PLANTING DESIGN AND ITS IMPACT ON EFFICACY IN THERAPEUTIC
GARDEN DESIGN FOR DEMENTIA PATIENTS IN LONG-TERM
CARE FACILITIES IN NORTH TEXAS

by

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ABSTRACT

PLANTING DESIGN AND ITS IMPACT ON EFFICACY IN THERAPEUTIC GARDEN DESIGN FOR DEMENTIA PATIENTS IN LONG-TERM CARE FACILITIES IN NORTH TEXAS

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This research addresses planting design and its therapeutic benefits for bringing life-enhancing therapy to people dealing with dementia. The senses heightened by plants have proven to be powerful stimulators of early, emotional childhood memories due to the structure and evolution of the human brain (Minter, 2005). Plant materials used in therapeutic gardens are carefully chosen to stimulate the senses of dementia patients (Cooper Marcus and Barnes, 1999; Minter, 2005; Chalfont, 2008) and to enhance safety and security, orientation, stimulation, and autonomy.

Many long-term care facilities for dementia patients have been built in the United States to provide settings for optimal care (Desai and Grossberg, 2010). A number of studies demonstrate the healing benefits of plants and the natural environment as well as the benefits of outdoor spaces for dementia patients (Carstens, 1998). However, researchers suggest that there is a need for more empirical studies on the therapeutic or healing benefits of gardens in healthcare facilities (Cooper Marcus and Barnes, 1995, cited in Ghose, 1999).
This study adapts the theoretical, anecdotal and clinical research of the therapeutic effects of plants and nature into the realm of landscape architecture. A set of preliminary planting design recommendations used for therapeutic gardens is proposed from the review of relevant theories and research. The study primarily follows qualitative research methods (Taylor and Bogdan, 1998) and evaluation (Rossi et al., 2004), to assess the patterns of use in existing gardens and the possible therapeutic benefits experienced by their users. Interviews are conducted with staff and residents’ family members in long-term care settings. Passive observations of the residents are utilized as supporting data. The preliminary planting design guidelines are tested against the existing qualities of the therapeutic gardens relative to the preference of the users.

Landscape architects designing gardens for dementia residents in long-term care facilities can include plants which are non-toxic, harmless, colorful, and aromatic, have seasonal interest and fine texture, produce therapeutic sound, attract wildlife, and provide appropriate sun or shade. Also, horticulture therapy as a practice needs to be used for residents’ physical, psychological and social benefits. Chosen either to suit a particular group of residents, or as an expression of a regional plant and materials palette, these gardens can be used by horticultural therapists and nursing staff to provide many beneficial outcomes to dementia residents.
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CHAPTER 1
INTRODUCTION

Old age, as young as happy now! Youth, like lark, with its morning song; old age, like the nightingale, should have his nocturne.
— Kant (Germany)

1.1 Introduction

This research addresses the study of dementia, particularly of Alzheimer’s disease, treated in long-term care facilities in the United States, and explores how landscape architects might harness the power of plants to improve the lives of dementia patients. It seeks to link reminiscence therapy (Kennard, 2006a) and horticultural therapy (Haller, 2006; American Horticultural Therapy Association) research to landscape architecture. The contribution that plants can make to therapeutic efforts is examined, along with the extent to which outdoor spaces can be designed as ideal therapeutic environments to affect medical outcomes. To expand the subject beyond just plants, the relationships between senses and experiences as well as people and natural elements are briefly explored in the broader landscape architecture knowledge base.

1.2 Statement of the Problem

1.2.1 Alzheimer’s Disease

Alzheimer’s disease (AD) has risen from a little recognized phenomenon in the early 1970s to being recognized as the fourth leading cause of death in the elderly in the United States. The number of Americans diagnosed with AD has more than doubled since 1980 (Herbert et al., 2003, cited in Pearce, 2007). Recent estimates indicate that more than five million Americans have AD and related dementias. According to the Alzheimer’s Association, if
a cure or significant means of prevention is not found soon, an estimated 12 to 14 million Americans will be affected by the year 2040 (2009).

The disease was first identified in 1907 when Alois Alzheimer, a German neuropathologist studying the brains of nonelderly adults who had had severe memory loss before their deaths, found a common set of conditions: neurofibrillary brain “plaques” and “tangles”. These plaques and tangles are not random but rather affect similar parts of the brain at different times in the disease’s progress (Zeisel, 2004, p.1). By the terminal stage of the disease, up to 40 percent of the brain’s weight, and as much of its cellular structure, can be affected. Research into AD’s symptoms, causes, risk factors, and treatment has gained momentum only in the last 30 years (Reisberg, et al. 1987, cited in Zeisel and Tyson, 1999; Zeisel, 2004; Alzheimer’s Association, 2012). Figure 1.1a illustrates how plaques interfere with communication between brain cells in a person with Alzheimer’s disease. Figure 1.1b shows the normal brain versus the brain with Alzheimer’s.

1.2.2 Long-Term Care Facilities

Approximately 30 percent of all individuals with dementia are cared for in a long-term care facility; the other 70 percent live in their homes (Caselli et al., 2006, cited in Desai and
A high proportion (80 to 90 percent) of people with dementia eventually require admission to a long-term care facility. Approximately 66 to 80 percent of long-term care facility residents have dementia (Tariot et al., 1993; Magaziner et al., 2000; Roseblatt et al., 2004; cited in Desai and Grossberg, 2010, p.50) and some assisted living facilities and nursing homes are designed for, and care exclusively for, people with dementia.

