SUPPORTING SOLDIER MENTAL HEALTH DURING DEPLOYMENT CYCLES

Interventions through Mobile Applications and a Wearable Device

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"One of the greatest threats to our force is posttraumatic stress, depression, and other behavioral health concerns. This is not something we can change, but it is something we can treat. Break the silence and promote dialogue in your formations at home and in your communities. Seek help and take the first step in recovery and overall resiliency."

- Sergeant Major of the Army Daniel A. Dailey

TABLE OF CONTENTS

GRATITUDE

I am grateful for the U.S. Army and the Ft Bragg community.

Thank you for the biggest adventure of my life.

I am grateful for my cohorts and friends.

Thank you for motivating me to go beyond my self-imposed doubts and fears.

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I am grateful for my siblings.

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ABSTRACT

Of the 1.8 million U.S. soldiers deployed to Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan, an estimated 10-18% are likely to have returned home with Post Traumatic Stress Related Disorder (PTSD). Veterans account for 14-16% of suicides in the U.S., yet are 8% of the population. Professionals advise that PTSD treatment should begin as soon as symptoms are observed, which can occur immediately after the event. Delays in treatment can worsen the individual's symptoms. A decrease in marital satisfaction and an increase in depression, anxiety, anger, and addiction following deployments have been observed. Yet when soldiers are deployed, often for six to twelve months at a time, access to mental health care options are limited and under-utilized.

This research explores how a system of designed interventions may address the unique mental health care needs of soldiers on deployment. This project acknowledges the barriers and resistance to care and explores the prevailing stigma surrounding therapeutic and healthy coping skills within the military. Solutions are proposed which leverage the unique comradery of the military community to encourage new practices which support mental health care, emotional intelligence, and emotional processing. The first half of this study involved interviews with soldiers and behavioral health researchers, an analysis of the current mental health care options, and a taxonomy of therapy approaches. Next, rapid ideation produced an exploration of visual and systemic possibilities. These studies consider the user's environmental factors, anonymity requests, and long-term objectives.

The results of this research show that there is a desire, need, and potential for a variety of new mental health care options for soldiers during deployment.

section one

CONTEXT

"Healing is not linear."

- Unknown

INTRODUCTION

Afghanistan

On August 2, 2017, two soldiers from the 82nd Airborne Infantry Division were killed by a suicide bomber in Kandahar, Afghanistan (Shah & Mashal, 2017). The surviving members of their unit returned home in March of 2018 (Walters & Stump, 2018). Many of the soldiers impacted by these deaths did not have access to a mental health professional until they returned to the United States seven months after the attack.

CONTEXT

mental health and the military

The United States Department of Defense (DOD) is one of the world's largest employers with 1.3 million active duty soldiers and another 1.5 million civilian workers ("About the Department of Defense," 2017). In 2017, the DoD revealed that approximately 11,000 troops were deployed overseas (Sisk, 2017). The mental and emotion health of this population is crucial to the physical capabilities, behavioral choices, and cognitive processing effectiveness of completing their job duties. Moreover, providing easily accessible, destigmatized, personalized, and effective mental health care is not only a matter of national safety but also a matter of ethics.

Many active duty military units conduct mandatory daily physical training exercises as a group. This established routine often involves closing large sections of military bases to ensure the safety of participants as they run along streets and travel to and from fitness fields and gymnasiums. However, there is no parallel mental health activity to this physical ritual. In most instances, soldiers must determine on their own if they need the assistance of a therapist.

A 2009 study of soldiers returning from Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan concluded that of the 1.8 million US troops deployed, an estimated 10-18% are likely to have returned home with Post Traumatic Stress Related Disorder (PTSD) (Litz & Schlenger, 2009). The U.S. Department of Veteran Affairs (VA) states that some soldiers do not seek mental health care for fear of being perceived as weak, privacy concerns, treatment side effects, accessibility (cost, location of treatment), and effective treatment options ("Mental Health Effects of Serving in Afghanistan and Iraq", 2015).

CONTEXT

stigma

Former Command Sergeant Major of the Army (SMA) Raymond F. Chandler III was forthright in sharing his experience with suicide, traumatic brain injury, and PTSD. He communicated with Army soldiers regarding mental health care concerns stating, “If I can do [therapy], you can. The stigma is really within ourselves. There may be some folks out there that think you may be less because of those injuries but that’s really not [true]” (Hames, 2014). The current SMA, Daniel A. Dailey, has also expressed that “[PTSD] is not something we can change, but it is something we can treat…I urge everybody to break the silence and promote dialogue…seek help and take the first step in recovery in overall resiliency.” (The U.S. Army, 2017). During another speaking engagement, SMA Dailey goes further to say that securing an appointment with a mental health professional should be a common practice and as accepted as having a checkup at a dentist (Lopez, 2016). With the most senior Non-Commissioned Officers of the Army advocating for change, the perceptions and stigma that surround mental health care are slowly changing.

addressing the issue

Technology now allows a larger number of soldiers to fight remotely to avoid the trauma of death, violence, and direct fire. As a result, PTSD rates have been slowly decreasing since Vietnam (Kang et al., 2003). Yet many in the military community agree that more can be done.

CONTEXT

current mental health care opportunities

I discovered there are four predominate mental health care options (Figure 1.1) for soldiers on deployment:

Chaplain

Every military installation base has a Chaplain. A Chaplain is a religious leader who ministers to the soldiers. A Chaplain is often first suggested when a soldier is having issues ("About Army Chaplaincy", n.d).. Very few Chaplains have any training around mental health care and soldiers are hesitant to be seen by their peers entering the Chaplain's office.

Combat Operational Stress Control (COSC)

Select bases have a COSC teams. These teams have buildings where soldiers go to receive resources about managing stress. Educational information is usually delivered via pamphlets and brochures (Bosch, 2017).

eHealth and mHealth

A rising number of electronic health (eHealth) and mobile health (mHealth) applications and services provide meditation, journaling, and online counseling services. Continued use for mental health mobile applications falls upon the diligence of the user. With so many mHealth options to choose from, new users may find the number of choices overwhelming and difficult to choose.

Peers

If soldiers choose to speak about their mental health concerns, they are more likely to speak to another soldier. Because on their shared experiences, they feel that other soldiers will understand them better.

No one

Most often soldiers do not discuss their mental health. Fear of stigmatization, being perceived as weak, and lack of mental health knowledge prevents this population from discussing their issues (Warner et al., 2011).

Figure 1.1
Right: Visualization of options available to soldiers while in most combat zones. Chaplain, COSC materials, mHealth, and peers.

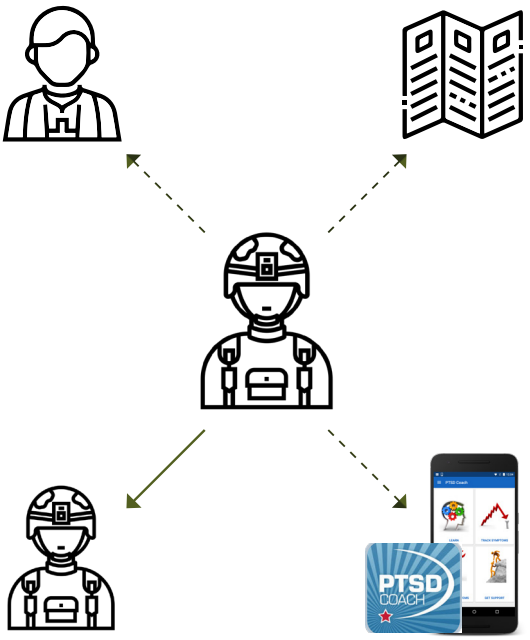


Figure 1.2
Bottom: Example of living conditions of soldiers. Higher ranking soldiers may have private rooms. Transitional periods may require soldiers to live in an open space.

CONTEXT

living situations

To further complicate this problem, the living conditions for soldiers in combat zones are often small and lack privacy. Depending on the base, higher ranking soldiers may have private bedrooms connected to common areas. Groups of soldiers may share large living quarters (Figure 1.2).

free time

For many on deployment, there is "down time." There is a public perception that soldiers are constantly working, moving, and fighting while on deployment. While this was true for earlier deployments in the War on Terror, many soldiers at the time of this research live on bases with full dining facilities, gyms, WiFi, and small shops. Soldiers I spoke with were able to complete online college classes, play video games, watch movies, and progress fitness goals during their time on deployment. Some soldiers will say the worst aspect of deployment is when they are not working or have an activity to distract themselves from their problems.

JUSTIFICATION

timing

Professionals advise that PTSD treatment should begin as soon as symptoms are observed, which can happen almost immediately after the event. Based on interviews conducted during this study, family members, friends, and co-workers are often the first to notice an initial change in behavior. Waiting to receive treatment can worsen the individual's symptoms over time (Mayo Clinic, 2018). In the time it takes to get back home and speak to a professional, soldiers have likely learned how to suppress and ignore the warning signs of anxiety, depression, and anger. This research will propose healthy coping which can be used in place of potentially dangerous or self-destructive responses to stress.

Soldiers returning home with PTSD are three times as likely to show signs of spousal aggression when compared to civilian relationships and are twice as likely to end their marriages in divorce (Karney, 2016; McCarrol, 2010). Military leaders are advocating for mental health awareness and treatment, yet soldiers are often unable to receive treatment soon after a potentially traumatic event occurs.

why the military

Although the military is most often associated with technological advancements related to warfare, the military has also created innovations that have found a way into civilian life. Tools such as the internet, GPS, duct tape, microwave ovens, digital cameras, canned food, penicillin, the EpiPen, and blood transfusions were all developed in part due to military-sponsored research (Willings, 2018). As such, the U.S. DOD is perfectly positioned to advance mental health care treatment and accessibility.

JUSTIFICATION

why designers

Designers are equipped with an array of user-centered research methods and tools that would contribute to this type of research. Along with an understanding of traditional design principles and elements (space, form, unity, hierarchy, balance, etc) which allows the creation of engaging and memorable visuals, designers value research practices. Interviewing, user testing, rapid prototyping, and the application and merging of behavioral frameworks are just some practices which allow designers to produce innovative, thought-provoking and meaningful products and services.

LIMITATIONS

scope

This research focuses on designing a system which communicates and presents existing and accepted cognitive behavioral therapy treatment practices directly to the soldier. I am not focused on the intricate details of cognitive behavioral therapy. However, acquiring this knowledge was beneficial during the design process, so that I may best serve my target audience. This research focused on designing a system which could realistically be implemented within the next five years. The soldier should also be able to find, enroll in, and utilize the service independently. Another military service member or contractor should not be required to connect the soldier to this service. The soldier should also be able to continue using the system post-deployment. My preliminary research found that anonymity is an important aspect of soldiers seeking treatment for PTSD. Thus, the system should promote anonymous use and treatment where appropriate and when necessary – but not at the cost of the soldier's safety.

Although this study references statistics and studies focused on individuals with PTSD, the purpose of this project is not to design for a user who is specifically diagnosed with PTSD. With my current knowledge, experience, resources, and timeframe for this project, I do not feel comfortable declaring that any of the work produced can responsibly treat or address signs and symptoms of combat related PTSD. While these users may find some benefit from the design solutions, I am designing for soldiers who experience other mental health concerns such as general stress, anxiety, depression, and feelings of sadness, confusion, guilt, or shame.

LIMITATIONS

stressors

When the general public hears of soldier stress in combat zones, they often picture dramatic and life-threatening events such as direct firefights, suicide bombers, and Improvised Explosive Devices (IED). Based on my interviews (at the time of this writing) the majority of deployed soldiers experience very little of these combat activities. Instead, soldiers hear of these events second hand. Soldiers report more common points of stress are the "mundane" worries such as maintaining relationships with loved ones back home, finances, career development and progression, and day-to-day job responsibilities (Center for the Study of Social Policy, n.d). (Figure 1.3).

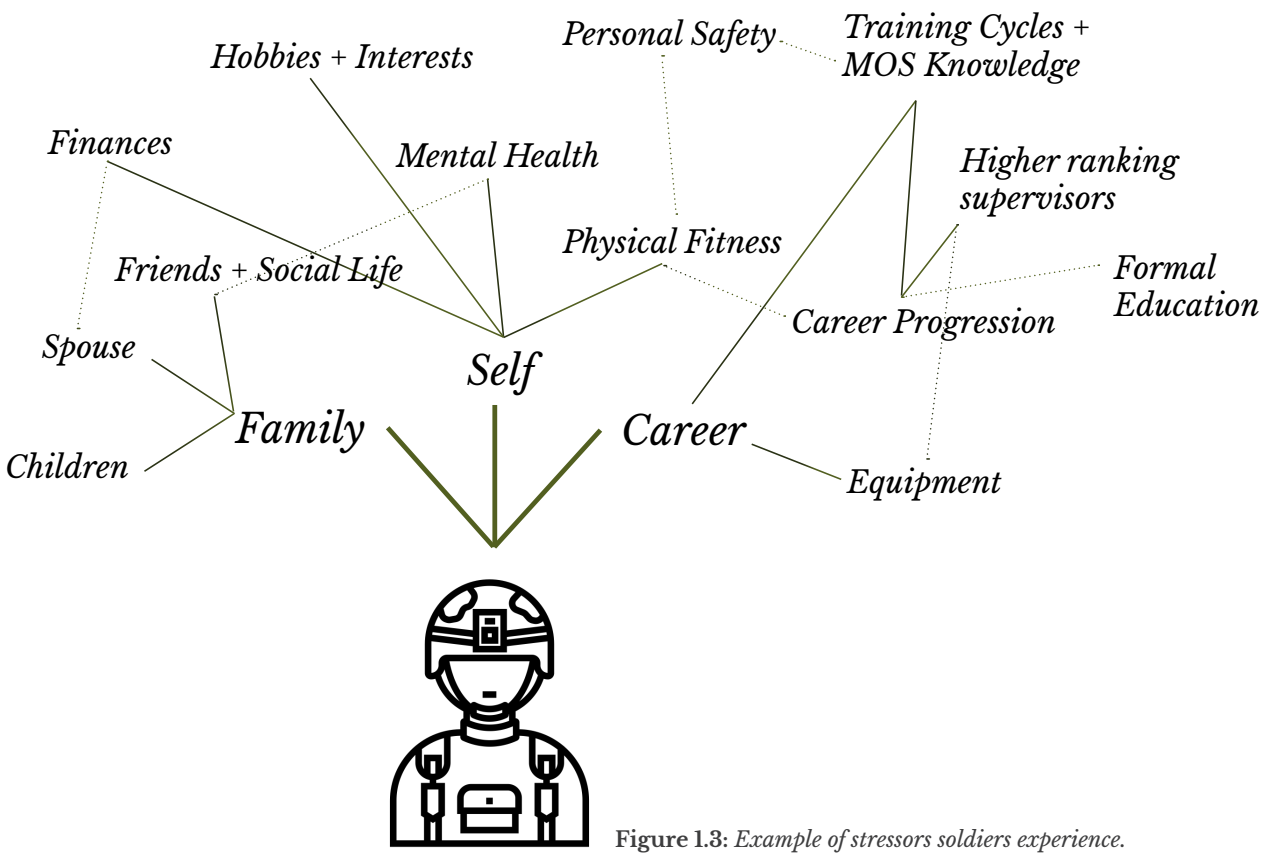


Figure 1.3: *Example of stressors soldiers experience.*

ASSUMPTIONS

understandings

This research focuses on designing a product or service with the use of mobile phones, computers, and wearable technology to allow Army soldiers in combat zones to address their mental health issues. Therefore, the following is assumed:

- *The Army would allow such a service to be accessible to the soldiers.*
- *Political complications associated with the implementation of a designed system of this type is not a concern.*
- *Soldiers would know that the system exists. (Lack of information dissemination pertaining to mental health care within the military is a current issue).*
- *Soldiers would willingly engage with the system.*
- *Internet access and any online health services provided would be secure and private.*
- *The service would inflict no risk to the soldier or the soldier's unit.*
- *Currently, active duty soldiers receive completely free health care. This product or service would also be free and present no cost-related barrier to entry.*
- *The soldier would utilize this system on their "down time" and not when they are required elsewhere for their job.*

LITERATURE

overview

Although this research required a general overview of many topics, the following articles were of particular importance to the development of the visual studies:

MENTAL HEALTH AND THE MILITARY: THE IMPORTANCE OF ANONYMITY

Importance of Anonymity to Encourage Honest Reporting in Mental Health Screening After Combat Deployment

Christopher H. Warner, MD; George N. Appenzeller, MD; Thomas Grieger, MD; Slava Belenkiy, MD; Jill Breitbach, PsyD; Jessica Parker, PsyD; Carolynn M. Warner, MD; Charles Hoge, MD

After returning home from deployment, US soldiers are required to take two tests to gauge their likelihood of depression, PTSD, and mental health illnesses. Both tests are conducted by a physician, physician's assistant, or a nurse practitioner who then determine if the soldier needs a referral to a specialist. The results of these tests are documented in the soldier's medical records.

The researchers (Warner, et al., 2011) conducted their own screenings where soldiers would remain anonymous. They found that 20% of soldiers felt uncomfortable reporting honestly with traditional mental health screenings. Furthermore, soldiers were two to four times more likely to screen positively for PTSD, depression, report relationship issues, share thoughts of losing control or hurting someone, suicidal ideation, and interest in seeking care. Warner et al (2011) believe that perpetuating stigma around mental health care prevents soldiers who may need help the most are preventing them from answering these tests honestly. However, the promise of anonymity will encourage more soldiers to come forward.

Anonymity was an important factor for many of the final visual explorations.

LITERATURE

MILITARY CULTURE: COMMUNITIES OF PRACTICE

Communities of Practice: A Brief Introduction

Etienne Wenger-Trayner and Beverly Wenger-Trayner

A Community of Practice (CoP) is formed when a group of individuals comes together under a common interest to exchange ideas, experience, and knowledge. The group actively seeks to further their understanding of the domain and disseminate the information amongst members. Some objectives for members may be to solve a problem, discuss developments, map knowledge, seek experience, and grow confidence in the subject matter.

CoPs were utilized in SCAN'D (See Figure 4.14)

MILITARY CULTURE: ONLINE PROFESSIONAL FORUMS

Army Operational Knowledge Management: Professional Forums

The United States Army Combined Arms Center's Army Operational Knowledge Management

What is more widely known as a "community of practice" the Army refers to as "professional forums" and focuses on leader development. The Army Operational Knowledge Management (AOKM) supports over 60 online professional forums where the exchange of knowledge can occur. Some of these forums develop tools, guidelines, and publications to disseminate the knowledge created. The current groups, while structured and included guided conversations, are "voluntary, self-organizing and self-policing."

LITERATURE

MILITARY CULTURE: SHIFTING PERSPECTIVES

Leading Change in Military Organizations: Primer for Senior Leaders

Published by Department of Command, Leadership, and Management within the United States Army War College. Written but Tom Galvin

Galvin's book argues that systemic change in a military is a multistep approach that can take many years depending on the size and scope of the issue being addressed. Galvin (2018) advises that in large organizations, "dismissing change as 'too hard' is unhelpful. There are ways to approach it, but it requires patience and collaboration" and that there is no perfect answer to complex problems. When reviewing some of the diagrams Galvin uses (Figure 1.4 and Figure 1.5), I found particular interest in Developing and Implementing Change (Figure 1.6). Currently, the army has diagnosed the institute as having a problem with soldiers and their mental health and there seems to be a loose vision for what they would like soldier mental health to look like. However, the vision, concept, and plan has not been definitely decided and disseminated among the participants of this system. This reading emphasized that change much occur throughout the entire system to have lasting results.

To address multiple concerns, multiple concepts were explored. Those can be seen in the visual studies section (p. 84)

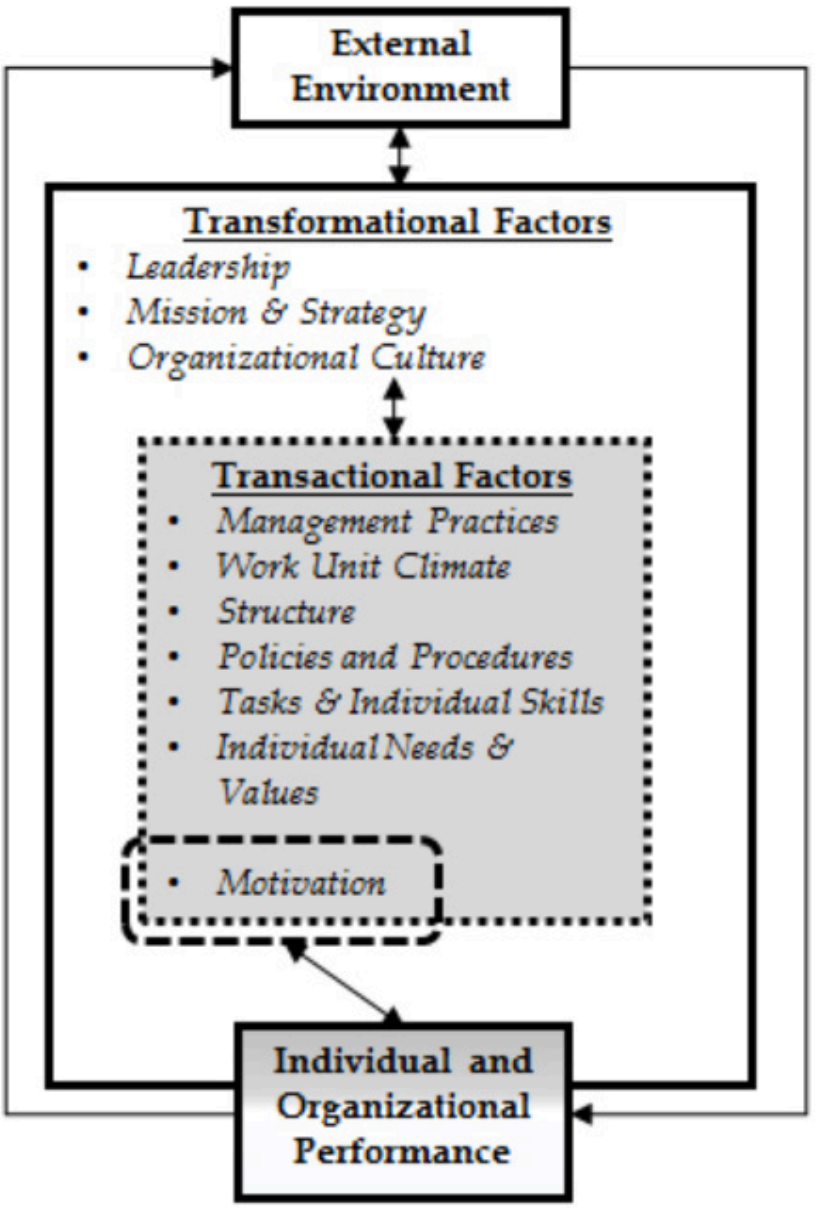


Figure 1.4: *Burke-Litwin (1992) model - simplified*

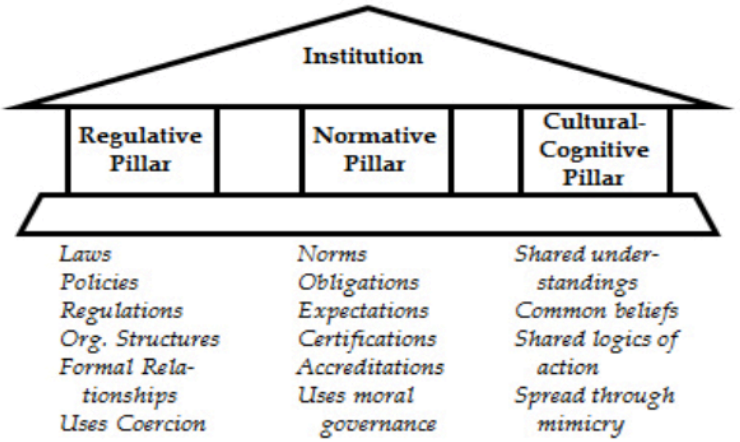


Figure 1.5: *Scott's three pillars of institutions*

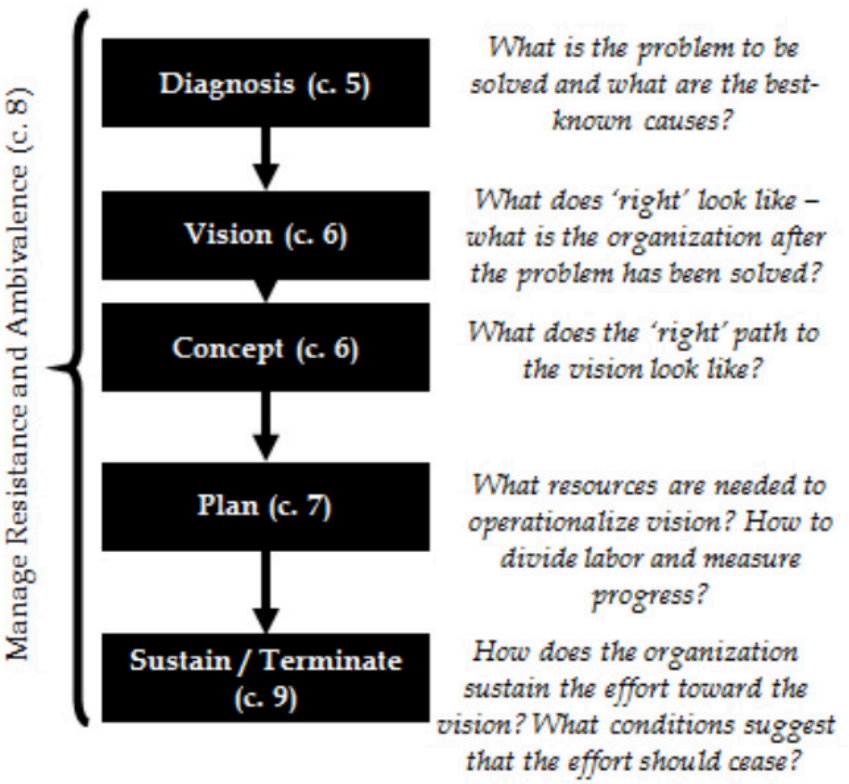


Figure 1.6: *Developing and implementing change*

LITERATURE

DESIGN + MENTAL HEALTH: INTERIOR DESIGN

Design for Mental Health Housing: Design Guidelines

Aine O'Reilly, Isoilde Dillon, Emer Whelan

While seeking design guidelines or suggestions for mental healthcare applications, I uncovered numerous books on the topic from the perspective of architecture, interior design, and housing design. One particular book (O'Reily, A., Dillon, I., & Whelan, E., 2016) found that people living in "poor internal and external features" were 29% to 58% more likely to experience depression. Borrowing from the established beliefs of interior design and architecture, I wondered how mobile application design could borrow from a related visual industry.

