The study questionnaires and interventions will share mental health resources that you can use at any time if you are experiencing distress during or after the study.

</div>

You should read the information below, and ask questions about anything you do not understand before deciding whether or not to participate.

If you have any questions or concerns, please feel free to contact Ila Kumar at:
ilak@media.mit.edu
267-467-8618

· **PARTICIPATION AND WITHDRAWAL**

Your participation in this study is completely voluntary and you are free to choose whether to be in it or not. If you choose to be in this study, you may subsequently withdraw from it at any time without penalty or consequences of any kind. The investigator may withdraw you from this research if circumstances arise.

· **PURPOSE OF THE STUDY**

The goal of this study is to explore if and how a novel mobile application might be able to support youth in the United States foster care system.

- **PROCEDURES**

  You will first be asked to complete a short questionnaire, either in a webinar or on your own. In two weeks, you will be asked to join a 15-30 min study webinar, in which you will be asked to complete another short questionnaire and then will be guided through the process of downloading a digital application that has been created for current and former foster youth. You will then be asked to check in on the app for 2 weeks, at least once a day. Afterward, you will be asked to join another 15-30 min study webinar, in which you will be asked to complete a third questionnaire. If you are unable to attend the second or third webinar, we will send you the relevant questionnaire/steps to complete on your own by a specific date. Upon completing these steps, you will receive a $100 Amazon, Uber, or Apple gift card as compensation for your participation. You may be invited to participate in an optional 30-minute follow-up interview as well, for an additional $20 Amazon, Uber, or Apple gift card compensation.

- **POTENTIAL RISKS AND DISCOMFORTS**

You may feel anxious, sad, and/or angry as you remember or share about your past experiences. You do not need to answer any question that makes you uncomfortable, and you can stop your participation at any time. The study questionnaires and interventions will share mental health resources that you can use at any time if you are experiencing distress during or after the study.

- **POTENTIAL BENEFITS**

There will be no direct personal benefit to you from taking part in this study.

However, you may find it fulfilling to be part of research that will inform the design of new technology that can improve the well-being of foster youth.

- **PAYMENT FOR PARTICIPATION**

You will receive a $100 Amazon, Uber, or Apple gift card as compensation for your time and participation in the study. If you are invited to and choose to participate in an optional 30-minute interview after the study, you will receive an additional $20 Amazon, Uber, or Apple gift card.

- **PRIVACY AND CONFIDENTIALITY**

The only people who will know that you are a research participant are members of the research team, which might include outside collaborators not affiliated with MIT. No information about you, or provided by you during the research will be disclosed to others without your written permission, except: if necessary to protect your rights or welfare, or if required by law. In addition, your information may be reviewed by authorized MIT representatives to ensure compliance with MIT policies and procedures.

You have the right to review or edit any video or audio of yourself from the interview. Contact Ila Kumar at ilak@media.mit.edu or 267-467-8618 if you would like to do this.

The data files will be coded, but your identity will be viewable in video or audio recordings if you choose to share identifiable information in a post-study interview. The data will be stored on secure,

password-protected computer networks at MIT. Only the research team will have access to this data. The recordings will be kept for a minimum of 3 years before being erased.

When the results of the research are published or discussed in conferences, no information will be included that would reveal your identity. If photographs, videos, or audio-tape recordings of you will be used for educational purposes, your identity will be protected or disguised.

· **IDENTIFICATION OF INVESTIGATORS**

If you have any questions or concerns about the research, please feel free to contact a member of the research team below.

Ila Kumar
ilak@media.mit.edu
267-467-8618

Dr. Rosalind Picard
picard@media.mit.edu

· **EMERGENCY CARE AND COMPENSATION FOR INJURY**

If you feel you have suffered an injury, which may include emotional trauma, as a result of participating in this study, please contact Ila Kumar as soon as possible at 267-467-8618 or ilak@media.mit.edu.

In the event you suffer such an injury, M.I.T. may provide itself, or arrange for the provision of, emergency transport or medical treatment, including emergency treatment and follow-up care, as needed, or reimbursement for such medical services. M.I.T. does not provide any other form of compensation for injury. In any case, neither the offer to provide medical assistance, nor the actual provision of medical services shall be considered an admission of fault or acceptance of liability. Questions regarding this policy may be directed to MIT's Insurance Office, (617) 253-2823. Your insurance carrier may be billed for the cost of emergency transport or medical treatment, if such services are determined not to be directly related to your participation in this study.