Special care units (SCUs), as unique long-term care facilities, have been built to provide better quality care than the traditional nursing home setting for dementia patients. They are designed according to “the needs of those living there and staffed with competent and motivated employees” (Cohen and Day, 1993; Kelly, 1993, cited in Wijk, 2007, p.107). First described in the 1960s, SCUs are among the most popular innovations in nursing homes (Maas et al., 1994, Volicer, 2000, cited in Gruneir et al., 2008). By 2000, approximately 20% of nursing homes in the United States reported a SCU, nearly three times more than the number that reported rehabilitation units, the second most popular form of specialized care (Agency for Healthcare Research and Quality, 2000, cited in Gruneir et al., 2008, p.838).

Since the physical environment has been identified as a major component in the successful care of dementia patients, the number of special care units has increased significantly since 1990s. “SCUs should promote physiological support, safety, belonging, self-esteem and self-expression by focusing on the physical environment, together with therapeutic programs and the involvement of staff and relatives” (Berg, et al., 1991, cited in Wijk, 2007, p.107).

According to Pearce (2007), there are many advantages to this type of setting:

1. the homelike environment encourages relationship building;
2. meals are social occasions, and relaxing on the covered porches offers a familiar and peaceful time for socialization;
3. the staff-to-resident ratio is doubled that of special care units in traditional assisted living, which results in employee longevity;
4. long-term employees become familiar with the needs and preferences of each resident, ensuring the best care possible; and
5. smaller populations enable the staff to customize the care plan and the activity program to each individual (p.283).

With millions more expected to develop Alzheimer's disease by the middle of the 21st century, the demand for long-term care has explored (Lopez, 2010). Alzheimer's SCUs exist to better meet dementia residents' needs and to protect residents without dementia in nursing homes and residential care facilities. Special care unit growth has become a challenge for Alzheimer's advocates concerned about the quality of long-term care. Nearly 60 percent of nursing home residents have Alzheimer's or another dementia. In recent years the number of nursing homes that have developed SCUs has proliferated. Special care dementia units now represent one of the fastest growing parts of the nursing home business (Alzheimer's Association, 2012). This movement began in the 1970s and gained momentum in the 1980s.

There are several remarkable long-term care (LTC) facilities in the United States, "led by people with vision and determination and staffed by compassionate, creative and competent individuals" (Desai and Grossberg, 2010, p.402). Even though the LTC facilities have many rules, the residents and staff members form strong bonds and friendships. The warmth of a caring relationship is even more important to residents of long-term care facilities, as well as their families and the professionals that serve them, than good food, good medical care, or clean facilities (Desai and Grossberg, 2010). According to Lawton (2011), there are four general user-related aims of environmental interventions:

1. decreasing disturbing behavior;
2. increasing social behavior;
3. increasing activity; and
As the number of seniors with dementia increase in the years ahead, this form of specialized care will be in higher demand.

1.2.3 Therapeutic Environments for Dementia Patients

For a long time, LTC facilities have mainly focused on technology and administrative efficiency. But gradually the public is becoming more interested and informed in their choice of healthcare which has led to the re-evaluation of their facilities both in terms of the services offered and the provision of an overall caring environment, including the gardens in outdoor spaces. Well-designed gardens can be wonderfully relaxing retreats that can help relieve physical and emotional stress by incorporating fresh air, sunshine and a green environment (Zeisel and Tyson, 1999).

While environment generally affects our state of mind and well-being, this is especially true for the elderly because of changes in our bodies and minds as we age. Decreases in visual and hearing ability that affect balance and orientation, make older people particularly sensitive to the physical environment. “To expect the aged to function somewhat ‘normally’ under the burden of the levels of sensory involvement, we are accustomed to may be a little like expecting a computer to function on the power of a flashlight battery” (De Long 1970, p.80, cited in Zeisel and Tyson, 1999, p.439).

Historical literature and recent research in environmental psychology, reminiscence therapy, and horticultural therapy indicate that the healing benefits of plants have been widely used throughout different cultures and social classes for a long time. According to the historian Warner, the therapeutic benefits of plants have been noted since the Middle Ages (Ghose, 1999). In recent years, research has emerged focusing on nature as a healer. There is a critical need for more documented research on plants and gardens, for their therapeutic benefits and for the development of design recommendations in long-term care facilities for dementia patients (Cooper Marcus and Barnes, 1999). “The concept behind the gardens is really so simple and it can make such a big difference” (Moore, 2011, p.1).

Gardens in Alzheimer’s facilities need to be carefully designed and constructed with a focus on the special needs of people with this progressive disease. It is also important to consider the needs of the staff and families in addition to the needs of the patients. A pleasant
environment alleviates some of the stress on the families and has been shown to increase visits. By increasing staff comfort levels, it is possible to reduce turnover and increase morale and productivity.

### 1.3 Importance of the Study

An important area of mental health that therapeutic landscapes can improve is the care and treatment of patients suffering from Alzheimer's disease and other forms of dementia. Gardens are being designed that provide a safe, orientative and stimulating environment both for patients and for caregivers.

Due to the demands of special care units and the unique opportunities for environmental design intervention that such units allow, this study focus on planting design criteria and its impact of outdoor space on residents in long-term care facilities. This is not to say that the results apply exclusively to this particular type of care setting. The design recommendations developed and the documented benefits provided by plants are adaptable to various settings and multiple applications.

### 1.4 Goals and Objectives

The primary goal of this research is to investigate the benefits of plants in therapeutic gardens by probing the experiences of principle users which include dementia patients and their families, visitors, and staff in long-term care facilities. Combining their responses and insights generates a body of practical information leading to an expansion of the opportunities and choices available to patients living in long-term care group environments.

