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I, Belinda J D’Souza, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture (Master of).

It is entitled:
Deinstitutionalizing Rehabilitation:
An Alternative Approach to Rehab for Veterans Suffering from Post-Traumatic Stress Disorder and Substance Abuse Disorder

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Deinstitutionalizing Rehabilitation:
An alternative approach to rehab for veterans suffering from
Post-Traumatic stress disorder and Substance Abuse Disorder

A thesis submitted to the Graduate School of the University of
Cincinnati in partial fulfillment of the requirements for the degree of

Master of Architecture, Class of 2014
College of Design, Architecture, Art, and Planning
University of Cincinnati, Ohio

by,

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Abstract

Post-Traumatic Stress Disorder is an anxiety disorder that develops after a person is exposed to traumatic events such as sexual assault, serious injury or the threat of death. In the typical case, the individual with PTSD persistently avoids all thoughts and emotions, and discussion of the stressor event and may experience amnesia for it. However, the individual relives the event through intrusive, recurrent recollections, flashbacks, and nightmares.

Persons considered at risk include combat military personnel, victims of natural disasters, concentration camp survivors, and victims of violent crime. Veterans frequently experience 'survivor's guilt' for remaining alive while others died. Veterans trying to cope with their PTSD may turn to substances to alleviate their symptoms, which may lead to SUD which refers to the overindulgence in and dependence of a drug or other chemical leading to effects that are detrimental to the individual's physical and mental health, or the welfare of others.

This thesis looked at various support options offered to veterans, and found that conventional rehabilitation centers have a shockingly low rate of success of only 15%. Part of their ineffectiveness lies in the fact that their programs are too prescriptive and not individualistic, their spaces are clinical and not homely and welcoming. While significant advances are being made in the field of medicine, there seems to be a lack of complementary advances in rehabilitation architecture. Additionally, Studies have shown that drug abuse costs the US economy over $500 billion a year, thus validating the need to rethink the current drug rehabilitation system.

This thesis does not undermine or undervalue the social and personal side of rehabilitation, which is out of the architect’s hands, however, rethinking a traditional recovery center can influence the patient’s perception of the program, and possibly make him or her more willing to change. New, alternative, holistic programs are being advocated and followed by a rising group of professionals in the medical field since these programs are proving to be a more effective means of recovery for veterans. This thesis will attempt to merge scientific findings with complementary architectural solutions. The close relationship between the two will help create an environment that is more conducive to recovery.
Preface

“They can get out of hell, but can hell ever get out of them?”

“Now. After” (PTSD From a Soldier’s POV) is a short film created by SSG Kyle Hausmann-Stokes in 2010. Kyle served five years in the US Army’s Airborne Infantry and is a combat veteran of Iraq (Bronze Star). After his return from Iraq, he went to film school at the University of Southern California to experience a normal student life. However, he found that re-adjusting to his former life as a college student to be very difficult because of the Post-Traumatic Stress Disorder symptoms he experience daily. This powerful short movie captures his fear, paranoia, panic, loneliness, and desperation.

The movie begins with him waking up from a nightmare, sweating profusely. Flashes of dismembered body parts, gun battles, and his fallen comrades give the audience an idea into the endless stream of horrific images that run through his head. Any event bearing the smallest resemblance to something he experienced in Iraq would trigger his symptoms, implying that he was on edge the entire day. He picked up a habit of chain-smoking in attempt to calm his symptoms. Towards the end of the movie, he decided to seek help at the US Veterans Association. The movie’s touching ending shows him being approached and embraced by a number of much older veterans who recognized his symptoms since they had battled them too.

Following graduation from the production track at USC’s School of Cinematic Arts, Kyle founded a production company (Blue Three) through which he has produced a variety of commercial, web, and video content for national television and multi-million dollar ad campaigns. The movie brings up the important issue of the rising cases of PTSD and Substance Abuse Disorder among veterans in the States. While Kyle Hausmann-Stokes fortunately found the help he needed, thousands of other veterans in the States fail to break the vicious cycle of PTSD and unfortunately fall victim to it.

2 2014. VFT – Veterans in Film and Television http://www.vftla.org/veteran/kyle-hausmann-stokes#.UyeyelXlyKw
de·in·sti·tu·tion·al·ize (v.)

- to remove the status of an institution from
- to release from an institution for placement and care in the community
- to free from the complexity of a bureaucracy

institution in·sti·tu·tion (n.)

- c.1400, "action of establishing or founding (a system of government, a religious order, etc.)"
- from Old French institucion "foundation; thing established"
- from Latin institutionem (nominative institutio) "disposition, arrangement; instruction, education"
- meaning "established law or practice" is from 1550s
- meaning "establishment or organization for the promotion of some charity" is from 1707

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Chapter 1: Introduction to the Issue

With the increasing number of veterans in the States, studies have shown that there is a spike in the number of cases of Post-Traumatic Stress Disorder (PTSD) and Substance Abuse Disorder (SUD). PTSD is an anxiety disorder that develops after a person is exposed to traumatic events such as sexual assault, serious injury or the threat of death. The sufferer may experience recurring flashbacks, hyperarousal and avoid or numb memories of the event. Veterans trying to cope with their PTSD may turn to substances to alleviate their symptoms, which may lead to SUD which refers to the overindulgence in and dependence of a drug or other chemical leading to effects that are detrimental to the individual's physical and mental health, or the welfare of others.\(^5\)

Veterans suffering from these two co-occurring problems, PTSD and SUD, face a higher risk of both injury and non-injury related death. Injury-related deaths included homicides, suicides and accidents, while non-injury related deaths included heart disease, cancer and other health problems.\(^6\) Of those admitted in rehabs centers, only 15% have managed to successfully stay sober, which puts the effectiveness of these centers into question. Some the many reasons behind their ineffectiveness is that their programs are too prescriptive and not individualistic, their spaces are not conducive to self-reformation and that they do not encourage creative means of recovery.

