Final Report

GRADUATION PROJECT

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SCHOOL OF ART, DESIGN AND ARCHITECTURE | ID-I

Dreamcatcher

"Improving Life Conditions of PTSD Patients by Helping Improve their Sleep Cycle"

By
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To my parents, Shahzad-ul-Hassan and Lubna Shahzad, who always stood by me during every step of my life and had faith in me when even I doubted myself. And to my sisters (Haleema Malik, Sadeeqa Shahzad and Hadia Shahzad) who always helped me whenever I needed it.

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Abstract

Over the past decade, the importance of mental health has been realized and a lot of focus is being dedicated into exploring avenues of existing mental health issues and their remedies. The paper explores the effects of natural disasters on the mental health of people. It further specifically discusses the behavior changes due to Post-Trauma Stress Disorder (PTSD) and aims to find design-centered methods to alleviate the condition of people suffering from it. The approach has been to first understand the condition itself followed by its effects, then specify the target audience and understand their perspectives and the possible activities or products that could help decrease the stress and provide an outlet for their worries.

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Chapter 01 - Introduction

1.1 Introduction

One of the major global concerns today is the trauma resulting from natural disasters such as earthquakes, tornados or hurricanes, forest fires, floods, volcanic eruptions, landslides, or tsunamis. There are various types of common traumatic events, all known to lead to Post Traumatic Stress Disorder (PTSD).
The research is based on the causes and effects of the trauma on people and how it affects their lifestyle to be able to come up with a solution which can help the victims right after a disaster. The solution reached at aims to help people to socialize and have an activity which can cater to their depression and overcome this event. Through the research conducted, the requisite design field of focus was considered, then followed to reach a feasible design.
The question then arises: "What can be designed to help alleviate the condition of the disaster victims suffering from PTSD?" The idea is to follow the path of design synthesis and arrive at a solution that would not only create a functional design, but one that helps make better the quality of life of the disaster-struck people.

1.2 Thesis Statement

"Improving life conditions of people suffering from PTSD due to natural disaster-caused displacement through helping them fix their sleep cycle."

1.3 Objectives

1.3.1 Exploring and understanding the effects of PTSD

1.3.2 Understanding sleep cycle issues and their causes

1.3.3 Exploring possible solutions to sleep cycle adjustments

1.3.4 Incorporating solutions into a multipurpose product

1.3.5 Incorporating human comfort factor and ergonomic requirements into the product

Chapter 02 - Problem Identification

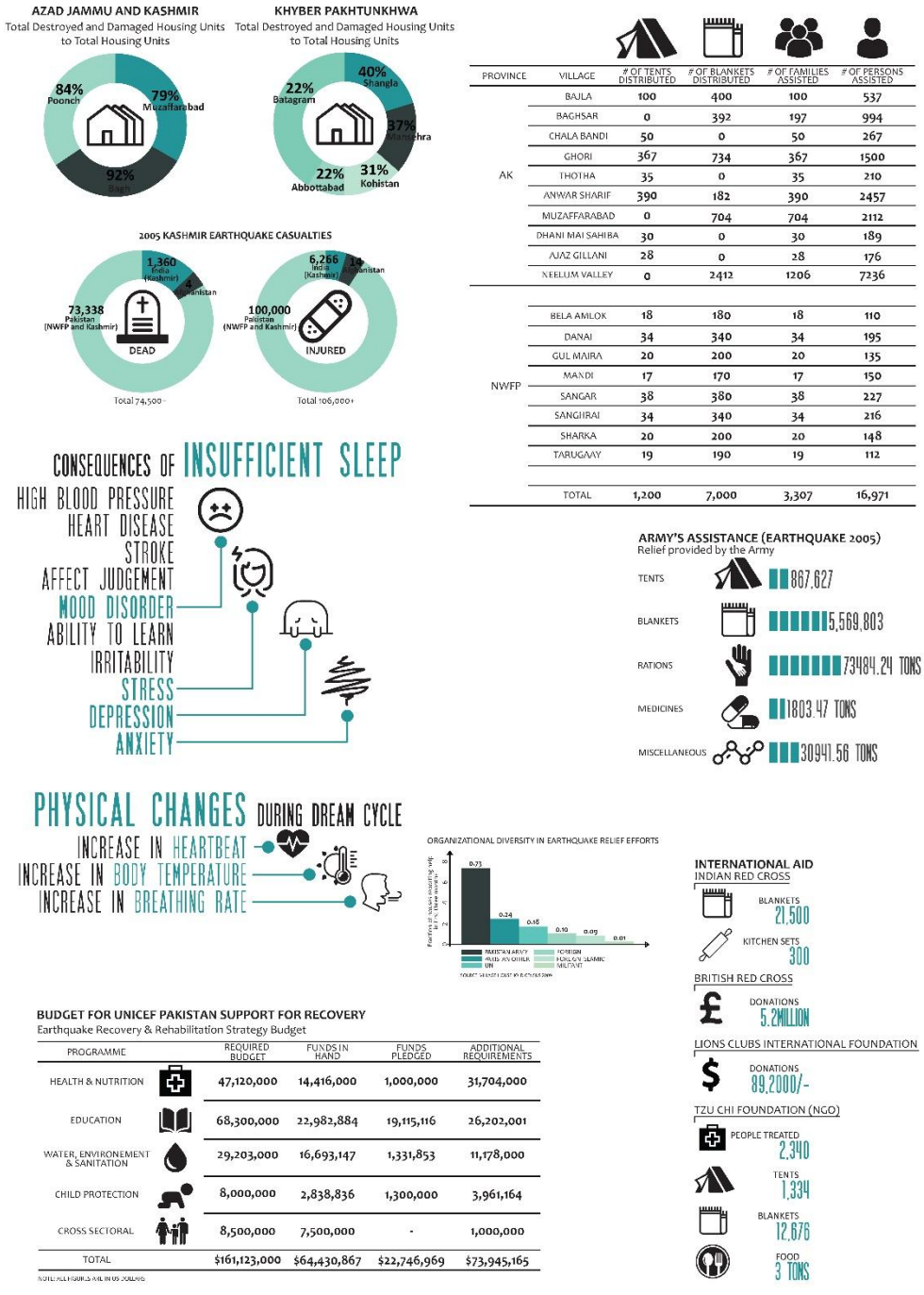
The geological location of Pakistan is such that is it prone to many natural disasters, with a major fault line running through it. Due to this, over the past decade, Pakistan has faced a huge number of immense natural disasters, the most impactful ones being earthquakes and floods. Both have resulted in the loss of property and human life, and have left a huge number of people displaced.

While the government and NGOs rush to aid the victims with portable shelters, food items, physical healthcare, and medicine, the trauma caused by the loss of loved ones, property (house and personal possessions) and witnessing these heart wrenching events goes unnoticed and is not catered to as the focus is to first ensure that the disaster victims make it through the situation alive. However, this trauma keeps growing undetected and later leads to many social and mental disorders and becomes a part of the victim's life for the rest of their days. As these disorders affect a huge chunk among the masses, the functionality of the society itself starts getting affected and the social machinery threatens to fail. In such a situation, on one hand, the people who have not been affected by the disaster, continue living their lives in its normal routine; while on the other hand, an entire part of the nation loses lives and properties, and a social imbalance is created, further encouraging tension in a country already plagued by many other social issues. In this scenario, children are the ones who are affected the most by this as it affects their personalities and stays with them, growing up to become adults with depression or anxiety.

The project delves in-depth into the issue for the comprehension and grasp of human psychology and design psychology and understanding the relation between the two. Another important avenue of exploration was the research related to material, as it helped identify the ones that are locally available, reducing the environmental impact and the future effects of material processing, decreasing the chances of increased events of natural disasters. Finally, it was imperative to understand the working of existing products that cater to stress and other psychological disorders and help in regulating sleeping habits, maintaining a consistent sleep cycle and ensuring improved health due to better rest schedules.

Chapter 03 - Research and Analysis

3.1 Research



PROVINCE	VILLAGE	# OF TENTS DISTRIBUTED	# OF BLANKETS DISTRIBUTED	# OF FAMILIES ASSISTED	# OF PERSONS ASSISTED
AK	BAJLA	100	400	100	537
	BAGHSAR	0	392	197	994
	CHALA BANDI	50	0	50	267
	GHORI	367	734	367	1500
	THOTHA	35	0	35	210
	ANWAR SHARIF	390	182	390	2457
	MUZAFFARABAD	0	704	704	2112
	DHANI MAI SAHIBA	30	0	30	189
	AJAZ GILLANI	28	0	28	176
	NEELUM VALLEY	0	2412	1206	7236
NWFP	BELA AMLOK	18	180	18	110
	DANAI	34	340	34	195
	GUL MAIRA	20	200	20	135
	MANDI	17	170	17	150
	SANGAR	38	380	38	227
	SANGHRAI	34	340	34	216
	SHARKA	20	200	20	148
	TARUGAAY	19	190	19	112
	TOTAL	1,200	7,000	3,307	16,971

BUDGET FOR UNICEF PAKISTAN SUPPORT FOR RECOVERY
Earthquake Recovery & Rehabilitation Strategy Budget

PROGRAMME	REQUIRED BUDGET	FUNDS IN HAND	FUNDS PLEDGED	ADDITIONAL REQUIREMENTS
HEALTH & NUTRITION	47,120,000	14,416,000	1,000,000	31,704,000
EDUCATION	68,300,000	22,982,884	19,115,116	26,202,001
WATER, ENVIRONEMENT & SANITATION	29,203,000	16,693,147	1,331,853	11,178,000
CHILD PROTECTION	8,000,000	2,838,836	1,300,000	3,961,164
CROSS SECTORAL	8,500,000	7,500,000	-	1,000,000
TOTAL	$161,123,000	$64,430,867	$22,746,969	$73,945,165

Figure 3.1 Statistical Research

3.2 SWOT Analysis

Strengths	**Weaknesses**
• Potential for exploration • Material exploration • Human sustainability factor	• Time constraint • Resources constraint
Opportunities	**Threats**
• Modular design • Personalized design	• Natural Disasters • Durability issues • Weather conditions

Table 3.2 - SWOT Analysis

3.3 PEST Analysis

The outcomes of the PEST analysis were very much in line with the outcomes of the SWOT, consolidating the picture emerging from the two analyses.