The purpose is to develop planting design recommendations for outdoor spaces in North Texas for these users. The supporting objectives to meet this goal, arranged in a logically correlated manner, are:

1. To evaluate commonalities between the various theories on the impact of plants and the practice of reminiscence therapy and horticultural therapy as they apply to long-term care facilities.
2. To summarize a set of preliminary planting design recommendations based on existing research in the field of design for long-term care facilities for dementia patients.

3. To evaluate existing facilities’ outdoor spaces against developed design recommendations and perform key informant interviews regarding the existing spaces.

4. To provide enhanced design recommendations through data analysis, for the development of outdoor spaces in long-term care facilities for dementia residents.

1.5 Research Questions

The research questions facilitate the collection of information from the literature review and from a group of principle users of therapeutic gardens in three facilities. The research addresses the following questions:

1. What are the benefits of therapeutic gardens for dementia patients?

2. How does planting design contribute to these benefits?

3. What are the characteristics of planting design that can most usefully be applied to therapeutic gardens for dementia patients?

1.6 Definitions of Terms

These definitions are included for terms which may be unfamiliar.

Alzheimer’s disease (AD): is a type of dementia that causes problems with memory, thinking and behavior. Symptoms usually develop slowly and get worse over time, becoming severe enough to interfere with daily tasks (Alzheimer's Association). It was first described by German psychiatrist and neuropathologist Alois Alzheimer in 1906 and was named after him (Zeisel and Tyson, 1999).

Alzheimer’s Disease and Related Disorders Association (ADRDA): is the leading voluntary health and non-governmental organization in Alzheimer’s care, support, research
education, public awareness, and patient advocacy for Alzheimer's and related disease patients. It is also known as: Alzheimer's Association (Alzheimer’s Association, 2009).

American Horticultural Therapy Association (AHTA): is an organization committed to promoting and developing the practice of horticultural therapy and the profession of horticultural therapist. AHTA advocates on behalf of the professional interests of horticultural therapy practitioners and strives to increase beneficial outcomes for clients, host facilities, researchers, and educators (American Horticultural Therapy Association, 2012).

Aromatherapy: is curative treatment based on the use of essential oils derived from plants to benefit physical, spiritual, and psychological well-being (Minter, 2005; Pearce, 2007).

Dementia: is “an umbrella term describing a variety of diseases and conditions that develop when nerve cells in the brain die or no longer function normally” (Alzheimer’s Association, 2012). Alzheimer's disease is the most common cause of dementia, but dementia can also be caused by strokes, Parkinson's disease, head injury, or a host of other conditions (Desai and Grossberg, 2010).

Horticultural therapy (HT): is defined by the American Horticultural Therapy Association (AHTA) as “the engagement of a person in gardening activities, facilitated by a trained therapist to achieve specific therapeutic treatment goals”. The focus is to maximize social, cognitive, physical and/or psychological functioning and/or to enhance general health and wellness (Haller, 2006, p.5).

Focus group: defines a well-established market or social research tool for interviewing groups (Zeisel, 2006).

Phenomenology: is the study of structures of consciousness in which an occurrence, a circumstance, or a fact that is perceptible by the senses is experienced from the first-person point of view (Giorgi, 1975, p.83, cited in Kvale, 1996).
Planting Design: is the art of composing plants to create a design by using the knowledge of landscape architecture and horticulture. It is fundamental to landscape design. There are three drivers of planting design—use, ecology and aesthetics (Robinson, 2004).

Reminiscence therapy (RT): is defined by the American Psychological Association (APA) as, “the use of life histories - written, oral, or both - to improve psychological well-being” (2006), which involves past activities, events and experiences with another person or group of people, usually with the aid of tangible prompts such as photographs, familiar tunes from the radio and other familiar items from the past (Kennard, 2006a).

Special care units (SCUs): are unique long term care facilities, which have been built in the form of a hallway or other closed off portion from the intermediate or skilled resident nursing home, to provide better quality care than the traditional nursing home setting for dementias patients (Kelly, 1993, cited in Wijk, 2007).

Therapeutic garden: is an outdoor garden environment offering individuals the opportunity to connect to the natural world, with or without facilitation, which has been specifically designed to meet the physical, psychological, social, and spiritual needs of the people using the garden as well as their caregivers, family members, and friends (American Horticultural Therapy Association; Haller, 2006).

1.7 Research Methods

In order to evaluate the data of possible plant benefits in therapeutic gardens for dementia patients, qualitative research (Taylor and Bogdan, 1998) and evaluation (Rossi et al., 2004) is proposed for this study. The process for the study includes:

1. Review and summarize the literature to determine the principles and preliminary design recommendations for planting design in therapeutic gardens.

2. Select two study facilities based on their North Texas location, the presence of an outdoor space, and their design qualities.
3. Evaluated the exiting outdoor garden design qualities and patterns of use according to the preliminary design recommendations.

4. Interview the users, such as nursing staff and patients’ families, using open ended questions through face-to-face or telephone interaction. According to Taylor and Bogdan, the data can be descriptive and based on the perceptions of the interview subjects as stated in their own words (1998).

5. Use passive observations techniques to record dementia residents’ behavior in garden settings, taking into account communication disorders with strangers.

6. Analyze evaluation score, along with the interview and passive observation results, to further explore the therapeutic benefits of plants and develop a list of enhanced design recommendations for dementia residents in long-term care facilities.

**Figure 1.2 Research Methods Process**

1.8 Delimitations of the Study

Delimitation of the study includes its location. Because of the relatively short time span, August 2012 through November 2012, the research is only conducted in the Dallas-Fort Worth
metropolitan area. Other regions have different patterns of therapeutic gardens in long-term care facilities based on weather, terrain, or plant materials.

This research focuses exclusively on the experience and opinions of the users in long-term care facilities, such as the staff and residents' family members. Designers are not interview subjects, because the research is to determine whether the design of the established therapeutic garden meets the needs and requirements of dementia residents.