· **RIGHTS OF RESEARCH PARTICIPANTS**

You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you feel you have been treated unfairly, or you have questions regarding your rights as a research participant, you can contact the Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E25-143B, 77 Massachusetts Ave, Cambridge, MA 02139, phone 1-617-253 6787.

| SIGNATURE OF RESEARCH PARTICIPANT OR LEGAL REPRESENTATIVE |

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study.

[ ] I give permission to be recorded if I attend an optional study follow-up interview.

_____
Name of Participant

_____
Name of Legal Representative (if applicable)

_____   _____
Signature of Participant   Date

_____   _____
Legal Representative (if applicable)   Date

MINOR ASSENT (ages 15-17)

I have read (or someone has read to me) the information provided above. I have been given an opportunity to ask questions and all of my questions have been answered to my satisfaction. I have been given a copy of this form. By signing my name at the bottom, I willingly agree to be in this study.

_____
Name of Minor Participant

_____   _____
Signature of Minor Participant   Date

DEMOGRAPHICS

We acknowledge that some demographics questions may not cover the full spectrum of identifies so the options we provide may not be a comfortable fit for you. Feel free to omit answers, select "prefer not to say", or write in a chosen term.

7. What best describes your race (choose all that apply):
   a. American Indian or Alaska Native
   b. Asian
   c. Black/African American
   d. Hispanic/Latinx
   e. Native Hawaiian or Other Pacific Islander
   f. White/Caucasian
   g. Prefer not to say
   h. Other (   )
8. What is your gender?
   a. Man
   b. Woman
   c. Non-binary
   d. Gender non-conforming
   e. Prefer not to say
   f. Other (   )
9. Are you:
   a. Transgender
   b. Cisgender
   c. I'm not sure
   d. Prefer not to say
   e. Other (   )

10. Do you consider yourself to be (choose all that apply):
    a. Heterosexual
    b. Gay
    c. Bisexual
    d. Lesbian
    e. Pansexual
    f. Asexual
    g. Prefer not to say
    h. Other (   )
11. What types of foster care do you have experience with?
    a. Foster home
    b. Group home
    c. Kinship care
    d. Other (please specify)
    e. Prefer not to say
12. *[If they were previously in foster care]* What age did you leave foster care?
    a. Open response box with age validation (must be positive, less than 120)

To what extent do each of the following statements describe how you feel? (Silvia, 2022)
[1 = strongly disagree / 7 = strongly agree]
13. I frequently examine my feelings
14. I frequently take time to reflect on my thoughts
15. I often think about the way I feel about things
16. It is important to me to evaluate the things that I do
17. I am very interested in examining what I think about
18. It is important to me to try to understand what my feelings mean

Please think about how you felt **over the last 2 weeks**. To what extent do each of the following statements describe how you felt? Note: when we say people, we mean in person or online. (Lok & Dunn, 2022)
[1 = strongly disagree / 7 = strongly agree]
19. I felt distant from people
20. I didn't feel related to most people
21. I felt like an outsider
22. I felt like I was able to connect with other people
23. I felt disconnected from the world around me
24. I felt close to people
25. I saw people as friendly and approachable
26. I felt accepted by others
27. I had a sense of belonging
28. I felt a strong bond with other people

29. Do you have enough of the following resources? (More than enough/Enough/Almost enough/Not quite enough/Not enough)
    a. Clothing
    b. Healthy food
    c. Stable housing
    d. Healthcare
    e. Mental health services
    f. Supportive friends/family
30. Are there any other resources you wish you had more of?

      a. Open response box
31. What is your main reason for wanting to participate in this study? Select all that apply.
      a. Interest in technology
      b. Interest in helping support foster youth
      c. Gift card compensation
      d. Someone asked me to
      e. Other (please specify)

Thank you for filling out this questionnaire and for participating in our study! We greatly appreciate your time.

Please reach out to us at ilak@media.mit.edu if you have any questions or concerns.