Political:

- Policy making issues due to differences between major political parties

Economical:

- Cost-effective mass production creates financial constraints
- Local materials cut down cost of transportation and negative environmental impact

Social:

- Healthier individuals make a better society
- Rehabilitation
- Enhanced communication between individuals

Technological:

- Combination of psychology and technology

3.4 Interviews

During the search for the comprehension of the post-disaster living conditions of the effected, interviews were carried out with stakeholders with different vantage points, including representatives from aid-providing agencies and the affected. This helped in shedding light on the issues that help build the bigger scenario.

CRS (Catholic Relief Services, Pakistan)

Mr. Nasrullah Khan, the provincial representative for KPK CRS was kind enough to provide an introduction to CRS, a walk-through of the process of aid-providing, the kind of aid that is provided and the material requirements of the aid.

During the 50 minutes interview with Mr. Nasrullah we were told about how CRS is an international organization spread over 101 cities worldwide. Started in 1954, CRS caters to disaster relief for both natural and man-made disasters, for example earthquake, floods, IDPs, etc.

Main disasters that have been catered to by CRS in Pakistan have been the 2005 earthquake, Swat IDPs and 2010 flood, with major contribution from USAID and USID.

Things CRS provide are non-food items like shelter (mainly), Clothes, Cooking utensils, Tents, Money, etc according to the need of the public. They send a team, who does the transit walk, focus group discussion and make observation to realize the need of the people so they can be catered to accordingly.

A major percentage of the aid provided by CRS is taken up by shelters. The material required are CGI sheet, timber, lasani, thermoplastic and bamboo. These shelters are known as transitional shelters and are meant for temporary use but people usually use these as long term solutions and later use the material in their permanent houses. A team of 4 people consisting of 3 unskilled laborers (unpaid) from the local affected area, with 1 skilled person (paid) take 2 days to set up 1 shelter. CRS provides material from vendors and later sets up shelters on-site using the material according to the area. Logistics time to set up shelters varies on the infrastructure but it is usually done within 1 month.

Mr. Nasrullah also informed that CRS in Pakistan does not cater to physical or mental care of the affected people but CRS in other countries does. In Pakistan,

UNICEF, ERRA and majorly RedCross cater to the rescue of them and cater to their medical needs.

Affectee Interview #1 (Abdullah)

Abdullah, a resident of Nowshera, Dubatta and now in his early twenties, was a school-going child when the 2005 earthquake struck. He survived, without any physical injuries, but losing his house, school and one of his family members to the disaster. Abdullah narrated how the aid did not arrive until about a month after the earthquake, creating severe difficulties in daily routine, as no shelter or food was available. The temporary shelters were created from torn sheets, and rainy days were spent spending a safer place to stay. The disaster left him, and his community, with a fear of earthquakes, creating chaos whenever the slightest of shocks are felt.

Abdullah's main concern was the lack of preparedness should another natural disaster hit. A solution that could somehow combine the bare requisites of existence, specially a place to sleep safely, would help in better preparing for such a situation in the future.

Affectee Interview #2 (Amid Ullah Khan)

Amid Ullah Khan, a resident of Nowshera, Dubatta and father of six, had to face the loss of a son and a grandson in the 2005 earthquake. The most major issues faced according to him was the lack of clean water and the loss of residence. According to him, the loss of something familiar, which is associated with safety and comfort, had a major impact as it created a sense of insecurity and elevated the fear.

His concern was also the lack of preparedness. He said that people had just moved on, preferring to forgetting the disaster instead of preparing for any such future occurrence.

Affectee Interview #3 (Amir Saqib)

Amir Saqib, resident of Dhani, Mai Sahiwa and from a family of ten, was one of the people that relocated after the earthquake. For him, the biggest issue that he faced was that of access roads, as the existing pulls were frail and were damaged during

the earthquake, increasing travel time by many hours. Another issue he faced for the few days that he was there after the earthquake was of a safe place to stay. As he was merely ten at that time, it was fear and the lack of a secure place that caused most of his uncertainty and trauma.

Affectee Interview #4 (Musarrat)

Musarrat, then 16 and now 28, is one of the fortunate ones from Baagh who did not suffer any loss in the earthquake. However, she and her family relocated to Rawalpindi about a week after the earthquake due to the lack of clean water and food in the area.

Army Officers' Interview

Interviews were conducted with army personnel that were posted in disaster-stricken areas to understand the issues in the deliverance of aid. Zia Ullah, Kamar and Daud were posted in Baagh when the earthquake struck. According to them, the major issue was the lack of access roads, due to which it was next to impossible to deliver aid right after the earthquake. The immediate needs are shelter, for the surviving and machinery, for the extraction of casualties. According to them, the water was not an issue, as many springs exist for both consumption and use.

The summary above represents the gist of all the interviews that were conducted, highlighting the issues faced at the time of the disaster and its longer lasting effects. The feelings of insecurity and uncertainty were prevalent among all affectees, causing behavior change and distortion. These feelings originated in the absence of a sense of center and a sudden disappearance of familiar objects.

Chapter 04 - Literature Review

4.1 Post-Traumatic Stress Disorder

During the research, the focus was to find studies conducted relating to PTSD in disaster stricken areas to better understand how the behavior pattern unfolds and the extent of effect on people from different areas. Mental health studies of disasters typically have been designed to answer three basic questions: What kinds of mental health problems, if any, result from exposure to disaster? Which groups of people are at highest risk for negative effects? And, what factors modify the impact of exposure to disaster (i.e., why are some people at particularly high risk)? Here are included abstracts and citations of studies that address one or more of these questions.

"Post-traumatic stress disorder (PTSD) in adults following disaster-precipitated family relocation was investigated in a longitudinal study of family and individual response to natural disasters. Adult participants included 78 women and 77 men in two communities. Psychosocial adjustment was measured at two points in time: at 4 months and 16 months after the disaster. Instruments used for assessing stress-related symptomatology included the Horowitz Impact of Event Scale (HIES) and the Diagnostic Interview Schedule (DIS). Major findings included: (a) levels of short-term stress symptomatology and diagnosable PTSD were substantial in both communities; (b) significant decrements in these levels occurred by 16-months post-disaster; (c) substantial gender differences (greater levels for women) were apparent in both short and long term PTSD response rates; and (d) patterns and levels of PTSD symptoms were different in the two communities. Findings have implications for the interpretation of PTSD within the context of family and community level variables." (Steinglass and Gerrity, Department of Psychiatry and Behavioral Sciences, George Washington University Medical Centre, 2006)

Those studies finding negative psychological consequences (with or without comparison groups) have reported a wide range of problems, from PTSD symptoms (Bravo et al., 1990; Green et al., 1990; Green et al., 1991; Shore et al., 1986; Smith et al., 1986) and symptoms of related non-PTSD disorders such as depression, alcohol abuse, anxiety, and somatization (Baum, Gatchel et al., 1983; Bravo et al., 1990; Bromet et al., 1982; Green et al., 1990; Norris & Murrell, 1988; Shore et al., 1986; Smith et al., 1986; Wilkinson, 1983), to physical illness (Adams & Adams, 1984; Leopold & Dillon, 1963), behavioral problems such as domestic violence (Adams & Adams, 1984), and more general symptoms of distress, performance, and/or physiological reactivity (Baum, Gatchel et al., 1983; Madakasira & O'Brien, 1987; Murphy, 1986). These effects have been reported for both natural disasters such as volcanos, fires, tornados, floods, and mudslides (Bravo et al., 1990; Krause, 1987; Shore et al., 1986; Smith et al., 1986;

Steinglass & Gerrity, 1990), and human-made disasters such as Three Mile Island (TMI), dam collapses, fire, and a skywalk collapse (Baum, Gatchel et al., 1983; Bromet et al., 1982; Green et al., 1990, Green et al., 1991; Wilkinson, 1983). Though this literature on the whole seems to suggest that disasters do result in, at the very least, stress reactions, if not full-blown psychiatric disorders, a question still outstanding is whether these effects are transient or lasting (i.e., persisting longer than several weeks post-event). Only recently has research been undertaken to examine the longer term effects of disaster exposure. This research suggests that for natural disasters such as volcanos, tornados, and floods, psychological consequences may persist as long as 3 years, though most symptoms seem to abate by about 16 months (Bravo et al., 1990; Krause, 1987; Shore et al., 1986; Steinglass & Gerrity, 1990). Consequences of human-caused disasters may persist even longer. Baum's work (1990) continued to show negative psychological effects for residents near the TMI reactor 6 years after the initial leak, while follow-up studies of Buffalo Creek (Green et al., 1990) showed continued effects for some survivors at 14 years. Clearly more research over longer periods of time is needed to address the longevity of impact for human-made events.

4.2 Sleep Patterns and Nightmares

Sleep is one of the main phases of daily human activity which helps the brain and the body recover. Even though many of us spend about at least one-sixth of the day sleeping, it is difficult for us to specifically define what sleep is, as the conscious realization of sleeping, while sleeping, is extremely rare. This is a part of the recovery process, as sleep inhibits conscious thought for the most part in order to give the brain some rest.

Once it was thought that sleep is an inactive process where the brain and body both become idle, are turned off for all intents and purposes, and rest. Research since has shown that even though sleep is used by the brain and body to recuperate from the day and its activities, the body retains its normal functions, and the brain undergoes a function transformation of its own with characteristic activity defining each period of sleep.

The normal sleep cycle consists of two periods: REM sleep and NREM sleep. REM or Rapid Eye Movement sleep is the part of the sleep cycle when, as the name indicates, eyes move rapidly. The conjecture for eye movement during REM sleep is that it is related to the dreams that a person experiences during this period. Research conducted has shown that when woken from REM sleep, people reported to have been experiencing vivid or bizarre dreams. The body muscles are temporarily paralyzed during REM sleep, to prevent the "acting out" of dreams. NREM or non-rapid eye movement sleep is characterized by slower, synchronized brain waves and still eyes. For the most part, no dreams were reported during the NREM period of sleeping. NREM sleep can be broken down into three distinct stages, N1, N2 and N3 with EEG showing increasingly higher amplitude and lower frequency brain waves as the stages progress.