1.9 Summary

Therapeutic gardens are outdoor spaces that aid in improving or restoring an individual's well-being. A successful landscape design has the ability to do much more than simply create an aesthetically pleasing environment. Today, therapeutic landscape design is a growing aspect of landscape architecture promoting emotional, social, and physiological health (Cooper Marcus and Barnes, 1999; Haller, 2006; Chalfont, 2008).

In 2012, there are nearly 5.4 million Americans of all ages who have Alzheimer’s disease. This figure includes 5.2 million people who are 65 and older and 200,000 individuals under age 65 who have younger-onset Alzheimer’s (Alzheimer’s Association, 2012). Worldwide, nearly 36 million people are believed to be living with Alzheimer's disease or dementia. That number is projected to increase to 65.7 million by 2030 and 115.4 million by 2050 (Alzheimer’s Health Assistance Foundation, 2012).

In the past few years, LTC facilities have incorporated design changes indoors to enable the Alzheimer’s residents to function independently and pleasantly. However, “little or nothing has been designed and implemented to enable the cognitively impaired individual to access and enjoy the out-of-doors” (Carman, 2002, p.111). Several researchers confirm the need for more empirical studies on the healing benefits of plants and the natural environment as well as the benefits of outdoor spaces for dementia patients (Carstens, 1998; Ghose, 1999; Cooper Marcus and Barnes, 1999; Zeisel and Tyson, 1999).
Therapeutic activities can also “change negative emotions and behavior quickly and promote feelings of purpose, accomplishment, and self-worth” (Brawley, 2006, p.33). According to Fabrigoule et al. (1995), it is possible that regular participation in gardening may offer some protection against the development of dementia. A prospective study of over 2,000 older people living in the Gironde area of France indicates that those who gardened were significantly less likely to develop dementia than those who did not.

Since plants are critical to the success of landscape, this study on the effects of planting design is significant to landscape architecture, specifically for the elderly and, in particular, dementia residents. Landscape architects designing gardens for dementia patients in long-term care settings can refer to the planting design criteria to express a regional plant and materials palette in addition to determining the arrangement or organization of the plants. In this way, it can be used by the caregivers to provide better lives for residents and themselves in long-term care facilities.
CHAPTER 2

LITERATURE REVIEW

The complete life, the perfect pattern, includes old age as well as youth and maturity. The beauty of the morning and the radiance of noon are good, but it would be a very silly person who drew the curtains and turned on the light in order to shut out the tranquility of the evening. Old age has its pleasures, which, though different, are not less than the pleasures of youth.

— W. Somerset Maugham, The Summing Up (Britain)

2.1 Introduction

A wide range of literature is reviewed to form a foundation for the present study. The importance of gardens and brief overviews of historical precedents for using plants in gardens are explored. Therapeutic benefits of plants that can awake the senses are stated. Horticulture therapy blooming as a profession and a practice is also addressed.

Design practices and recommendations for Alzheimer’s residents in long-term care facilities are introduced. A set of preliminary planting design recommendations is addressed, so that landscape designers for dementia patients can effectively incorporate these therapeutic principles into aromatherapy, horticultural therapy, and other garden programs. The model of “paradise garden” (Beckwith and Gilster, 1997) and the Alzheimer’s Memory Garden in Oregon, developed by landscape architects and horticultural therapists for Alzheimer’s facilities are explored.

The goal is to integrate the physical, psychological and social use of plants in outdoor spaces in order to give the reader a thorough understanding of the issues involved in designing gardens for therapeutic use for dementia residents.
2.2 Alzheimer’s Disease

2.2.1 Overview of Alzheimer’s Disease

Old age is not a disease. While occasional forgetfulness and confusion are normal occurrences, dementia is a medical condition (Zeisel and Tyson, 1999). Dementia or the loss of intellectual function, results from disease, and Alzheimer’s disease is the most common cause (U.S. Department of Health and Human Services, 1997; Zeisel and Tyson, 1999; Pearce, 2007; Grossberg and Desai, 2003b, cited in Desai and Grossberg, 2010). Alzheimer’s disease is a progressive, degenerative disease which produces dementia, or significant loss of intellectual abilities. It is estimated that about 10 percent of people over the age of 65 and up to nearly half of individuals over 85 have the disease. More women than men have AD and other dementias. Almost two-thirds of Americans with AD are women (Baum, 2005, cited in Desai and Grossberg, 2010, p.52; Pearce, 2007, p.278; Alzheimer’s Association, 2012). Alzheimer’s disease is the sixth-leading cause of death in the United States and the fifth-leading cause of death for those who are 65 and older (Alzheimer’s Association, 2012).

![Figure 2.1 Proportion of People Age 65 and Older with Alzheimer’s Disease and Other Dementias by Race (Source: Alzheimer’s Association, 2012)](image)
Because the prevalence of Alzheimer's disease doubles every five years beyond age 65, the rapid growth of the very old is expected to place a significantly greater number of people at risk for the disease (U.S. Department of Health and Human Services, 1997). From the first signs of impairment, the duration of the disease can last anywhere from three to 20 years with an average progression of over 12 years (Alzheimer's Association, 1997, p.1, cited in Zeisel and Tyson, 1999, p.437).

Dementia results in a range of cognitive, social, and behavioral difficulties that gradually impair verbal communication and threaten relationships. Depressed mood and loss of social skills frequently accompany cognitive losses that compromise the ability to learn or recall new or recent information, carry out normal activities of daily living, or engage in satisfying social activities (Burns, Deing and Lawlor, 2002; Cherminski et al., 2001; Lyketsos, Steele and Barker, 1997, cited in Gibson et al., 2007, p.126).