Currently, there are three major official organizations in the States that are raising awareness of the issue of PTSD and SUD and engaging in scientific research. The first is the United States of America, Department of Veterans Affairs. The mission of their National Center for PTSD is to advance the clinical care and social welfare of American Veterans and others who have experienced trauma, or who suffer from PTSD, through research, education, and training in the science, diagnosis, and treatment of PTSD and stress-related disorders.\(^7\) Their vision is to be the foremost leader in information on PTSD and trauma.

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Secondly, The *National Institute of Drug Abuse (NIDA)* strives to use the power of science to improve prevention and treatment and inform policy as it relates to drug abuse and addiction. NIDA-supported researchers are developing and testing novel treatment approaches such as using smart phones and wearable wireless sensors to record real-time responses among veterans suffering from addiction and trauma. The data is analyzed to detect patterns of responding that predict relapse.

The NIDA also strives to improve veterans' access to drug treatment and studies the use of drug courts. Drug courts have demonstrated effectiveness in addressing nonviolent crimes committed by drug abusers, ushering them into needed treatment instead of prison. Because the criminal justice system is a frequent treatment referral source for veterans, specialized drug courts for this population may give them the opportunity to access services and support they may not otherwise receive.

Lastly, the *Paralyzed Veterans of America (PVA)* collaborated with the New York chapter of the American Institute of Architects (AIA) on accessible design for paralyzed veterans. In 1986, PVA's "Barrier-Free Design Program" added the oversight of the design and construction of VA medical centers to its mission. Today, the PVA Architecture department continues to fulfill its mission of advocating for accessible design.

The PVA Architecture division focuses specifically on healthcare to improve the well being of veteran patients. They place a lot of importance on accessible, state-of-the-art facilities that maximize a patient’s independence. This progressive organization recognizes that there is a disconnect between architecture and the rehabilitation therapies used. They do not complement one another and often, the architecture remains outdated while the therapies are progressive.

Since the existing rehabilitation system has proven to be ineffective, we must rethink the programs and methods used. In the case of veterans, I feel that the programmatic elements of a holistic, evidence-based rehab treatment can be merged with the positive architectural and experiential aspects of a homely outdoor retreat center, so as to produce a hybrid Veterans Village. In this way, the realms of science and architecture can be brought together to hopefully produce an enriching and healing space.

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Currently PTSD affects an estimated:

2.2% of the population

7.7 million people

11-20% of the veterans of the Iraq and Afghanistan wars

300,000 people

Combat is not the only cause of PTSD:

55% of women in the military have reported sexual harassment

23% have reported sexual assault

38% of men in the military have experienced sexual harassment

2 out of 3 of Iraq and Afghanistan veterans suffering from PTSD may not be receiving treatment

Treatment options for PTSD:

Counseling and psychotherapy

Prescription drugs

Exposure therapy

Group therapy

Alternative therapy
Predictably, the increase in the number of military deployments has led to a sharp increase in PTSD cases in the States. In 2012, 10,000 combat veterans with PTSD flood into VA hospitals every three months, pushing the number of ill patients to over 200,000 and straining resources. The demand for mental health care is only going to continue to grow as thousands more troops return to the country.

Since the Iraq and Afghanistan wars began, 211,819 combat veterans have been treated by the VA for post-traumatic stress disorder, about 16% of the 1.3 million who fought. But the VA says it sees only about half the veterans from the two wars, because hundreds of thousands seek care elsewhere or not at all. Additionally, with advances in health care and modern medicine, soldiers with severe injuries and multiple amputations who could not have possibly be saved a decade ago, are now to come home to their families. However, the mental trauma, physical rehabilitation, and psychological harm that they have faced increases the likelihood of them suffering from PTSD and SUD.

The first army in history to determine that mental collapse was a direct consequence of the stress of war and to regard it as a legitimate medical condition was the Russian Army of 1905 in their war with the Japanese. It was believed the impact of the shells produced a concussion that disrupted the physiology of the brain; thus the term “shell shock” came into fashion. The brutalities of WWI produced large numbers of the psychologically wounded. WWI generated stress theories based on models of the mind, such as Freud’s “war neurosis” in which he postulated “war neurosis” was brought about by the inner conflict between a soldier’s “war ego” and his “peace ego.”

By the end of World War I, the United States had hundreds of psychiatrists overseas who were beginning to realize that psychiatric casualties were not suffering from “shell shock.” These psychiatrists came to comprehend it was emotions and not physiological brain damage that was most often causing soldiers to collapse under a wide range of symptoms. The modern understanding of PTSD dates from the 1970s, largely as a result of the problems that were still being experienced by US military veterans of the war in Vietnam.

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Chapter 2: Existing Rehabilitation Centers

Veterans’ home were formerly known as ‘old soldiers’ homes’ that were an institution for the care of military veterans and their families. The first national veterans' home in the U.S. was the United States Naval Home approved in 1811, but not opened until 1834 in the Philadelphia Naval Yard. It is now the Gulfport Campus of the Armed Forces Retirement Home and welcomes veterans of all services. The first Army national old soldiers' home in the U.S. was established in Washington, D.C. in 1851 and was the site of President Abraham Lincoln's summer home during the Civil War and is adjacent to National Cemetery. It is now known as the Armed Forces Retirement Home. The United States Department of Veterans Affairs (VA) was established in 1930, and has since been in charge of several federally managed veterans’ homes.

From an architectural point of view, most of the original old soldiers’ homes were often mundane and uninspiring have unfortunately not progressed much over the decades. The U.S. Naval Home in Philadelphia, Pennsylvania, which is the first national veterans’ home, pictured on the right, was designed by architect William Strickland in 1834 and is considered one of the best Greek Revival architecture. The site was placed on the National Register of Historic Places and designated a National Historic Landmark in 1971.