"Design for Mental Health: Housing Design Guidelines" related the design of housing for patients recovering from mental health issues to cognition, physical health, social disability, economic status, social life, and social violence. Some compelling considerations included the following:

- *Adding a chair to a bedroom if a patient has low stamina and needs assistance getting dressed in the morning.*
- *Limiting the number of possible distractions in the room to help the patient complete tasks.*
- *Having a coat rack and a mail bin so items have a designated place and do not result in visual clutter*
- *Allowing agency by encouraging residents to choose which housing unit will best fit their needs.*

There is an emphasis on creating "small wins" by identifying pain points and tailoring the environment to the user's behaviors.

These solutions adhere to scientifically-founded theories regarding mental health by personalizing the environment to each patient. "One size does not fit all" when it comes to designing for users with mental health concerns.

LITERATURE

DESIGN + MENTAL HEALTH: EXPERIENCE BASED CO-DESIGN

Co-design Services for Youth With Mental Health Issues: Novel Elicitation Approaches

Gillian Mulvale, Sandra Moll, Ashleigh Miatello, Louise Murray-Leung, Karlie Rogerson, Roberto B. Sassi

Experienced based co-design, as defined by this study, uses participatory research and design thinking to develop a product. This research suggests that when teams working on mental health applications for young adults partner with end users to create experience mapping, prototyping and interview videos, the final results are more impactful and have a greater likelihood to implement systemic change. These design research methods lead teams to "building common perspectives, building mutual understanding, and building innovation" alongside their stakeholders.

The visual studies (p. 84) were lead by user-centered research methods.

LITERATURE

DESIGN + MENTAL HEALTH: DESIGN FOR MHEALTH APPS

Mental Health Smartphone Apps: Review and Evidence-Based Recommendations for Future Developments

David Bakker, Nicklaos Kazantzis, Debra Rickwood, Nikki Rickard

After confirming that mHealth apps have the potential for significant impact, this research group conducted a literature review to determine 16 key features and functionalities would best serve users of mobile applications that address mental health issues. Those features are as follows:

- *CBT based*
- *Address both anxiety and low mood*
- *Design for use by non-clinical populations*
- *Customizable*
- *Reporting of thoughts, feelings, or behaviors*
- *Recommend activities*
- *Mental health education*
- *Real-time engagement*
- *Activities that directly address reported mood problems*
- *The encouragement of non-technology based activities*
- *Gamification and motivation*
- *History of app use*
- *Reminders to participate*
- *Simple and intuitive UI*
- *Links to crisis support services*
- *Experimental trials to establish efficacy*

The four concepts explored later in this research utilize 15 of the 16 recommended features from this article.

LITERATURE

TECHNOLOGY + MENTAL HEALTH: THE PROS + CONS OF EHEALTH AND MHEALTH

A Mobile App-Based Intervention for Depression: End User Expert Usability Testing Study

Matthew Fuller-Tyszkiewicz, PhD; Ben Richardson, PhD; Britt Klein, Helen Skouteris, PhD; Helen Christensen, PhD; David Austin; David Castle, PhD; Cathrine Mihalopoulos, PhD; Renee O'Donnell; Lilani Arulkadacham, PhD; Adrian Shatte, PhD; Anna Ware

Mental health treatments delivered via eHealth or mHealth technologies reduce user cost, increase access, allow for anonymity, and help avoid stigmatization of the patient. In recent years, eHealth solutions have been accepted by users, produce similar progress as traditional face-to-face treatment, and allow for feedback and reflections of the patient's progress through the use of highly personalized data collection. However, retention rates for self-guided mHealth solutions are lower when compared to face-to-face treatment, indicating that these solutions may not be engaging, user-friendly, or are being used to gain the desired effect.

Creating engaging, interesting, and memorable experiences became a priority to overcome this recognized challenge.

LITERATURE

TECHNOLOGY + MENTAL HEALTH: WEARABLES

Mobile Phone and Wearable Sensor-Based mHealth Approach for Psychiatric Disorders and Symptoms: Systematic Review and Link to the m-RESIST Project

Jussi Seppala, Ilaria De Vita, Timo Jamsa, Jouko Miettunen, Matti Isohanni, Katya Rubinstein, Yoram Feldman, Eva Grasa, Iluminad Corripio, Jesus Berdun, Enrico Damico, Maria Bulgheroni

Addressing Anxiety Disorders Using Wearable Devices: Challenges and Future Directions

Mohamed Elgendo, Carlo Menon

Both of these literature reviews found that there is weak evidence to support the claim that wearable devices positively influence a person's anxiety, stress levels, or depression. Both papers imply that further research must be conducted to determine if wearable devices have any effect on patient outcome. (However, user reviews for current wearable products on the market claim otherwise. See the Precedent Studies section beginning on p. 50 for more information).

Although lacking substantial research, it is still worth exploring as this technology can advance quickly if implementation and use increases.

LITERATURE

TECHNOLOGY + MENTAL HEALTH: VIRTUAL REALITY (VR)

Effectiveness of Virtual Reality Exposure Therapy for Active Duty Soldiers in a Military Mental Health Clinic

Greg M. Reger, Kevin M. Holloway, Colette Candy, Barbara O. Rothbaum, JOann Difede, Albert A. Rizzo, Gregory A. Gahm

This research evaluated the effectiveness of VR exposure therapy for soldiers returning from a deployment to Iraq or Afghanistan. Patients were considered for the study if other forms of PTSD treatment were not effective. Licensed clinical psychologists administered the VR sessions. The number and length of sessions varied between soldier. The 15 of the 24 patients who volunteered for the study reported a significant reduction in PTSD symptoms, showing that VR exposure therapy may be a viable treatment for some soldiers.

VR is not anonymous, nor can (or should) soldiers self-induce exposure therapy while on deployment. This research will not explore VR, but it has been noted that new media such as this is currently being explored.

TECHNOLOGY + MENTAL HEALTH: CONVERSATIONAL USER INTERFACE

A Fully Automated Conversational Agent for Promoting Mental Well-Being

Kien Hoa Ly, Ann-Marie Ly, Gerhard Andersson

While there are many self-help interventions (books and apps, for example) the user retention depends mostly on self-discipline. This study implemented a conversational agent/ chatbot called Shim within a CBT mobile app. Half of the participants in the 2-week study were given access to Shim. The other half of participants were used as a control group and had no chatbot. They found that users who worked with Shim spent more time in the app, reported lower levels of stress, and higher rates of happiness. During a post-study survey, Shim users said that the chatbot's guidance encouraged them to do positive activities they may not have usually considered.

Scribbler (p. 114) has a CUI that encourages users to engage with the app.

LITERATURE

THERAPY TYPES

What kinds of therapy are there?

Psychology Today

I familiarized myself with types of therapy that may benefit my user:

Art Therapy
Animal Assisted Therapy
Biofeedback Therapy
Cognitive Behavioral Therapy (CBT)
Eclectic Therapy
Group Analysis
Integrative Therapy
Marriage & Family Therapy
Mindfulness Based CBT

From interviews and personal experience, I created a list activities that therapists or stress management experts suggest:

Meditation
Serving or helping others
Creating a routine for stability
Identifying one's ideal self
Identifying moments of gratitude
Identifying patterns of behavior
Rewriting a story to reframe past situations
Goal setting + reward to encourage progress
Speaking to past self to give advice or console
Reflecting upon behaviors, actions, and choices
Changing perspectives to create empathy for others
Exercising to release endorphins and release tension
Sharing one's story in public to be known as an advocate or expert
Conversation or Discussion with others in similar situations to gain support and feel less isolated

This list was later used during the Rapid Ideation exercise (Figure 4.1)

LITERATURE

COGNITIVE BEHAVIORAL THERAPY

What is Cognitive Behavioral Therapy?

Psychology Today

Cognitive Behavioral Therapy (CBT) is often used to treat patients in their journey of overcoming depression, anxiety, addiction, marital challenges, and eating disorders. It is widely accepted that CBT improves the patient's mental state and quality of life. CBT is based on the belief that the way in which someone thinks and behaves can be consciously changed. To do so, the patient must do activities such as identifying unwanted thoughts, understand the cause of undesirable habits, address issues head-on rather than avoiding them, and developing calming skills during times of stress. CBT encourages the patient to learn how to be a therapist when there is no therapist currently present. This form of therapy also focused on the "here and now" rather than what actions and events have led up to this point. While some history is necessary for best results, CBT's goal is to progress the patient into creating a more fulfilling future.

CBT became the backcone of the concepts explored.

section two

QUESTIONS + FRAMEWORKS

"What I like about your research is that there is an immediate part. Waiting is not the answer."

- Davon Goodwin, Veteran with Combat PTSD

RESEARCH QUESTIONS

primary

How can the design of **mobile applications** and **wearable technology** function as a system to support the **mental health care** needs of U.S. Army soldiers while on **deployment** to combat zones?

subquestions

How can a mobile application and wearable technology assist in identifying and managing symptoms of stress for soldiers on deployment?

How can this interface incorporate machine learning technology to anticipate and address concerning behaviors by intervening at the optimal time?

How can the design of an online community platform, gamification, and augmented reality connect colleagues to progress their mental health treatment as a group?

How can the use this system facilitates a shift in military culture to encourage new rituals around mental health and emotional wellbeing?

KEY TERMS

definitions

Mobile Applications
A program or software that can be accessed via a mobile device such as a phone or tablet.

Wearable Technology
An electronic device users wear on their body.

Deployment
A span of time where soldiers are sent to a foreign country for the purpose of completing a mission or training.

Combat Zones
Any location where soldiers may need to fire a weapon to defend themselves, their base, or the native population.

Machine Learning (ML)
The utilization of algorithms and computer systems to execute a task. Machine learning often uses pattern recognition to make decisions.

Gamification
Applying elements of playing games (competition, progression, score keeping, etc.) to a task to encourage engagement and enjoyment.

Augmented Reality (AR)
Overlaying a computer-generated image onto a real environment.

CONCEPTUAL FRAMEWORK

receptivity gradient

David Rose's Receptivity Gradient (Figure 2.1) is a measure for behavioral change over the course of six distinct positions; not ready to know, ready to know, knows the facts, accepts ideas, ready to act, and ready to advocate (Rose, 2015). Most soldiers are aware that mental health care is important but are unsure or uncertain of how they can best address their concerns. Through first and second-hand interviews, I have learned that younger and lower ranking soldiers tend to fall to the left of the gradient. These soldiers have less exposure and knowledge regarding mental health care. They also feel more pressure to remain quiet if they experience anxiety, depression, or PTSD for fear of stigmatization or being passed up for promotions or deployments. Higher ranking soldiers, soldiers who have had multiple deployments, and older soldiers tend to fall on the right side of the gradient. It is not uncommon to hear that these soldiers have already experienced mental health issues, spoken to therapists, have a spouse who has encouraged them to seek help, know someone who has attempted or committed suicide, and/or feel less uncertain of losing rank because they have "put in the time" with the military, and it would be much harder for them to be demoted.

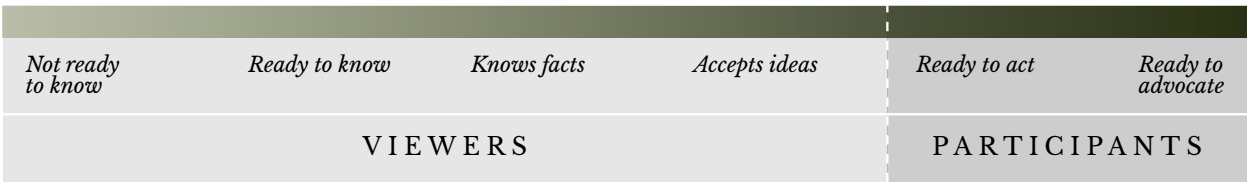


Figure 2.1: *David Rose's Receptivity Gradient*

CONCEPTUAL FRAMEWORK

behavioral objectives

In the process of reading, interviewing, observing, and speaking with experts and users I realized that all of the behaviors or actions users took as a response to stress, both positive and negative, fell into four categories:

Expression **Education**

Encoding **Escapism**

I have named these categories the "Behavioral Objectives". Peer-reviewed studies support the notion that these four objectives can assist in the improvement of an individual's mental health (See p. 40 - 43).

CONCEPTUAL FRAMEWORK

matrix

By combining the Receptivity Gradient and the Behavioral Objectives, the following conceptual framework was created:

Receptivity Gradient

Objective	Not ready to know	Ready to know	Knows facts	Accepts ideas	Ready to act	Ready to advocate
Expression						
Education						
Encoding						
Escapism						

Figure 2.2: *Conceptual Framework*

FRAMEWORK LITERATURE

EXPRESSION

The act of creating forms, sounds, movement, and words.

Negative Example	Lashing out verbally, breaking objects, and punching walls.
Positive Example	Spoken word poetry, dancing, creative writing, or visual artwork.

The Connection Between Art, Healing, and Public Health: A Review of Current Literature

Heather L. Stuckey, DEd, and Jeremy Nobel, MD, MPH

Stuckey and Noel conducted a literature review of 19 peer-reviewed articles in which they evaluated the current writings and findings of how art is being used for physical, mental, and emotional healing purposes. Creative expression has been entwined with culture throughout recorded history, but little empirical research exists to support this belief. However, anecdotal evidence suggests that such activity can decrease feelings of anxiety and depression, help participants understand and reflect on their experiences, reexamine identity of oneself, alter behavior, and elevate overall mood. Stuckey and Noel go on to propose that the use of the arts in combination with traditional healing practices can facilitate emotional and spiritual learning by shifting the focus of "fixing a problem" to a viewer the participant in a more holistic manner.

FRAMEWORK LITERATURE

EDUCATION

Learning about signs and symptoms to understand what they or someone near them may be experiencing.

Negative Example Obsessively searching resources for "worst case scenarios" and imagining only those poor outcomes.

Positive Example Attending a Mental Health Awareness fair and speaking to professionals in a casual environment.

Development and evaluation of a youth mental health community awareness campaign - The Compass Strategy

Annemarie Wright, Patrick D McGorry, Meredith G Harri, Anthony F Jorm, Kerryn Pennell

One's ability to improve their mental wellbeing must first start with mental health literacy. Treatment can only begin when an individual identifies an issue and then chooses to seek help. In this study, teens and young adults of a specific region in Australia were asked to participate in a phone survey regarding their mental health knowledge. After the survey, the research team began an awareness campaign within the same region. The team found that newspapers, materials distributed within schools, and posters led many viewers to a website where they could learn more about mental health. After the campaign, the survey participants were called again and asked about mental health care knowledge. Researchers found that the participants' "perceived suicide risk, barriers to help-seeking... media exposure, correct prevalence estimate, and self-identified depression" were more accurate. Researchers also found that more people within the campaign region sought more treatment when compared to areas who did not see the campaign. By merely educating a population on the topic of mental health care, more of that population began asking for help.

FRAMEWORK LITERATURE

ENCODING

Self-tracking and self-monitoring personal information.

Negative Example	Someone suffering from anorexia counting and limiting calories.
Positive Example	Using a sleep cycle application to get a better night's sleep.

Self-Tracking for Mental Wellness: Understanding Expert Perspectives and Student Experiences

Christina Kelley, Bongshin Lee, Lauren Wilcox

"Personal informatics" or "quantified self" is the act of collecting one's data. That data can be used as a tool for reflection and goal setting. Self-tracking applications have been successful in the realm of weight loss, improved sleep, increased productivity, and more physical activity. Using personal informatics for mental health is relatively new. Early studies include observing college student's attendance to class or parties, typing analysis, and the pressure a user emits on a computer mouse. By using data based on physical actions, computer programs can predict the users' mental well-being. This article acknowledges that close monitoring of behavior and stress is not always beneficial for mental wellness, and connoting mental illness with behavior was subjective but progressive for the user.

FRAMEWORK LITERATURE

ESCAPISM

A method an individual may use to gain relief from everyday activities and obligations. (Stenseng et al., 2012)

Negative Example	Drinking until one "blacks out".
Positive Example	Immersion into a book or movie, working out with friends, playing video games, but always returning to the "real world" at the conclusion of the entertainment.

Activity Engagement as Escape from Self: The Role of Self-Suppression and Self-Expansion

Frode Stenseng, Jostein Rise, Pal Kraft

When faced with emotional distress, individuals may attempt to gain relief from these stressors by dissociating from the self. This behavior can be observed in what is described as "concrete actions" such as suicide attempts, excessive drinking, eating disorders and drug abuse. Harmful behaviors result in the lowered self-awareness and decreased self-evaluation, also known as cognitive narrowing. In contrast to those self-destructive escapist behaviors, research has also found that healthy activity, such as physical exercise, can produce the same results of lower self-awareness and decreased self-evaluation while putting aside the person's daily stressors. Thus, both positive and negative behaviors can act as a form of escape. Stenseng, Rise, and Kraft (2012) explore how escape is executed efficiently by participating in activities that involve a high degree of task absorption, the allowance of temporary dissociation, and distractions which lead to reduced self-evaluation.

section three

INVESTIGATIONS

"Escapism is putting reality elsewhere for a short time."

- Anonymous Interviewee

METHODOLOGIES

approach

The following methods were utilized for this study:

Interviews

From November 2018 to February 2019, interviews with four mental health care, military family, and military culture experts were conducted.

Precedent Studies

Existing solutions were evaluated and critiqued for qualities and features that may benefit this specific user.

Rapid Ideation

A timed ideation exercise was practices. A wide variety of ideas were sketched and written. These ideas were the basis of the four concepts used in the visual studies.

Persona and Scenario

A hypothetical user and scenario were developed to assist in the storytelling and communication of how the design explorations and systems may be utilized.

Visual Studies

The strongest concepts from the Rapid Ideation exercise were further explored through visual studies.

Focus Group User Test

The visual studies were taken to Ft. Stewart, Georgia where 18 U.S. Army Infantry soldiers offered their first impressions and thoughts regarding these ideas.

INTERVIEW

Kellie Artis + Elizabeth Austin

One of my first steps in this research process was to sit down with Kellie Artis and Elizabeth Austin. Kellie is the Chief Operating Officer of Millie, a privately funded military relocation service. She is also a Board Member of the Military Family Advisory Network, consultant for private firms who wish to know more about the military lifestyle, and a military family researcher and advocate. Elizabeth is a veteran, former military chaplain, and a current researcher focusing on soldier resiliency and interdisciplinary approaches to performance optimization, PTSD, and moral injury. Elizabeth describes her specialty as a "preservation of force and family" and calls her line of work "spiritual fitness". Both Kellie and Elizabeth are married to active duty and high-ranking soldiers. Below are the key findings from our conversation. (To read the entirety of our conversation, please refer to p. 137).

Key Findings

- *The stigma surrounding mental health in the military is very real and wide reaching.*
- *Gamification can hold a soldier's interest.*
- *Have educational resources available when soldiers are ready – do not force it upon them too early.*
- *Chaplains are not trained to address mental health concerns.*

INTERVIEW

Davon Goodwin

Davon Goodwin is a husband, father, farmer, and Army veteran with PTSD and a traumatic brain injury. He now works at the Sandhills Agriculture Innovation Center where he finds a sense of purpose and calm by farming. He speaks publicly about PTSD awareness and was a central role in a 10-part documentary series called "The War Within". Below are the key findings from our conversation. (To read the entirety of the interview, please refer to p. 140).

Key Findings

- *When soldiers are unable to decompress and process emotions, they learn how to bottle it up. But those emotions can come back in undesirable forms and actions.*
- *Soldiers do not want to be seen talking to a mental health professional while they are deployed.*
- *There is often a breaking point or an ultimatum presented by loved ones which becomes the catalyst for a solider to begin seeking help.*
- *Sharing your story and listening to others' stories can be therapeutic, but it does not work for every soldier.*
- *Different forms of therapy work for different people, and some forms will be more effective at different times.*
- *Transitioning into non-combat or civilian living can be extremely challenging.*

INTERVIEW

Anonymous

The final interview was conducted approximately one week before the rapid ideation stage of this research. The interviewee, who requested to remain anonymous, is a female in her 20s. For the purpose of this writing, I will call her Valerie. Valerie heard of my project and reached out to me asking if she may be of assistance. She has experience with PTSD, depression, and anxiety. Below are the key findings from my conversation with Valerie. (To read the entirety of our conversation, please refer to p. 143).

Key Findings

- *Behaviors can be directed for positive and negative outcomes to create forms of escape.*
- *A variety of methods can be used to compliment professional therapy.*
- *Peer support contributed to personal progress and feelings of worth.*
- *The individual is not always aware that they are engaging in destructive or unhealthy behaviors. This may require an outside force to bring their actions to their attention.*
- *Many family members held a negative perception of mental health. This contributed to the lack of mental health care received by other family members.*

PRECEDENT: INDIVIDUAL

Chaplain

Objective

To "bring Soldiers to God and God to Soldiers." ("About Army Chaplaincy", n.d).

Key features and functions

Chaplains are often the first person suggested a soldier should speak to if they are having difficulty. Chaplains are trained in faith-based support.

Appearance

Chaplains wear a symbol of their religion above their name tape and on their cap.

Anonymity

One-on-one meetings are available, but if others see a soldier enter the Chaplain's office there may be speculation that the soldier is having difficulties.

How it can help soldiers

Chaplains are easily accessible. In most cases, soldiers are allowed to simply walk into the Chaplain's office. Religion may bring peace to some during difficult times

How it may not help soldiers

Most Chaplains are not trained in mental health care. Soldiers may not wish to speak to Chaplains for fear of being seen by peers. Soldiers who are not religious may not be interested in speaking to a Chaplain.

What soldiers say

"If I saw my leader go see the Chaplain I would think, 'Wait, how are you leading me if you have to go see him.'" - Davon Goodwin, before his change of mind around mental health care.

Figure 3.1: *Top, Chaplain with cross on cap.*
Figure 3.2: *Bottom, Chaplain with cross above name tape*

PRECEDENT: VR

T2 Virtual World

Objective

To "educate visitors about combat-related posttraumatic stress and offer resources for seeking help." T2 is the abbreviation for the DoD's National Center for Telehealth & Technology. (Holloway & Reger, 2013).

Key features and functions

The immersive and interactive learning activities educate participants about PTSD through virtual buildings, exhibits, signage, and trails. T2 has the ability for exposure where users can re-experience a traumatic event to desensitize and understand the experience.

Appearance

T2 Virtual PTSD Experience is a semi-realistic visualization of a nature center. The users have 3D avatars that navigate the space.

Anonymity

The user must wear a VR headset, making it obvious to those around them that they are engaging in a virtual world. However, the content of that virtual world may remain a secret to onlookers.

How it can help soldiers

The most important quality of T2 Virtual World is its immersive capabilities. Soldiers may find the world safe, structured, educational, and relaxing.

How it may not help soldiers

The average soldier is not yet accustomed to VR and might require some instruction to utilize T2. VR headsets draw unwanted attention to the user. The ability to reenact a traumatic event must be done under the supervision of a trained professional, which may not be accessible for a soldier on deployment. This type of treatment may be too "triggering" for soldiers still in combat zones.

What users say

During initial research for the effectiveness of T2 Virtual PTSD Experience, a veteran with PTSD noted that the world made him feel as if he was not alone in his struggles and that there is hope for the management of his symptoms.

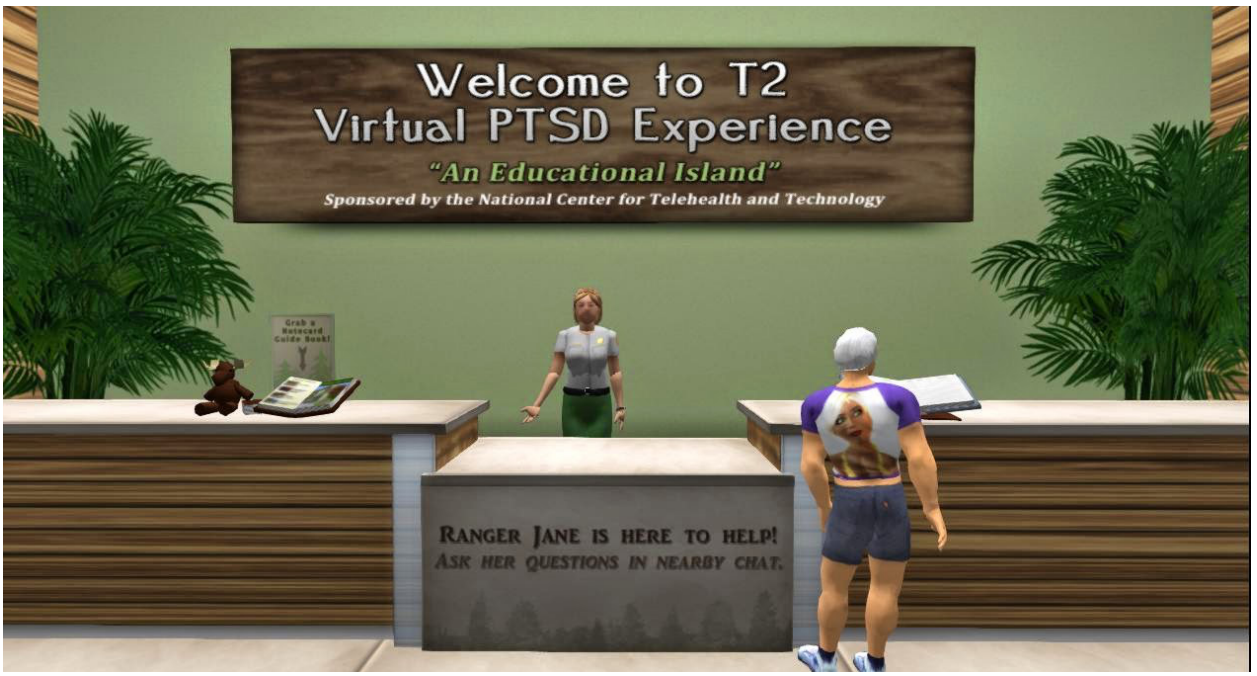


Figure 3.3: *Top left, Soldier experiencing T2 Virtual World*
Figure 3.4: *Top right, T2 Virtual World lobby*
Figure 3.5: *Bottom, T2 Virtual World welcome desk*

PRECEDENT: WEARABLE

Spire Stone

Objective

"Spire Stone monitors your breathing all-day and guides you to calm." ("Spire Stone", n.d.)

Key features and functions

Spire measures breath and analyzes the data, categorizing it as "calm, tense, or focused". If the user suddenly changes their breath, Spire notifies them via the companion app. Users can review their data and reflect on their behavior.

Appearance

The actual wearable is slim, smooth, and unrecognizable as a piece of technology. The app is mostly neutral with moments of color.