Additionally, if you find yourself feeling anxious, sad, or angry after completing this survey, or just want some extra support, here are some resources that can help.
- National Suicide Prevention Lifeline: Call or text 988
- Crisis Text Line: Text 741-741
- The Trevor Project (LGBTQ crisis support): Call 1-866-488-7386 or text 678-678
- findhelp (resources/services): https://www.findhelp.org/
- TeenTalk (teen peer support): App Store or Google Play

10.8.2 Touchpoint 2 questionnaire

1. First name
      a. Open response box
2. Last name
      a. Open response box
3. Email address
      a. Open response box with email validation

To what extent do each of the following statements describe how you feel? (Silvia, 2022)
[1 = strongly disagree / 7 = strongly agree]
4. I frequently examine my feelings
5. I frequently take time to reflect on my thoughts
6. I often think about the way I feel about things
7. It is important to me to evaluate the things that I do
8. I am very interested in examining what I think about
9. It is important to me to try to understand what my feelings mean

Please think about how you felt **over the last 2 weeks**. To what extent do each of the following statements describe how you felt? Note: when we say people, we mean in person or online. (Lok & Dunn, 2022)

[1 = strongly disagree / 7 = strongly agree]

10. I felt distant from people
11. I didn't feel related to most people
12. I felt like an outsider
13. I felt like I was able to connect with other people
14. I felt disconnected from the world around me
15. I felt close to people
16. I saw people as friendly and approachable
17. I felt accepted by others
18. I had a sense of belonging
19. I felt a strong bond with other people

Thank you for filling out this questionnaire and for participating in our study! We greatly appreciate your time.

Please reach out to us at ilak@media.mit.edu if you have any questions or concerns.

Additionally, if you find yourself feeling anxious, sad, or angry after completing this survey, or just want some extra support, here are some resources that can help.

- National Suicide Prevention Lifeline: Call or text 988
- Crisis Text Line: Text 741-741
- The Trevor Project (LGBTQ crisis support): Call 1-866-488-7386 or text 678-678
- findhelp (resources/services): https://www.findhelp.org/
- TeenTalk (teen peer support): App Store or Google Play

10.8.3 Touchpoint 3 questionnaire

20. First name
    a. Open response box
21. Last name
    a. Open response box
22. Email address
    a. Open response box with email validation

To what extent do each of the following statements describe how you feel? (Silvia, 2022)
[1 = strongly disagree / 7 = strongly agree]
23. I frequently examine my feelings
24. I frequently take time to reflect on my thoughts
25. I often think about the way I feel about things
26. It is important to me to evaluate the things that I do
27. I am very interested in examining what I think about
28. It is important to me to try to understand what my feelings mean

Please think about how you felt **over the last 2 weeks**. To what extent do each of the following statements describe how you felt? *Note: when we say people, we mean in person or online.* (Lok & Dunn, 2022)
[1 = strongly disagree / 7 = strongly agree]
29. I felt distant from people
30. I didn't feel related to most people
31. I felt like an outsider
32. I felt like I was able to connect with other people
33. I felt disconnected from the world around me
34. I felt close to people
35. I saw people as friendly and approachable
36. I felt accepted by others
37. I had a sense of belonging
38. I felt a strong bond with other people

39. How often did you post a check-in on the app?
    a. Every day
    b. Most days
    c. Half of the days
    d. A few days
    e. Never
    f. I can't remember
40. What did you like or find helpful about the app?
    a. Open response box
41. What did you dislike about the app?
    a. Open response box
42. What would you change about the app to make it more useful for current and former foster youth?
    a. Open response box

43. Would you recommend this app to current and former foster youth?
    a. (1) Not at all - I would not recommend this app to any foster youth
    b. (2)
    c. (3) Maybe - I would recommend this app to some foster youth
    d. (4)
    e. (5) Definitely - I would recommend this app to all foster youth
44. Tell us why you gave that answer.
    a. Open response box
45. How likely would you be to use this app in the future?
    a. Extremely Unlikely
    b. Unlikely
    c. Neutral

- d. Likely
- e. Extremely Likely
46. Tell us why you gave that answer.
    - a. Open response box
47. What is your overall (star) rating of the app?
    - a. (1) One of the worst apps I've used
    - b. (2)
    - c. (3) Average
    - d. (4)
    - e. (5) One of the best apps I've used
48. Is this app similar to any other apps you've used? If so, please name them below.
    - a. Open response box.