Many of the original old soldiers' homes were constructed in high Victorian style, like the New Hampshire Soldiers' Home in Tilton, New Hampshire. This style features of Gothic Revival, Italianate, Romanesque, or Second Empire were often combined, resulting in picturesque facades. High Victorian Gothic exhibits heavier detailing and more complex massing than the earlier Gothic Revival. Polychromatic effects, a hallmark of the style, are achieved by the use of materials of differing color and texture.

To the right is the Texas State Veterans’ Home, constructed in 2001 in Big Spring, Texas. As can be seen in the modern veteran homes and rehabilitation centers, there seems to be a lack of innovative and inspiring architecture in this typology. Revival and Neoclassical architecture seems to be a favorite style. Having escaped the contemporary design, the veterans’ rehabilitation home is in need for a new, refreshing outlook.

In addition to the flagging architecture and design of these centers, the current system of rehab also fails because it is rooted in an entrenched, inaccurate view of persons struggling with drugs or alcohol. These addictions do not stem from a disease, but from a habitual choice to use it in ways that lead to a lifestyle of continual substance abuse. Alcoholic Anonymous follows a 12-step program, based on the belief that a spiritual higher power is the only supposed cure for an “addiction”. AA has claimed a success rate of about 5%. The 12-step program relies on shelling out moral principles as a form of medical treatment. Using AA as the only rehabilitation treatment, rather than as an adjunct to treatment, defies the reality that there are many different effective treatment methods. Regardless of the benefits or drawbacks, most experts agree that all addicts should have highly personalized attention from a therapist. After all, the sources of addiction are myriad: past trauma, self-medication, masking another mental illness, genetics, etc.\(^ {13}\)

It's difficult to accurately determine the success rates of traditional drug and alcohol treatment facilities because various treatment centers measure success so differently. Some may define sobriety as successfully moderating drug or alcohol use, while other treatment facilities measure success rates for only a brief amount of time after completion of the program. And others may claim success rates upon abstinence from drugs and alcohol over a substantial period of time. These statistics can be manipulated to generate revenue from those seeking to overcome their drug and alcohol struggles.\(^ {14}\)

Unfortunately there is a growing need for alcohol and drug treatment in our society today, but the problem is that these treatment centers are almost always based on the generally ineffective twelve-step model. On the other hand, there is strong evidence that cognitive behavioral education is highly effective in helping people overcome severe alcohol and drug abuse. Underlying conditions such as depression, or a social problem could sabotage recovery. To be effect, treatment must address the individual’s drug abuse and any associated medical, psychological, social, vocational, and legal problems.\(^ {15}\) Cognitive behavioral therapy helps addicts recognize what prompts them to use drugs or alcohol, and teaches them to redirect their thoughts and reactions away from the abused substance.

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Chapter 3: Evidence-Based Rehabilitation

The current system of rehab fails because it is rooted in an entrenched, inaccurate view that addicts are morally bereft and weak. If they were not, the belief goes, they’d stop using when drugs began to negatively impact their lives. Most treatment centers in the U.S. are based on an archaic philosophy that is rooted in the 12-step model of recovery. Although this program has saved countless lives, it does not work for a majority of people who try them. In the case of veterans battling PTSD and SUD, a more sensitive approach must be advocated.

Evidence Based Treatments (EBTs) are proving to be far more effective than the current treatments used in rehab centers. Rather than requiring contrition and prayer, they use therapies that have proved effective in clinical trials, including cognitive-behavioral therapy designed to train addicts to recognize and interrupt the cues that trigger the relapse mechanism; motivational interviewing, a therapy approach widely used to treat many psychological disorders that helps addicts engage in treatment; contingency management, which essentially rewards addicts for clean time; and psychopharmacology.

Stephanie L. Brooke, a nationally certified counselor at the Capella University has written three books on creative art therapies that can be used for rehabilitation. One of them, *The Use of Creative Therapies with Chemical Dependency Issues* examines the use of art, play, music, dance/movement, drama, and poetry therapies with respect to treatment issues relating to substance abuse. She discusses a concept called ‘Expressive Therapies Continuum’ which describes a person’s interactions with art media or other experiential activities in order to process information and form images. The ETC organizes media interactions into four levels, namely kinesthetic/sensory, perceptual/affective, cognitive/symbolic, and creative.16

Each level of the ETC encompasses two polarities, whereby the emphasis on one polarity decreases the involvement of the other polarity. The therapeutic aspects of the ETC are based on the following art therapy approaches: art as therapy, gestalt art therapy, phenomenological art therapy, psychodynamic art therapy, and cognitive art therapy. The stepwise three-tiered structure of the ETC incorporates concepts from cognitive psychology and art education, namely perception and imagery, visual information processing, stages of graphic development, and different expressive styles.

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In addition to the Dr. Stephanie Brooke’s research, I also consulted Juhani Pallasmaa’s work, ‘The Eyes of the Skin’. He addresses the issue of a degradation or “impoverishment” of human perception of architectural beauty caused by our tendency to limit all other sensory realms outside the mere sense of sight. Drawing from the notion that our experience in the world is formulated by a combination of all senses, Pallasmaa suggests that we undergo a similar experience in appreciating the beauty of an architectural work; an experience that obviously steps beyond architecture’s visual qualities. He advocates a “life-enhancing” architecture that addresses all the senses simultaneously and fuses our image of self with our experience of the world. He emphasizes this idea by stating that “the

Pallasmaa looks to our visual, hearing, and haptic senses to better understand the being as a whole, because though it operates in unison, it is a collection of parts. I find it hard to disagree with Pallasmaa’s opinion that senses cannot be examined independently; they interact with each other as well as the spaces they inhabit or the objects they encounter. An integrated body uses multiple senses to better understand the world, an essence that I hope to capture in the design of the recovery center. Pallasmaa’s division of the five sensory systems, namely the visual system, auditory system, the taste-smell system, the basic-orienting system and the haptic system, makes one realize that we would be limiting our scope of architecture if our design solely catered to the visual system, as is usually done.