Anonymity

It would be relatively easy for users to engage with Spire without drawing attention to themselves. The wearable attaches to a waistband and faces the stomach, leaving only the clip visible (if the wearer does not cover it with an article of clothing).

How it can help soldiers

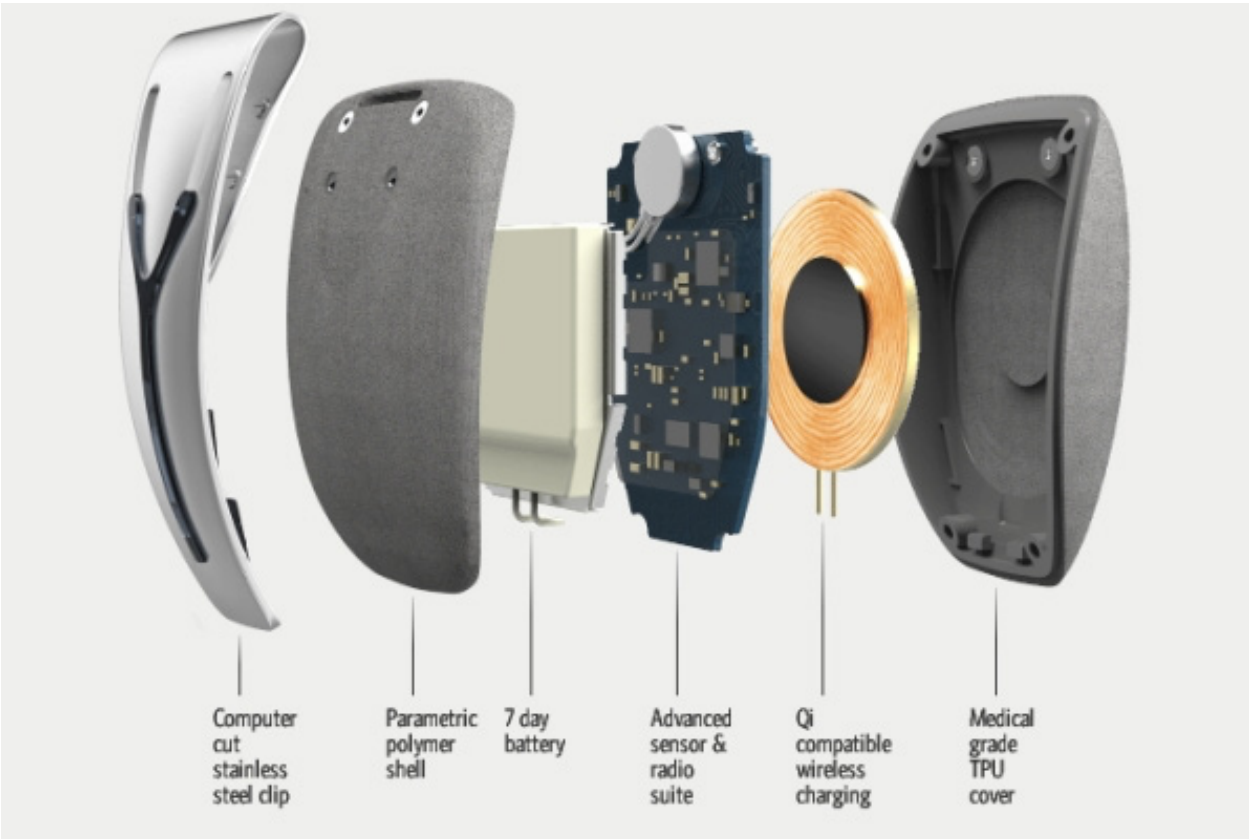
Spire appears simple and easy to use with clear and concise communication and data.

How it may not help soldiers

None to think of.

What users say

"This app is very useful as it provides weekly updates, which permit me to identify my current performance with personal pervious performance as well as compare my breathing and such with people within my gender and age range...share it with other busy, ambitious people who seek a more balanced life; need a reminder to decompress or unplug from the matrix; and people who may be prone to anxiety of any type, high blood pressure, or any other health issue related to stress." - BAA20016, user



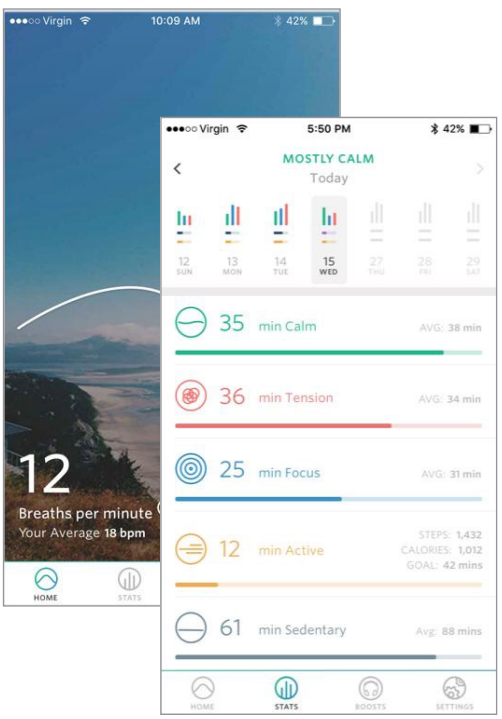


Figure 3.5: *Top, Spire Stone disassembled*
Figure 3.6: *Bottom left, Spire Stone worn on the waist*
Figure 3.7: *Bottom right, Spire Stone companion app screens*

PRECEDENT: WEARABLE

Feel

Objective

"Feel recognizes and tracks your emotions, while providing real-time coaching to help you achieve your mental well-being goals." (Feel, n.d.)

Key features and functions

Feel monitors parts of the Autonomic Nervous System to predict a user's mental and emotional state. Specifically, Feel tracks heart rate, blood pressure, temperature, and muscle tension. By using artificial intelligence and machine learning, Feel recognizes patterns and begins understanding the user's emotions. This data is shared with the user via a report. The user provides feedback, increasing Feel's knowledge in the process, and the app responds with personalized suggestions on how the wearer might "better regulate and optimize" their emotions.

Appearance

The Feel wristband appears more as a nondescript bracelet. It does not draw attention to itself. The companion app has soft colors, an abundance of white space, and does not overwhelm the user with data.

Anonymity

It would be easy for users to engage with Feel without disclosing the purpose of the wearable or app.

How it can help soldiers

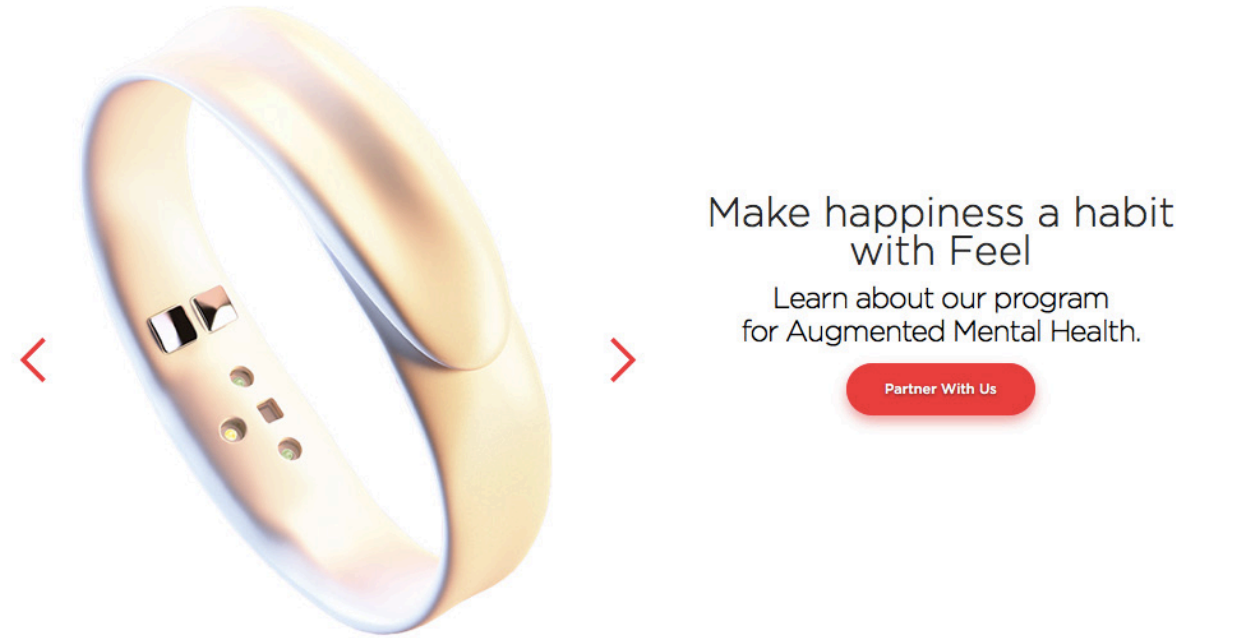
Data collection and processing seems easy and straightforward.

How it may not help soldiers

None to think of.

What users say

N/A; it is not currently on the public market and only available to employers.



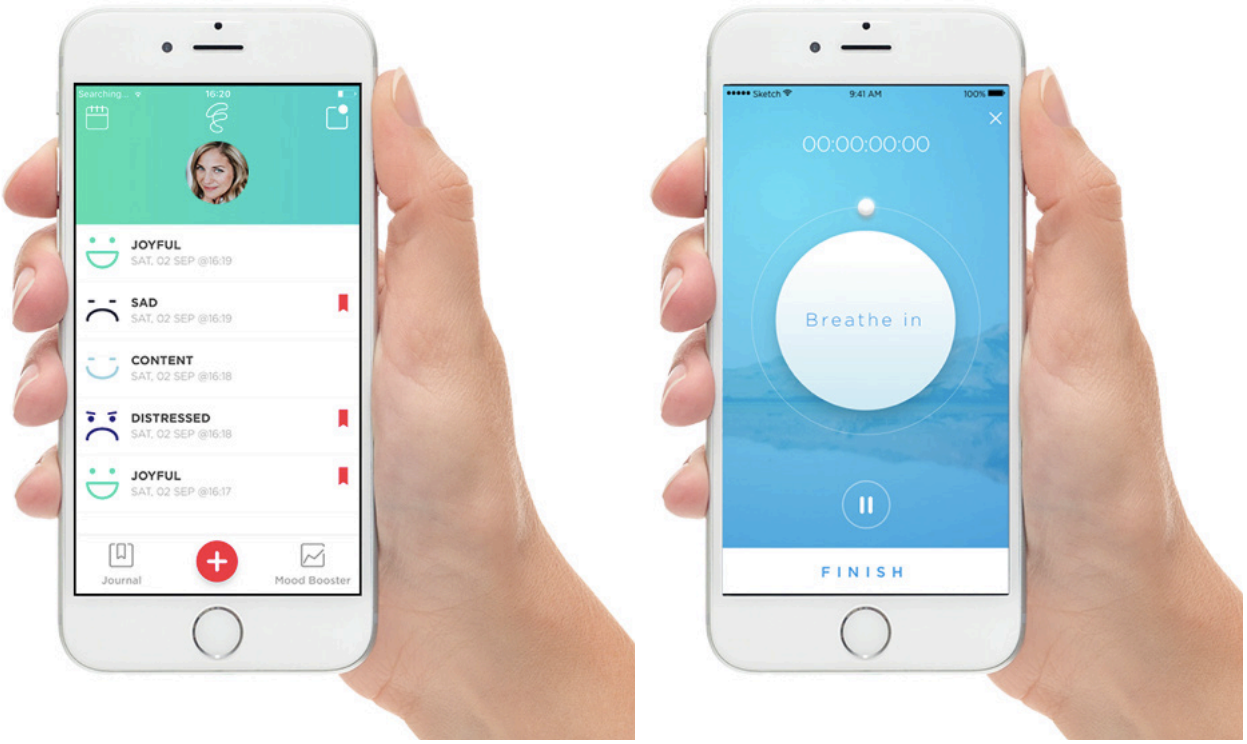


Figure 3.8: *Top, Feel promotional image with wearable wrist band*
Figure 3.9: *Bottom, Feel companion app UI*

PRECEDENT: WEARABLE

WHOOP

Objective

"By balancing your daily Recovery, Straining and Sleep, you will train optimally and unlock the secrets to your body's true potential." (Lowry, n.d.)

Key features and functions

WHOOP is a wrist wearable that tracks heart rate, temperature, and motion. The system can then suggest how much strain you could put on your body during workouts, how much sleep you need, and how your body is recovering from your workouts. Daily, weekly, and monthly analytics are provided for user review. Community and team pages connect users to create an accountable community to leverage shared data and challenges. WHOOP seems to collect data with minimal input from the user. The data and suggestions are presented to the user automatically.

Appearance

Dark backgrounds are paired with white text for high contrast. Graphs and charts are no-frills and include extensive details about the data.

Anonymity

While the wearable is noticeable on the user's wrist, the data collected remains private on the mobile application. It may not be obvious to those around the user what they are engaging with.

How it can help soldiers

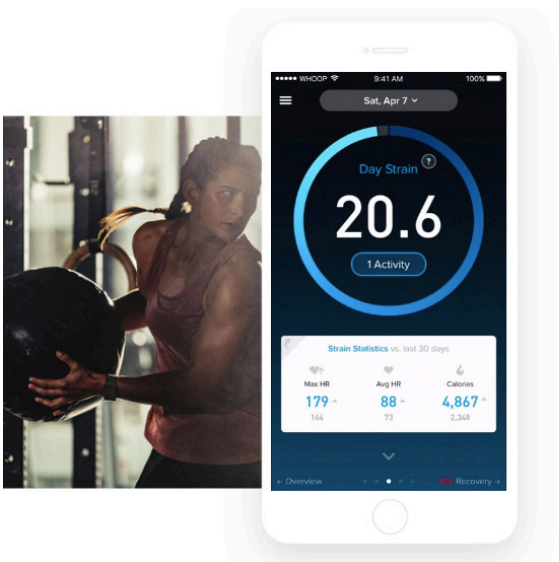
Physical advancements and comradery drive soldier motivation. WHOOP assists them in this journey while showing their progress. WHOOP is excellent at building physical health habits and establishing a user community.

How it may not help soldiers

None to think of.

What users say

> *"The data that this app records and quantifies is incredibly relevant and valuable to athletes who are trying to take it to the next level." - thejaycash, user*



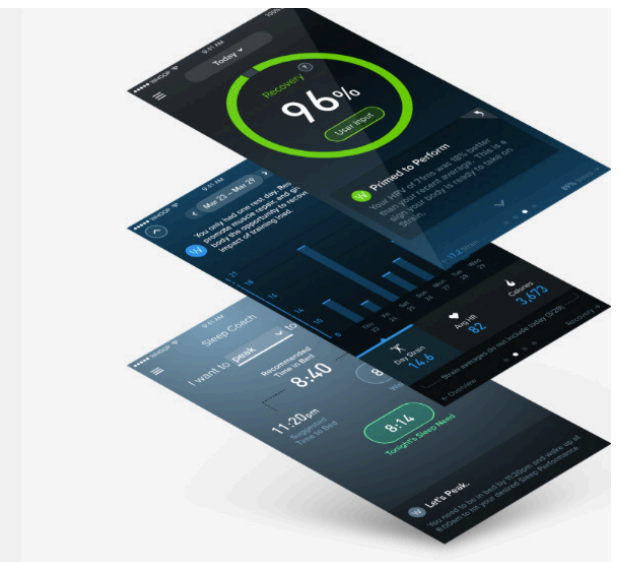


Figure 3.10: *Top, WHOOP worn on the wrist*
Figure 3.11: *Bottom, WHOOP app UI*

PRECEDENT: MOBILE APP

Tagtool

Objective

"Tagtool transforms your iPad into a visual live instrument. Paint with light, create animated graffiti, or tell improvised stories." (Dorninger, 2019)

Key features and functions

Tagtool is an art creation application that links multiple iPads to a single canvas. The canvas is then projected onto a wall or side of a building. The app can be used alongside orchestras to create live animated stories. Performances sometimes connect the artwork back to the history or purpose of the site where Tagtool is being projected.

Appearance

The app initially appears straight forward. But behind the simple interface are functions and features which must be taught through complex and multitouch based gestures.

Anonymity

There is no anonymity when using Tagtool. One of the main purposes of the app is performance.

How it can help soldiers

It is a beautiful form of expression with many capabilities. The community feature of "making" with others is a pleasant bonding experience.

How it may not help soldiers

There is often little guidance on how or what to create, leaving some users unsure of how to proceed when handed an iPad.

What users say

None found. However, I had the opportunity to use Tagtool in the Winter of 2018. The app requires practice, preparation, and dexterity. It is overwhelming to project your artistic abilities on a wall alongside others who may be more artistically capable than you.

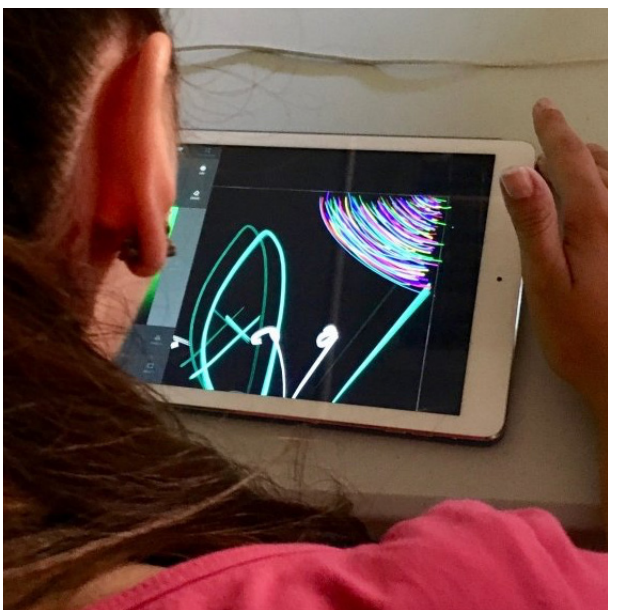


Figure 3.12: *Top, classroom using Tagtool on interior wall*
Figure 3.13: *Bottom left, individual using tagtool app*
Figure 3.14: *Bottom right, Tagtool projecting on to building*

PRECEDENT: MOBILE APP

PTSD Coach

Objective

Designed by the VA's National Center for PTSD and the DoD's National Center for Telehealth & Technology, PTSD Coach serves individuals who have or may have PTSD. (PTSD Coach, n.d.)

Key features and functions

PTSD Coach is an educational tool with calming exercises. The app provides short articles about PTSD, has space for the user to make a note of their triggers, and tracks symptoms through self-guided assessments. There are many elements of CBT to managing stress through activities like playing calming sounds, focused breathing, reading inspirational quotes, and observing their thoughts. At the beginning and end of each activity, users are asked to rate their stress level. If a particular tool works well for that user in reducing self-reported stress, the app is more likely to suggest it again in the future.

Appearance

PTSD Coach is straightforward and "no frills." While the content and functions of this solution are strong, the weakest aspect is the visual appearance and delivery. The home screen icon says the name "PTSD," leaving little privacy for the users. The main menu consists of generic clipart and information is delivered as black text on a white screen, leaving users feeling less engaged.

Anonymity

It would be very easy for a user of this app to use it without drawing attention to themselves. If the user has headphones, every task can be done with minimal activity. However, the home icon clearly showing "PTSD" may advertise a user's challenges if someone happens to use their phone.

How it can help soldiers

This app's ability to learn which tools works best for

the user and then suggest it in the future is excellent for building trust and confidence in the program. The educational qualities of the app are strong, and there are many stress management tools to choose from. The assessment tool is wonderful for tracking a user's progress over time. The ability to observe change is encouraging for users who are in the process of modifying their behavior.

How it may not help soldiers

The visual branding lacks engagement and certain sensitivities that this user group would greatly benefit from. Those with mental health issues are often in denial that they may need help. Seeing the words "PTSD" may push potential users away from uncovering the rather interesting functions of this app.

What users say

"This app is what the VA should be using to help vets. Their current system is a total failure and that failure leads to dead vets. This app makes self evaluation and tracking a breeze. The VA"s staff makes the problems the worst." 2Old2CareNRmore, user

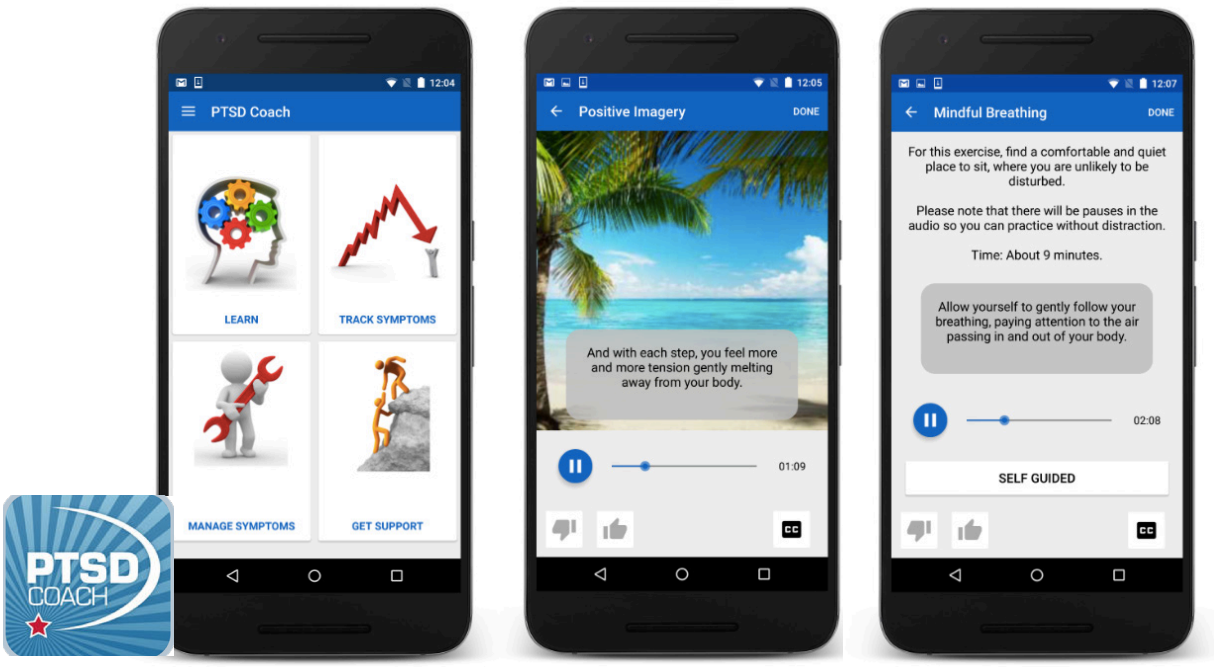


Figure 3.15: *PTSD Coach Icon and app UI*

PRECEDENT: MOBILE APP

Calm

Objective

"Meditation techniques for Sleep and Stress Reduction" ("Experience Calm, n.d.)

Key features and functions

Calm is Apple Editor's Pick and ranked #1 in Health and Fitness in The App Store. Calm has guided meditations focusing on topics like self-care, anxiety, relationships, and personal growth. They also have timed mediations and sleep stories. Their vast library of mediations and narrators is appreciated by many of their users.

Appearance

Soft gradients, cool tones, sans serif typography, and a two column grid creates peacefulness but structure. The app wishes to inspire calmness, so it is logical that the appearance is orderly. Each menu item is clearly and simply stated.

Anonymity

Users can engage with Calm without making it apparent that they are working in an application that is addressing mental health concerns. Calm even has meditations for walking and driving, expanding what many consumers may think it means to be in a meditative state.

How it can help soldiers

Meditation can help with stress and anxiety management. The variety of topics and stories can appeal to a wide range of users. The app is discrete. Soldiers can easily use it in the privacy of their bunks with headphones.

How it may not help soldiers

While Calm has a section for beginner meditators, it is working under the assumption that the user knows, understands, and believes in the positive effects of meditation. It is not appealing to an audience that is skeptical about self-care (which is my target user).

What users say

"Calm gives you a toolbox with multiple different tools that you can use in various situations" - bgschubert, user

"I've developed techniques that help me combat a busy and destructive mind. I'm continuing to learn how to balance my thoughts." - Gallery Hopping NYC, user

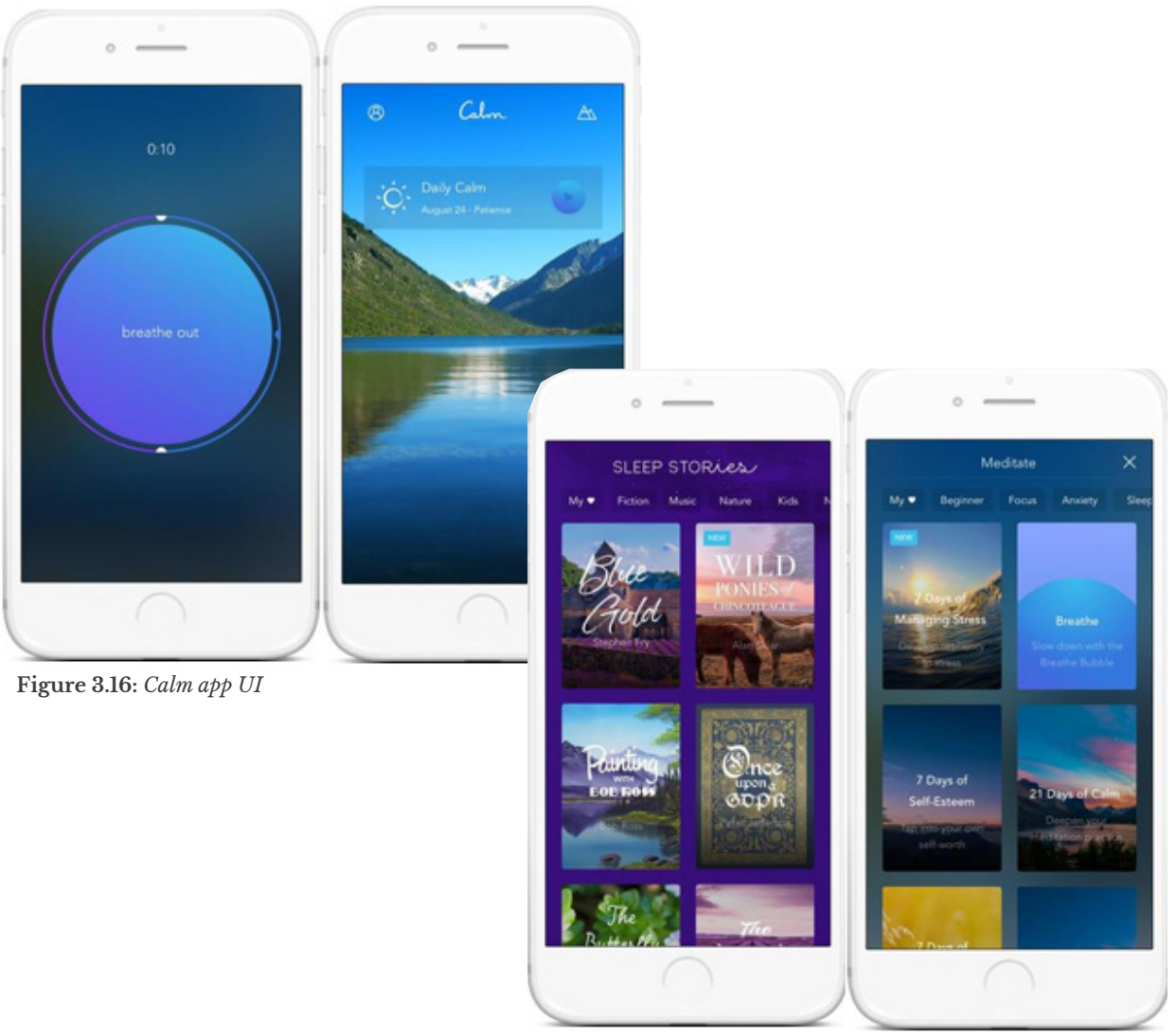


Figure 3.16: *Calm app UI*

PRECEDENT: MOBILE APP

10% Happier

Objective

"Meditation for Fidgety Skeptics: A clear, simple approach to meditation with bestselling author Dan Harris and the most respected teachers and scientists on the planet." ("10% Happier, n.d.)