49. On a scale from 1 ("Not at all") to 5 ("A lot"), with 0 being "Did not use", to what extent did you enjoy the app feature of…
    - a. Writing highs and lows for your check-in post (Check-in form)
    - b. Writing questions in your check-in post (Check-in form)
    - c. Selecting a feeling for your check-in post (Check-in form)
    - d. Reading other people's check-ins (Community feed)
    - e. Reacting or commenting on other people's check-ins (Community feed)
    - f. Revisiting your past check-ins (Memories page)
50. On a scale from 1 ("Not at all") to 5 ("A lot"), with 0 being "Did not use", to what extent did these factors motivate you to keep using the app?
    - a. Writing highs and lows for your check-in post (Check-in form)
    - b. Writing questions in your check-in post (Check-in form)
    - c. Selecting a feeling for your check-in post (Check-in form)
    - d. Reading other people's check-ins (Community feed)
    - e. Reacting or commenting on other people's check-ins (Community feed)
    - f. Revisiting your past check-ins (Memories page)
    - g. Receiving reactions or comments on your check-ins (Memories page)
51. On a scale from 1 ("Not at all") to 5 ("A lot"), with 0 being "Did not use", to what extent did the following features help you reflect on your feelings?
    - a. Writing check-ins (Check-in form)
    - b. Reading other people's check-ins (Community feed)
    - c. Revisiting your past check-ins (Memories page)

52. How often did you **get useful advice or information** from the app?
    - a. Never
    - b. A few days
    - c. Half of the days
    - d. Most days
    - e. Every day
    - f. I can't remember
53. How often did you try to **give advice or information** on the app?
    - a. Never
    - b. A few days
    - c. Half of the days
    - d. Most days
    - e. Every day
    - f. I can't remember
54. How often did the app help you **feel understood or less upset** about something?

a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember
55. How often did you try to **help others feel understood or less upset** about something on the app?
   a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember
56. How often did the app help you **feel less alone or more connected** to others?
   a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember
57. How often did you try to **help others feel less alone or more connected** on the app?
   a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember
58. How often did the app help you **feel inspired or motivated** to pursue your goals?
   a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember
59. How often did you try to **help others feel inspired or motivated** to pursue their goals on the app?
   a. Never
   b. A few days
   c. Half of the days
   d. Most days
   e. Every day
   f. I can't remember

You're almost done, just two pages to go!! THANK YOU for your thoughtful feedback.

Think about your experience using the app over the past two weeks. To what extent do each of the following statements describe how you felt? (Brooke, 1995)
[Modified to be rated on a 7 pt scale, Strongly Agree to Strongly disagree]
   60. I think that I would like to use this app frequently.
   61. I found the app unnecessarily complex.
   62. I thought the app was easy to use.

63. I think that I would need the support of a technical person to be able to use this app.
64. I found the various functions in this app were well integrated.
65. I thought there was too much inconsistency in this app.
66. I would imagine that most people would learn to use this app very quickly.
67. I found the app very cumbersome to use.
68. I felt very confident using the app.
69. I needed to learn a lot of things before I could get going with this app.

70. If you have completed the study requirements, you will be emailed a $100 e-gift card in the next 7-10 business days. What kind of gift card would you like to receive?
    a. Amazon
    b. Uber
    c. Apple

71. Are you interested in participating in a 30 min follow-up video call to share more feedback, in exchange for an additional $20 gift card?
    a. Yes
    b. Maybe, ask me later
    c. No

72. Is there any other feedback you'd like to share with us?
    a. Open response box.

Thank you for filling out this questionnaire and for participating in our study! We greatly appreciate your time.

If you have completed the study requirements, you will be emailed a $100 e-gift card in the next 7-10 business days.

Please reach out to us at ilak@media.mit.edu if you have any questions or concerns.

Additionally, if you find yourself feeling anxious, sad, or angry after completing this survey, or just want some extra support, here are some resources that can help.
- National Suicide Prevention Lifeline: Call or text 988
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- findhelp (resources/services): https://www.findhelp.org/

- TeenTalk (teen peer support): App Store or Google Play