The third author that I referred to is Maurice Merleau-Ponty, a French phenomenological philosopher, who was strongly influenced by previous philosophers such as Karl Marx, Edmund Husserl, Martin Heidegger, and Jean-Paul Sartre. His book, Phenomenology of Perception, which was published in 1945, constitutes a thorough rethinking of phenomenology and the phenomenological method. Merleau-Ponty defines phenomenology as the study of essences, including the essence of perception and of consciousness. He also says that it is a way to describe the nature of our perceptual contact with the world and our experiences. He repeatedly calls for a rediscovery, reawakening and returning of our sensitivity to phenomena. He states that the whole system of experience: world, own body, and empirical self are intricately intertwined and mutually engaged. In his search for a new status for ‘sensation’, Merleau-Ponty introduces four influencing factors, which are

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color, sensible versus intellectual consciousness, cogito and Transcendental Theory of Perception.

Merleau-Ponty states that a study of the inductive psychology of colors proves that they produce sensations and sensible qualities have a ‘motor accompaniment’. For example, he says that red and yellow favor abduction, an act where the organism turns towards the stimulus and is attracted by the world. Blue and green, on the other hand, favor adduction, an act where the organism turns away from the stimulus and withdraws towards its center. He also introduces the idea that consciousness includes the two distinct realms of sensible consciousness and intellectual consciousness. He relates the former to traditional Empiricism, which advocates that experience is the primary source of knowledge, which in turn is derived from sensory perceptions. On the other hand, the latter is related to Rationalism, which maintains that reason is the primary source of knowledge, and that knowledge does not depend on sensory perceptions.

The third factor that he introduces is cogito, which related to self-consciousness. The human being understands that he is an individual but belongs to a species, i.e.; he sees himself in the world. Finally, he introduces the Transcendental Theory of Perception and a term priori which means ‘from what comes before’, referring to knowledge or justification that is independent of experience. He also extracts some philosophies from Gestalt, an essence or shape of an entity’s complete form. This philosophy serves to emphasize Merleau-Ponty’s belief that we do not react automatically to isolated stimuli, but that we grasp the lived situation as a whole. Transcendental reflection allows one to rely on his internal judgement to gain self-respect and possibly reach the level of self-actualization.

I then synthesized the research and information that I gained from these three primary sources, as well as other secondary sources. I have classified the stages of rehab into four, starting with the most crucial initial stage, and then progressing to the more stable, later stages.
The Kinesthetic/Sensory Level represents the simplest form of information processing. Kinesthetic feedback is received from motor actions, which contribute to the healing function of rhythmic motion and energy release. Art experiences like clay work help release built-up tension and lead to stress reduction and bodily awareness. The Sensory component of this theory provides a healing function by making the subject aware of his internal and external sensation and is promoted by art experiences like face painting and mixing of colors.

**Stage 1**
Denial + craving + relapse
Depression + violence

**Existing Conditions**
24-hour security
Series of locked doors

**New Programs**
Art studio
Painting
Pottery

**Phenomenology**
Abduction
Adduction

**Veteran-specific activities**
carpentry
The Perceptual/Affective Level deals with the concept of radical reflection, which encapsulates the acts of forming and formulating the ideas of subject and object. The Perceptual component, like drawing oneself in the world, promotes an awareness of internal organization thus helping individuals manage what used to feel like chaotic inner experiences. The Affective component encourages patients to make pro and con collages that help them identify, discriminate, and soothe emotions, thus expressing affect.

**Stage 2**
- Realize they are lost
- Seek help

**Existing Conditions**
- Group therapy rooms
- Individual counseling

**New Programs**
- Classrooms

**Phenomenology**
- Empiricism
- Rationalism

**Veteran-specific activities**
- Coaching
- Meeting halls
The Cognitive/Symbolic Level processes information in a sophisticated, symbolic, and sometimes, mysterious manner. Cognitive art therapy like cartooning and future life books teach cause and effect thinking and helps them work out the chain of events that lead to a trigger emotion of situation, and eventually their substance abuse. The Symbolic level helps patients learn and embrace disowned parts of their self through activities like self-portraits and mask making.

**Stage 3**
Back on their feet
Try to be independent

**Existing Conditions**
Religious, spiritual
Vocational training

**New Programs**
Theatre
Drama
Poetry

**Phenomenology**
Cogito ergo sum

**Veteran-specific activities**
Auditorium
Finally, the highest Creative Level helps in reduction of shame, interdependence on other, and ultimately, a creative expression related to self-actualization. The following graphic shows a breakdown of the different stages of rehab and corresponding ETC programs that should be implemented.

**Stage 4**
Self-respect  
Holistic view of life

**Existing Conditions**
Gym, exercise room  
Yoga

**New Programs**
Music room

**Phenomenology**
Transcendentalism  
Priori

**Veteran-specific activities**
Sports with general public
Although skeptics criticize Evidence-Based Treatment methods, nearly all the private rehabilitation centers in the world that boast the highest rates recovered addicts, follow this integrated, holistic method of rehab.