The two periods alternate during the sleep cycle. The normal progression of sleep cycle is from three stages of NREM sleep to REM sleep and back to NREM sleep. The first cycle lasts from 70 to 100 minutes and successive cycles last for something between 90 to 120 minutes. The reason for this specific timing for cycles is unknown. However, these act as the benchmark for normal sleep cycle, but are affected by multiple factors, including but not limited to body temperature, daily activity, and psychological well-being.

Other than the amount of sleep and activity during the day, two of the factors that contribute the most towards the quality of sleep are body temperature and psychological well-being. In case of disruption from routine, these may cause sleep issues like nightmares, insomnia, night terror, and sleep apnea.

Fever affects the normal body functions as well as the sleep cycle, causing an increase in vivid dreams and nightmares. On the onset of sleep, the body loses some heat to the surrounding. Some people believe it is to conserve the amount of energy required to regulate temperature.

During REM sleep, the body temperature is still maintained but at a reduced level. During this period, should a person be feverish or cold, the manifestation occurs in the form of increased brain activity and vivid dreams, which might turn into nightmares.

Nightmares

Nightmares are dreams that induce feelings of anxiety, fear, guilt, anger or sadness. Nightmares may be caused due to physiological reasons, like fever, body ache, or psychological reasons, like disturbing content, anxiety or depression. Some medications like anti-depressants and sleeping pills, and withdrawal from them may also cause nightmares.

They are not inherently symptoms of any underlying medical condition or psychological disorder. However, in the case of PTSD, it may lead to disruption of the sleep cycle, triggering other sleep disorders.

Nightmares are a common occurrence in both adults and children. However, persistence may indicate an issue that needs to be diagnosed by a doctor. A sensor test for heartbeat, breathing, eye movements, leg movements, muscle tension, and brain waves can help narrow down and diagnose the cause.

Nightmares can be avoided by simple life styles changes. Exercise, yoga, meditation and consistent sleep pattern can help decrease the frequency and finally, eliminate nightmares. As routine preventive practices, breathing exercises, dream journals and comfortable sleeping environment and position would help reduce nightmares.

4.3 Color Psychology

Our world physically exists in colors, creating wonder in our conscious and sub-conscious mind. Science says that looking at colors can relax you. That's right, colors have an enormous impact on us, psychologically, emotionally and even physically. For instance, red shades tend to trigger your stress response, making you more anxious, while lighter shades calm you down.

If you are feeling overly stressed, you can use color as a stress management tool. With that in mind, we have compiled a list of the most relaxing colors you should choose for a stress-free life.

Blue

This color stands true to its appearance. Peaceful, calm and gentle, blue has tremendous power to manage stress. It's a very soothing color that helps calm your mind, slow down your heart rate, lower your blood pressure and reduce anxiety. Blue is believed to have a cooling and astringent effect. When choosing the right shade of blue, it's best advised to go for a soft and neutral shade (eg bedroom wall) for a calming effect.

Violet

Violet signifies strength, peace and wisdom. It has the capacity to bring balance and make you feel inner peace. Many consider decorating their space with violet to create a peaceful environment. Also violet is said to be good for bone growth, maintaining the potassium and sodium balance of the body. Studies even suggest that the power of meditation can be ten times greater under violet light. So now you know the secret to powerful meditation. In case you don't want to opt for all-violet look, try placing a violet flower in a visual place in the living room or use a violet-colored decoration item.

4.4 Sound Therapy

An increasing number of mainstream medical and education institutions around the world use healing effects of Himalayan singing bowls and gongs as a vital process of cancer treatment. Deepak Chopra Centre in California has found that the sound of Himalayan singing bowls is chemically metabolized in the body as the endogenous opioid, which works as internal medicine and pain reduction. Stress reduction is one of the most important results of receiving sound therapy. Stress is the underlying cause of many physical conditions and it melts away with ease when you are bathed in a sea of sound healing vibrations.

Emotional imbalances are at the root of many physical diseases and when we heal our emotional bodies, the physical symptoms disappear. Sound and emotions are deeply connected. Human emotions have their immediate expression through sound, and it is often the repression of the sound of the emotions that creates emotional blockages.

Chapter 05 - Case Studies

5. 1 Product Name: Pack n Go

Designers: Bisma Shahzad, Nadir Zamir, Zoha Shafiq

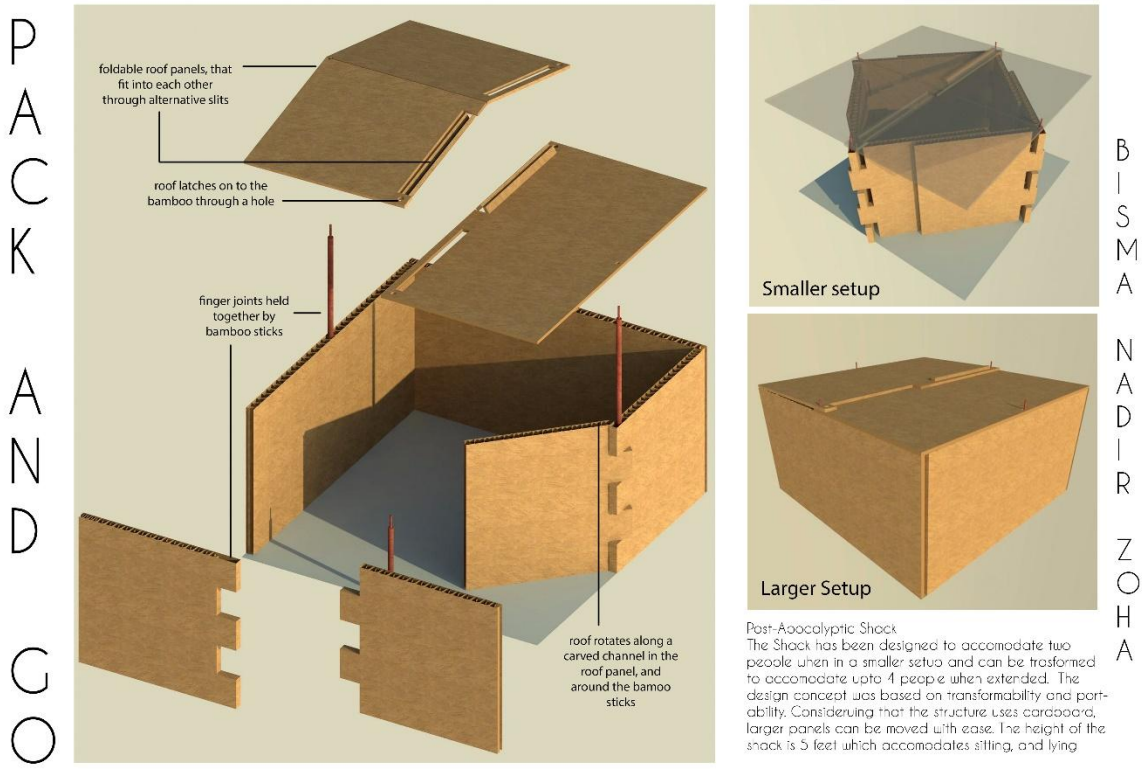


Figure 5.1 – Pack n Go

The project focused on designing a shack for a post-apocalyptic world. The material limitations were cardboard, wood and fabric. The shack should have been able to accommodate two people sitting and lying down. The design of the shack was based on the idea of modules that could be joined together should the need for a larger accommodation arise. The shack in itself had two setups, a small 7’x7’ one and a larger 10’x10’ one, which could further be joined with repetitive modules to create a community.

5.2 EMPWR Coat

By Veronika Scott

Figure 5.2 – EMPWR coat

The EMPWR coat is a water-resistant jacket, which can transform into a sleeping bag, or be worn as an over-the-shoulder bag when not in use. The coat is constructed out of durable, water-resistant Cordura fabric from Carhartt, upcycled automotive insulation from General Motors, and other materials provided by generous donors. It costs $100 to sponsor a coat, which covers the cost of labour, materials and overhead expenses.

5.3 JAKPAK

Figure 5.3 – JAKPAK

The JakPak, which is made of a waterproof/breathable fabric, adds pit zips, a no-see-um bug net, and a more “athletic” fit. First rendition weighed between 2.5 lbs and 3.5 lbs, depending on size. The JakPak costs $250.

5.4 WheelLy

By ZO_loft

Figure 5.4 – WheelLy

WheelLY provides sustainable homeless shelter.

Chapter 06 - User Profile and Stakeholders

The users of the product is anyone and everyone who has been affected by a natural disaster. The idea is to figure out a solution which can help these victims right after a disaster. It should help people to socialize and have an activity which can cater to their depression, help normalize their lives and gradually overcome this traumatic event. Table 6.1 shows a list of natural disasters that have hit Pakistan and the damage due to them.

Event	Disaster	Location	Date	Affected	Death Toll
	Earthquake/Tsunami	Makran	325 BC		
1935 Balochistan earthquake	Earthquake	Quetta	May 31, 1935		60,000
1945 Balochistan earthquake	Earthquake/Tsunami	Makran	Nov 27, 1945		4,000
	Flood		1950		2,900
	Wind storm	Karachi	Dec 15, 1965		10,000
	Flood		Aug 1973	4,800,000	
1974 Hunza earthquake	Earthquake	Northern Areas	Dec 28, 1974	97,000	5,300
	Flood		Aug 2, 1976	5,566,000	
	Flood		Jun 1977	1,022,000	10,354
	Flood		Jul 1978	2,246,000	
	Flood		Aug 1988	1,000,000	
	Extreme Temperature		Jun 11, 1991		961
	Flood		Aug 9, 1992	6,184,418	
	Flood		Sep 1992	12,324,024	1,334
	Wind storm		Nov 14, 1993		609
	Flood		Jul 22, 1995	1,255,000	
	Flood		Aug 24, 1996	1,186,131	
	Flood		Mar 3, 1998		1,000
	Drought		Mar 2000	2,200,000	
	Earthquake	Muzaffarabad	Oct 8, 2005	2,500,000	78,000
	Flood		Jul/Aug 2010	20,000000	

Table 6.1 List of earth quakes in Pakistan and the affected (Wikipedia 2017)

Figure 6.2, 6.3 and 6.4 show the areas affected by floods in Sindh, Punjab and Khyber Pakhtunkhwa respectively by 2010.