Many people with dementia experience considerable stress, anxiety, depression, and social isolation. Presently, there is no cure for Alzheimer's disease. However, well-designed environments, good planning, and medical and social management can be used to reduce symptoms and ease the burdens on family members and caregivers (Zeisel et al., 1999).

2.2.2 Stages of Alzheimer's Disease

Alzheimer's disease can be diagnosed with an accuracy of over 90 percent using "physical and neurological exams, mental status exams, brain imaging, laboratory tests, and a
detailed history of the progress of the disease” (Bajaj, 2003, p.10). The length of survival depends on one's age at the onset of symptoms (the younger the age, the longer the survival) and co-morbid conditions. For residents older than 85, survival after the onset of dementia may be much shorter; three years on average (Wolfson et al., 2001, cited in Desai and Grossberg, 2010, p.54). The various stages of their disease can be loosely organized into three categories named early, middle and late (Silverstein et al., 2002; Bajaj, 2003; Timlin and Rysenbry, 2010).

Early stage: Lasting from one to three years, people in the early stage of Alzheimer’s require less supervision and lead a normal lifestyle with minimal changes in their abilities and behavior. While the brain cells have begun to degenerate, memory loss is temporary and momentary. Onset of dementia can be difficult to pinpoint, because some aspects can also be attributed to other factors such as stress, bereavement or the natural process of aging. Complex tasks that require understanding, planning or calculations may take a little longer than usual and may start affecting productivity at work. People in the early stage are aware of their illness and have the cognitive ability to seek help.

Middle stage: Lasting from two to eight years, people in the middle stages require help with daily living activities such as bathing, dressing, using the restroom, ambulation, medication supervision, and/or eating. Memory lapses and confusion become more obvious, and patients can no longer hide it from those around them. Short-term memory becomes impaired and they often ask repetitive questions. Also, they become more forgetful and develop difficulties in finding words or remembering names. They may become more socially withdrawn or less comfortable in group situations and may lack an awareness of their environment. Psychiatric health declines with a rise in anxiety, paranoia and hallucinations.

Late stage: This stage of the disease lasts for about one to three years and requires complete care. The brain cells degenerate completely causing the patients to have poor recent and remote memory. There is a gradual and increased loss of communication. Some people can have less control of their emotions and become aggressive, particularly if they feel
threatened. Final areas of decline include the major organ systems, which are controlled by the autonomic nervous system, thereby leaving the person completely dependent on caregivers. Although a person may no longer be able to communicate verbally, it is still possible to share significant experiences and to communicate using other methods. “Holding someone’s hand, a smile, the scent of a freshly baked scone, the sound of a loving voice or the feel of an animal’s fur can all communicate where words fail” (Timlin and Rysenbry, 2010, p.16).

Figure 2.3 Stages of Alzheimer’s Disease (Source: Timlin and Rysenbry, 2010, p.17)
2.3 The Importance of Therapeutic Gardens

_Gardens are wondrous, inspired, and inspiringly beautiful, fragrant places where friendships grow_ (Brawley, 2006, p.274).

2.3.1 The Role of Nature

Nature is the phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations. According to Lewis (1996), the realm of nature is “from its home in the unpeopled wildness to its precarious position as guest in an urban environment, totally depend on human nurturing” (p.3).

According to Gerlach-Spriggs et al. (1998), the therapeutic garden is one among the many varieties of gardens that appeared over 10,000 years ago. The natural elements of gardens, such as sun and moonlight, plants, and water of gardens, have always “afforded human beings psychological orientation and sensations important to maintaining the sense of self” (Gerlach-Spriggs et al., 1998, p.7). There have been great strides within the last decade in bringing natural elements into hospital lobbies, particularly those incorporating an atrium or courtyard. However, the trend rarely extends to accommodate the elderly living in long-term care facilities (Marberry and Zagon, 1995). There is considerable research to support the benefits of nature in an individual’s physical, mental, and social fitness (see such as Carstens, 1993, 1998; Gerlach-Spriggs, et al., 1998; Copper Marcus and Barnes, 1999; Lawton, 2001; Catlin, 2006; Chalfont, 2008).

Ulrich’s “window studies” and Verderber’s interviews with hospitalized patients, collectively show that the mere presence of windows with a good view help connect patients with the outside world and may reduce their delusions and depression therefore easing their prolonged stay (Gerlach-Spriggs et al., 1998, p.35). Watson and Burlingame (1960) state, even little touches of nature, such as flowers in a patient’s room, may enhance recovery (cited in
Gerlach-Spriggs et al., 1998). Clearly, contact with nature plays a critical role in a patient's psychological well-being promoting a faster and easier recovery (Gerlach-Spriggs et al., 1998).

Marberry and Zagon state that, human beings find comfort and solace in nature which may result from the symbolism inherent in nature itself.

Water, for example, is associated with baptism and rebirth or purification; flowers express the fragility of life; autumn leaves symbolize the onset of winter or advancing age; stones and rocks express strength, performance, the ability to withstand stress and the forces of nature which over centuries have worn away and shaped cliffs and rocks; a rainbow may symbolize hope (Marberry and Zagon, 1995, p.89).

2.3.2 Therapeutic Gardens as Healers of Communities

Since the 1990s, studies have been conducted on whether the outdoor environment can actually help heal people. Researchers found that proper outdoor design can heal sick people. In addition, healing environments promote social connections and provide stimulation; both are important stress reducers especially for the elderly (Adler, 2002). In recent years, there has been considerable improvement in the design of buildings to reflect the particular needs and constraints of this elderly client group. Sadly, until now, these considerations have rarely gone beyond the building and the outdoor spaces have received relatively little attention. Many literature indicated the benefits of environment as treatment for dementia residents, but more focused on the indoor living environment, such as bedrooms and activity room.