Passages Malibu, US
- no 12-Step approaches
- focus on the patient’s underlying issues like depression, ADD, anxiety, low self-esteem, lack of purpose, insomnia, family turmoil
- one-on-one treatment
- acupressure, acupuncture, art therapy
- hypnotherapy, meditation

Betty Ford Center, US
- 20 acre site
- treatment team
- physician, nurse, psychologist, counselors, dietician, fitness trainer, and chemical dependency technician
- 12 step program
- gender-specific treatments

The Sanctuary, Byron Bay, Australia
- luxury, private, therapeutic retreat and rehab center
- holistic - Western and Eastern medical traditions
- whale watching, music lessons, painting
- fishing, tennis, yoga, golfing, beach walks, sailing, hot air ballooning
- no interaction between clients

PROMIS Rehabilitation Clinic, UK
- idyllic setting
- equine assisted psychotherapy
- creative therapy - music, collage, painting, and sculpture
- exercise and recreation - gym, aerobics, yoga, countryside walks, massages, acupuncture
- cooking lessons, gardening
- family group sessions

[21] 2002. Passages Malibu: Addiction Treatment Center - Alcohol Rehab...
http://www.passagesmalibu.com/
Another effective method that can be used is Evidence Based Design (EBD), which is a field of study that emphasizes the use of credible evidence to influence the design process. The approach has become popular in Healthcare Architecture to improve patient and staff well being, healing, stress reduction, and safety. This developing body of science ties elements of the physical environment with patients, staff, and resource outcomes to produce healing environments. Architects, interior designs, and even urban planners use EBD as it helps them make decisions based on the best information available from research, project evaluations, and from evidence gathered from the operations of the client.

Healing spaces have been around since ancient Greece. People who were ill looked toward temples in the hope of having dreams where the god would reveal cures. Later, in 1860, Florence Nightingale fixed ventilation and fresh air as “the very first canon of nursing,” and underlined the importance of quiet, proper lighting, warmth, and clean water. Then, a pioneering study conducted by Roger Ulrich in 1984 found that surgery patients with a view of nature suffered fewer complications, used less pain medication, and were discharged sooner than those with a brick wall view.

A major component of EBD research analyzes nature’s healing effects on our bodies. Nature’s presence has been associated with lowering blood pressure and stress hormones, which contribute to a more positive emotional state and a boosted energy level. Conversely, its absence can produce negative results: higher levels of anxiety and depression, even possibly accompanied by high rates of delirium. Healthcare design has three common EBD applications: incorporation of views of nature, increase of daylight in interior spaces, and the presence of therapeutic gardens.

The PVA advocates several architectural and design interventions that have proven to have a positive effect on the health of patients. One of them is chromatherapy or color therapy, the principle that certain colors are infused with healing powers. Ayurveda is an ancient form of medicine associated with color therapy practiced in India for years. It uses the energies inherent in the colors of the spectrum to restore balance within the individual.

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The Jesuit Chapel of St. Ignatius in Seattle, Washington, design by Steven Holl, embodies this concept of chromatherapy. In the Jesuit ‘spiritual exercises’, no single method is prescribed since they believe that different methods of worship help different people. In order to distinguish these different zones of worship, Holl created a series of colored volumes, each with unique light qualities that seem to sculpt the space. The light is sculpted by a number of different irregular colored volumes emerging from the roof, which aim at different qualities of light; but gather together for one united ceremony. The play of color, light, and architectural elements define the physical and spiritual spaces within the chapel.

Interestingly, Holl not only manages to use chromatherapy to create distinct spaces, but also to develop the phenomenological aspects of each space such as the sensory, perceptual, and emotional intentions. The extraordinary aspect of the Jesuit Chapel is that it retains the simplicity of modernism and embodies meaning, philosophy, and science of perceptions. Its sculptural roof forms and iconic cross and bell tower provide the building with object status. Essentially, it is a ‘complete’ building: it enables visitors to grasp architecture in its fullness, successfully functions as a spiritual home and a shelter, and engages the senses, thoughts, and feelings.

Since light and color go hand in hand in this chapel, it is impossible to discuss one without the other. Steven Holl envisioned the chapel as seven bottles of colored light in a stone box, each represented by different volumes emerging from the roof thus producing seven qualities of colored light for the different parts of a Jesuit service. Each bottle combines the reflected color with a colored lens of the complementary color. His use of light and complementary color adds a layer of raw and vivid intensity to the overall spatial experience. The worshippers do not experience direct light coming into the nave, but the chromatic light spilling from behind the walls, thus making the space seem alive and fluctuating.

1. *Bell Tower and Reflection Pool* use a color field of natural light, and the lens color of water. Since this is an outdoor area, the spaces are loosely defined by light through reflection and illumination. The pool and tower provide a meditative, shared space, similar to a Zen garden.

2. *Processional*, which has a white color field making this the brightest area inside the chapel and creating a transition between the exterior daylight, and the more, subdued interior lighting.

3. *Narthex* has a warm color field of red.

4. *Nave* has a yellow color field and blue lens which create a calming glow as a backdrop for the altar. The crucifix is washed with silhouettes that bring a sense of spiritual enlightenment to the observer.

5. *Reconciliation Chapel* is located to the south of the altar and is dedicated to the celebration of the sacrament of reconciliation or confession. A color field of purple and orange lens is located within the baffle.

6. *Choir* has a distinct green color making it visually distinct from the rest of the spaces, even though there aren’t any physical partitions. A red lens contributes to the warm appearance of the space.

7. *Blessed Sacrament* is filled with an orange color field and a purple lens. This area is devoted to private meditation and prayer. Unique to this bottle is the use of beeswax on the walls to appeal to the olfactory sense and cause diffusion of light on the wall surfaces.