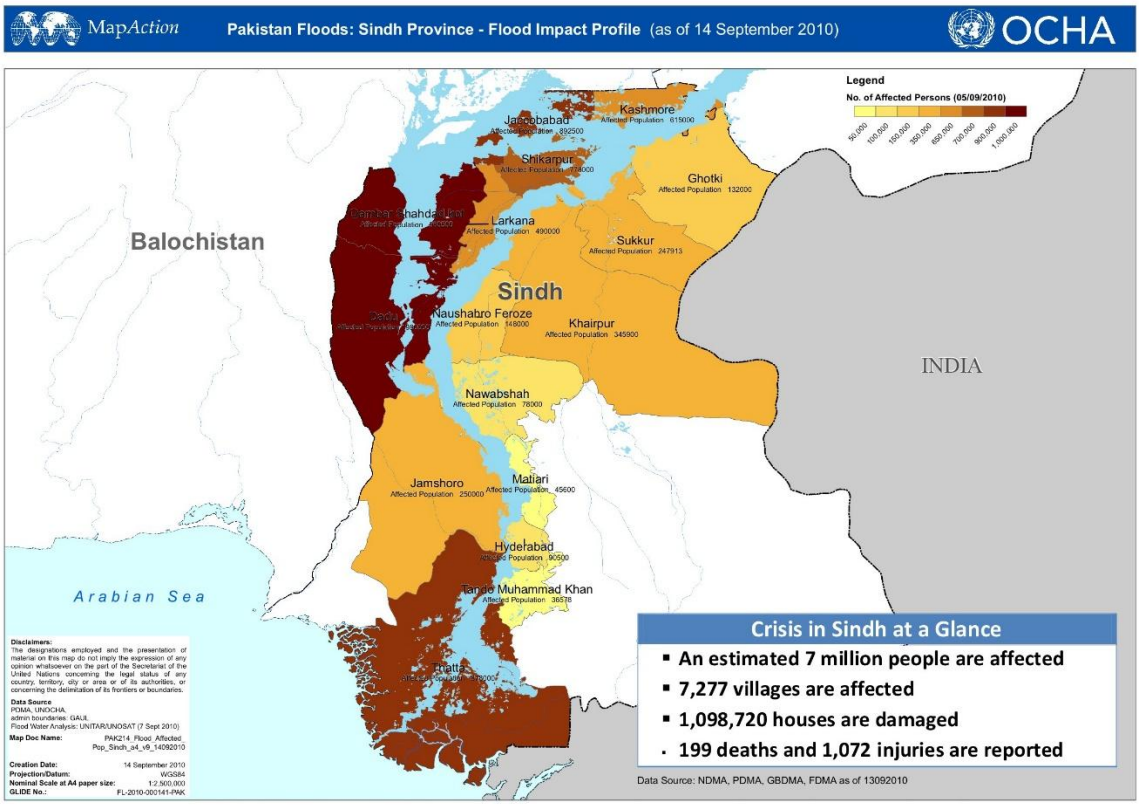


Figure 6.2: Sindh areas affected by floods, OCHA 2010

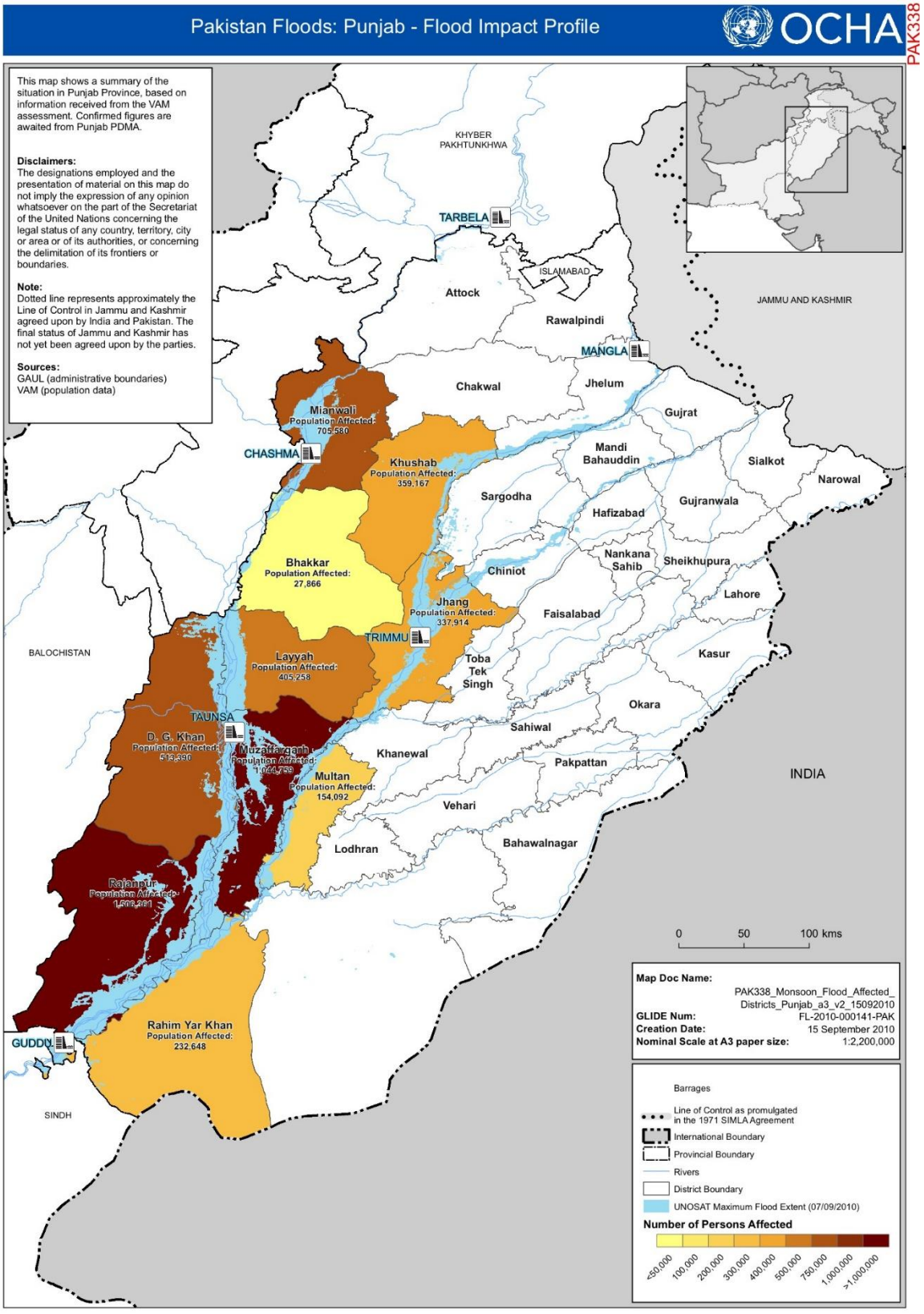


Figure 6.3: Punjab areas affected by floods (OCHA 2010)

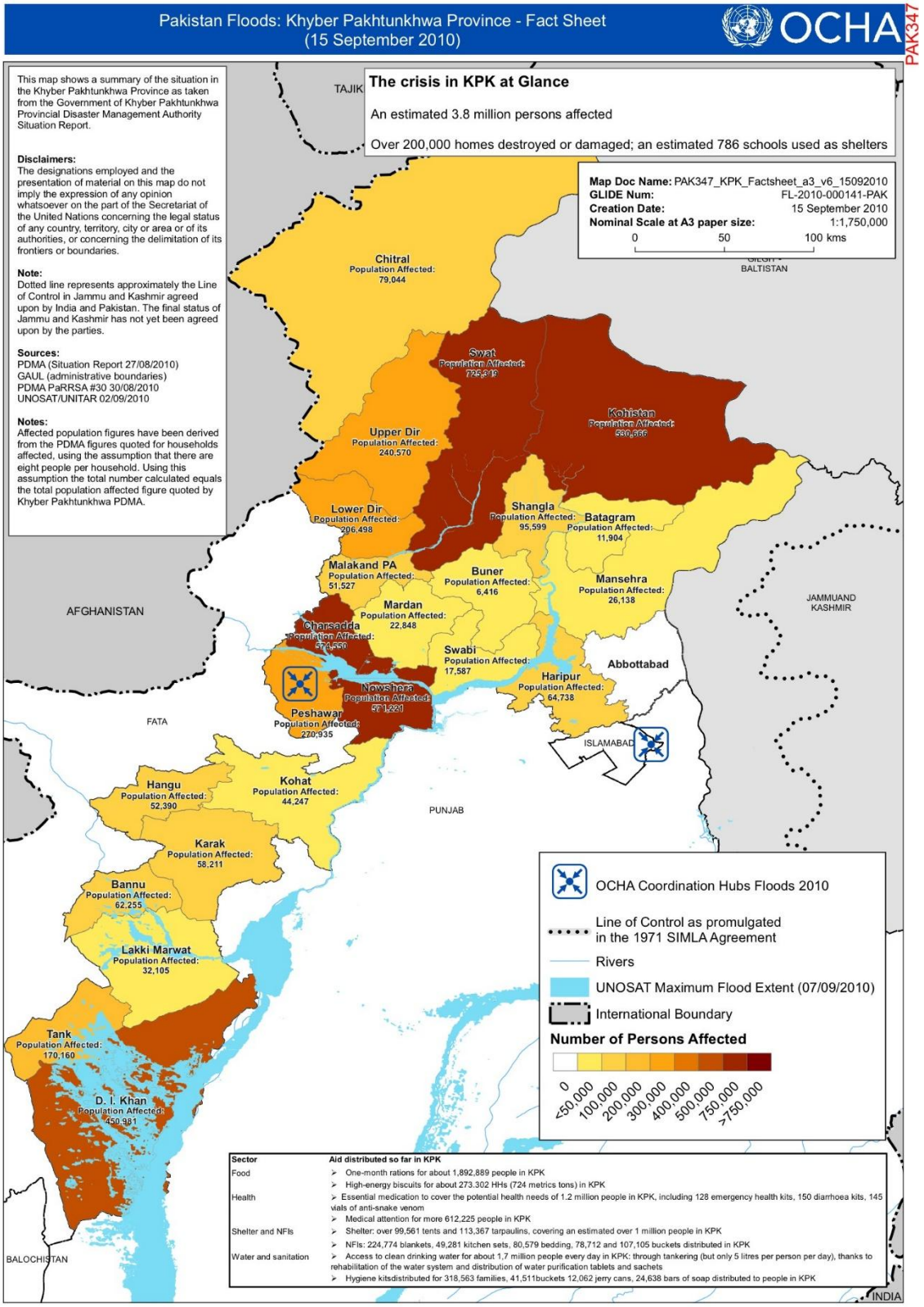
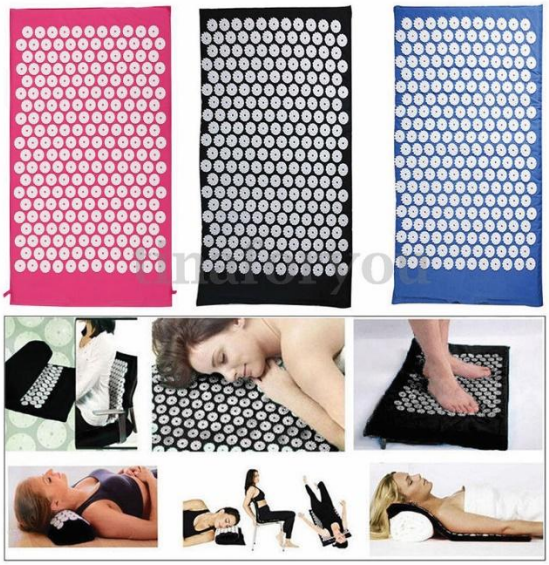