Actually, one successful environmental element in treating Alzheimer’s disease is a garden. People with Alzheimer’s face problems of way-finding, as well as object and place identification, whether inside or outside. Therefore, the design of gardens for this group takes special effort and design knowledge. In their “Garden-use Model”, Grant and Wineman (2007) identify five main categories of elements to enable effective use of outdoor areas: Organizational policy, staff attitudes, visual access, physical access, and garden design (cited in Chalfont, 2008, p.87).

Healing environments promote social connections, the fabric of a community. The components that make up “sense of community” include “fulfillment, group membership,
influence, and shared emotional connection” (Peterson, Speer, and McMillan, 2008, cited in Hannon et al., 2012, p.387). These components can be evaluated by objective and subjective ties to the environment. Hannon et al. (2012) reported that both individual and community-level attributes will influence health-enhancing behavior. In well-designed long-term care facilities, residents share elements of the built environment. Aesthetically pleasing landscape, scenic beauty, evenly paved sidewalks, clean benches and varieties of plants are all positive features that people encounter in the course of outdoor activity. When elements within the built environment are well-designed, well-maintained, and functional, the therapeutic garden plays a significant role in developing a positive “sense of community” (Ross and Moriwsky, 2001, cited in Hannon et al., 2012, p.387). Accordingly, residents who have a positive sense of community may feel more comfortable being outdoors to engage in activities, and furthermore, they may also have a positive outlook on life itself (Hannon et al., 2012).


A well designed outdoor environment can contribute to quality of life by increasing opportunities for activities and interests, extending social horizons, and breaking feelings of isolation from the outside world. Sitting out or walking in the open provides contact with plants and an opportunity to collect materials for hobbies such flower-arranging or cooking. The garden can also be important in providing an additional private area to the house. It defines personal territory, provides interest and things to look forward to through the year and can be a valued source of escape from the organized indoor world (Stoneham and Thoday, 1996, p.18).

Until now, most research and clinical experience indicate that appropriate and therapeutic outdoor spaces for people with dementia need to be both accessible and supportive (Zeisel et al., 1994, cited in Zeisel and Tyson, 1999, p.442). According to Hannon et al. (2012), participation in activities, such as walking, depends on positive attributes within the outdoor environment (Handy et al., 2002, Saelens, Sallis, and Frank, 2003). Gardens need to be accessible, designed to support the patients’ physical needs as well as interaction with the natural environment and participation in social life. When residents actively participate in the
upkeep or activities in the garden, similar to the interaction they would have in their own homes, the concept of “ownership” gracefully moves from the facility and designer to the residents themselves and even extends to their families (Zeisel and Tyson, 1999, p.444).

The use of the outdoor environment also benefits caregivers (Cohen and Weisman, 1991, cited in Zeisel and Tyson, 1999). According to Tyson (1998), the support and involvement of the primary caregivers, such as the staff who works directly with residents, is essential for a successful program. A pleasant work environment can make staff members comfortable which encourages them to integrate new ideas and programs that best meet the needs of residents. Also, they need a space away from the main activity area to readjust their mental state when there are stressful situations in the work environment (Tyson, 1998). A therapeutic garden, providing a homelike living setting, can also meet the unique need and concerns of family members who spend time with their loved one in the facilities. When working with residents, the staff or family can use outdoor spaces to involve residents in activities such as walking and potting plants.

Gayton Terrace, in Richmond, Virginia, is a 100-unit retirement community (see Figure 2.4 and Figure 2.5). Built on 16 acres, the community caters to both independent and assisted living residents. The design goal for the memory garden is to create a safe and enjoyable space that improved the residents overall quality of life. The project’s main users – residents – present the need to provide a space that is functional, enjoyable, and safe for Alzheimer’s and other dementia residents to use on a daily basis.
Figure 2.4 Gayton Terrace Memory Garden Master Plan (Source: Cite-design Studio, 2010)
2.3.3 A Theory of Supportive Gardens

Marberry and Zagon (1995) state that “the setting in which care is given – the treatment environment – is one component of the dynamic process of balance”. Also, to maximize positive outcomes, a supportive environment needs to be combined with well-trained staff (pp.83-84). Healing environments cannot be achieved by a prescriptive set of design details alone. There must also be a desire to deliver healthcare services that is patient-centered (Marberry and Zagon, 1995).

According to Ulrich (1999), on the basis of theory and research in the behavioral sciences and health-related fields, it is justified to propose that gardens in healthcare situations are important stress mitigating resources for patients and staff to the extent that they foster (p.36):
1. a sense of control and access to privacy;
2. social support;
3. physical movement and exercise; and
4. access to nature and other positive distractions.

The sense of security provided by a garden further becomes effective as a requisite condition for these four stress-coping resources.

Figure 2.6 Conceptual Model: Effects of Gardens on Health Outcomes (Source: Ulrich, 1999, p.37)

Sense of Control, especially in a hospital setting, can affect a patient’s ability to cope with stress, including the stress of having an illness (Ulrich, 1999). Control refers to “persons’ real or perceived ability to determine what they do, to affect their situations, and to determine what others do to them” (Gatchel et al., 1989, cited in Ulrich, 1999, pp.37). According to Ulrich (1999), there are many aspects of hospitalization that erode a patient’s feelings of control including “lack of information, loss of privacy, loss of control over eating and sleeping times, lack of authority over what to wear, inability to adjust room lighting and temperature, and way-finding difficulties in complex, and unfamiliar buildings” (p.38).
If a garden in a healthcare facility is to foster restoration and coping by providing control, potential users must know the garden exists, be able to find their way to the setting without difficulty, and be able to use the garden in an active and/or passive manner. Control-related benefits should be increased by garden designs that facilitate on-site usage by patients, including accessibility and independence for persons in wheelchair (Ulrich, 1999, p.41).