Key features and functions

10% Happier is a library of instructional videos on meditation and positive mindset practices. The app can send push notifications to remind users to practice their daily meditation at a time right for them. Meditations vary from sleep, focus, relationships, and eating. There is a community forum aspect where users can refer to an expert about questions they have regarding meditation.

Appearance

10% Happier is bright, colorful, and cheery. Each video has a thumbnail showing the instructor and details about the course before users dive in. This allows the user to "shop" for the best course without having to enter, exit, and reenter videos in search of a lesson that fits their needs. The host, Dan Harris, is no-nonsense, avoids spirituality and whimsy (which many other meditation apps take on), and uses science to support his claims.

Anonymity

Users can remain relatively anonymous as long as they have earphones. Full video screens may attract some attention, but they can also turn or lock their phone.

How it can help soldiers

The online community aspect is unique to a meditation app. The ability to ask an expert, while remaining anonymous, will likely be attractive to my target users. The app is to the point and instructions are clear, which soldiers will appreciate. This app is aware that their users are novice meditators. Most phrases have an accompanying definition to clarify any ambiguity.

How it may not help soldiers

There is a lot of content. Soldiers may initially feel overwhelmed by so many options.

What users say

"I find this program to be rich with workable options and opportunities to learn about (and manage, bit by bit) my mind and entrenched mental habits. It has helped me in several ways, maybe because it gets straight to a point without any pseudo-spiritual 'fluff'....I see it as helping users to notice and learn about one's habitual thoughts, emotions, and responses" - dogmind, user

Figure 3.17: *10% Happier app UI*

PRECEDENT: MOBILE APP

#Selfcare

Objective

"#SelfCare is a free, simple, and beautiful companion for relaxation and mindfulness. It's a safe space to take care of you. Let's cuddle with our cat, light a candle, consult our Tarot cards, collect things for our altar. Let's stay in bed." ("#selfcare", n.d.)

Key features and functions

The user navigates an illustrated bedroom scene and interacts with the objects to trigger activities such as mediation, basic spelling quizzes, and "doing laundry." Favorite objects or activities can be "collected" at an altar.

Appearance

#SelfCare is unique for its top-down room view. Objects have specific uses and the shaky, quirky quality of the graphics are less calming than the other examples included in this Precedent. The user can customize some of the elements such as skin tone and bedding color.

Anonymity

A user can likely interact with #SelfCare without drawing attention to themselves.

How it can help soldiers

The app's ability to scaffold activities and slowly unveil data may appeal to a user who is not accustomed to mental health care practices. The very visual presentation is captivating, unusual, and memorable.

How it may not help soldiers

The tone and message ("Let's stay in bed all day" for example) are too far removed from the reality a soldier experiences. They do not have the option to avoid leaving their room, which the character in #SelfCare does. In its efforts to be predominately navigated by tapping objects, this app has some navigational and discovery issues. Activities may be passed over because they blend into the background.

What users say

"I love that you don't have access to everything right away, like we have a few things to do right away so it's not too overwhelming and then over time you have access to more little games... The games are simple and interesting."
- Miraculous Molli, user

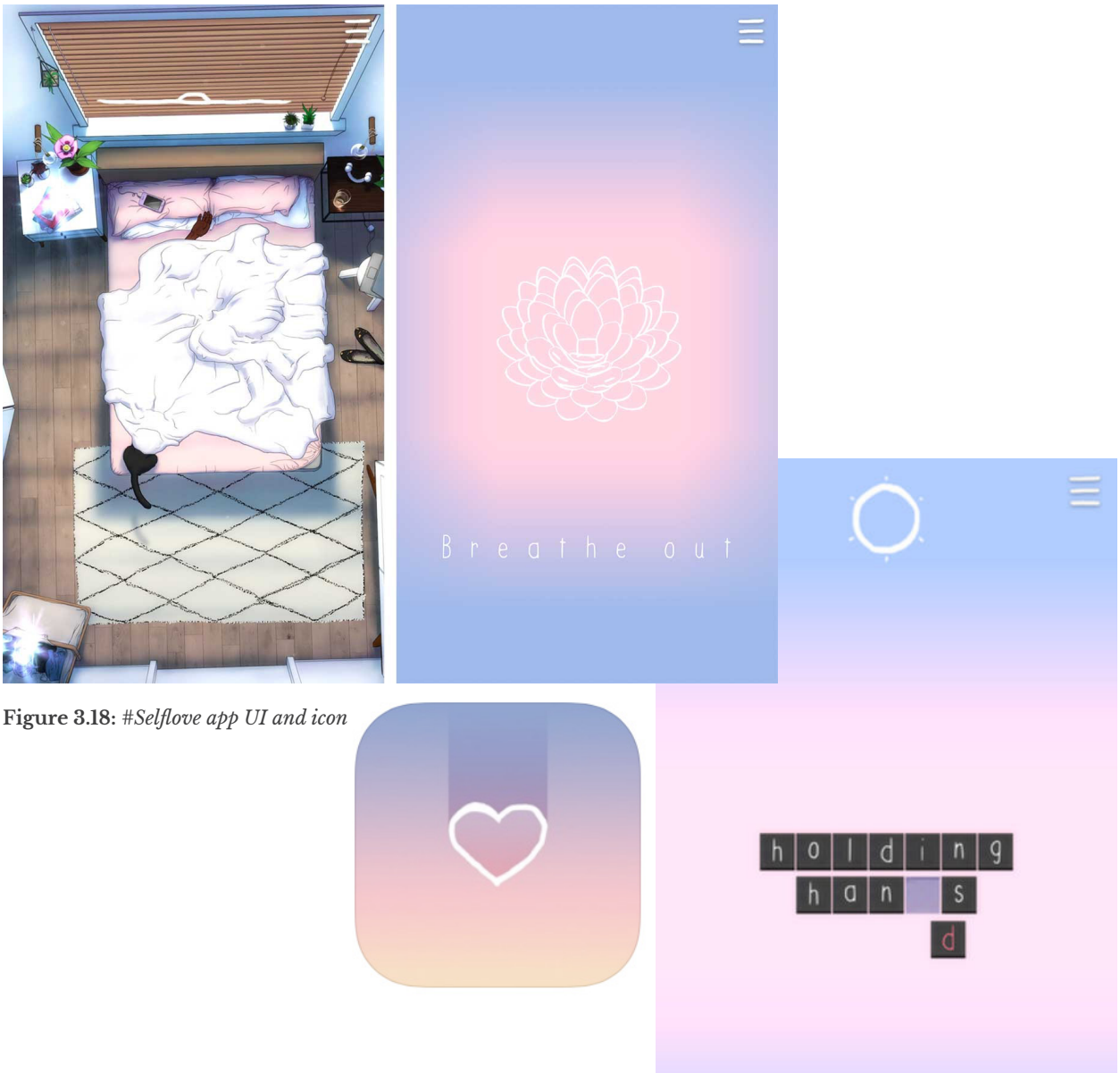


Figure 3.18: *#Selflove app UI and icon*

PRECEDENT: MOBILE APP

Reflectly

Objective

"Reflectly is a journal utilizing artificial intelligence to help you structure and reflect upon your daily thoughts and problems. Your mental health companion." ("Reflectly", n.d.)

Key features and functions

Journal prompts, progress tracking, and morning motivational quotes encourage users to keep coming back to Reflectly. Push notifications remind users to reflect and rate their day. Reflectly begins with short sentences and understandable icons for quick input. Users can then go back and add more details about their day and experiences if they wish.

Appearance

Muted colors and soft round edges on fonts and shapes create a welcoming digital environment.

Anonymity

Users can easily participate with Reflectly without alerting people around them that they are using a journaling app.

How it can help soldiers

The app is simple to use and easily approachable. Anonymity is preserved well.

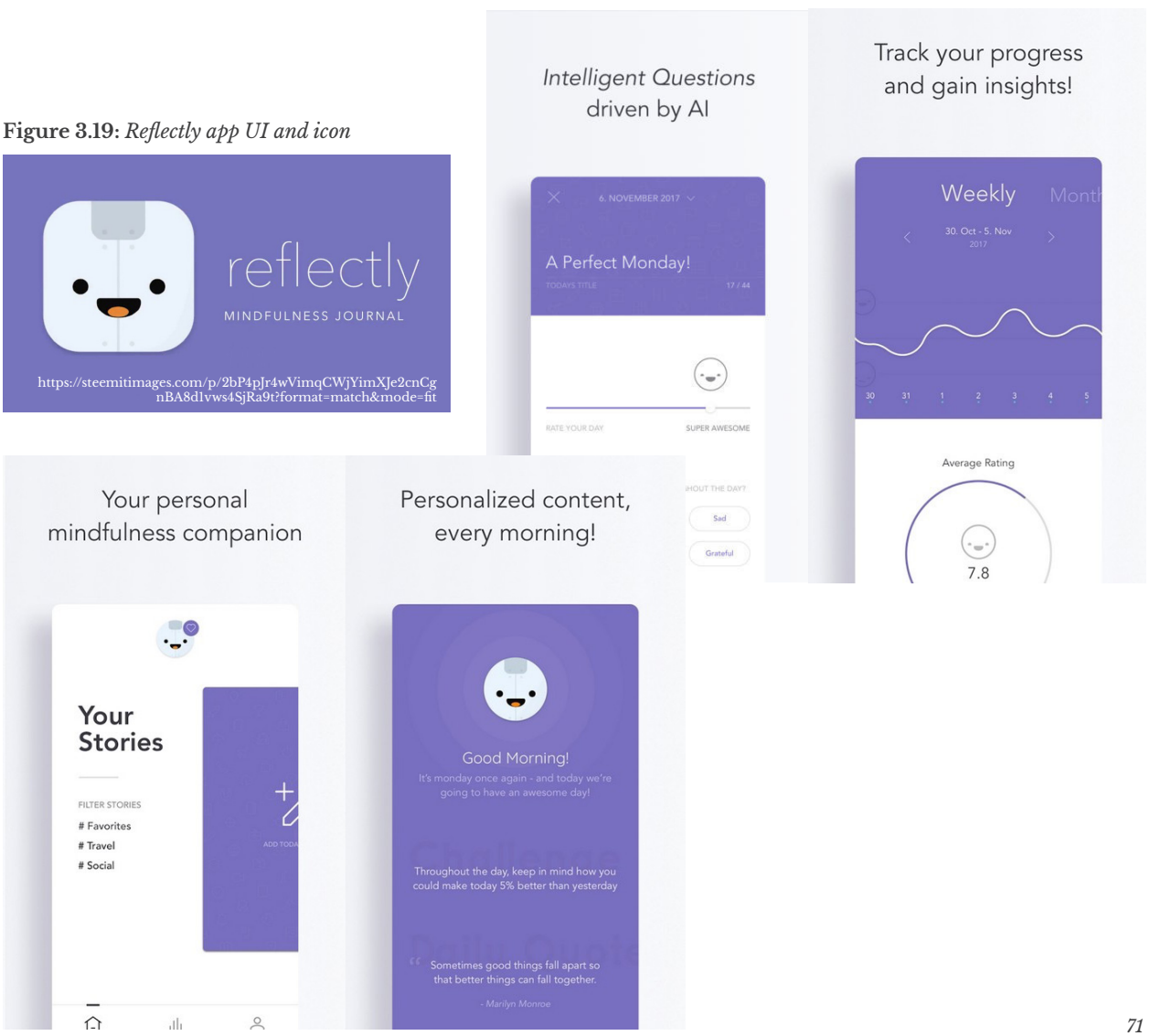
How it may not help soldiers

The childlike appearance of Reflectly may deter some soldiers, and the prompts may be too vague for deep reflection. Soldiers may not be encouraged to delve into their emotions with such broad questions.

What users say

"This has changed the game for me in being able to reflect on my day and journal! This has helped increase my consistency, ease of journaly, my "want" to journal, and include more details of my day.... I like how it asks questions to make me think and reflect, although I don't find all the questions worth answering... The only things I wish that were improved on this would be increasing how much you can type per section, having something to save all this data, and [I don't know] if its desktop friendly, but if it's not, then being ab; eo to use on a laptop/computer as well. But overall, I love this app and how convenient it is to journal." Ryan Haruguchi, user

Figure 3.19: *Reflectly app UI and icon*



section four

EXPLORATIONS

"Whenever a therapist is brought up I'm like, 'Oh, shit.' Somebody might be going through a hard time right now. Would they like to see a therapist? Yeah. Would it go on a record? I'm not willing to take that risk. Everyone is paranoid. I would just distract myself from my issue. If I don't forget it about then I just keep trying to push it aside."

- Soldier during User Testing

RAPID IDEATION

make, make, make

To assist with the generation of ideas, I compiled a list of technologies, people, and places available to soldiers while in a combat zone. I then used an online randomization tool and requested classmates to select two to three of these options at a time. These combinations are noted in the columns of Figure 4.1. I considered all 25 combinations and selected seven which seemed most interesting. I asked myself, "What would happen if the only items or events available to a soldier to address their mental health were the things in this column?" These were combinations I would not have initially chosen for myself, but forcing connections would result in new and interesting ideas.

Taking small pieces of paper and a permanent marker, I challenged myself to sketch as many ideas as possible for each of the seven selected combinations. I allocated 10 minutes per combination, and the only rule was that I could not stop sketching new ideas until the timer was up. Ideas could be outlandish, wild, and future-thinking while neglecting realistic and logistical concerns. In 70 minutes I produced 60 ideas (Figure 4.2). I then transcribed these ideas into a spreadsheet (Figure 4.3) where I wrote short descriptions explaining the sketches, what I liked about each idea, and what I did not like about each idea. Next, common ideas were compiled together to create eight solid concepts which could addressmy initial Research Question. I selected four of the strongest concepts to further explore through visual studies (see p.84).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Y
App	x				x	x	x	x	x									x					x	
AR		x							x		x	x		x										
Book	x																		x					
Call Home			x				x														x		x	
Chaplain																	x							
CUI													x	x			x			x	x	x	x	
Dog			x					x							x			x	x					x
E-Therapist										x	x			x						x				
Gym																							x	
Journal						x										x					x		x	x
Peers (discussion)		x					x											x		x		x	x	
Peers (sharing story)						x																		
Peers (gym)	x			x								x											x	
Wearable													x		x	x			x					x
Web (educational)		x			x				x	x													x	
Web (forum)				x	x			x				x	x									x	x	
Which ones I have done	-	-				-	-						-				-	-				-		
made by	google	google	google	google	google	google	google	google	google	google	google	google	google	google	ellis	ellis	krithika	krithika	krithika	alyse	alyse	alyse	alyse	alyse

Figure 4.1: *Matrix created for ideation exercise*

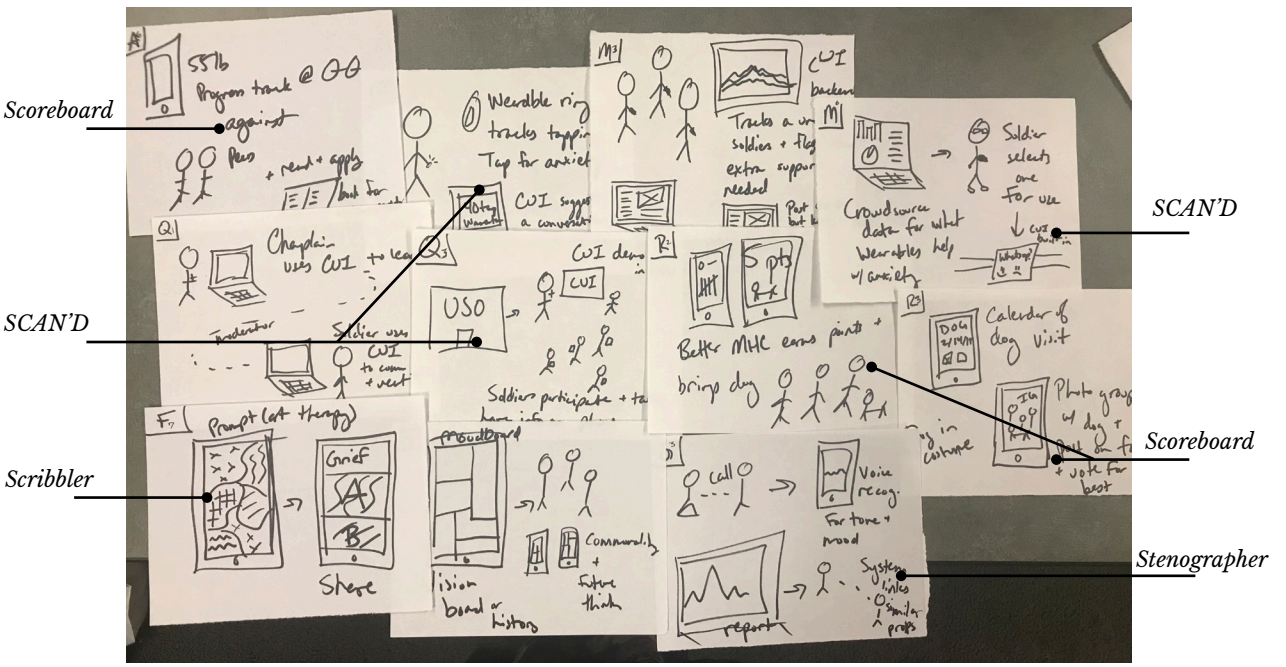


Figure 4.2: *Some of the 60 sketches from ideation exercise. These were the first visuals for the concepts later explored.*

RAPID IDEATION

make, make, make

Visualization	Study	Continue	Element	Element	Element	Description
A	A2	2	App	Book	Peers (Gym)	Soldier downloads app which is a health tracking game where soldiers compete deployment) then reflect in a journal about how the competiton went. Journaling competition.
A	A3	3	App	Book	Peers (Gym)	Soldier writes in their journal or app how the deployment is going for them, then submits digital text. App scans notes and connects them to a gym buddy who m
B	B7	3	AR	Peers (discussion)	Web (educational)	Soliders wear AR glasses and go outside and (like Harry Potter mirror) whatever them. Maybe this is discovered through a survey. Soldiers then engage in discus another. Screens and AR settings can be downloaded from website.
F	F5	3	App	Journal	Peers (sharing story)	Soldier uses app to create gratitude lists and envisioning future and goals post-d an online forum
F	F6	2	App	Journal	Peers (sharing story)	Soldier uses app to see speaker series from vets and active duty about mental h mindmap emotions with pictures and colors and textures and identify patterns.
F	F7	2	App	Journal	Peers (sharing story)	Phone app shows prompt and soldier creates art and can share with the commu stories, just the prompts and tag. ML can suggest certain shapes/colors can sug
F	F8	2	App	Journal	Peers (sharing story)	Phone app helps solder create vision board or mood board or history of self. Sha
G_1	G1	3	App	Call home	Peers (discussion)	Soldier calls loved one back home then after phone call, the app askes questio evaluate emotional quality of the call and then track patterns and behavior.
G_2	G4	3	App	Call home	Peers (discussion)	App gives info/reminders about what was talked about last and how to have a g one back home. Call is followed up by a survey to gather more info and get data remember, mind dump. AI, how does that work.
G_3	G6	3	App	Call home	Peers (discussion)	Group of soliders sit around with speaker phone on. App generates questions to other end of the line to help them learn about the "focus" soldier/peer
G_4	G8	2	App	Call home	Peers (discussion)	Solider and loved one back home are linked on a call (phone, google hangout, s video) and use app prompts to assist with working out their issues or list their str the loved ones back home and the soldiers deployed so they each have in pers
M	M2	3	CUI	Wearable	Web Forum	Wearable tracks data, sends to CUI with soldier can consult with. Soldier can als talking to other thearpists)
M	M3	2	CUI	Wearable	Web Forum	All soldiers have wearabled with track the unit and flags when there is a noticab Extra support can be sent out.
M	M4	4	CUI	Wearable	Web Forum	Wearable ring allows soldier to tap whenever they feel stress. CUI suggests a co behavior.Ring connects them to different parts of their life. When out on patrol th track emergencies.
M	M5	3	CUI	Wearable	Web Forum	Applewatch allows for user to log emotions during the day with short keywords, later with guidance from CUI which also leads to a forum for people with similar
Q	Q2	3	CUI	Chaplain	-	Soldiers use CUI on phone or lapton to work out issues and calm themselves. D who knows who he may need to speak /reach out to either in person or online

Figure 4.3: *Categorization and analysis of concepts produced from ideation exercise*

	Persona benefit best	Anon?	Need inten	What I like	What I don't like
mpete on teams (long term, whole rnaling is also part of the	All, especially P2 and P3	No, but can be disguised	Yes	- Team competition - Data tracking - Build comraderie - Normalize journaling - Long term	- Chance that people fall out of the habit/excitement
, then takes photo of notes or who may relate.	P3	Anon to everyone except partner	Yes	- Like the connection between soldiers - Not immediatly about mental health - Uses gym as a way to build relationship	- Not sure soldier will give enough info to have a soldi pairing
atever they desire most is shown to discussion to learn about one	All	No, but can be disguised	Occassionaly	- Like how it helps them visualize and get away from cabin fever - Uncover greatest desire.	- AR has privacy risks
post-deployment, then uploads to	P2, mostly P3	Either	Yes	- Like the idea of gratitude and future thinking and being able to see what others have - Gratitude Circle for Soldiers	- Fear that they may compare what is shared - Needs moderators to ensure gratitude and Future thinking is safe to share
ental health topics, then can visually erns.	P2, P3, P4	Yes	Yes	- Art therapy aspect, visualizing emotions - Like the speaker series delivered digitally	None?
ommunity. No sharing of actual n suggest things.	P3, P4	Yes	Yes	- Art therapy aspect fo visualizing emotion - Like how it can be sorted by prompt and topic and create an "album" or assemble "favorites"	- Would help for user to put words to the emotions
elf. Share with community	P2, P3	Yes	Yes	- Art therapy aspect fo visualizing emotion - Like how it can be sorted by prompt and topic and create an "album" or assemble "favorites"	- Might be tricky if people start comparing
uestions about topic and to r.	P2, P3	Yes	No?	- Like the reflective part of conversing - Like using a tool to talk to someone back home - Like pointing out patterns of behavior.	- Not sure soldiers would use right after the call when it would be most valuable and its fresh in their mind.
ve a good conversation with a loved t data on emotions. Helping me	P2, P3	Yes	Occassionaly	- Reminder, store data for home, allows for separation of home and work - Gives soldier a moment of reflection	None?
ions to propose to loved one on the	All	No	No	- Get to know soldier from someone else's point of view	- Might be awkward/uncomforatble to be speaking to loved one/coworkers
gout, skye, zoom, Facetime, FB heir stressors. App then connects n person support.	P3	No, but can be disguised	Yes	- Connect loved ones and soldiers - Soldier and loved one works collaboratively	- Might be awkward to meet someone because of shared issues? - Might be distracting to tal and type on app at same time
an also speak to other CUIs (like	P2, P3	No, but can be disguised	Yes	- Soldier doesnt have to reply to symptoms in the moment - Can review data with a guide of sorts - Can speak with other informed agents without talking to the soldiers directly	- No connection to other human
oticable change in group behavior.	All	Yes and no	Yes	- Crowd source data and flag a whole group or ID individuals who are showing abnormal levels of stress - Since everyone is involved, no one gets pointed out for looking different with the tech	- Forcing everyone to participate isnt ideal
ts a conversation around their trol they can take it with them and	P3	Probably	Yes	- Allows user to log moments of stress	- User may not remember why they hit the ring at that time and why they were stressed. Calls attention to the negative.
words, colors, and icons. Can review imilar challenges.	P3	Yes	Yes	- Quick journaling of emotions -CUI acts as a guide for understanding emotions. this can be teanslated somewhere other than wearable like digital journal.	None?
ves. Data is conveyed to chaplain nline	P2, P3	Maybe	Yes	- Gives chaplain birds eye view of how soldiers are feeling	- Chaplain may feel overwhelm with all this data - Soldiers may not be as honest if they know it feeds back to chaplain

VISUAL STUDIES

overview

To best convey the four proposed solutions, the functionality and features of these designs will be communicated through the story of a persona on a nine-month deployment.

timeline

Below is the timeline for the persona's deployment. Each red circle represents a moment that the soldier is struggling with their mental health.

Figure 4.4: *Cycle of Deployment, a nine month mission with moments of stress*

PERSONA + SCENARIO

overview

The following persona, Ethan, was developed by observing or speaking with approximately two dozen soldiers over six months. Ethan represents a common soldier in the Army.

PERSONA + SCENARIO

Ethan

Ethan is a 25-year-old male in the Army. He enlisted when he was 20 years old and is an E6 (Staff Sergeant). Ethan is from Crystal City, Virginia, went to basic training in Ft Benning, Georgia, was stationed at Ft Stewart, Georgia, and finally transferred to Ft Bragg, North Carolina. His Military Operational Speciality (MOS) is 11C, Indirect Fire Infantry. He is deployed to Ft Dwyer, Afghanistan for nine months with the 82nd Airborne Division. He is a platoon leader with four soldiers who report to him.

He is married to Margaret and they have a two-year-old daughter. Ethan has some college experience but did not complete his degree. His father and uncle both retired from the Army so Ethan grew up understanding military life. Like his father and uncle, Ethan enlisted because he has a desire to serve the military, would like a stable career, and enjoys the pay and healthcare.