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To summarize, the proposal for a new rehabilitation center will not negate the current research and rehabilitation programs employed, but will instead build on their tried and tested methods, while incorporating a new aspect of evidence-based programs. These new programs such as music, art, sport, etc. will be introduced at the appropriate stages of rehab, as advised by the Expressive Therapies Continuum. Other elements such as color usage, light, and the absence or presence of framed views will vary depending on the ambience needed in the particular programmatic zone.
Chapter 4: Site Selection

As can be seen in the map below, the state of Texas has one of the highest numbers of veterans in the United States. As of September 2012, the State recorded a total veteran population of 1,675,689\(^{28}\) which was broken down as follows:

- Wartime Veterans: 1,293,260
- Gulf War: 572,355
- Vietnam Era: 560,927
- Korean Conflict: 141,957
- World War II: 87,059
- Peacetime: 382,429
- Female: 188,050
- Male: 1,487,639

Additionally, Texas has the third highest number of active duty military personnel, which was 123,879 as of September 2012, implying that the population of veterans in the states will only increase in the coming years.

Fig. 4.1

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Despite this high density of veterans, Texas has only 6 official VA Medical Centers. The VA North Texas Health Care System (VANTHCS) is VA’s second largest health care system, serving over 113,000 Veterans and delivering one million outpatient episodes of care each year to Veterans in 38 Texas counties and two counties in southern Oklahoma. VANTHCS comprises of the Dallas VA Medical Center, Sam Rayburn Memorial Veterans Center, Fort Worth VA Outpatient Clinic, Tyler VA Primary Care Clinic, Polk Street VA Annex and 6 community based outpatient clinics.29

VANTHCS provides comprehensive health services through primary, tertiary and long-term care in many areas like medicine, surgery, mental health and rehabilitation. The 853-bed system has a Spinal Cord Injury Center, Domiciliary Care Program and Community Living Center with a dedicated hospice unit. In 2009, a temporary lodging facility was built at the Dallas VA for families of Veterans or active duty military personnel undergoing treatment at the facility.

The Dallas VA offers a variety of services to homeless veterans including opportunities to return to employment. The Compensated Work Therapy (CWT) is comprised of three unique programs: Sheltered Workshop, Transitional Work, and Supported Employment. Additionally, the Homeless Veteran Supported Employment Program (HVSEP) provides vocational assistance, job development and placement, and ongoing supports to improve employment outcomes among homeless Veterans and Veterans at-risk of homelessness. Formerly homeless Veterans who have been trained as Vocational Rehabilitation Specialists (VRSs) provide these services. Safe, temporary housing, health care, and mental health services are also available to Veterans.

The existing center is located at 4500 S. Lancaster Rd., Dallas, TX 75216 and is pictured alongside.30 The center in Dallas is located in the outskirts of the city, 15 miles south of the downtown area and is not accessible by any public transportation route. The main challenges the center faces are the inconvenient location and the limited capacity, which is not prepared to treat the future spike in the number of returning veterans.

There is a need for another VA center located in a more urban, centralized site in Dallas. I think that the veterans in the region would greatly benefit from a rehabilitation center located closer to the city, with easy access by public transportation. I have selected a site by the serene and picturesque White Rock Lake in Dallas, 7 miles from downtown Dallas. The site is located on major bus routes as well as on the DART railway.
The new site is located on the shore of the White Rock Lake in East Dallas, Texas, 32.8150° N, 96.7253° W. As can be seen in the topography map, there is a significant elevation change around the lake, ranging from 390’ to 520’ above sea level. The map below shows that the area around the selected site is mainly residential (shown in grey) with very few industrial/retail areas (shown in red).
The 1,254 acre White Rock Lake reservoir is centrally located at 8300 East Lawther Drive and offers a wide variety of outdoor activities including a hike and bike trail 9.33 miles long, numerous scenic picnic areas, fishing piers, the Bath House Cultural Center and the Dallas Arboretum and Botanical Garden. Before Dallas County was settled, the land on which the lake was built was a shallow, tree-lined valley in which Native Americans hunted for the bison that came to drink from White Rock Creek and graze upon its grassy banks. In the 1840s, while Texas was still an independent republic, white settlers began establishing homesteads on the high ground surrounding the White Rock Valley, among them were the Daniel and Cox families, who owned a collection of farms. Thomas Walker Daniel and his wife Frances Herndon Daniel seem to have moved to the White Rock area in the late 1830s and early 1840s. They were friends with the Cox family who moved to land adjacent to the Daniel family. Together they had a joint family cemetery called the Daniel-Cox Cemetery.\footnote{2008. File:Dallas, Texas Map 1905.jpg - Wikimedia Commons. http://commons.wikimedia.org/wiki/File:Dallas,_Texas_Map_1905.jpg.}
As can be seen in this 1905 map of Dallas, the site where the future White Rock Lake would be located was out of the city bounds, and flat land. A White Rock Stream flowed through the area, but the area was primarily considered farmland.\textsuperscript{32}

The city of Dallas, in a long-range plan for water, forced the Daniel family to sell their land to build White Rock Lake in 1910. By 1914, White Rock Lake had filled completely and the city began to consider its recreational potential. By the 1930s, the lake had become a popular destination and was given the name ‘The People’s Playground’. Although the lake entered a decades-long period of decline in the 1950s, it was renewed and cleaned up in the 1970s, and has become increasingly popular since. There citizens of Dallas formed a grass-roots activist organization called ‘For the Love of the Lake’ in the last decade and has worked with the Dallas Parks and Recreation Department in the reversal of the deterioration and decay of decades past.\textsuperscript{33}

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\begin{figure}[h!]
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A useful precedent to look at is REHAB Basel Center for Spinal Cord and Brain Injuries in Basel, Switzerland. This rehab center was designed by Herzog & de Meuron in 2002 and covers an area of 22890 m2. It has 92 beds and is both a private inpatient and outpatient clinic.

The client’s wish was not to have the new REHAB center look or feel like a hospital. As a conceptual beginning, the architects clearly stated what a conventional hospital is, and chose to design a center that challenged the very definition of a hospital. At a rehabilitation center, people live for up to 18 months and learn to cope with their changed lives in order to become as independent as possible again. They have a daily routine like the rest of society, but with one significant difference: everything happens in one place. Since the space they occupy is so restricted, the architects designed a multifunctional, diversified building, almost like a small town with streets, plazas, gardens, public facilities, and more secluded residential quarters.