Social support is another important salutary property of garden design for patients, visitors, and employees. Social support refers to “perceived emotional support for caring, and material or physical aid, that a person receives from others” (Brannon and Feist, 1997, cited in Ulrich, 1999, p.42). According to Wortman (1984) and Edgman-Levitan (1993), supportive social behaviors include “expressing to a sick person that he/she is cared about, loved, or esteemed; encouraging the patient to express beliefs and feelings openly; giving the patient a sense of belonging to a social network or support group; and providing tangible assistance” (cited in Ulrich, 1999, p.42).

At a general design level, social or emotional support benefits of gardens will be increased by design and planning that facilitate on-site access by patients, visitors, and staff, and provide settings conductive to social integration among small groups. Designers should be cautioned to avoid garden design approaches that strongly promote social interaction to the point of interfering with access to privacy (Ulrich, 1999, pp.45-46).

Physical movement and exercise is a positive factor with significant physical health benefits. In addition, movement is associated “with psychological or emotional benefits of exercise and related therapeutic effects on stress” (Ulrich, 1999, p.47).

Gardens can be designed and sited to serve as positive trip destinations that motivate increased patient walking and wheelchair movement. Indoor physical rehabilitation settings might be designed so that patients are exposed to large window views of gardens or other attractive outdoor nature areas (Ulrich, 1999, p.48).

Nature Distractions are environmental features or situations that promote an important emotional perceiver, such as environmental design elements that “may block or reduce worrisome thoughts, and fosters beneficial changes in physiological systems such as lowered blood pressure and stress hormones” in patients, visitors, and healthcare staff (Ulrich, 1992a, 1992b, cited in Ulrich, 1999, p.49). According to Ulrich (1999), the areas of positive distractions that have received the most attention include “comedy or laughter (Cousin, 1983); companion
animals (Friedman et al., 1980; Beck et al., 1986); art (Kaye and Blee, 1997); music (Moss, 1988; Caine, 1991); and nature” (p.49).

2.4 The Role of Plants

Lewis (1996) said that once people begin to identify plants on a conceptual level, deeper emotions may surface because plants exist as part of the familiar environment. Bringing plants into the conceptual level can be achieved because plants can be identified by characteristics such as size, shape, color, and weight.

The appropriate and imaginative selection of plants is critical to the success of any landscape, but it is especially important in creating an intimate and detailed style of garden or landscape for elderly people to enjoy, especially for dementia residents. Good planting design relies on the designer’s understanding of the different roles that plants play. The provision of domestic-style gardens and grounds capable of succeeding with little maintenance demands the imaginative combination of many types of plant materials. A successful design maximizes interest and provides the opportunity for a range of activities. In addition, the choice of plants should take into account the interests and hobbies of dementia patients. “In new developments multi-use plants may help to encourage fresh interests, and may also give rise to contact with neighbors who may be only too pleased to receive a gift of dried flowers or fresh herbs” (Stoneham and Thoday, 1996, p.156).

Rappe and Linden (2004) studied 10 nursing homes. In their contact with over 60 staff members, they found that both indoor and outdoor plants were used as tools as they cared for dementia patients. Staff believed that using plants had benefits on the environment of the homes, which “created a lush, homelike atmosphere and improved the quality of indoor air, according to the survey respondents”. They noted that the psychological and social well-being of the residents improved with the introduction of plants and observed that plants “stimulated residents’ senses, created positive emotions, and offered opportunity for rewarding activity” (cited in Chalfont, 2008, p.20).
According to Minter (2005), cultures have differed in their systems of healing, even if many of them stress the importance of maintaining balance within the individual. The commonality between cultures, however, is the use of plants to heal the sick and prevent illness. Lewis (1996) indicates that historically, plants have been associated with healing. Ancient societies knew the medicinal value of their native flora, and the therapeutic botanical knowledge of Native Americans is being examined (p.76).

Growing plants with patients is curative because plants and people share the rhythm of life. The patient and the plant progress through the cycle of life in similar ways. The patient may notice that they both react to temperature and even sun and shade opening the doorway to a bond with another living thing. For some patients, bonding with a plant may seem safer than reaching out to another human being (Lewis, 1996).

Cultures and languages of different lands may vary, but plants are universal. Plants growth proceeds in stages familiar to gardens all over the world. Although the names may differ, the process can be a focus for communication with others; people often will resist instruction less when the medium is nonthreatening plant rather than another person. The gift of a carefully tended plant carries something of the spirit of the one who grew and nurtured it (Lewis, 1996, p.105).

2.5 Awaking the Senses

Plants give people pleasure and can bring healing through all of the five senses – sight, hearing, smell, touch, and taste – either physically or more "indirectly via memories and moods" (Minter, 2005, p.85). According to Eckerling (1996), “by incorporating the senses explicitly into the garden, the experience is fuller and more complete” (p.29, cited in Ghose, 1999, p.28). Because of their heightened sensitivity to mood, emotion and senses, elderly people who suffer from dementia are more likely to benefit from a strong connection to pleasant memories with plants (Zeisel and Tyson, 1999; Brawley, 2006). “Experiencing the familiar smell and sight of lilacs or roses, tasting a fresh tomato from the vine, touching the smooth leaves of an oak tree, or working the soil warmed from the sun prompt recall of memories of home and days of the

2.5.1 Sight

According to Minter (2005), the visual pleasure generated from the plants and planting design depends largely on the choice of plants, their colors and shapes, and the way they are grouped together. “Whatever your taste in garden style, a garden that satisfies your eyes will also engender a strong sense of psychological well-being” (Minter, 2005, p.98). Color is an ideal design element and an influential design facet that can be easily applied and manipulated in a variety of design materials. However, there is a lack of systematic research on the use and effect of color on the living environment of elderly populations.