Figure 6.4: KPK areas affected by floods (OCHA 2010)

Chapter 07 – Technology Incorporated

Acupressure Mat Spikes
$19.99 (mat+pillow)



Pillow with speakers installed
$7.99 (amazon)

Fidget Toys

Wearable Health bands

Digital LCD Wrist Blood Pressure Monitor Heart Beat Rate Pulse Meter Measure.
battery: 1 AA battery
Cost: $8.79 (ali express)

Muse headband: the brain sensing headband helps you get the most out of your meditation practice by giving you real time biofeedback of what is going on in your mind. The routine is simple. you complete the breathing exercises to the sound of waves (neutral), storms (bad) and tweeting birds (good) which indicate how focused and calm you are. If your mind is too active, the Muse gives you feedback to help you clear your thoughts.

Android Sleep App: this useful app can pair with your sleep tracker and wake you up at the best possible time so you're rested and don't feel groggy at all. The app can wake you with nature sounds, soothing music, captcha or puzzle alarms. It also helps you track your sleep, deep-sleep and warns you if you are running on a sleep deficit. The app even pays attention to the sound in the room while you are sleeping to catch you snoring, record you talking in your sleep, or help you diagnose sleep illnesses.

TempTraq Wearable Smart Thermometer
Cost: $22.59 (amazon)

Chapter 08 - Sustainability Aspect

8.1 SUSTAINABLE DESIGN PARAMETERS

Sustainability pyramid includes quality and safety of human life. The project will cater to protection of human life from mental illness which usually ends up effecting the whole community rather than just one person. It will spread positivity amongst the people of a certain area affected by a disaster. In such horrifying conditions, people tend to panic in search of food, shelter or even in grief due to loss of lives of loved ones and home. All these factors usually make people to react in a violent way, fighting over food and basic necessities of life, leading in destruction of social lives and the environment. In these conditions victims need to remain calm and focus on helping others in community rather than just looking out for themselves. The project should create a bridge between humans and must enhance communication between them, must help them pass time, which at times becomes their worst enemy.

8.2 MATERIAL EFFICIENCY

Material used for the making of the bag is mostly fabric as shown in the DFD matrix and can be reused in parts. Rest of the technological parts is the products available in the market with a long lasting life cycle. One bag is supposed to be used by a victim through the transitional period of maximum one year of time but the bag can be used for over the year time. The product can be repaired and the defect parts even the fabric can be repaired as stitching of is simple and can be done by skilled tailor. The wearable technology has an Arduino chip installed in for having a check on victims lifestyle which needs to be custom and can only be repaired by skilled personnel only.

8.4 THE 3 Ps OF SUSTAINABILITY

The product is for the mental health of the people and is helping in saving lives of the masses rather than just making a profit. It is made for the NGOs or Government organizations to buy and store so it can be donated to people once the disaster occurs. The first P (people) is the main focus of this product, providing them with good quality life.

8.5 Return and Recycling

Given above are the patterns of the product and the product can be disassembled easily and components with the technological parts can be changed separately, their batteries are removed and decomposed while the zippers are recyclable and can be disassembled properly using commonly available tools in the market.

8.6 Sustainable Packaging

The product itself has no packaging and can be rolled up and carried on the shoulders by the user with the strips similar to a bag pack. It has 2 clips so it retains is rolled up shape and is easily carried. It’s compact in a way that any extra packaging will hinder in the logistics and will require more space for transport.

Chapter 09 – Cost Analysis

Material	Rate/unit	Quantity	Cost
Fabric (polyester)	180/yard	15 yards	2700/-
Polyester (cotton filling)	200/kg	10kg	2000/-
Zip	-	-	100/-
Buckles	-	-	100/-
Acupressure Mat	-	-	1700/-
Pillow with Speakers	-	-	700/-
Heart Beat Sensor	-	-	700/-
Body temperature sensor	-	-	1000/-
Labour	-	-	4000/-
Total	**-**	**-**	**13,000/-**

Table 9.1: Cost Analysis

Other Material:

- FM Radio Chip
- Programming Chip (Ardiuno Lillypad)
- Velcro S

Chapter 10 - Design Process

The initial design form was inspired by the shell of exoskeletal animals, both in literal and symbolic terms. Symbolically, the inspiration was that of protection from the surrounding environment, a place where you feel included but safe. Literally, the inspiration was that of form manipulation and mobility.

Figure 10.1: Design Process and Iteration

Chapter 11 - Design Outcome

The final product is designed to accommodate the different sleeping styles of people and has in-built technology to help calm the user and release their stress. The form is inspired by the The branding of the product is titled “Dreamcatcher”, considering the nightmare-relieving property of the product. The product is accompanied by an application, that helps in customizing the product for the user’s specific needs.

11.1 Product Features

Sleeping Bag

-Easy to roll and carry
-Comfortable
-Waterproof
-Multifunctional
-Accommodates all body sizes
-Accommodates all Sleeping Postures
-Portable
-Easy to Transport
-Durable
-Speakers
-Can be used as a hammock
-FM Radio
-Bluetooth connectivity with sleeve
-Includes Acupressure Mat (massage)
-Double sided zip
-Velcro straps
-Polyester roll filling for insulation
-Simple repetitive making patterns
-Easy to manufacture