The center is a horizontal building on two floors, in which wheelchair users and pedestrians can easily move from one place to another: therapy and medical facilities are on the ground floor; the patients’ rooms on the second floor. The connection between indoor and outdoor spaces was a primary architectural concern. One enters the center through an outdoor space and follows various inner courtyards, which are filled with different elements; water, wood, concrete, etc. Large windowpanes and views of the landscape, which provide a seamless transition between inside and outside, define common spaces such as the gym or the workshops. The REHAB is an open, permeable, breathing building.

The purist simplicity of the rectangular form helps emphasize and celebrate other elements such as the indoor courtyards, the simple, alley-like circulation, covered pathways, and their façade treatment. As is with most of their projects, the architects have paid a lot of attention to the façade and use it as a means to reveal uncommon relationships. They realize that rehabilitation centers are introverted and very private but they did not want to sacrifice natural day lighting at the cost of providing this privacy. The closely spaced wooden slats allow a variety of private circulation routes both on the ground level and first level. The wood also ties in with the use of greenery and water features in the indoor courtyards. All these elements work together to maintain a natural, organic, outdoors ambience.

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The particular area that I am looking at has a 40’ elevation change (from 490’ to 450’ at the edge of the lake). I will exploit this elevation change to provide different views at each level of the building. The lack of adjacent buildings will also allow me to frame views at every cardinal direction. Establishing strong connection to the White Rock Lake will be a major focus in the design process. Some of the considerations to be kept in mind are using complementary materials to those used in the vicinity, exploiting the varied views available in every direction, and establishing an architectural language that will tie the elements of the building together.

Fig. 4.13
Chapter 5: Concept

The rehabilitation center that I will be designing will be at a similar scale to the existing building in the vicinity, or even smaller, hence, making any overly bold gestures will make the building stick out like a sore thumb. Hence, I will choose to make a humble architectural move and use the materials familiar in the area.

While visiting the Cincinnati Veterans Association and the Cincinnati Crossroads Center, the one architectural element that stood out to me was the treatment of the circulation paths. While the quality of treatment within the classrooms might be exceptional, once one steps out of the classroom and into the narrow hallways lit with repetitive, jarring fluorescent light bulbs, you are reverted the previous state of mind you were in, thus negating the beneficial aspects of the counseling. In my project, I choose to challenge this clinical treatment of hallways by celebrating movement, providing a variety of framed views of the outdoors, of the White Rock Lake, and of downtown Dallas.

This intention to design a center that opposes and challenges the conventional thinking of a rehabilitation center will drive all design decisions in the project. To be specific, I have defined the current vibe and layout of a rehab center:

“Elevators and indoor corridors flanked by countless doors leading to rooms or examination rooms a waiting lounge at the end of the hall or next to the elevator. The same pattern repeated on as many floors as permitted by zoning regulations - an economic solution because it is repetitive to the extreme, and requires no modification of staff behavior.”
The main focus on this new design proposal will be rethinking the circulation route from one programmatic zone to another. The high quality of the treatment within the spaces will be complemented with a stimulating circulation route. The new architectural proposal for the new rehabilitation center will follow the definition below:

“A celebrated, accessible ramp is externalized, thus eliminating the need for internal, artificially lit corridors. The ramp wraps a single, simple, stoic volume that holds the necessary program and provides direct access to the corresponding stages of rehabilitation. The ramp transitions from an indoor space to an outdoor one depending of the location. The ramp is simple enough for the visually impaired to form a mental picture of the circulation, but allows others a stimulating movement from one space to another. The ramp, most importantly unites every person’s movement irrespective of whether they are wheelchair bound or not.”
These are diagrams created at the early stages of the design process. The building will not be a bold intervention on the site that stands out from the contextual architecture. Instead, it will be a modest intervention that emphasizes the importance of the views and daylighting in the building. The first diagram represents the two basic materials that will be used, namely, brick and concrete.

Stage 1:
Communal Housing
Internalized
Central Courtyard
Framed Views
Occupies brick wall

Stage 2:
Individual housing, art
Starts to break away from the brick wall
Private courtyard

Stage 3:
Gym, swimming pool
Brick wall dematerializes
Brick and concrete facades are one

Stage 4:
Music, theater
Concrete volume becomes more dominant
Brick wall recedes

Stage 5:
Classrooms
Breaks away from brick wall
More glass
Access to outdoors, verandah
These diagrams are also one of the initial design/programming attempts. They convey a logical sequence of events that lead to the current form of the center.

**Subtractive**

#1: *Carve entry volume*
Reveal volumes embedded within

#2 *Designate courtyards*
Introversion to extroversion

#3 *Layering outer wall*
Interaction of activity volumes with bounding box

**Additive**

#4 *Slits*
Framing views and delineating program

#5 *Fully accessible circulation path*
Ramp system
Vertically segregating stages of rehab

#6 *Programming*
Distributing alternative program with corresponding existing program
Chapter 6: Programmatic Considerations

Circulation

As stated in the definition, the building will challenge the conventional layout of a rehab center and invert the circulation path, making it the celebrated feature of the building. A precedent that I looked at is the Center for Scottish War Blinded by Page Park Architects, in Kirknewton, Scotland. The building operates as a day care centre and offers a comfortable and sociable environment whilst also providing rehabilitation and life skills assistance for ex-servicemen and women suffering from visual impairments. Facilities include a workshop, art space, training areas, a gym, therapy spaces and administration as well as a remembrance room. A terrace and landscaped sensory garden to the south of the building is also provided for recreational use in addition to education. The shifting demographic of users that the organization now supports has influenced this broad mixture of activities.35

The building harbors a strong focus on internal flow, with a mainly open plan arrangement fed by one, generous circulation spine. The accommodation is organized so that the circulation and larger spaces are placed near the external walls, while smaller, ancillary spaces requiring enclosure, privacy and acoustic insulation are placed in ‘pod’ elements nearer the center of the plan. The organization of the building aims to be as simple as possible so that the users can easily form a mental picture of the building, thus allowing straightforward navigation. In addition, bold gestures (both architecturally and through the use of color) are made at doorways and changes of direction to further assist building users’ way finding.