Ethan has a few close friends from home but does not often communicate with them. He attends social outings with his coworkers on occasion but spends most of his free time with his wife and daughter. Because of his rank, Ethan finds it uncomfortable fraternizing with soldiers who are higher or lower enlisted than him.

One of Ethan's former coworkers committed suicide recently. He is aware of the high suicide rates for soldiers and was encouraged by his wife, who pointed out his signs and symptoms of stress before he did, to see a civilian therapist under his wife's name. He was afraid that if he sought help using his name, there would be a "paper trail" prohibiting him from career advancement. He saw personal growth from seeing the therapist but found it challenging to get time off of work to attend his appointments. While Ethan acknowledges the benefit of mental health care, he is afraid to speak openly to his peers about it.

PERSONA AND SCENARIO

receptivity positioning

Based on Ethan's current beliefs and knowledge around mental health care, he likely falls somewhere between "Knowing the Facts" and "Accepting Ideas" on the Receptivity Gradient.

Figure 4.5: *David Rose's Receptivity Gradient with initial persona positioning*

USER FOCUS GROUP

speaking with soldiers

The four visual studies in the next section were presented to 18 soldiers at Ft. Stewart, Georgia. (These studies were shown in their most preliminary forms). The soldiers in the group varied in age, rank, ethnicity, and deployment experience. Working in large, medium, and small groups, I spent two hours at their unit. I did not disclose that I was addressing mental health care until the completion of the discussion. The proposed designs sparked an engaging conversation about mental health and the opportunities that technology has to address their concerns on deployment.

Using their feedback, the studies were refined. The responses to the preliminary designs will be included with each corresponding study.

Figure 4.6: *Conducting a user focus group in Ft. Stewart, GA*

USER FOCUS GROUP

THING #1

You're on deployment. You're having personal problems. You don't want to talk about it to anyone or draw attention to yourself, but you feel frustrated that you can't work through things.

THING #2

You're on deployment. You just got off the phone with your wife and you both hung up angry. You realize this is not unusual and wish there was a better way to communicate.

THING #3

You're on deployment. You're feeling isolated from your peers and wish your time over seas was spent more productively when you are not busy doing your job.

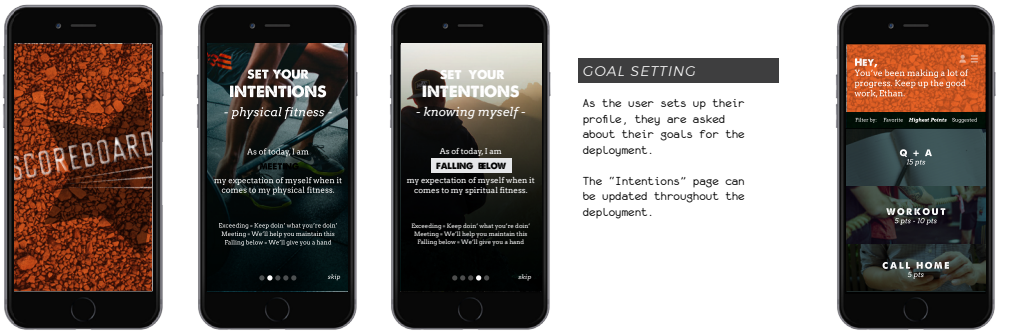


Figure 4.7: *Poster presentation for User Focus Group*

ARTIFICIAL INTELLIGENCE

Scribbler, an AI, can be pulled up to give insight on the forms being created. Scribbler might also suggest other galleries of creations the user may find interesting.

DIGITAL GRAFFITI

Tag indoor and outdoor locations with compositions. Augmented Reality will allow that only participants of the app will see the compositions. Compositions can replay like a movie. New artists can come by and layer their artwork on top of old pieces to create a sense of history.

VOICE RECOGNITION

During a call, voice recognition identifies keywords and the tones expressed throughout the conversation.

This technology is currently being used for Sales Centers to increase awareness of exchanges between employee and caller interactions.

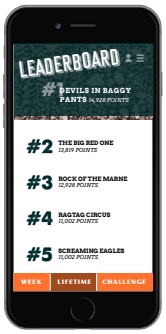
AFTER THE CALL

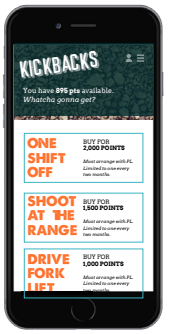
The user has the opportunity to correlate topics the phone identified with possible reactions.

Patterns are then recognized and visualized. The app may give some advice to improve the situation.

INTERACTION

Users can earn points through a variety of activities such as going to the gym, writing, and calling home. When feasible, users are encouraged to partner up with other app participants.





MOTIVATION

Points can be traded in for rewards. Base points are tallied up and bases compete against one another for the top spot.

EXPLORATION #1

SCAN'D

A wearable biometric tracking device that flags unexpected changes in data to keep the soldier safe.

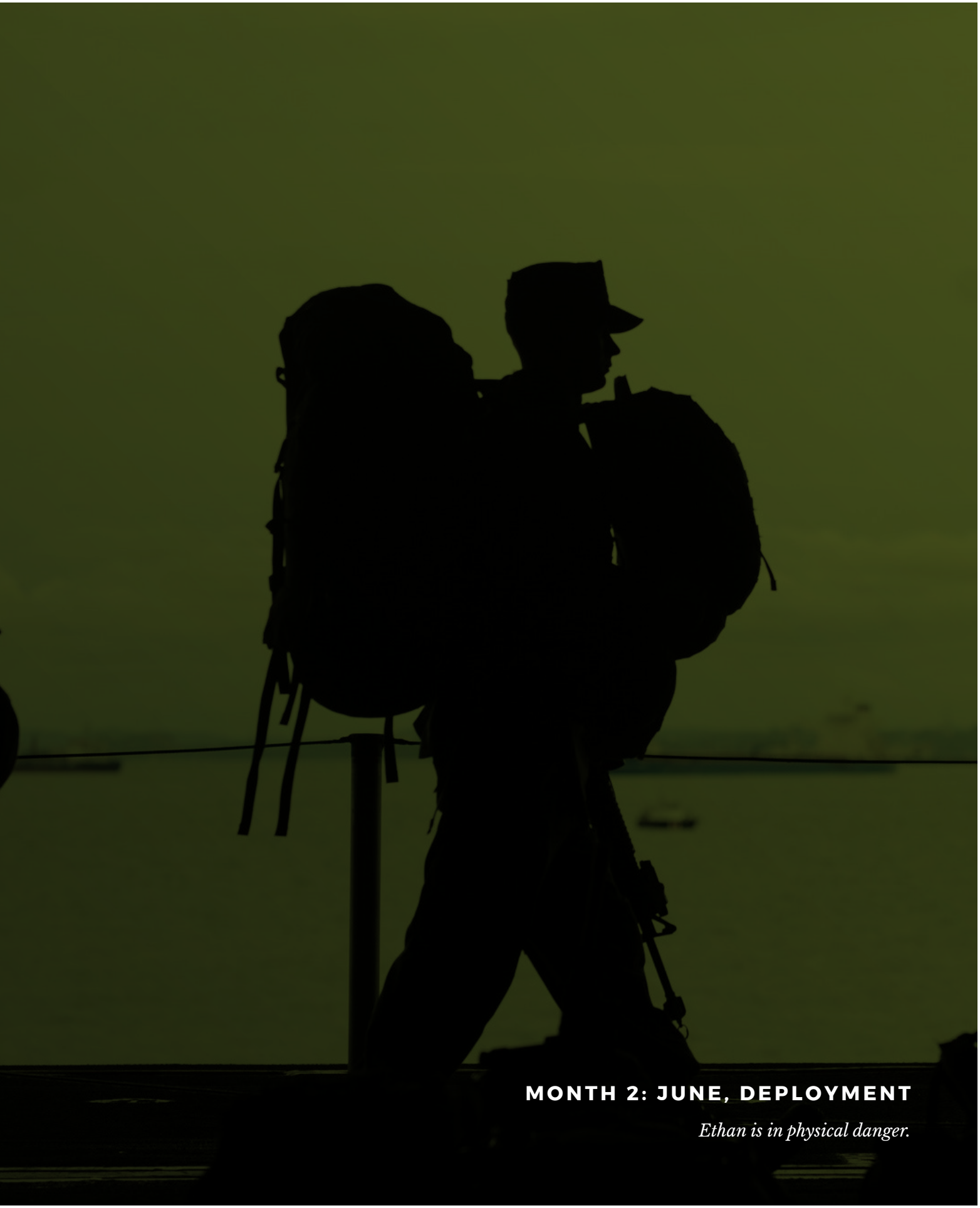
Self Communicative Analytic Networking Device (SCAN'D) is a wearable biometric tracking device which links all of the new design interventions into a single system. When SCAN'D detects an unexpected change in data, the system is alerted and communicates with the wearer via vibrations. Users can review their data to observe and change patterns of behavior.

Main Behavioral Objectives

Encoding and Education

Therapeutic activities utilized

Data tracking for self-reflection, routine, exercise, identifying patterns, goal setting, conversation/discussion, telling your story, serving others.



MONTH 2: JUNE, DEPLOYMENT

Ethan is in physical danger.

SCAN'D

overview

The Army has implemented SCAN'D, or "Self Communicative Analytic Networking Device." Every dog tag now comes with a biometric tracking chip and GPS. Every soldier also wears a biometric tracking wrist device. The system tracks heart rate, breathing, blood pressure, and location SCAN'D can make inferences about a user's stress levels and sleep quality.

Figure 4.8: *SCAN'D dogtags and wristband*

threat

While on patrol outside of the base, Ethan and his platoon are startled by popping noises. They duck for cover, unsure of what is happening. His heart rate has increased, and SCAN'D notifies him through a series of vibrations on his wristband that his heart rate has spiked. Ethan uses this as a reminder to focus himself during this moment of stress. They are about to engage in a firefight with the enemy.

SCAN'D

response

Back at the base, the SCAN'D system sends out an alert there has been a rapid and alarming change in the information being gathered from a group of soldiers on patrol. The soldiers monitoring the system are immediately concerned and begin to respond to the alert.

Figure 4.9: *Soldiers monitoring SCAN'D at the base*

SCAN'D

base user interface

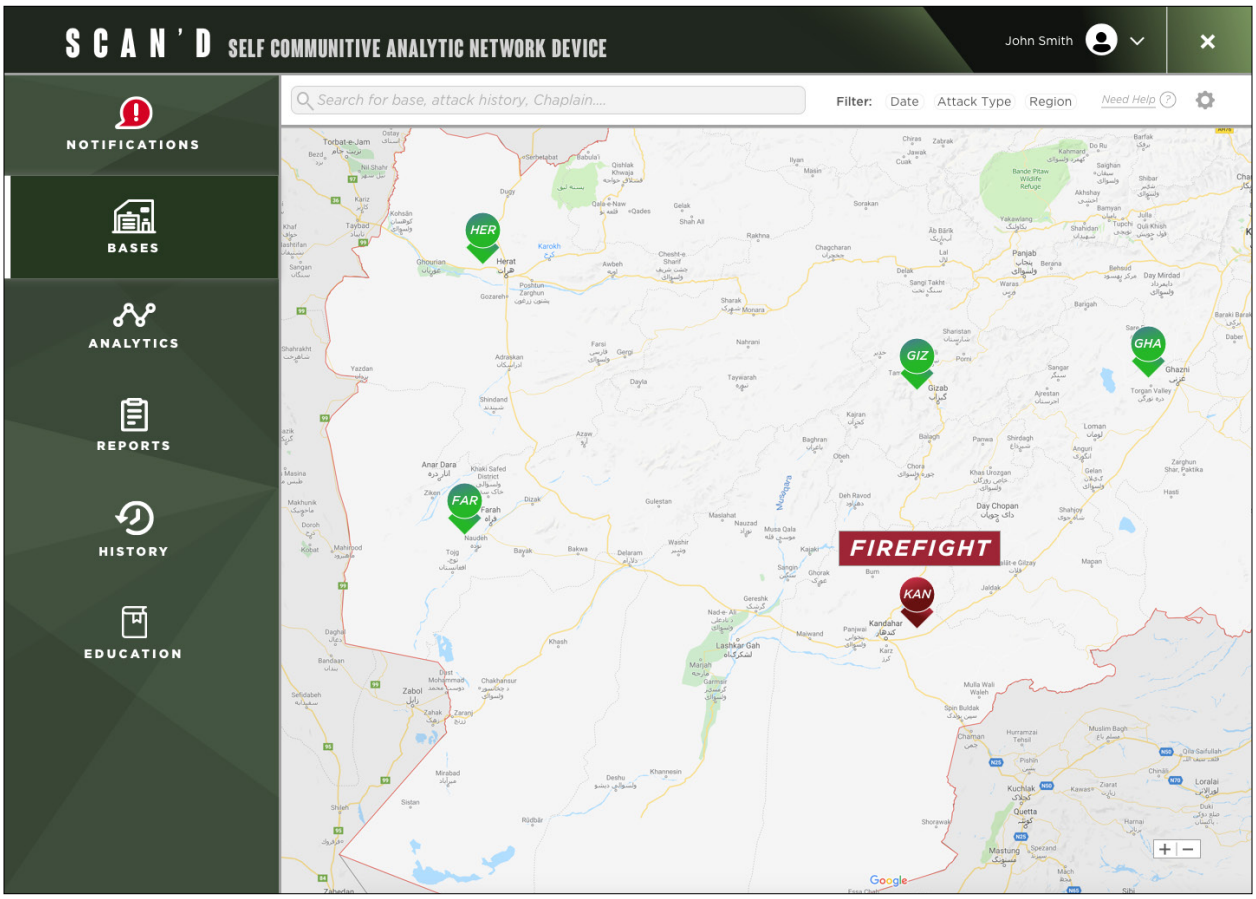


Figure 4.10: *SCAN'D is notified of an emergency*

SCAN'D

base user interface

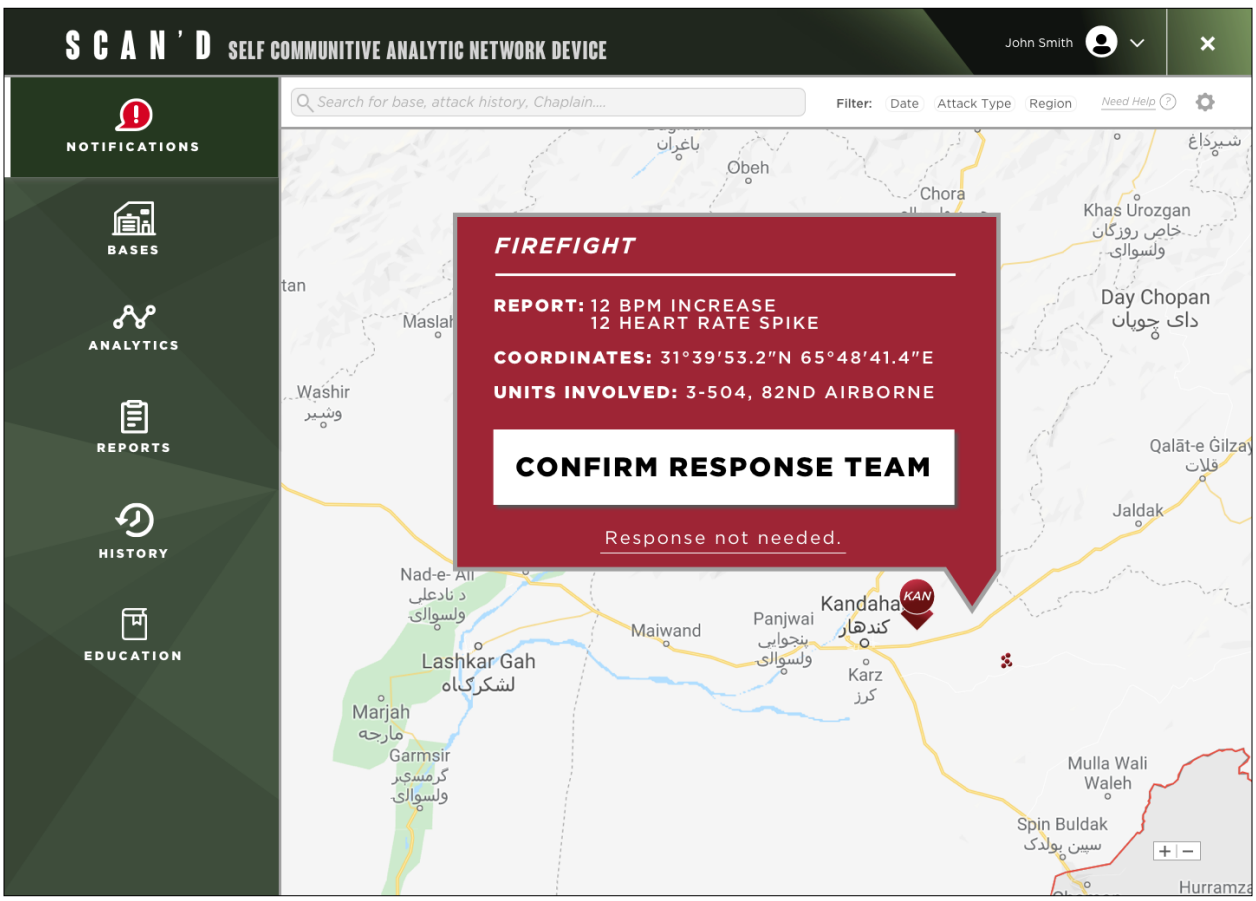


Figure 4.11: *Soldier sends response team to the site of the emergency*

SCAN'D

user communication

Once the base confirms that backup is on its way, the soldiers in the field feel the SOS signal vibrate on their wrist. This tells them that help is coming.

The next day, Ethan reviews his SCAN'D data from the firefight. He is curious if it affected his profile.

user data

While in the companion app, he notices that his heart rate has stayed slightly elevated since yesterday. He also slept less when compared to his previously collected data (Figure 4.13). SCAN'D suggests that he speak to the base Chaplain or connect with others on the community forum about his deployment experience thus far (Figure 4.14).

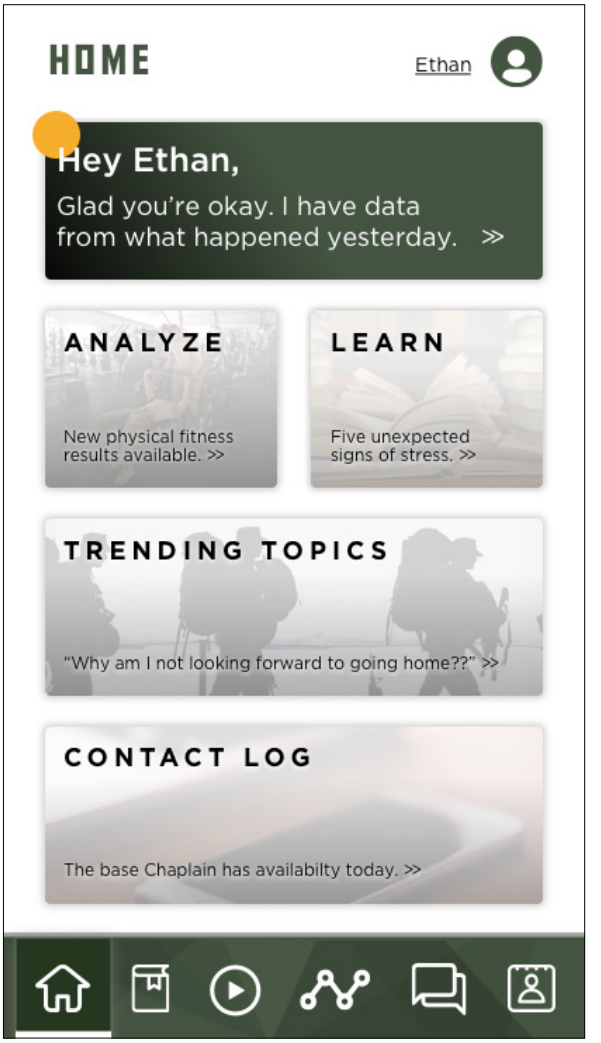


Figure 4.12: *SCAN'D phone app UI, home screen*

Figure 4.13: *SCAN'D phone app UI, data*

Figure 4.14: *SCAN'D phone app UI, notification*

SCAN'D

online community

Ethan chooses to browse the forum. He bookmarks a thread he wants to read later when he has more time.

SCAN'D FEEDBACK

user first impressions

Surprisingly, soldiers were very receptive to this concept. Passive data collection and privacy concerns does not deter them from engaging with a new technology. Many soldiers already wear FitBits and Apple Watches in deployment zones. When told that this wearable would communicate back to their base in case of an emergency, saving them precious time and energy if there is a need to call for help, many of them nodded enthusiastically that this is something that they would want on deployments.

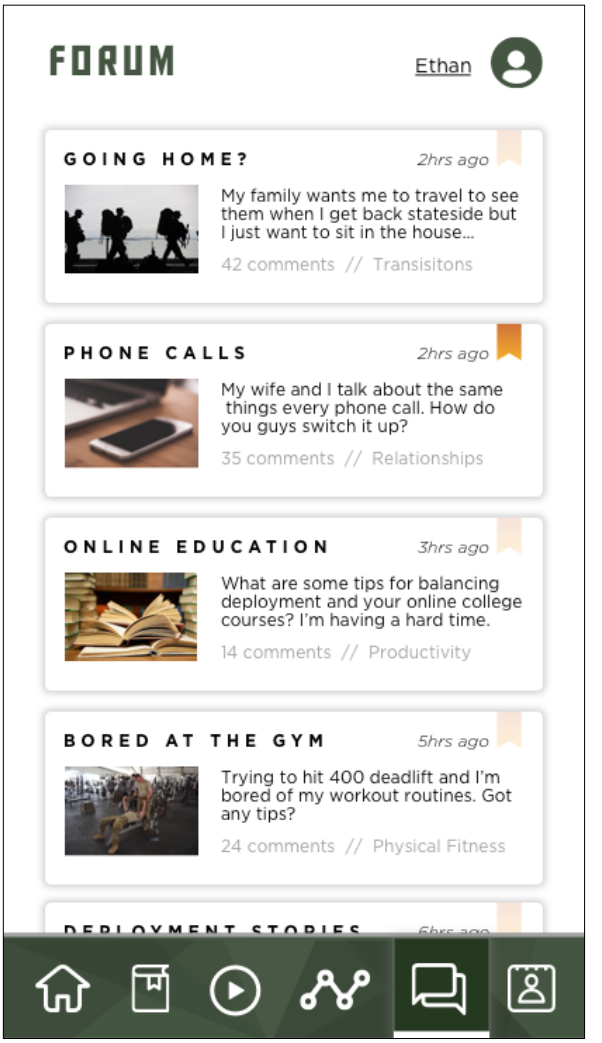


Figure 4.15: *SCAN'D phone app UI, forum*

SCAN'D FEATURES

functionality

Wrist wearable and Dog Tags

A wrist-worn device will not interfere with the armor or weapons soldiers wear but is still in a prominent spot to receive vibrational messages. A second tracker is implemented on the soldiers' dogtags; the one piece of their uniform they never take off.

Biotracking

SCAN'D tracks heart rate, blood pressure, and breathing. This data can be used to suggest soldiers' physical and mental state. SCAN'D can send messages to the appropriate party (the user, a superior, a Chaplain, etc) if the soldier should be notified of concerning behavior.

GPS

The wearable tracks the user's location. In case of an emergency (missing person, attack or firefight, solider taken prisoner, or a soldier's body left behind), SCAN'D can act quickly to help locate the individual.

Vibrational Feedback

To make the system durable for the tough conditions it will be used in, it does not have a screen. SCAN'D communicates with users via patterns of vibrations.

10,000 foot view

The data of all users is collected by the system. This community-sourced information can be used by the Army to notice unusual behavior or possible emergencies.

Machine Learning and Pattern Observation

SCAN'D can notify users and supervisors if there is behavior change. Users can view their data to make a note of unintentional or unwanted changes in behavior and be mindful of habits they wish to implement.

Communities of Practice

With the online forum feature, users can voluntarily enter a community to exchange knowledge, share experiences, and support their peers. Leaders within each community can emerge or onlookers can remain quiet observers.

EXPLORATION #2

SCOREBOARD

Scoreboard encourages healthy coping habits through gamification, competition and rewards.

Scoreboard gamifies healthy coping habits through a motivational competition and reward platform. Activities such as exercising, calling home, and journaling increases a soldier's points and their platoon's standing in the competitions. Points can be exchanged for special activities.

Main Behavioral Objectives

Escapism and Encoding

Therapeutic activities utilized

Goal setting, competition and reward, meditation, routine creation, exercise, journaling (topics may include gratitude practice, speaking to your past self, rewriting your story, changing perspective).

MONTH 4: AUGUST, SUSTAINMENT

Ethan rallies his platoon.

SCOREBOARD

setting intentions

Ethan notices that his soldiers are getting bored with the deployment. Day-to-day activity is becoming mundane. Ethan gets all of his soldiers signed up with the app Scoreboard. Scoreboard helps groups of users set intentions and then motivates them to follow through on their goals through a point and reward system.

Figure 4.16: *Scoreboard phone app UI, setting intentions in physical fitness*

Figure 4.17: *Scoreboard phone app UI, setting intentions in spiritual fitness*

SCOREBOARD

activities

One of Ethan's soldiers wants to take online college classes. He earns points for good grades. Another soldier wants to increase is physical fitness test scores and make new gym buddies. He earns points for achieving weight lifting goals and working out with other people.

Figure 4.18: *Scoreboard phone app UI, college courses*

Figure 4.19 *Scoreboard phone app UI, exercise*

SCOREBOARD

activities

Another soldier wants to understand why he is experiencing certain emotions. They use the journal to reflect.

And Ethan wants to make sure he calls home and keeps his family updated (something he has been told he doesn't do very well). He earns points for that, as well.

Figure 4.20 *Scoreboard phone app UI, journaling*

Figure 4.21 *Scoreboard phone app UI, calling home*

SCOREBOARD

competition, points, reward

Scoreboard shows the points of other platoons which creates healthy competition. With points earned, soldiers can trade them for rewards like a shift off work, opportunity to go shooting for practice, or driving heavy machinery for fun.