Sleeve

-Portable

-Fits all hand sizes

-Sensors

*Heartbeat Sensor *Body temperature Sensor

-Bluetooth connecting device

-Easy to manufacture

11.2 Information Architecture

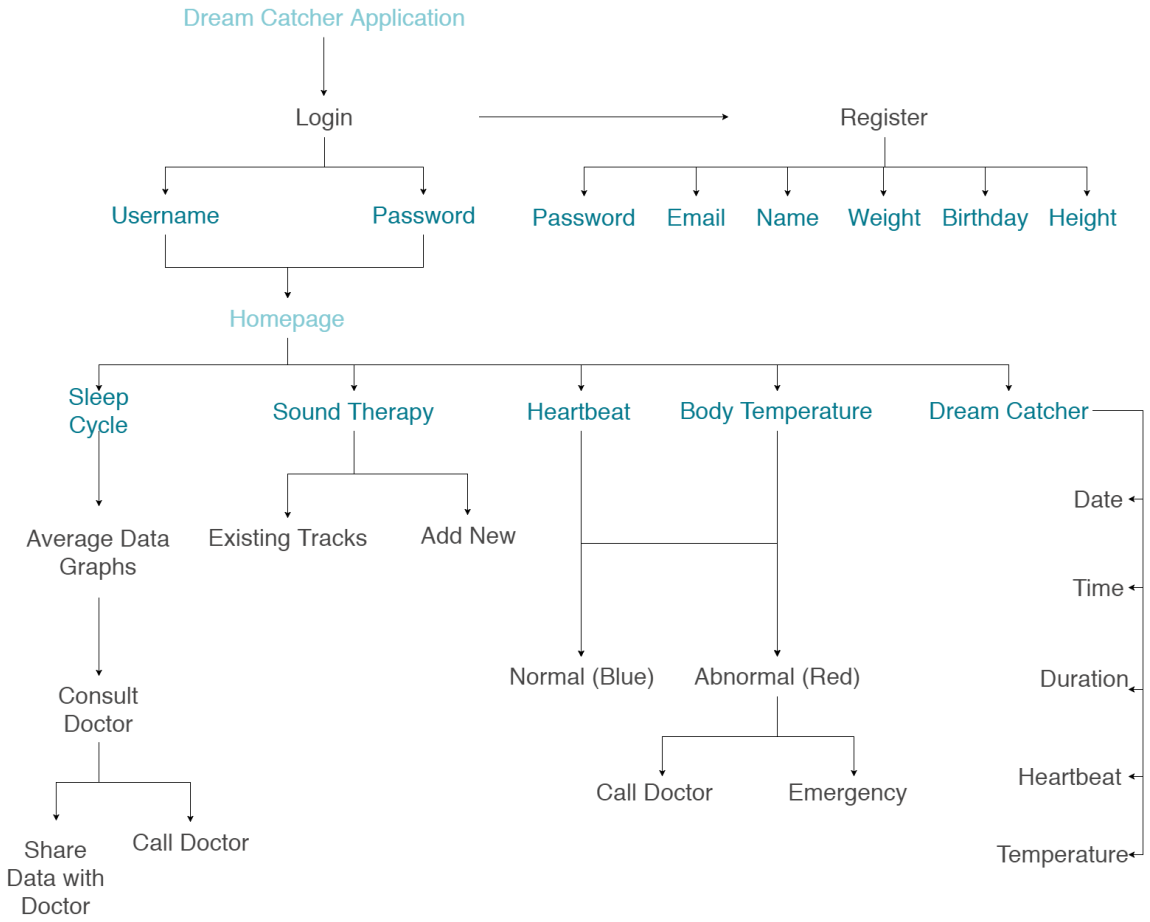


Figure 11.2: Information Architecture Flowchart

11.3 Technical Drawings

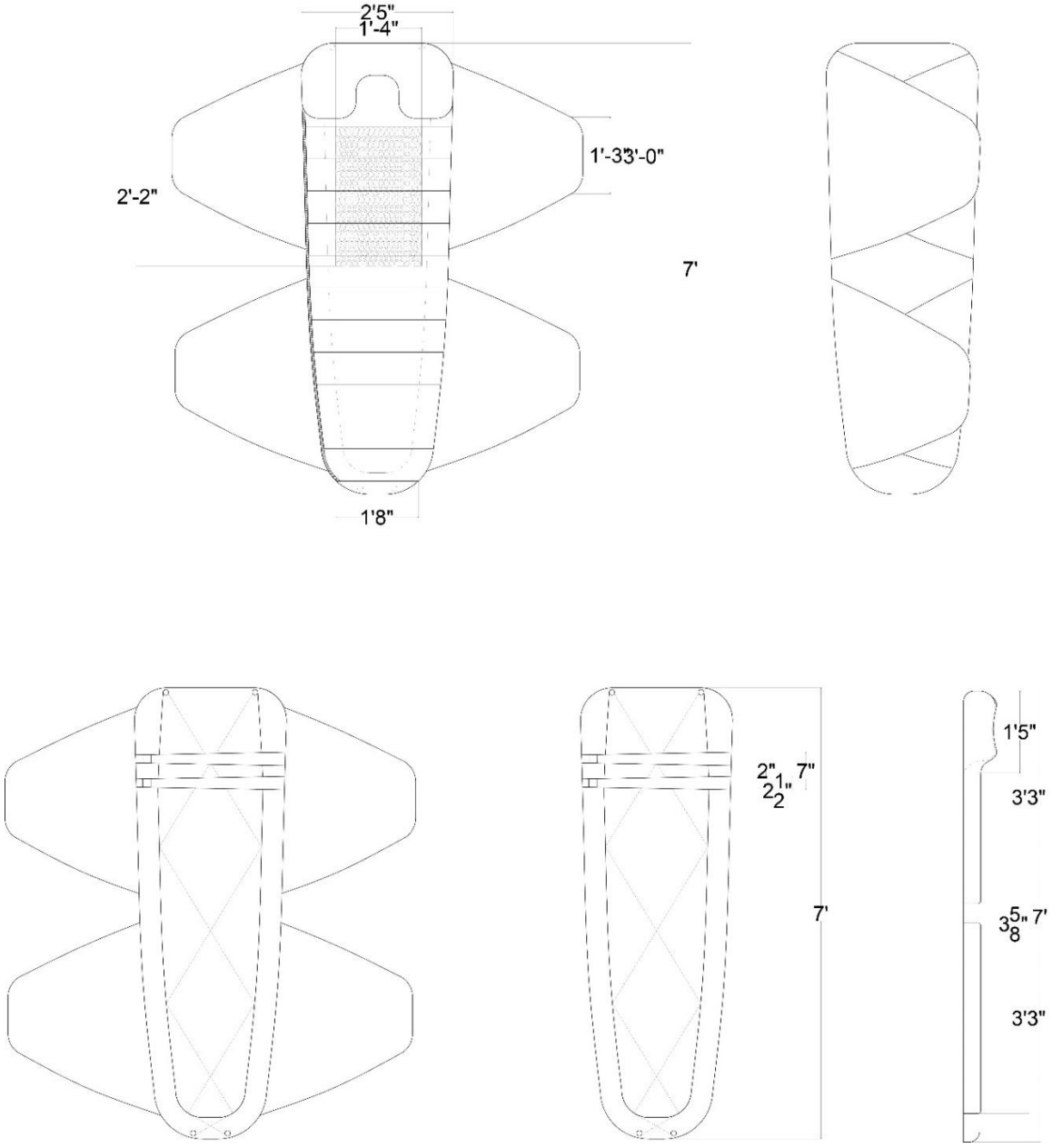


Figure 11.3: Technical Drawings

11.4 Patterns