The building and surrounding garden are all on one level so as to allow full access to wheelchair users. In addition to this, there are ultra low-profile thresholds throughout the building so as to avoid any potential trip hazards. Inside the building, the primary circulation route is a generous width and has a continuous handrail down one side to provide support where required in addition to acting as a guide to the visually impaired.

Music and Theater

Music therapy is a powerful and effective part of rehabilitation that is unfortunately glanced over in most rehab programs. This form of expressive therapy consists of a process in which a music therapist uses music and all of its facets—physical, emotional, mental, social, aesthetic, and spiritual—to help patients improve their health. Music therapists primarily help clients improve their health in several domains, such as cognitive functioning, motor skills, emotional development, social skills, and quality of life, by using music experiences such as free improvisation, singing, and listening to, discussing, and moving to music to achieve treatment goals.

A study was conducted on the effects of music therapy on patients with persistent Post-traumatic Stress Disorder symptoms. Contrary to popular belief, loud instruments such as drums were actually preferred by the patients as a means to let out anger and frustration. During the first session, the patients were encouraged to experiment with all instruments and find the ones that they were most comfortable with and those that were difficult to tolerate. The next sessions used drumming to facilitate group cohesion and self-expression thus encouraging patients to lead the group. Fast, loud music on drums enabled expression of anger while slow, steady music involving the piano, flute, and low-resonant instruments encouraged relaxation.  

The space that contains the music and theater program needs greater emphases on finishes and sound quality rather than views to the surroundings and day lighting, considerations that will affect the location of the program in the building.

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Materiality

The proposal for a new rehabilitation center will be a modest form that uses similar materials to those on the buildings in the vicinity, namely concrete and brick. As a precedent, I have looked at the Health center by Abalo Alonso Arquitectos in Oleiros, Spain. This single story health center was built with minimal disturbance to the chestnuts, oaks, and eucalyptus trees around the site. The building holds staff facilities, rehabilitation rooms, a pediatrics division and general consultant offices organized around courtyard and hallways. This project serves as a form and material precedent for my project. I admire the massive, solid feel of the building that emphasizes its introverted, private scheme. The rawness of its exterior facade allows it to blend in with the greenery surrounding the site. Glimpses of this greenery are captured through framed views from the interior. The solid nature of the board-formed concrete is complemented by sleek fins on the ceilings, and a generous use of glass in the interior courtyard.

I also admire the complementary contrast of colors used in the building. The raw concrete on the exterior surfaces transitions into clean, soft colored surfaces in the interior. A language of repeated fins is used throughout the building to bind elements together. One first notices these fins at the main entrance. The striations on the board-formed concrete complement these vertical fins. The cleanliness of the plan is dictated by regulating lines. The subtle interplay of materials: concrete, wood, metal, and glass are also designed around these regulating lines.

As can be seen in the plan and diagram the health center has a straightforward, simple layout, corresponding to its overall form. An inner courtyard separates a housing wing on the left from the offices and therapy rooms on the right. Although the rooms do not allow exterior views because of privacy, there are generous views into the interior courtyard and the adjacent forest. The smaller courtyards allow an abundant amount of sunlight to enter the building. The simplicity of the layout allows for an ease of circulation, which is vital in a veteran’s home.

Duality of views

The proposed rehabilitation center will exhibit a duality in the East-facing entry façade and the West-facing private façade. The former façade will convey a more private, firm message, while the later will be lighter and will provide wide views of the waterfront. In this way, there will not any direct views into the rehabilitation center, thus preserving the privacy of the patients.

A useful precedent to study is the 4x4 House in Hyogo, Japan by Tadao Ando. Each floor of the house is used for a different activity: storage in the basement, access and service on the ground floor, bedroom on the first floor, study on the second, kitchen and dining room on the top floor. The spaces are almost completely enclosed on three sides, while they are open along the fourth facing towards the sea as can be seen in the photographs alongside.  

The simplicity of the form makes the deliberate intention of opening up the façade to the sea a very powerful move. I hope to emulate this design decision in my project. By keeping the program block as simple and clean as possible, the gesture of the circulation paths will be emphasized and will be a strong, powerful element.

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Conclusion

Through all the research I have conducted, I have decided to tackle the following issues in my design process: the troubling low success rates of current rehabilitation centers, the uninspiring ambience and architecture that these medical facilities are renowned for, the lack of adequate rehab facilities for the veterans in Dallas, Texas, and finally bridging the gap between the advances in the medical field and the emerging evidence-based design methodologies.

Through my research, I have surmised that having advanced, state-of-the-art teaching methods and medical equipment within the rooms will not have the impact it could, on the patients, if they circulate from one space to another in depressing, clinical hallways, lined with doors, and lit with harsh fluorescent lights. I thus propose to rethink the circulation path, celebrate it, and invert it. All the programmatic spaces will be held in a single, simple volume, while the main focus will be on the circulation path that wraps around the building. The ADA accessible ramp will also unite all the patients and staff in their movement instead of isolating the wheel-chair bound from the abled.

The building will be open and breathable so that the patients so not feel confined and trapped. I hope to change their outlook on rehabilitation by promoting movement in the open air and views of the calming, serene White Rock Lake. I hope to create a stimulating environment and challenge the conventional circulation layout in rehabilitation centers so as to create a center that is more conducive to recovery.
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