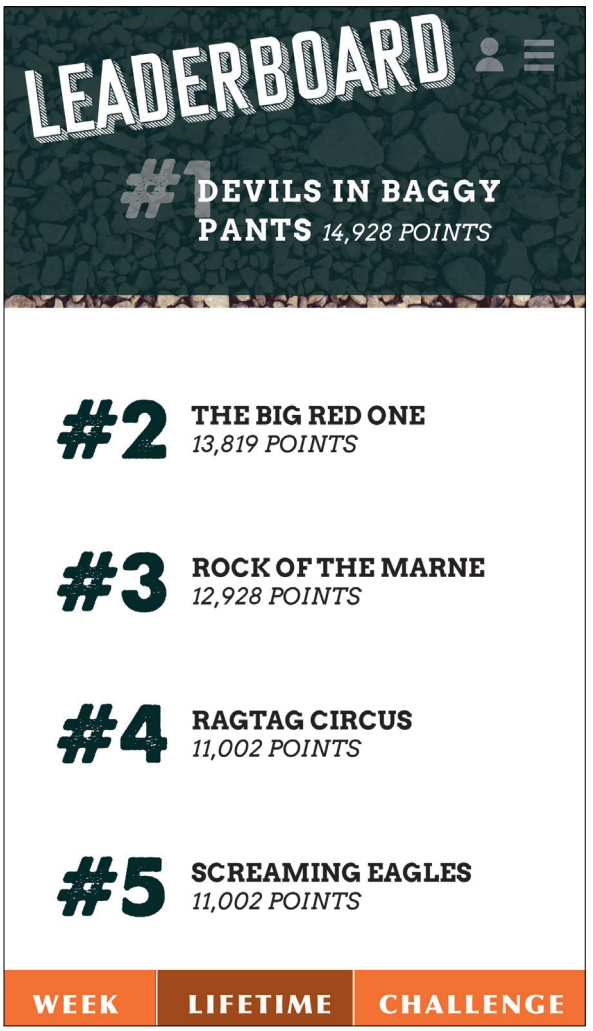


Figure 4.22 *Scoreboard phone app UI, leaderboard*

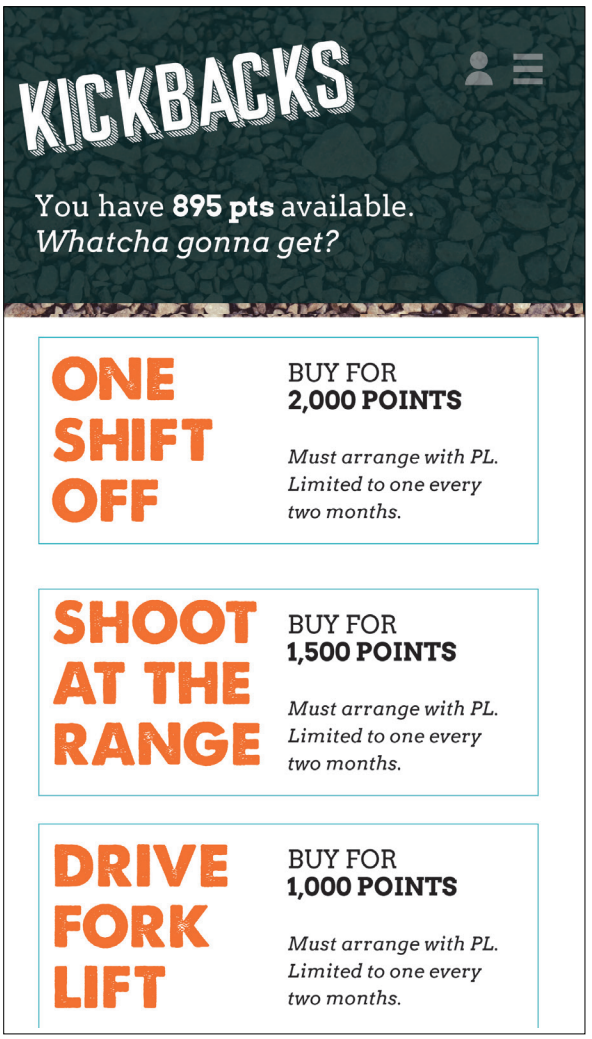


Figure 4.23 *Scoreboard phone app UI, rewards*

SCOREBOARD

improvement

Ethan and his soldiers notice a boost in moral, higher physical training test scores, and better communication amongst co-workers.

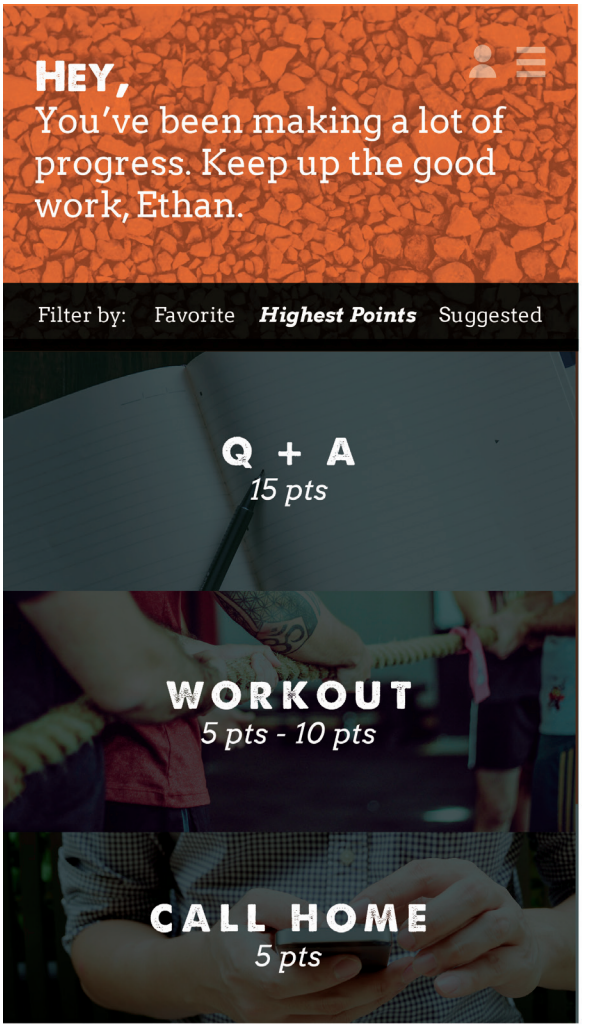


Figure 4.24 *Scoreboard phone app UI, home screen*

SCOREBOARD FEATURES

functionality

Goal setting

Users set their intentions when using the app and can modify their goals at any time. Each intention builds the soldier's profile, helping them focus on activities that may progress them towards meeting their goals.

Variety of Activities

The app can suggest and track activities like journaling, meditation, academic course completion, working out at the gym, calling home, and speaking with a Chaplain or Counselor. All of these activities are used as healthy coping habits and directly align with the goals they have set.

Competition

Soldiers are naturally competitive and are motivated by sheer bragging rights. Users can be divided into groups (gun crews, squadrons, platoons, rank, etc) and battle it out for first place.

Points + Reward

Points are distributed on a sliding scale depending on the goals they have set. If the user identified that one of their weaknesses was physical fitness, but they were very good at calling home, then they may earn 10 points for going to the gym but only 2 points for calling a family member. Points, acting as motivation, can be turned in for rewards approved by their supervisors.

Camaraderie Building

Certain activities can be completed with peers, gaining users extra points. This encourages the networking and relationship building of soldiers who may not usually cross paths.

Habit formation, reminders, progress tracking

Through push notifications and reminders, soldiers will learn that these coping behaviors can turn into ongoing healthy habits.

SCOREBOARD FEEDBACK

user first impressions

The higher ranking officers in the room found this solution the most intriguing. As leaders, they were interested in using Scoreboard as a motivation and accountability tool. The main concern was ensuring that leadership would allow for the rewards to be redeemed. Some direct quotes regarding Scoreboard were as follows:

> *"I would definitely use this in a platoon setting to give soldiers an incentive to complete things. It would give soldiers a drive if soldiers are down and they don't have any moral."*

> *"It would give you something to look forward to. If I want to get the day off, I can use this to get a couple points from working on my bench press."*

> *"As a leader, I want to keep my soldiers happy and give them personal goals."*

> *"[Scoreboard] is perfect for visual style for the military."*

EXPLORATION #3

STENOGRAPHER

Stenographer uses tone analysis to build constructive communication behaviors with the soldier and loved ones back home.

Stenographer builds constructive communication habits through tone analysis and self-reflection. Users can connect topics with emotions, allow notifications for conversation prompts, and document the user's notes between calls. User accounts are synced to share insights with loved ones.

Main Behavioral Objectives

Education and Encoding

Therapeutic activities utilized

Routine, compartmentalization, telling your story, data collection for reflection, changing perspectives, conversation/discussion.

MONTH 7: NOVEMBER, SUSTAINMENT

Ethan and his wife need communication assistance.

STENOGRAPHER

listening and reflection

Ethan and his wife, Jenna, decide to start using Stenographer during their phone calls. Stenographer uses tone analysis and voice recognition to link keywords with emotions.

As the app listens to their call, the circle on the screen spins slowly to indicate that it is in use. He and Jenna talk about their finances and the upcoming Thanksgiving holiday. Ethan is disappointed that he will not be home but happy that his base will do their version of a Thanksgiving Feast.

Ethan closes the call by rotating his thumb around the icon in a clockwise motion. Ethan is then invited to link the terms Stenographer identified with the descriptions. Stenographer already has some indication of how he might be feeling (thanks to it's use of tone analysis and voice recognition) . However, this is an activity for Ethan to self reflect.

Figure 4.25 *Stenographer, listening visualization*

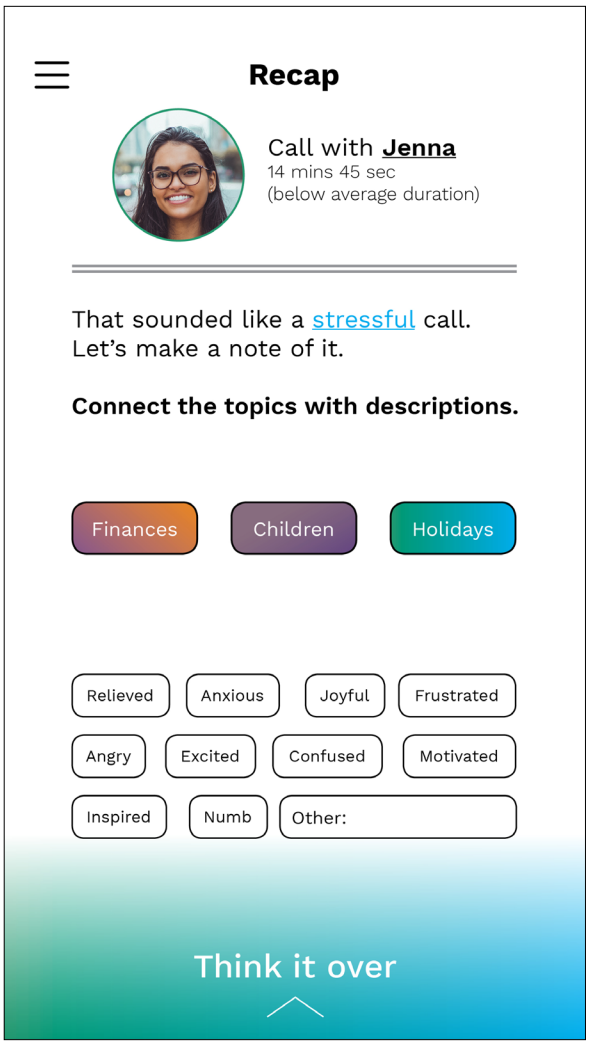


Figure 4.26 *Stenographer phone app UI, post-call*

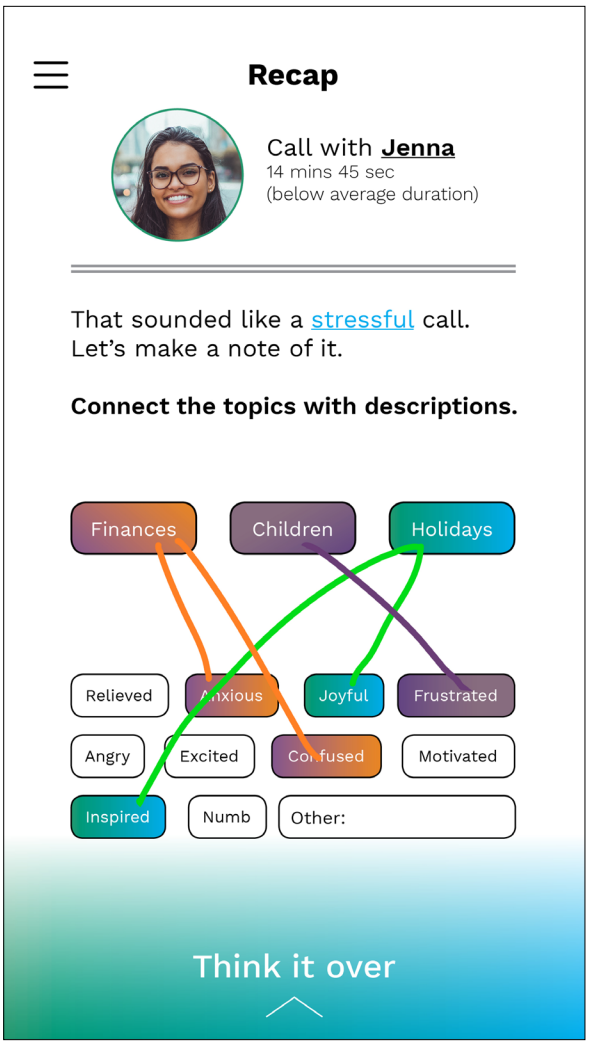


Figure 4.27 *Stenographer phone app UI, user reflecting*

STENOGRAPHER

unveiling data

He chooses to swipe up to unveil his accumulated data. He is surprised by how much time he and Jenna spend talking about finances. The length of time corresponds to the size of the circle.

He "unscrews" the finances section to peek into what connections he usually makes and notes he has taken on the topic. Based on the negative terms he sees, he considers that he and Jenna may need to start speaking with a financial advisor.

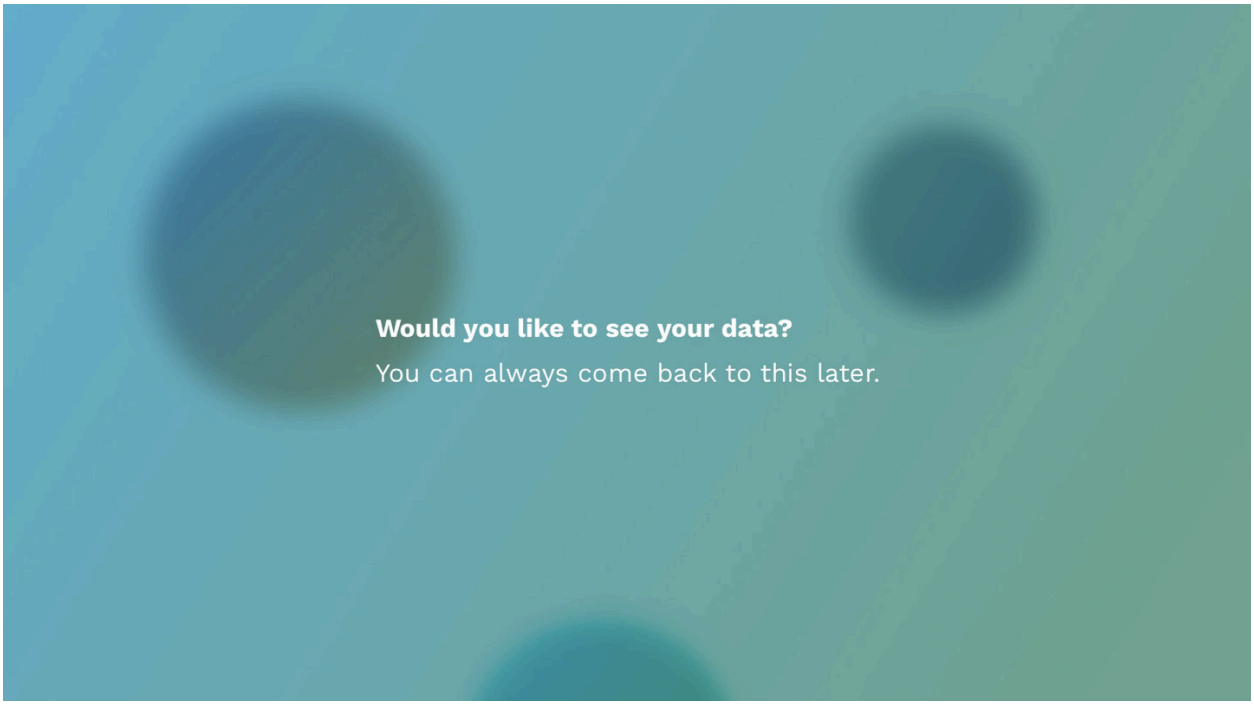
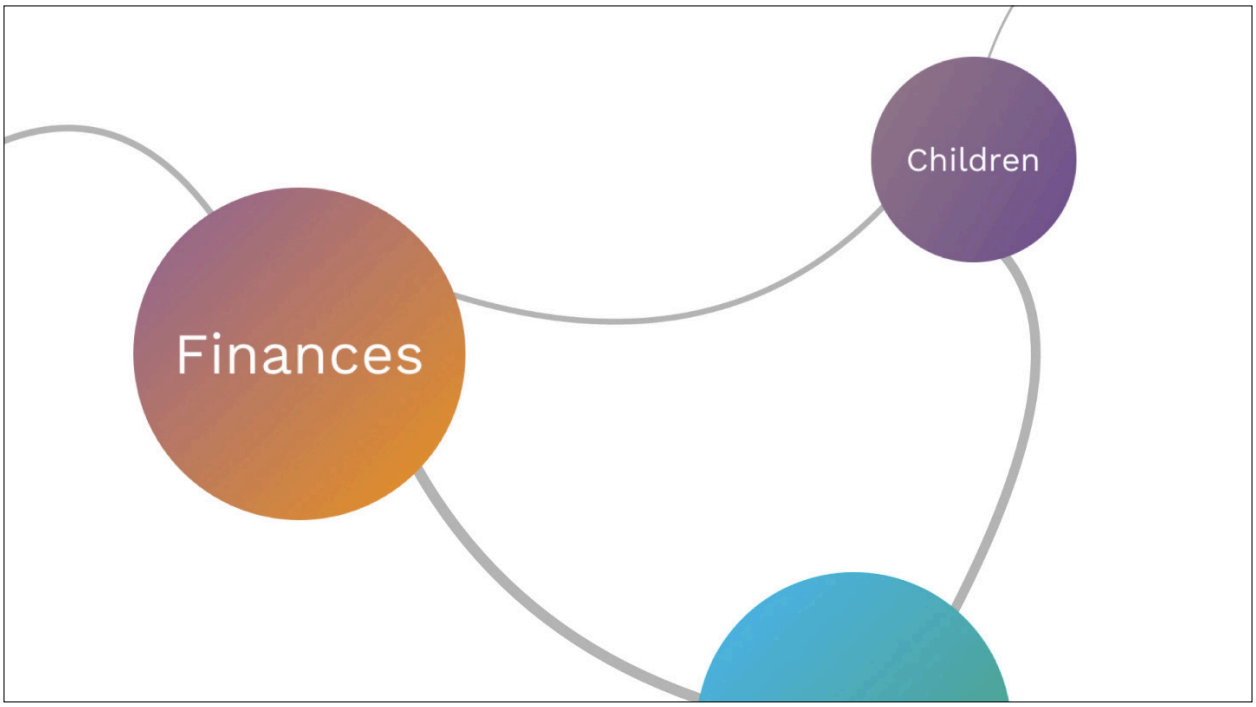


Figure 4.28 *Stenographer enlarged visualization of veiled data*



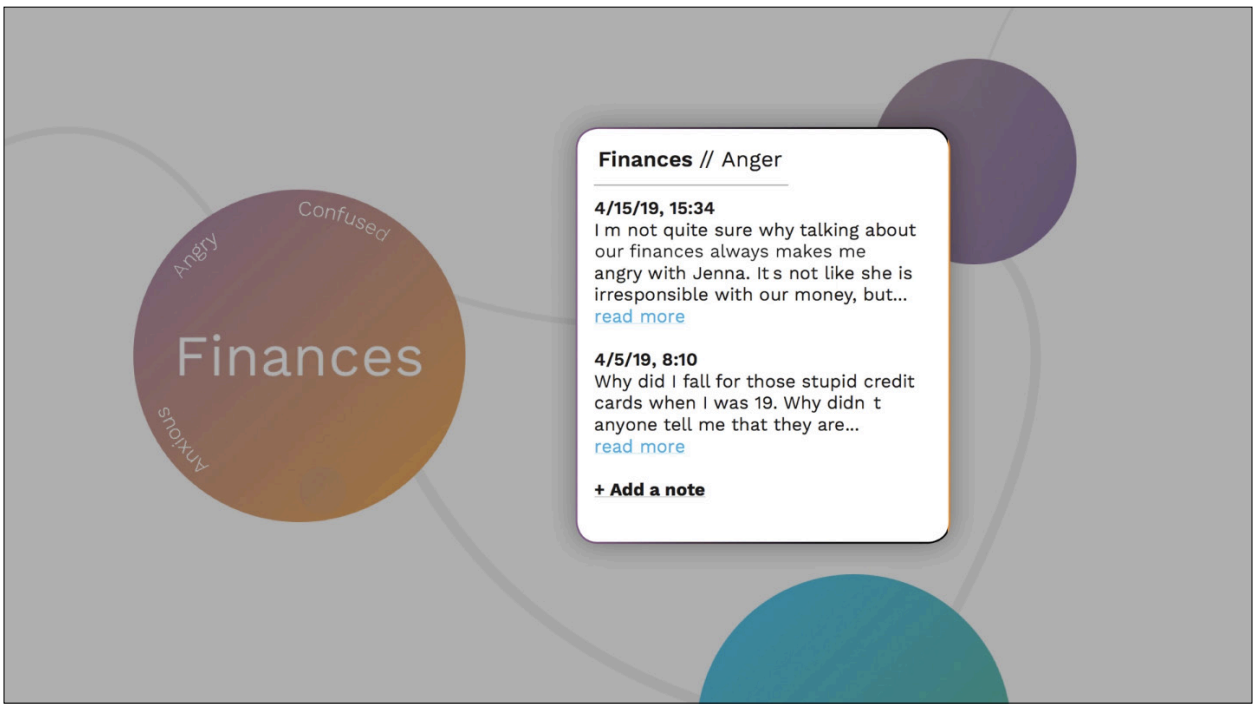


Figure 4.29 *Top, Stenographer enlarged visualization of unveiled data representing discussion topics*
Figure 4.30 *Bottom, Stenographer enlarged visualization of user written notes*

STENOGRAPHER

compartmentalization

Stenographer also acts as a compartmentalization tool so he can separate work from his personal life. He can keep a log of topics he and Jenna talked about and refer to them before the next call. He can also make notes in-between calls so he never forgets what he wants to tell Jenna when they do get a chance to speak.

Ethan can opt into sharing his profile data with Jenna. She will receive a notification before their call to indicate what Ethan has been up to in the app. Today, she is warned that Ethan has been expressiong frustration around his career. She chooses to avoid the topic.

Over time, the couple finds that Stenographer encourages more constructive and enjoyable conversations.

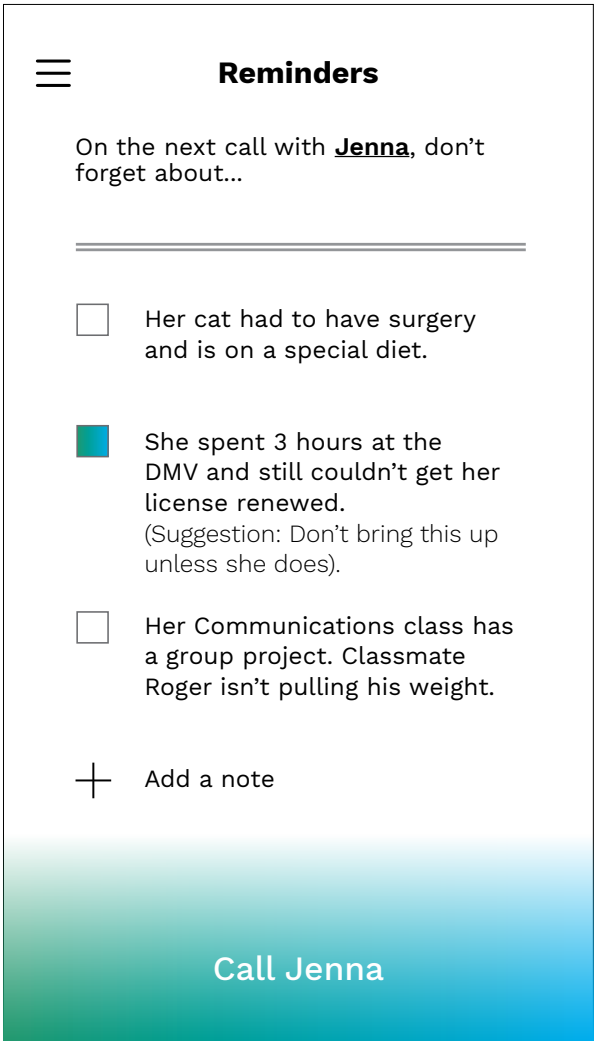


Figure 4.31 *Stenographer phone app UI, note taking*

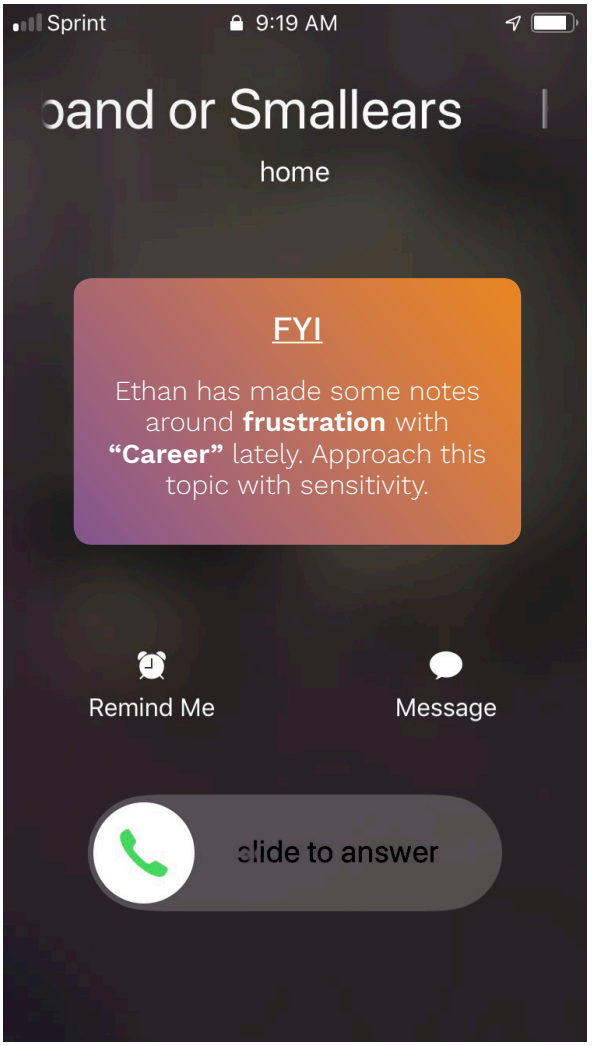


Figure 4.32 *Stenographer phone app UI, push notification*

STENOGRAPHER FEATURES

functionality

Tone analysis and word recognition

Stenographer can use tone analysis to assume a user's mood. Then, by identifying commonly used words ("money", "kids", "house", etc) and pairing that with tones, the app can begin to observe trends in the conversations and topics.