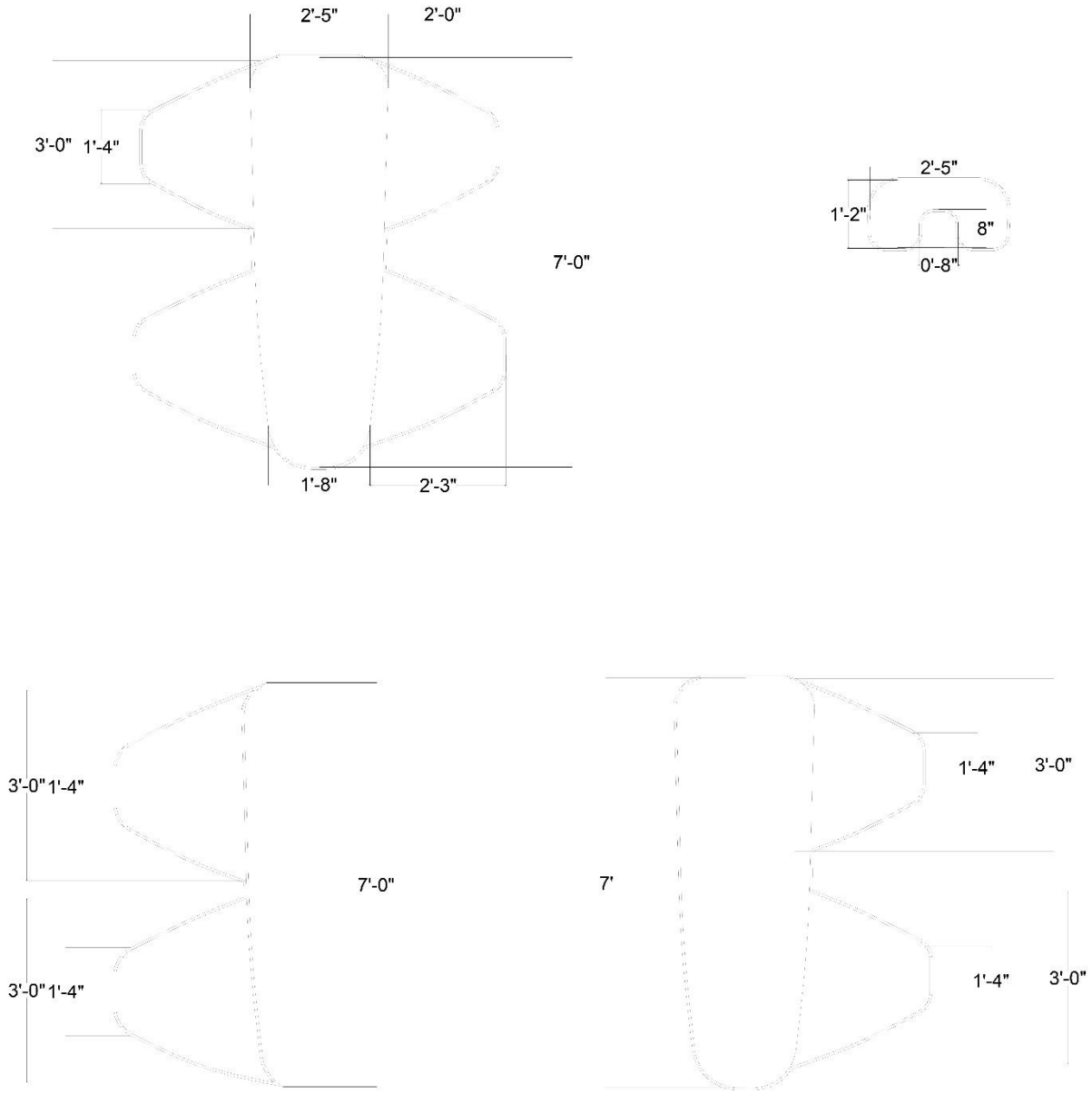


Figure 11.4: Patterns

11.5 Renders

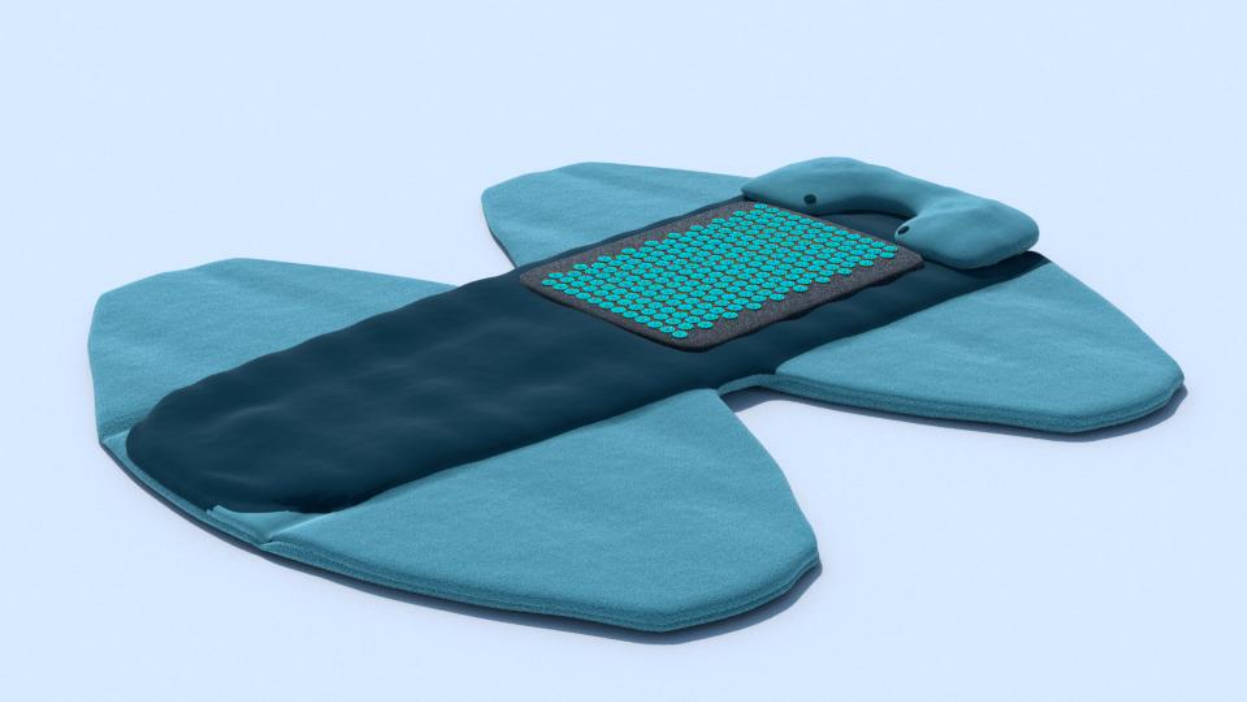


Figure 11.5.1: Axonometric View

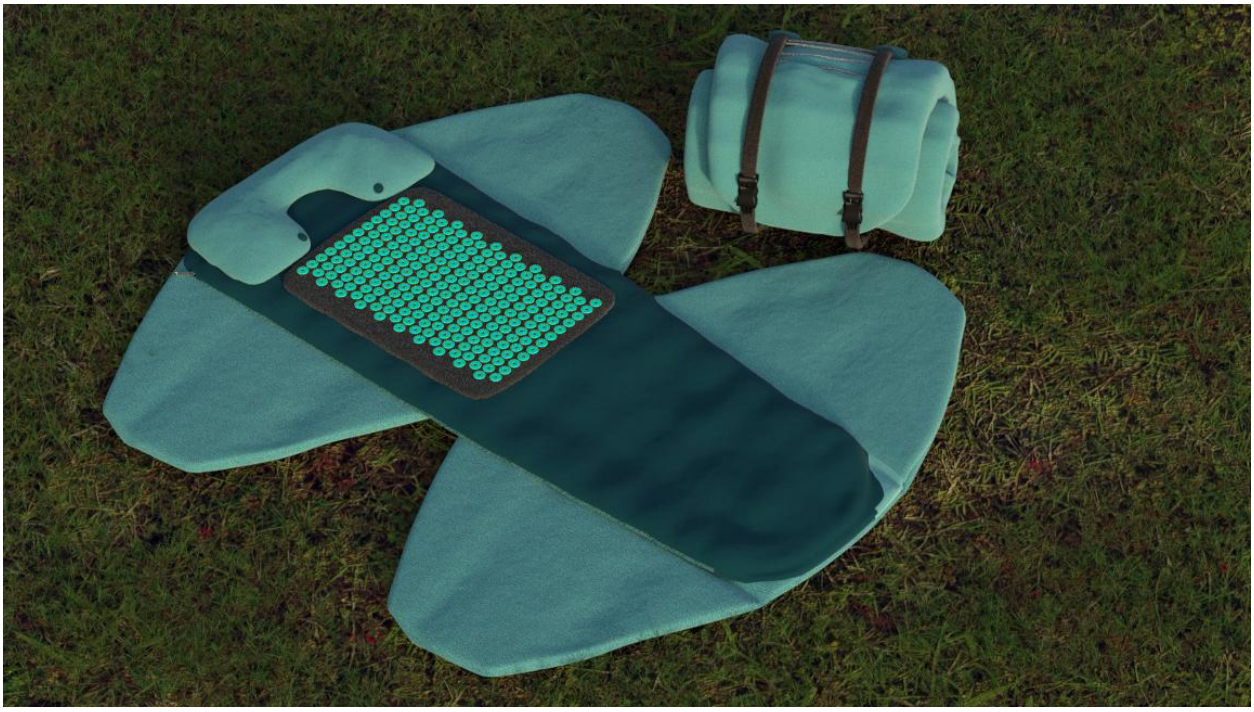


Figure 11.5.2: Rolled up and opened bags

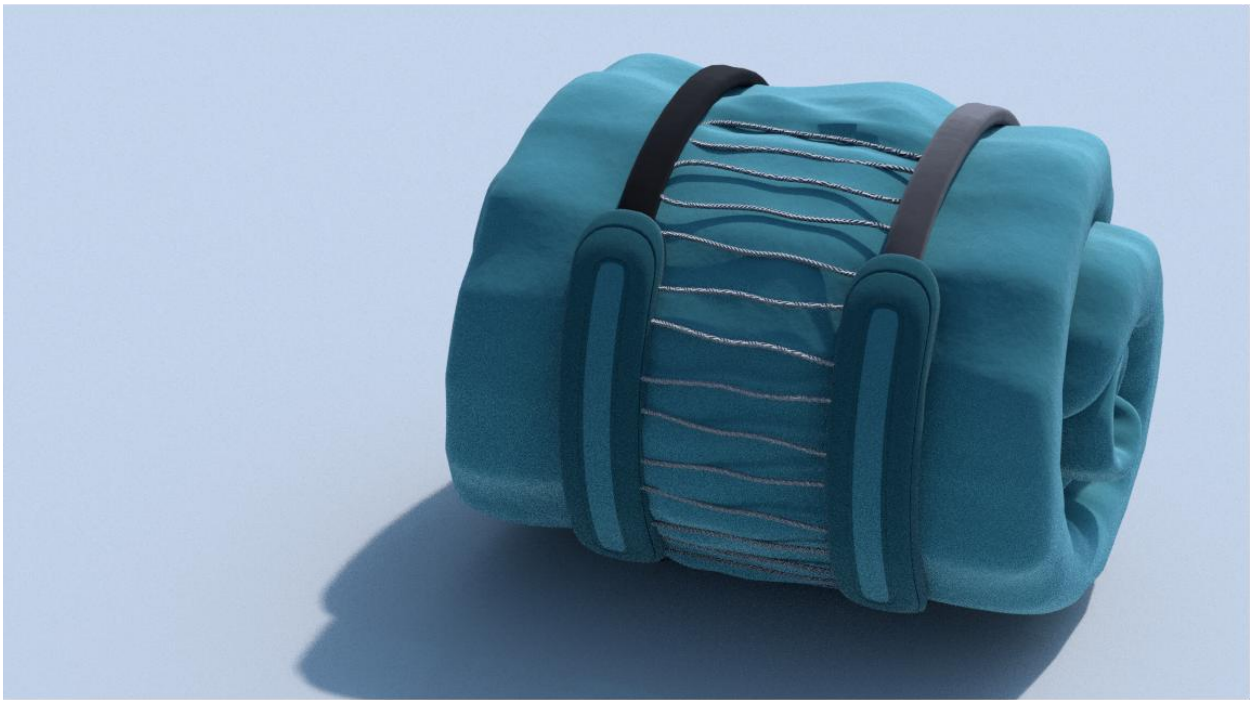


Figure 11.5.3: Rolled up back view

Figure 11.5.4: Rolled up front view

Figure 11.5.5: Folded view

11.6 Application