Conversation Reflection

Although Stenographer has some indication of emotional connections to the topics, it encourages the user to connect their feelings with the subjects discussed. This builds the skill of identifying and acknowledging feelings.

Unveiling of data

Stenographer gives the users control to view their data when they feel most comfortable. The gesture of "lifting the veil" is symbolic and designed to be low risk and pleasant. Data collected in this context may be a point of stress, but users have the final decision of when it is a good moment to view that information.

Compartmentalization

The journaling and notes section of Stenographer allows a place for the soldier's "home life" to be stored. Users can write their thoughts and refer back to them later before the next call. This allows them to focus on their deployment duties. The written text is also processed through the tone analyzer.

Synced profiles

Data can be shared between users to encourage healthier and more productive conversations. If User A is alerted via a push notification that a certain topic has been causing stress to User B, User A may be less likely to inadvertently upset User B by bringing up that topic. Or, User A may be more inclined to ask, "I know this has been giving you stress lately. Would you like to talk about it now or at a later time?" thus giving the users control over the discussion.

STENOGRAPHER FEEDBACK

user first impressions

Married soldiers found Stenographer the most interesting of the solutions. A few soldiers were concerned about the app listening to the conversation while others were not deterred. Some test users speculated this app might delay important conversations that may need to be had sooner rather than later. One solder felt that the app's visual style was too formal, but another spoke up saying he liked it because it felt like his "own personal therapist." Much of their feedback validated the need for Stenographer. These were some of their comments:

"I forget things that are important and she gets upset."

"When you go a long time without talking you build up a lot of stuff you want to talk about, important topics."

"I would use this most [out of the other solutions] on deployment."

"I would use [Stenographer] all the time. I would use that every day."

"My wife doesn't like to talk about issues and it would be a good way for her to pour her heart out in the app and I can look at the app to understand. It could be a great way to build communication skills."

"I wouldn't need to use [Stenographer]. I don't have anyone to talk to honestly."

EXPLORATION #4

SCRIBBLER

Scribbler uses art therapy and augmented reality to create geotagged graffiti and anonymous digital art galleries.

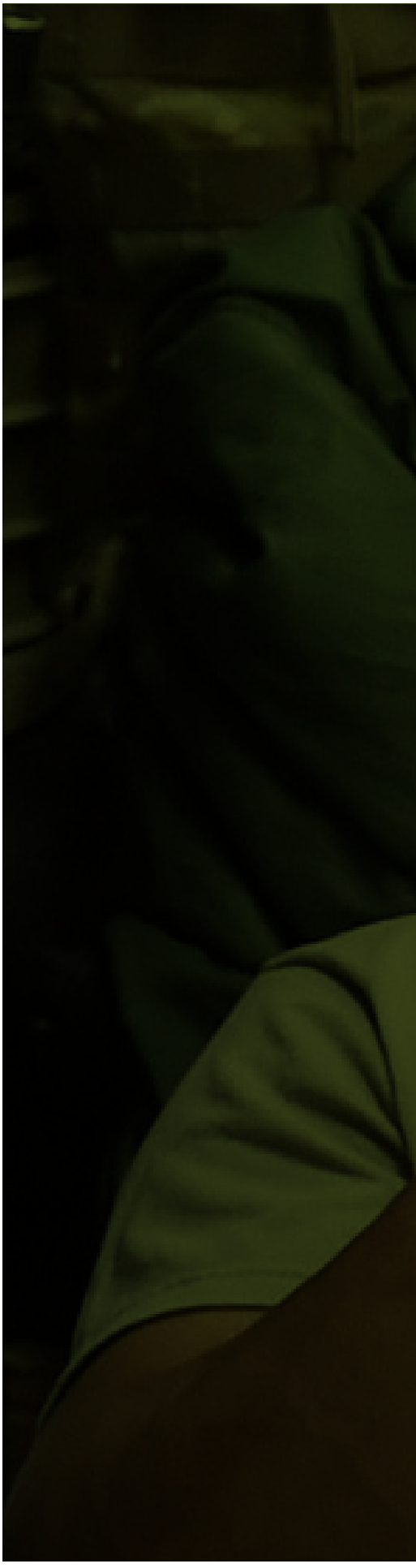
When soldiers cannot put words to their emotions, they can use **Scribbler** to create compositions. Compositions can be viewed in anonymous digital galleries or geotagged to create augmented reality graffiti. A conversational user interface utilizes machine learning to suggest emotional ties to topics.

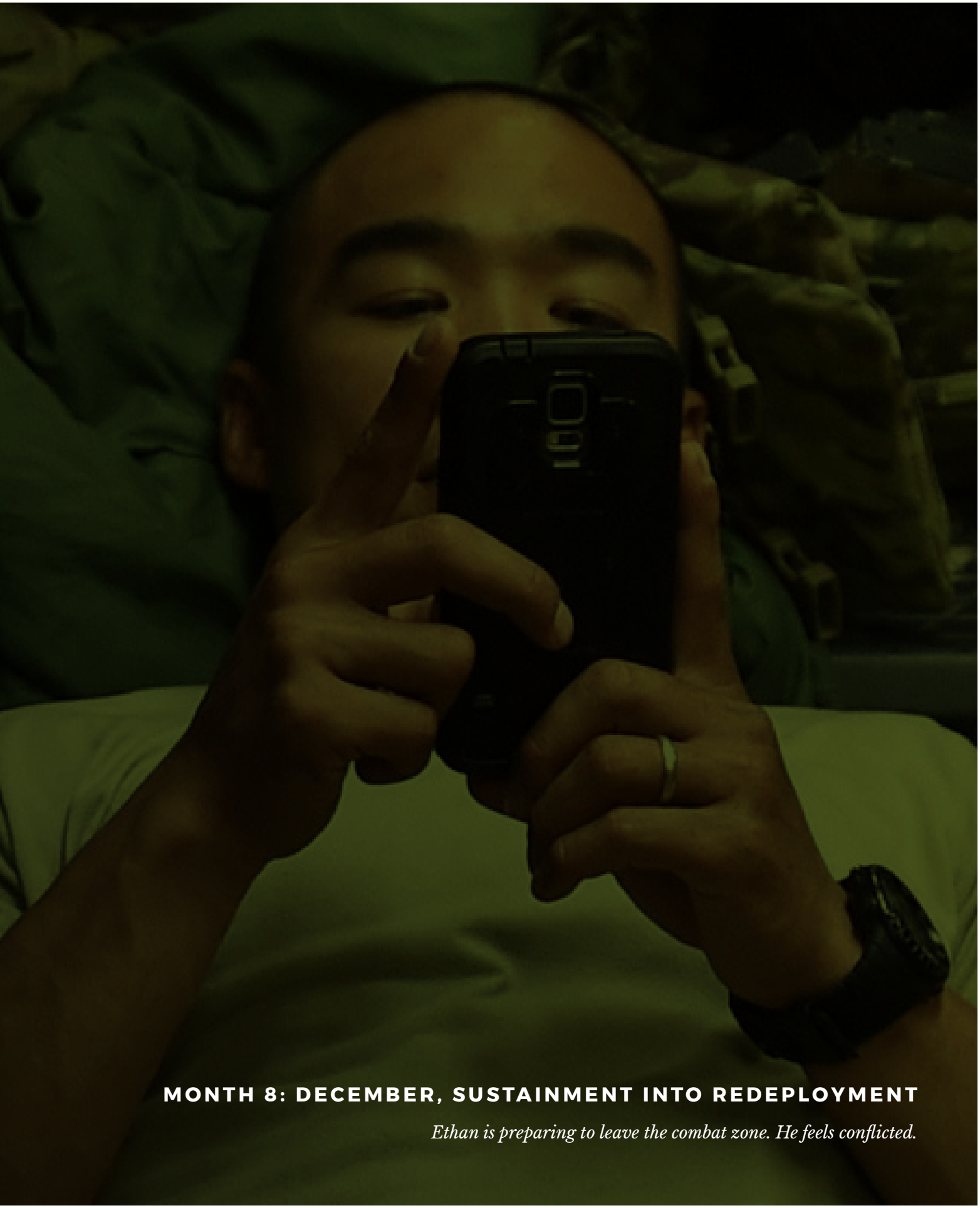
Main Behavioral Objectives

Expression, Education

Therapeutic activities utilized

Artistic expression, reflection, telling your story, identifying patterns, changing perspectives.





MONTH 8: DECEMBER, SUSTAINMENT INTO REDEPLOYMENT

Ethan is preparing to leave the combat zone. He feels conflicted.

SCRIBBLER

browsing and starting

Ethan is preparing to leave Afghanistan and feels conflicted. It is difficult for him to unpack a lot of the emotions he is feeling. He has scrolled through Scribbler public albums out of curiosity, but this is the first time he is using Scribbler's prompt system to create compositions for himself by using texture, color, shape, sound, and animation to reflect on what has happened in Afghanistan.

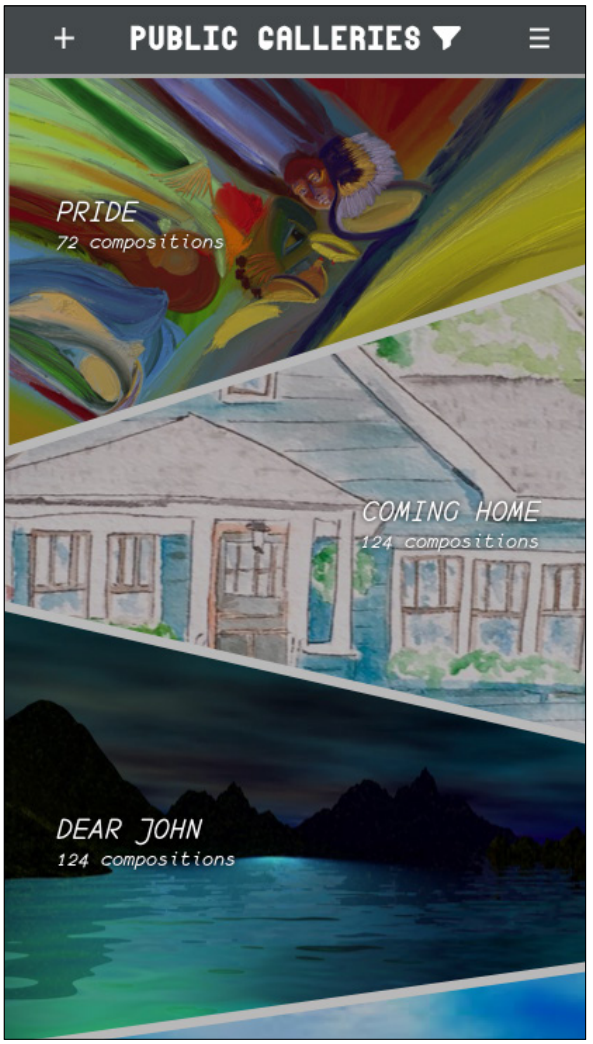


Figure 4.33 *Scribbler phone app UI, public galleries*

Figure 4.34 *Scribbler phone app UI, new composition*

SCRIBBLER

prompts

The app first offers prompts that may spark inspiration to create a composition.

Figure 4.35 *Scribbler phone app UI, prompt examples*

SCRIBBLER

creating a composition

Once a prompt is chosen, Scribber's conversational user interface helps get Ethan started by making some marks on the canvas.

Figure 4.36 *Scribbler phone app UI, CUI conversation*

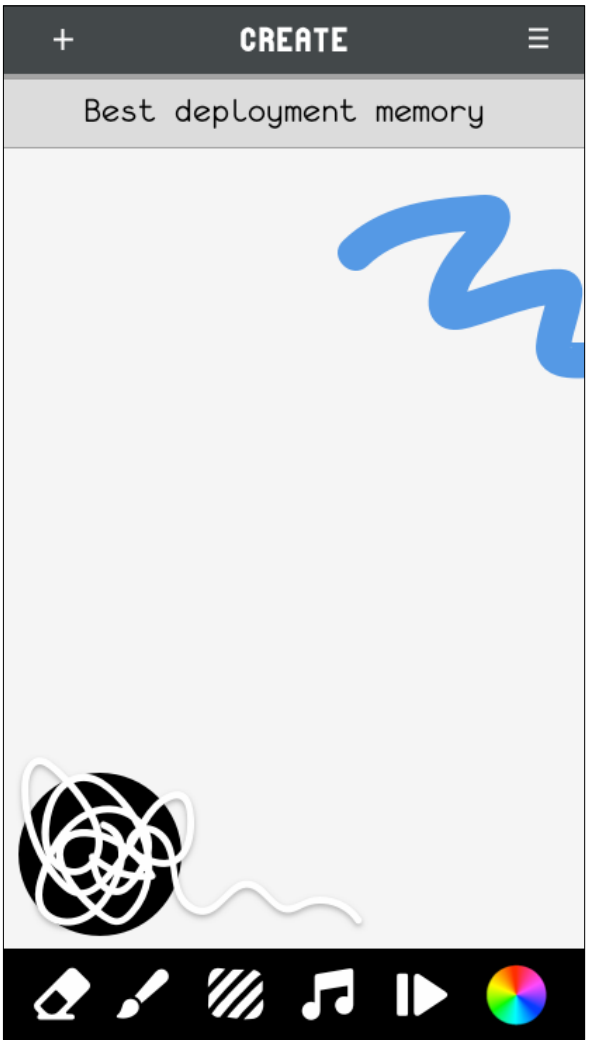


Figure 4.37 *Scribbler phone app UI, CUI creating*

SCRIBBLER

browsing and starting

Eventually, Ethan's personal galleries start to build in size the more he creates. Compositions are organized by category and each soldier's interpretation of that category will be different depending on their connotation with that topic. Scribbler sometimes makes an appearance to suggest a pattern it notices. Even if the prediction is incorrect, Scribbler encourages the user to evaluate how they are feeling.

Figure 4.38 *Scribbler phone app UI, created composition*

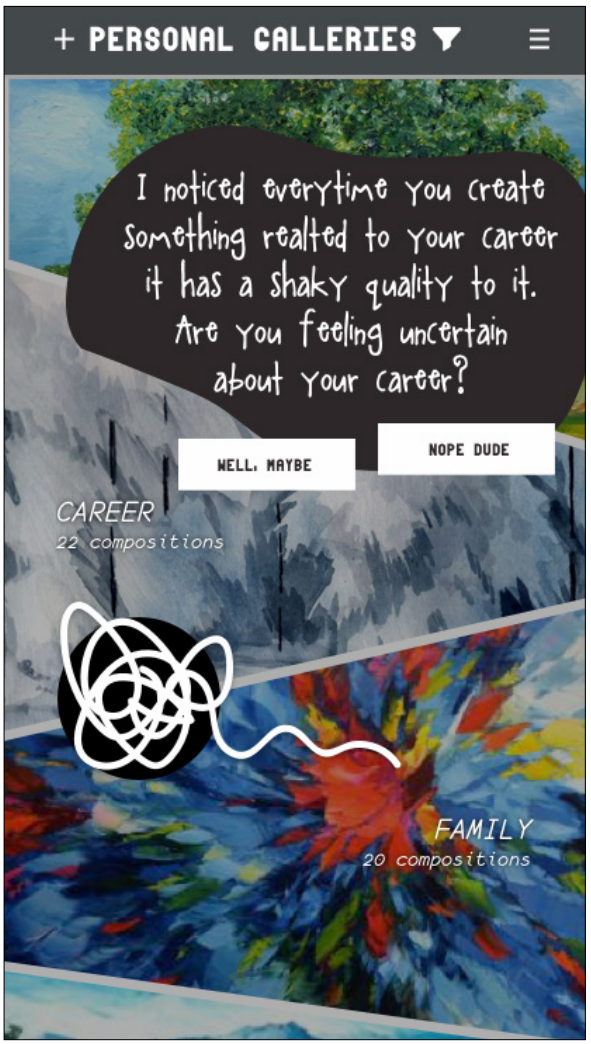


Figure 4.39 *Scribbler phone app UI, CUI suggestion*

SCRIBBLER

map

Before Ethan leaves the base, he wants to see some of the geotagged compositions from the public gallery. He chooses a nearby building and walks there. It appears like any other wall.

Figure 4.40 *Scribbler phone app UI, map screen infront of building*

SCRIBBLER

augmented reality graffiti

By using Scribbler he sees the augmented reality graffiti other soldiers have created for this spot. This composition was created by the unit that was here before him. The soldier created a piece in memory of a fallen comrade.

Figure 4.41 *Scribbler phone app UI, user viewing a geotagged AR composition*

SCRIBBLER

geotagging

He walks to a new location that is meaningful to him. His platoon would meet here often so it is meaningful to him. He leaves a message for the soldiers that will be arriving in Afghanistan soon. He is comforted to know that he left his mark.

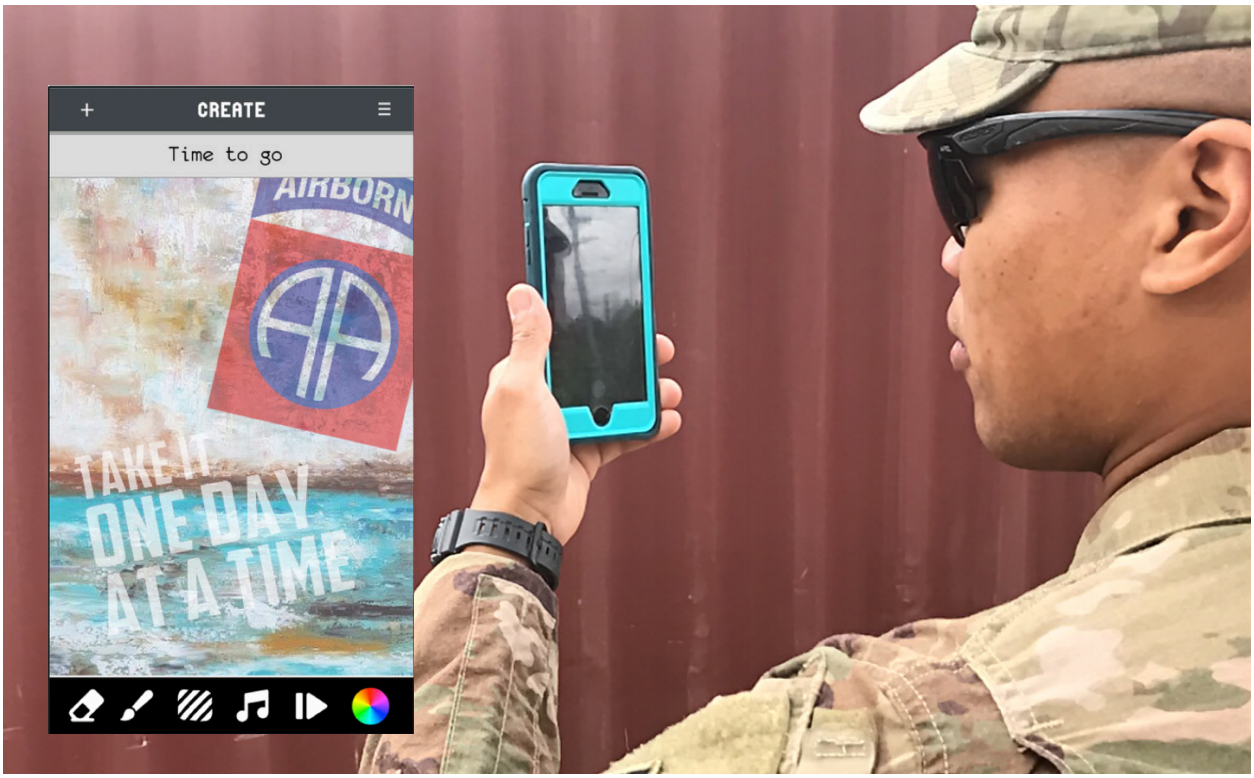


Figure 4.42 *Scribbler phone app UI, user creating in a new location*

SCRIBBLER FEATURES

functionality

Composition prompts, categorization, albums

Compositions are guided by prompts or short questions to encourage the soldier to reflect on their experiences and jumpstart their creations. Soldiers can also enter into a Freeform mode and create pieces without prompts. The topic of these prompts helps in categorizing them by experience or emotion, creating both personal and public galleries. Users can opt-in to public galleries, contributing to the story of that prompt.

Creation

Scribbler allows composition creation through shape, color, texture, movement, layering, and imported images.

Geotagging and Augmented Reality

Compositions can be tagged to walls or the ground and then viewed via augmented reality. Composition creators determine the location of the graffiti.

Digital Graffiti and Layering

By tagging compositions to locations, digital graffiti is created. Soldiers can choose to tag over existing compositions, creating layers for users to "peel back" and explore. Information like the creator's rank, unit, and time at the base can be shown if the creator allows.

Anonymity

Soldiers have usernames that do not disclose their identity. Users can "follow" other artists to be notified of their new compositions and view existing galleries they have labeled as public. But there is no social ranking system ("likes," "hearts" or the number of followers displayed). Users cannot direct message one another or comment on compositions.

SCRIBBLER FEEDBACK

user first impressions

Of all of the solutions, this seemed to be the scariest for the test group to use on their own. They were excited about the ability to see potentially inspiration messages and compositions left by the people who went before them, but only one soldier (the only female in the group) identified as a "creative or artistic" person. Everyone else was hesitant to try to make artwork. Some of the statements regarding Scribbler are as follows:

"I wouldn't know what to do if given a blank canvas."

"Say people are scrolling down some city and they see [through the app] that 'this house has already been hit, let's move onto the next one. Oh, this one is dangerous.' It is a good use in the combat world."

"What if I could aim this at a radio and it teaches me how to use it?"

"From a personal perspective I would use this like social media. 'This has been tagged, let's go see what is there."

GENERAL FEEDBACK

user first impressions

I was initially allotted 30 minutes with these soldiers. After 45 minutes, the discussion was still very lively and active. A few soldiers wished to stay longer to speak more in-depth about these solutions. I eventually spent two hours with them at their unit. (They were allowed to go home early that day, so my time with them was not cutting into any training or job responsibilities).

The soldiers were interested, engaged, enthusiastic, healthily skeptic, but also very receptive. They were grateful that someone was asking these questions and excited to see these solutions. The soldiers validated and confirmed much of my prior research regarding stigma, resource availability, and the unmet mental health care needs on deployment.

Most of their feedback focused on continuing to push my existing designs and apply them for new uses, rather than a re-evaluation of the key features. I believe their positive feedback and encouragement to keep going with these four solutions is due to my comprehensive understanding of the deployed living environment, the importance of anonymity, and the culture of the military. I understood my user well, therefore the designs I proposed were well received.

10 of 18 soldiers surveyed said that they would want to use Scoreboard throughout the year, even when they are not deployed.

11 of 18 soldiers thought Scoreboard would help them improve their mental health.

Three soldiers were not interested in mental health care, but all said they would try at least one of these solutions because it does not overtly look like mental health care as they know it. The message and visual branding influenced their perception and openness to this topic. Words like “anxiety” and “depression” will not be found in these apps for that reason.

section five

REFLECTIONS

"You can move a mountain one shovel at a time."

- Nicholas Cosby, Army Soldier

RECEPTIVITY GRADIENT

persona movement

After participating in the therapeutic activities found in SCAN'D, Scoreboard, Stenographer, and Scribbler, the persona will have likely advanced along the Receptivity Gradient.

Before the deployment, Ethan knew that his mental health care was something he should spend more time building. After deployment and using the system, he is actively improving his mental state. He is also quietly speaking to his soldiers about healthy coping habits that work for him.

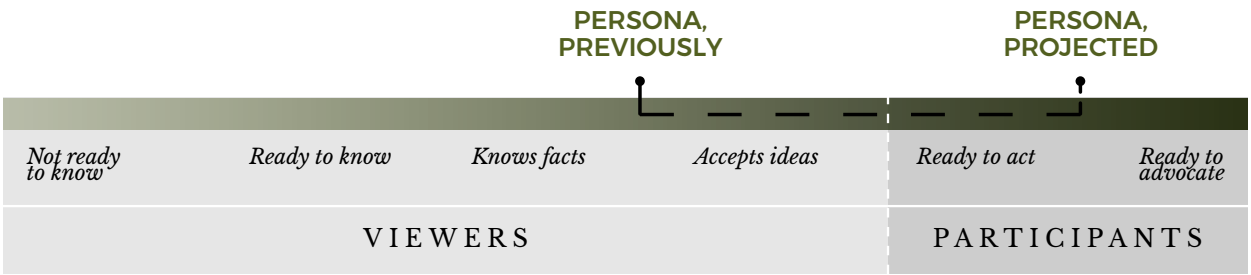


Figure 5.1: *David Rose's Receptivity Gradient with persona progress*

CONCEPTUAL FRAMEWORK

applied

These four studies (subjectivity) span across the Conceptual Framework. A user who may not be ready to admit they have mental health issues, or "Not Ready to Know", could use one of the tools in that column. As they advance along the gradient with the help of one tool, there are always options of other tools to continue moving them forward.

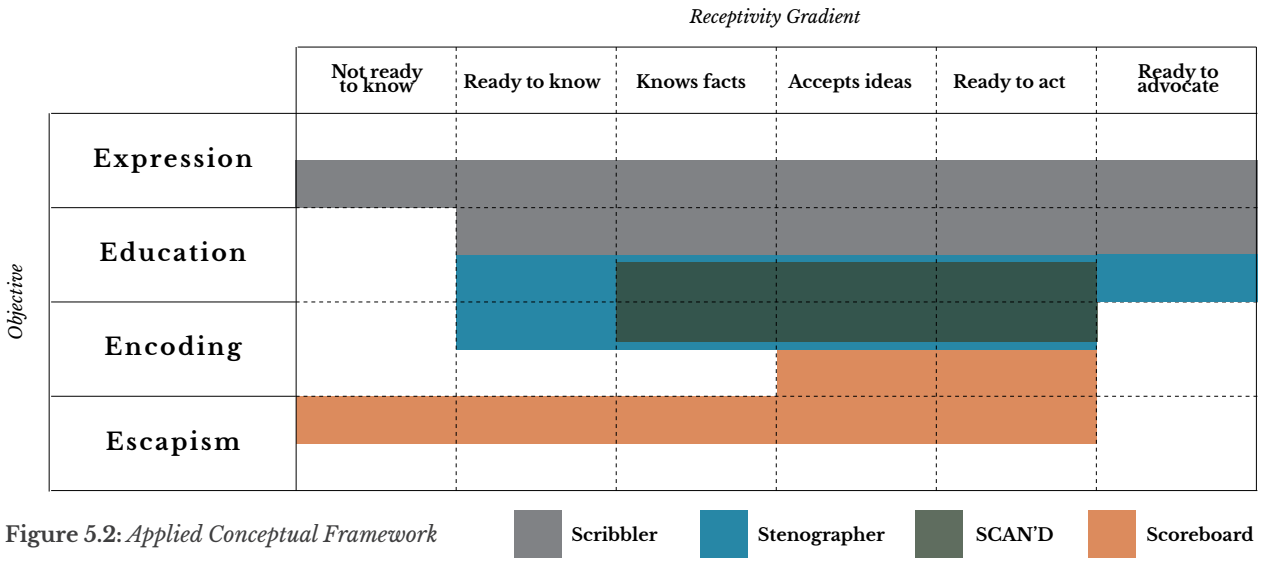


Figure 5.2: *Applied Conceptual Framework*

THE SYSTEM

a library

These four solutions are what I see as the start of a system to build a library of tools all connected by SCAN'D. Soldiers are free to use any of the tools but are never forced to participate. Additional tools in the system could take forms beyond mobile applications and wearables. They could be books, physical journals, virtual reality, and live events.

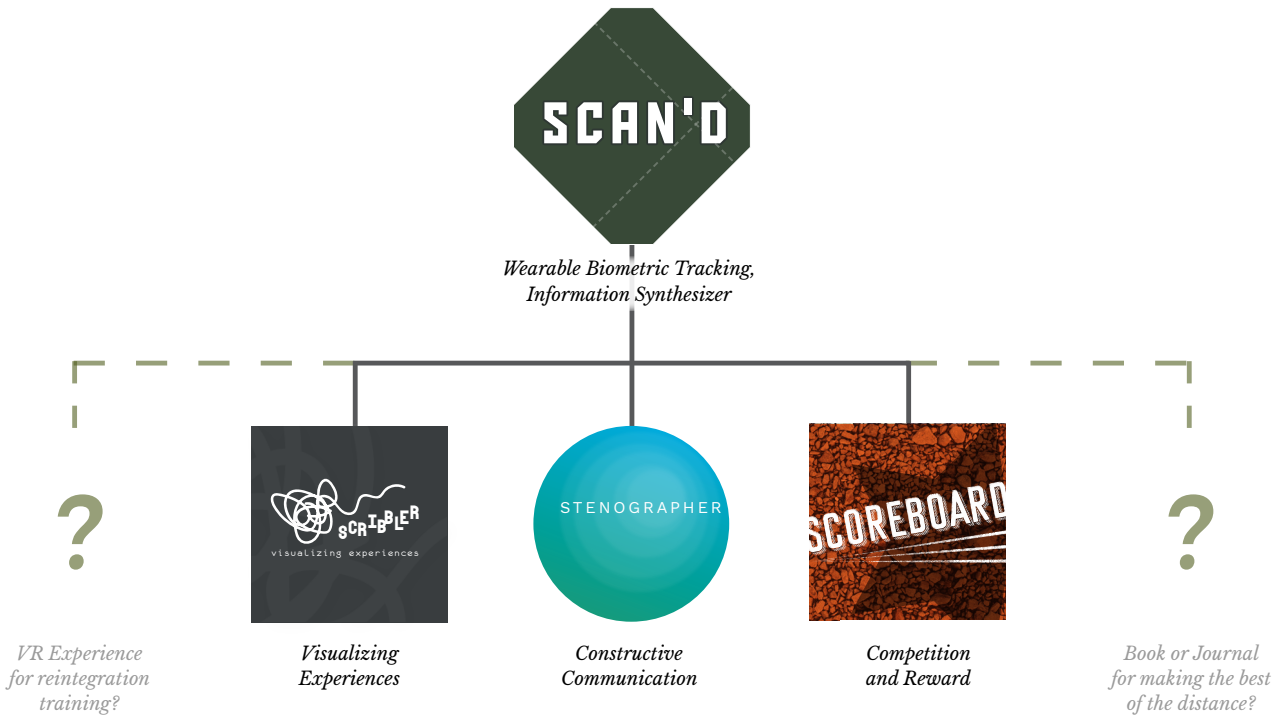


Figure 5.3: *Overview of tools and their role on this system*

SOMETHING GREATER

big picture

Thanks to this work, more people now know that soldiers do not have proper mental health care tools when they are deployed. Most of the soldiers I spoke with said it had never crossed their mind that they do not have support like this while overseas. They accepted the lack of mental health care options as a reality. I have made a difference in the lives of the soldiers I user tested with; I do not believe they will forget our conversations anytime soon. If nothing else comes of this project, I believe these two realizations mean this research made a difference.

It was only within the final days of this work when I realized this system (FIG 5.3) is one piece of a potentially even larger organization. I now envision a company whose sole purpose is to design tools for the military community.

What would that company design?

Mobile applications, wearables, VR experiences, books, journals, and events.

Who are they designing for?

Soldiers, military spouses, military children, extended family, and friends.

When would these tools be used?

Some tools would be designed for use in combat zones (as this project focuses on) while others can be used stateside.

What topics would these apps cover?

Expanding upon the current studies, the company could design tools for stress management, reintegration, explaining deployment to the military child, commemorating the deployment in a positive light, making friends among the military community, and any other challenge military families may face.

THE FUTURE

potential

New ideas and areas to progress arose to the surface during this research. Many of these ideas were out of the scope for the project timeframe, but are as follows:

Graphic Design and Mental Health

There was surprisingly limited literature on how the visual design of digital environments affects mental health. This topic is a potential area of exploration.

Benchmarking Mental Health

While speaking with Davon Goodwin, he suggested that the pre-deployment and post-deployment mental health survey be reimagined. There should be a better indicator of mental health progress and regress. One study I reviewed confirmed that the current survey techniques are not as accurate as they could be. (Warner, et al., 2011)

Scribbler Multi-users and History

Initially, Scribbler was to have the capability of allowing multiple users to create artwork together. The app would also allow users to "peel back" layers of graffiti to see the history of that space. With time as a consideration, these visualizations were not explored. These functions were well received by users during testing.

SCAN'D Vibrational Tapping

Currently, SCAN'D only communicated with the soldier through vibrations. I believe it would be beneficial if it was explored how users might be able to relay messages back to the system through tapping or gestures.

Spirituality and Music

When Eddie Opara, partner at Pentagram, spoke with me about this work he suggested I explore how spiritually and music can be forms of healing. Both of these topics could become additional tools within the system.

AI Companion

During the user focus group, one soldier said he would not use Stenographer because he does not have anyone back home to talk with. I began to wonder if there was potential for an AI Companion app to act as a "friend."

SaveIt

Stenographer has a "notes" section where users can document thoughts between phone calls. I was recently asked how I communicate with my soldier husband when he has to be without his phone for various lengths of time. This idea bloomed into a new app, SaveIt. It records voice memos, photos, messages, and Internet pages to be digitally "shipped" and unpacked in a celebratory way at a later time with the users.

CONCLUSION...?

keep moving

I do not see this document as the conclusion of this research. There is an obvious need for well designed mental health care tools that soldiers can use while in combat zones. This document presents four potential tools, and there are many more possibilities to be developed.

This research has given me momentum. I will pursue these ideas by reaching out to, and partnering with, whoever may help me progress these ideas.

APPENDIX

INTERVIEW

Kellie Artis and Elizabeth Austin

One of my first steps in this research process was to sit down with Kellie Artis and Elizabeth Austin. Kellie is the Chief Operating Officer of Millie, a privately funded military relocation service. She is also a Board Member of the Military Family Advisory Network, consultant for the military lifestyle, and military family researcher and advocate. Elizabeth is a veteran, former military chaplain, and a current researcher focusing on soldier resiliency and interdisciplinary approaches to performance optimization, PTSD, and moral injury. Elizabeth describes her specialty as a "preservation of force and family" and calls her line of work "spiritual fitness". Both Kellie and Elizabeth are married to active duty and high-ranking soldiers.

I first shared my previous research topics with Kellie and Elizabeth and explained how those topics lead to the current questions and goals. I expressed that I was in is the very early stages of exploring which forms the designs might take and was hoping to gather their views about mental health in the military.

Elizabeth opened by explaining how soldiers are challenged when they must quickly switch from participating in an active firefight to saving the lives of the people around them. This can result in a "moral conundrum." Elizabeth suggested that simulations of scenarios may assist soldiers in understanding how they will react or think in these difficult situations, but there is nothing quite like experiencing these events first hand. She also said that Chaplains are not often trained to handle certain situations, but she believes there is an opportunity to supplement their training through online classes. Kellie added to Elizabeth's commentary by saying that, in her experience, video games and interactive games work well for resiliency, but she warned against the "cheesy factor."

When I brought up the readings I had done around the stigma of mental health and the military, both Kellie and Elizabeth agreed that they observe disappointing behaviors in the community. Kellie noted that soldiers are very accomplished at concealing symptoms of mental illness, especially if it is related to PTSD. In her experience, soldiers fear they may lose a security clearance, their job, or put their spouse's job on the line. This puts pressure on the soldier to keep their mental health concerns hidden (and, ultimately, exacerbating the problem). Extending beyond the soldier, Kellie has observed how military spouses do not seek therapy or medication for fear

that the soldier will lose a security clearance. Spousal medical needs may affect the family's chances of being relocated to certain bases as well. (I have had a friend who is also a military spouse. She has a history of depression and suicidal thoughts. When the Army learned of this, they revoked her family's PCS orders to Italy stating there was no medical facility that could treat her. Instead, the Army rewrote their orders and they were reassigned to Alaska – the state with the highest suicide rate (CITE). Her husband chose to leave the military instead).

Kellie believes this stigma extends into the military child. Some military families do not want to bring their children to therapy for fear that the visits will be put on the child's permanent records. Families feel that by creating a "paper trail" proving the child had mental illness in the past, it may damage their opportunity to join the military in the future. The current stigmatization of mental health is directly affecting the next generation.

The conversation turned back to the training of Chaplains since soldiers and their families can go speak to a Chaplain and avoid a "paper trail." Elizabeth shared that Chaplain seminaries do not teach mental health, nor are they prepared to properly respond when faced with challenges of abuse or PTSD. In Elizabeth's experience, there is "not a lot of rigorous suicide prevention techniques in place, and it is not focused on the variety of causes that lead to suicidal thoughts." Elizabeth believes that with additional Chaplain training, stigmatization and the sheer number of soldiers who receive help could improve.

Kellie and Elizabeth went on to say that to address the issue of mental illness in the military, one of many concerns for soldiers, the entire system must be reevaluated. Moral injury, spiritual struggle, spousal employment, spousal mental health, and food insecurity all affect mental health.

When I asked how the topic of mental health might be addressed best, Kellie and Elizabeth returned to the idea of gamification. Both agreed that soldiers dislike taking surveys and will often falsify data to "get it over with." However, if data was presented engagingly and enjoyably, soldiers are more likely to find interest in the topic. They emphasized that soldier does not like being forced to do anything, especially if that task stands in their way of accomplishing a goal they feel is more important. They believe education around mental illnesses should be available and easily accessible whenever the soldier is ready to hear about it, but not forced upon them. Both Elizabeth and Kellie agreed that an intervention or education should not "trigger" the soldier. I deduced that the images and wording should be carefully considered to avoid such an occurrence.

I then asked what some efforts the Army is doing to address the concern of mental health are. They know of two-day mental health briefings where “Death by Powerpoint” is being used, but they do not work.) Death by Powerpoint” is a phrase used to express long, dull Powerpoint presentations). From what I later learned about these briefings through speaking with soldiers ad attending a few personally, the participants are not engaged, the workshop is mildly interactive, the space is not one where soldiers can be vulnerable, and there is no anonymity. Positive mental health care is a skill that can only be learned over time and with practice; a two-day briefing is not the space for such a feat.

The three of us then engaged in quick, casual, and unstructured ideation and commentary where the following points were brought up:

- *Downtime on deployment is the worst because that is when soldiers have the time to think and not busy themselves with their job.*

- *What are the measurable outcomes of the efforts of the soldiers? Is that determined by how many soldiers are then encouraged to see a therapist as a result of whatever I design?*

- *A free and accessible “infinity group” was brought up, where digital networks could be formed amongst deployed soldiers at other bases.*

- *The idea above lead to the topic of Social Learning and I shared my understanding of Communities of Practice. They agreed that a format utilizing Communities of Practice could be beneficial.*

- *Both believed that whatever I design should have some form of guidance, as soldiers will “go off on their own”.*

- *Kellie and Elizabeth were hesitant to the idea of an overbearing CUI like Cortana (from the Halo game series) or Navi (from the game Legend of Zelda: Ocarina of Time).*

- *They both felt that if the soldier has a spouse, it may be advantageous to involve the spouse in mental health efforts.*

- *Where the Army does not provide for soldiers, the community (churches, private groups, schools) allow empowered civilians to assist the military. There may be an opportunity to partner with such groups.*

At the end of our discussion, Elizabeth and Kellie expressed excitement over how my skills as a visual and experience designer might illuminate this problem from a different angle.

INTERVIEW

Davon Goodwin

Davon Goodwin is a husband, father, farmer, and Army veteran with PTSD and a traumatic brain injury. He now works at the Sandhills Agriculture Innovation Center where he finds a sense of purpose and calm by farming and working with the land. He speaks publicly about PTSD awareness and was a central role in a 10-part documentary series called "The War Within".

I first briefed Davon on my research and goals for this project. Davon opened with saying that during his time in Afghanistan as an Army Reserves soldier, he and his peers did not have time to process traumatic events or decompress from stress. His unit, a transportation group, experienced back-to-back missions. Instead, they chose to bottle up their emotions. When Davon was involved in an IED attack and sent back to Ft Bragg, North Carolina, his emotions came out in the form of alcoholism. Although he was involved in the Wounded Warriors project, he felt alone. Having alcohol so easily accessible was "too easy."

Davon shared that he liked what he had read about my research so far because I am aiming to create a tool or system that can be used while soldiers are still on deployments. He does not feel that waiting until soldiers return to the states is the answer as it can easily lead to disaster. He shared that one week before his unit was to return home from Afghanistan, one of the soldiers committed suicide. Davon feels that suicide could have been prevented. He believes that when leadership knows the soldiers they are reasonable for and is accountable for them, the unit can be healthier and stronger.

He shared that even though IEDs were going off around them every day, at no point did any leader say, "Whoa, stop, let's just stop. Let's meet as a unit, get the Chaplain and let's just freely talk. Nobody ever asked me, 'How do you feel today? Are you okay to go on this mission?'" I asked him if there was a point where anyone ever noticed unusual or concerning behaviors of their peers, did they ever say something and he replied, "No, you sweep it under the rug." I asked if the Chaplain was the only available resource or did he also have access to a Combat Operational Stress Control Group, phones, or computers. He said that during his time in Afghanistan, earlier in the war, there was not Combat Operational Stress Control Group in his area, and they had limited computer and phone time. If he did get a chance to call his family he would not disclose the stress he was on. While the

Chaplain was the most readily available resource, Davon said that he would never speak to them. He confidently stated that he would not speak to any professional in person while on deployment as the stigma was too great. For Davon and his unit, if they saw someone in a leadership position even walk into the Chaplain's building, they would wonder if that person was fit to fight with them. Davon acknowledged that it should not be that way though.

And although Davon knew soldiers who committed suicide, he never thought he would be one of them to consider it. After he was discharged from the Army Reserves due to the injuries from the explosion, he said he felt like the Army no longer cared for him. This experience, "was the worst feeling in the world," because he loved serving in the military and was now cut off from his career and community. He felt lost and unwanted, and that the Army had failed him. Farming is what helped him come back to reality, and he believes that without farming he would have ended his life. Davon and his fiancé are college sweethearts. He admits that he does not know why she stayed in the relationship. Although he was not physically abusive, he was verbally abusive at the height of his struggles. He says that he is "a work in progress." He did not feel that he had a bigger reason to live until his son was born.

When Davon first entered therapy after being discharged, he would refuse to speak during his sessions. He admits to sitting in the therapist's office for an hour without looking or speaking to the mental health care professional. I asked Davon what broke his silence and when did he decide to open up. He shared that his grandfather, a Vietnam War veteran, came home from fighting with PTSD. His grandfather began using heroin as a coping mechanism and died of an overdose. When Davon started showing signs of PTSD, his grandmother was the first to notice. His grandmother always made it known that he could talk to her if he wanted, but Davon never budged and grew angry with her. Eventually, after six or seven months of this, his grandmother took him to church and told him to stand in front of the entire congregation and tell them what he was struggling with. Davon says that was the most emotional day of his life. He believes that talking about his experience in church was also the first day that he began healing.

Davon believes that, for him, every time he shares his story he heals a little bit more. (This comment directly contributed to a feature in the art therapy visual exploration, Scribbler). And he feels that when he shared his story with others the burden is no longer entirely on him; it is on all of us to support him and change the ways things have always been done. (Which is the exact goal of this research). There is a downside, though. With sharing his story and allowing himself to be vulnerable, Davon worries that the

people around him will think differently of him. He used to care about what others thought of him, and did not want them to believe that he was "another crazy soldier." He also recognizes that this form of healing will not work for every soldier, and at one point in his journey he didn't care about other people's stories. Now, he does find it beneficial to hear from people who have similar experiences because he is in a different headspace. He also says that one-on-one therapy works well for him now, but group therapy is not his favorite. (This comment contributed to the flexibility of the system and the agency users have to choose what works for them in that moment).

We then discussed how the cultural perception of traditional masculinity plays a role in the military, and that crying is still perceived to be a sign of weakness. When Davon was deployed, he heard a lot of crying. Now, as a civilian, crying is a trigger for him. Rather than acting in sympathy, he feels anger. The sound of crying reminds him of that traumatic time of his life. He is working with his therapist to address this behavior. He went on to say that he believes the military should conduct cognitive testing before soldiers right before deployed, or even during regular stateside training cycles. AS Davon puts it, "Then you can go back to those records and say, 'Hey, before you got blown. Up you were like this. Now you're like this.' So I can gauge the severity of [my change.]" He felt that if the Army or his mental health care providers did not know the type of person he was before deployment, then they do not know what he is striving to get back to. Yet, at the same time, Davon said that he and his therapist are working on setting realistic expectations (goal setting), and redefining what happiness and success looks like to him post-deployment (reflection and future thinking).

Davon and I ended our conversation with him stating that he believes when someone looks at the problem for too long, they lose sight of things. And he feels that the Army, DOD, and VA are experiencing that. He was excited to see how I will bring a different perspective to this problem and expressed that he can be available in the future for additional interviews.

INTERVIEW

Anonymous

The final interview was conducted approximately one week before that rapid ideation stage of this research. The interviewee, who requested to remain anonymous, is a female in her 20s. For the purpose of this writing, I will call her Valerie. Valerie had heard of my project and reached out to me asking if she may be of assistance as she has experience with PTSD, depression, and anxiety. I was grateful for her offer, and we met a few days later.

I began the interview by briefing covering what I was researching. I expressed that I was most curious to hear of her positive and negative coping behaviors, experience with doctors and therapists, and how it has affected her relationships. Valerie began by sharing that when her anxiety is high she responds in a variety of ways; baking, chewing on her fingers, unintentional ticks, scratching her skin, sleeping a lot, and fidgeting. She explained that she must keep her hands busy with something to bite or squeeze. She does have a stress ball and fidget cube, but the fidget cube can annoy the people around her.

Valerie said that it is not unusual to force herself to cry to express those emotions, or to mindlessly eat. (This comment made me curious how the Dining Facility at a base might be brought into whatever I design, as food is often a source of comfort during times of stress).

I asked Valerie is she is always aware that she is behaving in these manners. She said no, and her therapist has explained it as a way of "unconsciously throwing up" her feelings through ticks and repetitive behaviors. It is not until an outside factor, usually a family member of friends, points out to her that she is behaving this way.

As much of my research is focused on simply attracting users to participate in healthy mental care habits, I asked what initially encouraged her to seek treatment. She said that she was, unfortunately, placed into a mental hospital against her will. She lost a close and trusted friendship and became overwhelmed. Those around her were concerned and she was sent away.

I asked if she was comfortable sharing some of her experiences while in the hospital, and she said that she was comfortable. One of her first comments was that her peers, the other patients, were very nice. The only book they

could have was a Christian bible, and they were not allowed to talk to people outside of the program.

Valerie shared that each patient was given a folder of exercises that they could do while at the hospital. In one, participants sat around a table and make song names for how they would categorize their life. They were allowed to play sudoku for mental exercises, but were only allowed markers as pens and pens had a sharp point. They were allowed to watch cheesy movies and make face masks out of tea bags, along with other sensory experiences like aromatherapy and finding pressure points on their hands and wrists. The only time they were allowed outside was for smoking, but if you were not a smoker you were not permitted to leave the building. Because of this, Valerie picked up smoking so that she could (ironically) get some fresh air.

She also mentioned that her sleep while at this hospital was highly disruptive, as nurses would routinely come into their bedrooms at night, shine a light in their face, and ensure that they were okay. Valerie had challenges around eating, and was told that if she did not eat they would strap her to a hospital bed and be forced to eat. Her bedroom was directly across from the room with this hospital bed, and she said the scare tactic was disturbing but worked.

She emphasized the importance that her peers played on her time at the hospital. She said that in times when she felt that she could not take care of herself, she could direct her attention to take care of others around her. It helped Valerie to hear the stories and experiences of the people around her. There was a grandmother over the age of 80, young adults, and a mentally disabled homeless woman in her group therapy sessions. Her roommate was a soldier, and while she never knew the specifics of why her roommate was admitted to the hospital, she knew that the soldier had self-harmed. This mixed group gave her a sense of community and it was “nice to have people who were struggling and I could openly talk to” because they would listen to her and not judge her. Valerie seemed grateful for the people she met and she keeps in touch with some of them years later, although she has not seen any of them in person since exiting the hospital.

For Valerie, continuing her education was part of her healing process. She said that she did not want to become another statistic of not finishing school, so she gave herself the goal to graduate. Even in the hospital, she wanted to complete her assignments but was not permitted to. Her professors were not understanding of her situation. She chose to finish that degree online after she left the hospital. She then enrolled in a new

school. She chose a second school and a new degree to "push herself" out of her comfort zone. Her parents did not feel that she was ready to enter a career field, and felt that more schooling would re-open communication and ease her into society again. I asked Valerie if it was merely the goal that motivated her. She said no, but that she is very reward oriented; she does not often do something unless she will get something out of it.

Valerie was unable to return to her previous living situation after her time in the hospital. It reminded her too much of what initially triggered her. She had to re-establish a new community, as the friendship she lost months prior resulted in the deterioration of her other friendships. During this time, her mother stayed with her and her family took her to dinners. Her family became a huge source of support, and eventually, she acquired an emotional support animal as well.

I asked if her family was always understanding of mental illnesses. Valerie's father's side of the family only understood the importance of getting help once she was forced into the hospital, but had not always seen the benefit of seeing a therapist. After her experience, her sibling also started receiving therapy for their own concerns.

We conversed on how finding a good therapist can be challenging. Valerie said, "A good therapist doesn't tell you want to do, she listens or gives suggestions." (This comment echoed Kellie and Elizabeth's statement that soldiers do not want to be told what to do or forced to do anything). Valerie's first therapist was too "blunt" for her liking, and she wanted to connect with someone more "feeling." Her current therapist prompts conversations rather than telling her how to handle a situation. This current therapist also gives Valerie homeworking like finding things she likes about herself, and self-care activities like taking a shower eating, changing her sheets and establishing a rewards system (like getting a small snack) for accomplishing big and small goals.

Valerie mentioned that some of her rewards (like video games and books) also acted as a form of escape. She described escapism as "putting reality elsewhere" for a short time. (This comment directly lead to the Behavioral Objective framework). She also said that while she has a reward system, she has a punishment system. If she feels that she is not behaving well, she will engage in unhealthy habits like scratching and cutting herself. Valerie is very aware of what works for her, and that she is on a journey of becoming and feeling better.

Finally, I asked Valerie what the "perfect solution" for mental health care would look like. She said that "having [a qualified professional] accessible when I want to and need them and have it be free" would be an ideal approach. For Valerie, therapy is expensive, and she is not able to speak to a professional as often as she would like. She misses her therapist.

We concluded our interview by discussing how her father's experience with mental health and his upbringing contributed to how Valerie and her sibling were affected during their childhood. Valerie felt that while her family did become her support system, the initial time away from them allowed her the distance needed to become self-aware, grow as an individual, and feel more in control of her healing journey.

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p. 14
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p. 51
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p. 53
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p. 55
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p. 57
https://www.myfeel.co

p. 59
https://www.whoop.com

p. 61
https://www.omai.at

p. 63
https://mobile.va.gov/app/ptsd-coach

p. 65
https://www.mobihealthnews.com/content/backed-harry-styles-ashton-kutcher-meditation-app-calm-nabs-27m

p. 67
https://pbs.twimg.com/media/DlyLoFKVAAARqXZ.jpg

p. 69
https://letsplayprogram.files.wordpress.com/2019/01/selfcare-app.jpg
https://itunes.apple.com/sg/app/selfcare/id1378384555?mt=8
https://lsn-staging.s3.wefew.io/filestorage/images/86741/truluv-selfcare-screenshot-books-big.

p. 71
https://cdn.trendhunterstatic.com/thumbs/reflectly.jpeg
https://cdn-images-1.medium.com max/1600/1*BRsGlQGgo8EZQZuoCET8ww.jpeg

p. 85
Art Credit: Getty Images, Corbis Historical, Hulton Deutsch

p. 86
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p. 87
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p. 88
https://www.google.com/maps

p. 90
https://www.google.com/maps
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p. 92
http://asoldiersperspective.com/tag/working-out/

p. 95
https://www.army.mil/article/85308/zero_tolerance_in_army_for_bullying_hazing

p. 96 – 99, 107
https://www.pexels.com

p. 115
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p. 116
https://theartstack.com/artist/gabriella-gardosi/circus-march-north
https://www.etsy.com/market/digital_painting
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p. 119
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p. 120
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p. 121
http://www.legacy.com/news/explore-history/veterans/article/100-years-ago-the-great-war-ended-and-we-had-a-holiday-for

p. 122
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