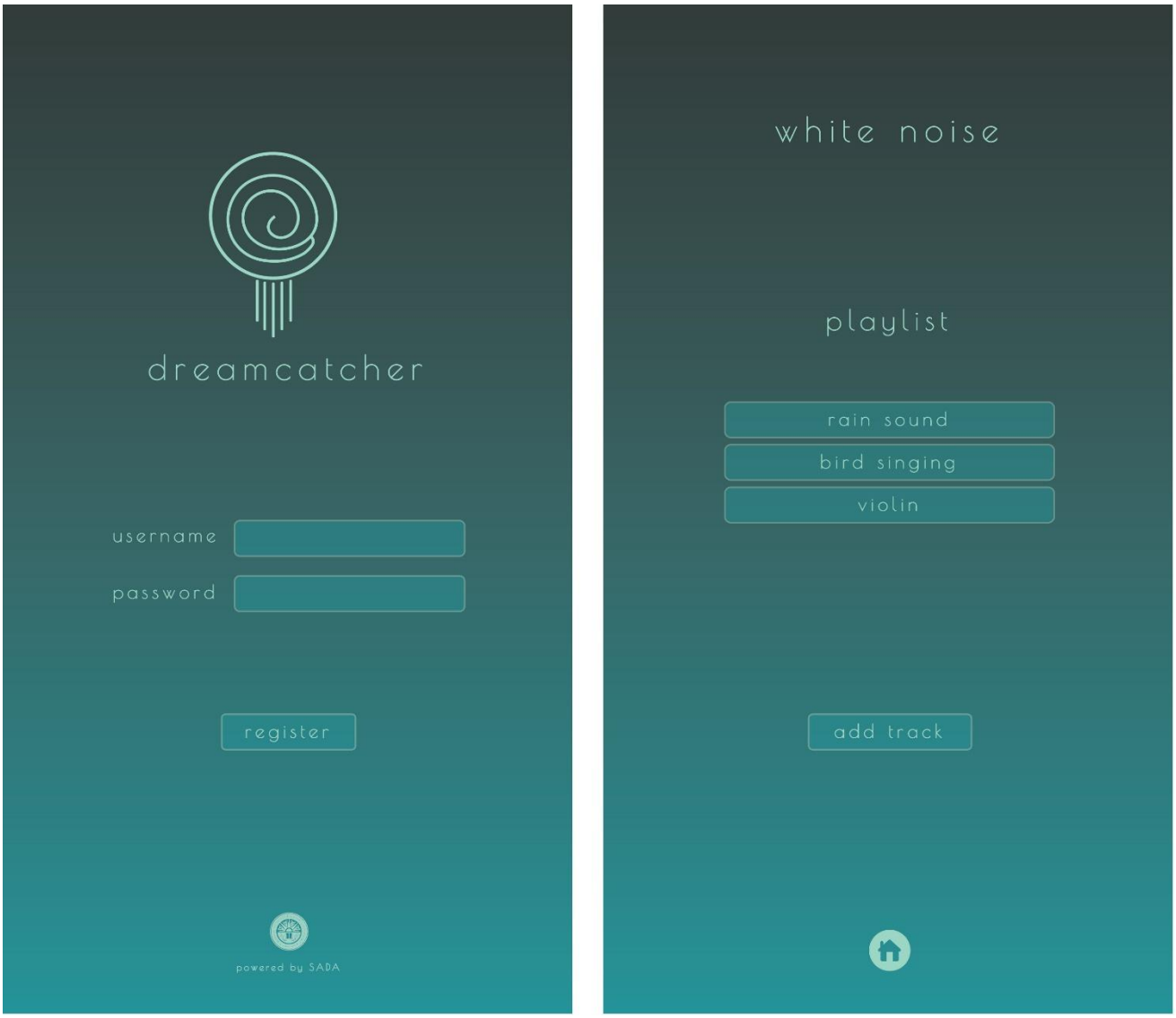


Figure 11.6.1: Application pages 1 and 2

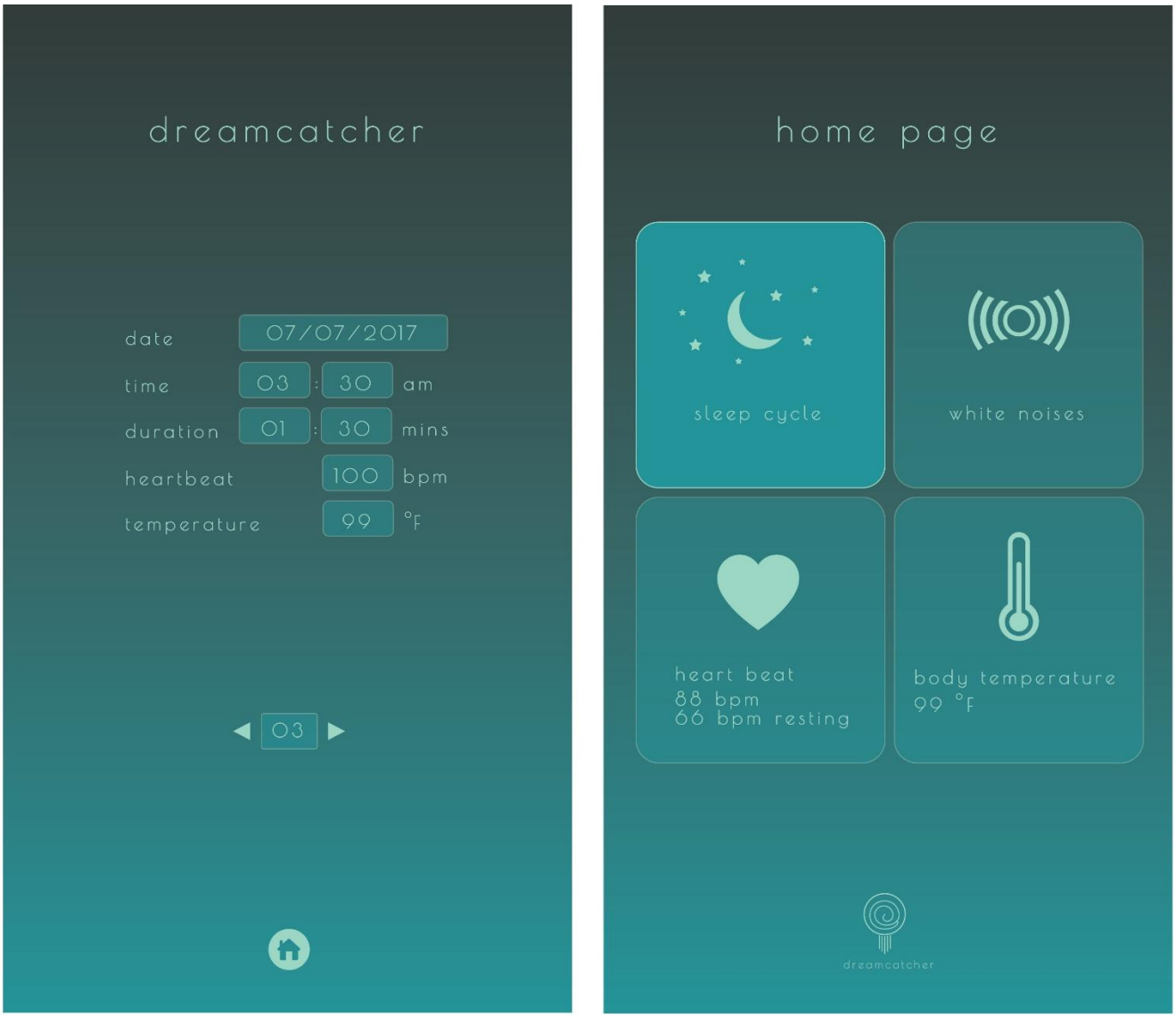
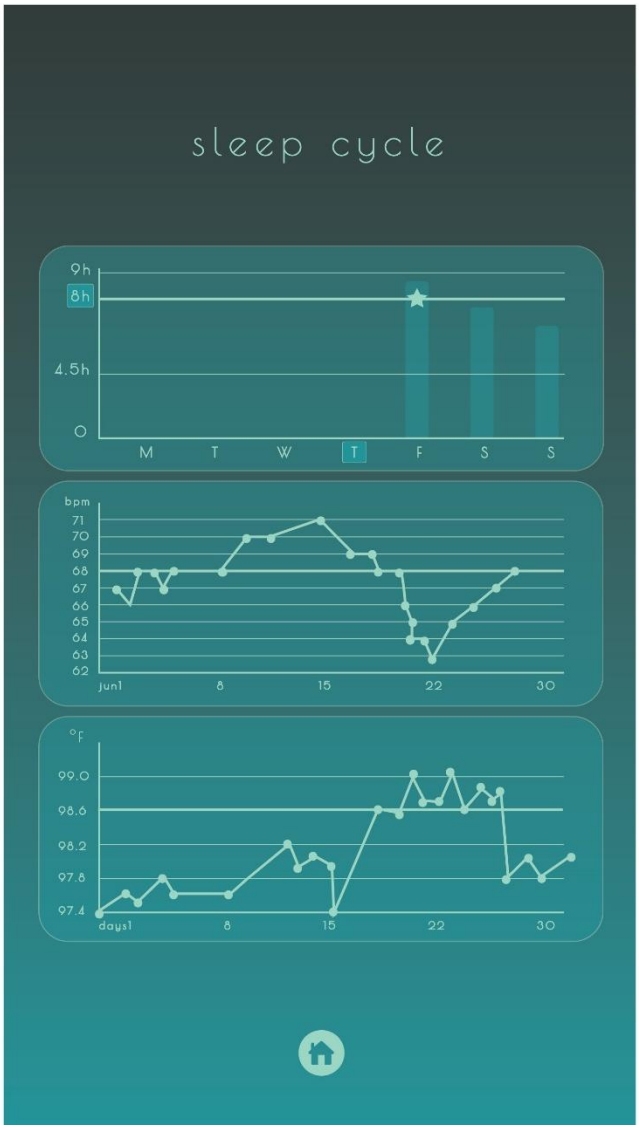


Figure 11.6.2: Application pages 3 and 4



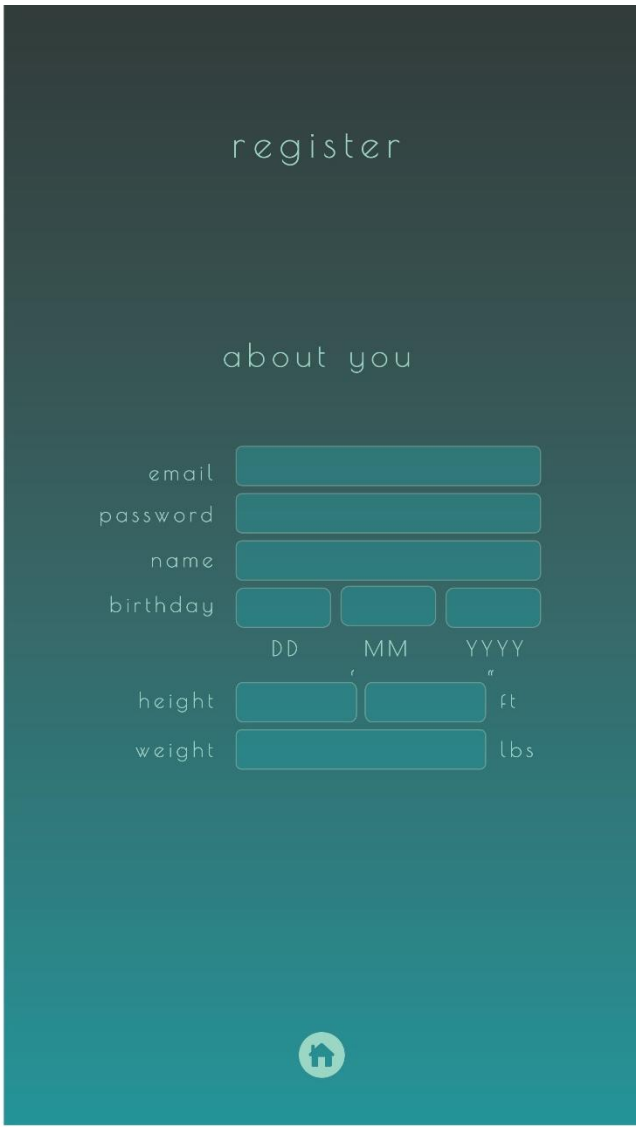
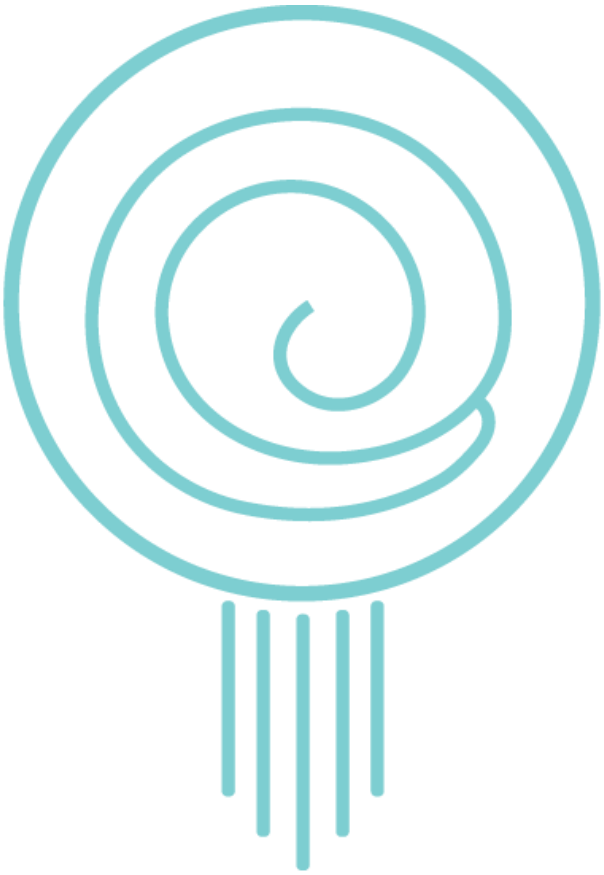


Figure 11.6.3: Application pages 5 and 6



dreamcatcher

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