Employing skill and patience, color can be used in a garden to create mood and atmosphere, in particular when the seasons change. In addition to the aesthetic value, color can provide information as well as help users to detect and identify objects (Minter, 2005; Wijk, 2007). Burnett (1997) suggests that, “the marking of the seasons is extremely important to understanding the passing of time and the life force by which we are all connected” (cited in Ghose, 1999, p.28). It can be achieved by seasonal flowering plants and the color of trees in the fall. According to Marberry and Zagon (1995), the proper use of color can play an important role in healing which provides both physical and psychological benefits. Color can bring out a variety of emotions in different people such as the feelings of peace, sadness, calmness, excitement, etc. Haynes and Jauron, Extension horticulture specialists at Iowa State University (ISU), prepared the 2009 ISU Extension Garden Calendar, which provides tips for using color in the landscape (see Figure 2.7). “Color is often the first feature we see when looking at a garden, flower arrangement or landscape,” Haynes said. “Plants, containers, deck and fence materials, arbors and walkways all contribute to our overall impression of color” (Larson, 2009, p.1).
According to Arditi (2005), as people age, there are a number of changes that affect both vision and color, including: loss of elasticity of the lenses, thickening and yellowing of lenses, reduced transparency of the lenses, change in smaller pupil size, and risk of age-related disease, such as macular degeneration (cited in Gohar, 2009, p.5). In Karatza’s (1995) work, which was based on the research and experiments with older people compared with a younger control group, she emphasizes the importance of using color contrasts to increase visibility, of color coding and cueing to support object identification, and of a conscious color scheme to make the environment attractive (Wijk, 2007).

These recommendations, however, do not take people with dementia specifically into consideration. When subjected to settings with a broad range of stimuli, studies suggest that Alzheimer’s patients may exhibit increased signs of dementia (Stuart-Hamilton, Rabbitt, and Huddy, 1988, cited in Gohar, 2009). Multiple studies show that visual distinctions such as depth and spatial perception as well as object recognition are enhanced by frequently contrasting colors in garden settings (Wijk, 2007; Marberry and Zagon, 1995). According to Wijk (2007), frequent use of the elementary colors, such as blue, red, green, yellow, black, and white, for codes and cues in the environment is recommended in contrast to some of the mixed colors.
that cause problems for a majority of the participants, such as turquoise, pink, orange, and purple. Because of deteriorating vision with aging, very dark or light colors should be avoided since they are difficult to distinguish for the elderly. Shades of different lightness within red and yellow colored area on the walls could support spatial distinction (p.113).

Figure 2.8a shows the Northfield Senior Center courtyard, decorated with a flower arrangement by America in Bloom, Northfield. Figure 2.8b shows the cottage garden located in the front yard of Modesto Garden Club office, which uses drifts of the same plants to get waves of color, especially along the walkways. Both of them are composed of roses, lavenders, sages, and many other perennials.

![Figure 2.8 Color Contrasts of Plants in Therapeutic Gardens](a) Wigley, 2008; (b) Modesto Garden Club, 2012

2.5.2 Hearing

Gardens can become refuges for people who suffer from urban noise pollution, disturbances, and stresses. According to Minter (2005), therapeutic sounds can trigger vivid memories which often come from the person's childhood, bringing happy moments to mind. These can help alleviate feelings of depression and defend the mind from the pressures and strains of daily stressors. According to Burnett, "water possesses tremendous healing qualities, as it is symbolically represented as a source of life. There is something clean, but not clinical, in
running water and its association with washing away disease and distress” (1997, cited in Ghose, 1999, p.28). From the sighing and rustling of leaves and foliage in the breeze to the tinkling or rushing of water, sounds in the garden can awaken the auditory senses and can generate and influence many different moods and feelings (Minter, 2005; Catlin, 2006).

There are many healing sound in the natural world which please the ear including the wind blowing through trees, shrubs, and grasses (see Figure 2.9a), the rushing sound of water from a small Zen-style fountain (see Figure 2.9b), the deep, low hum of bees as they pollenate flowers (see Figure 2.9c).

![Figure 2.9](a) Healing Sounds from Nature (Source: (a) paulinespaddock.blogspot.com; (b) youreasygarden.com; (c) www.splendidwallpaper.com)

Music offers many benefits in the care of dementia patients. In addition to offering both social and individual activities, music can have beneficial effects on those who cannot participate. Music can create a positive atmosphere and evoke pleasant memories and joy in residents (Marberry and Zagon, 1995; Wijk, 2007).

2.5.3 Smell

Smell, the first sense that evolved and the least subject to an individual’s conscious control, has proven to have the potential to activate a number of physical and emotional responses (Chu and Downes, 2002, cited in Minter, 2005; Pearce, 2007). According to Healy (1997), “fragrance can work to recall fondly remembered or traumatic past experiences and thus
be an important tool towards the clearing up of unfinished business” (cited in Ghose, 1999, p.29). The evocative power of scent can stimulate memories of happy times providing psychological healing (Minter, 2005).

Aromatherapy, detailedly explained and referenced in *Essential Oils Desk Reference* (2004), is the use of essential oils to benefit physical, spiritual, and psychological well-being. “Its history is pre-Christian and the principal ancient cultures that practiced it were Chinese, Egyptian, Greek and Roman, all of which used aromatic oils, although the oils were probably infused rather than distilled” (Minter, 2005, p.28). Essential oils are stored in minute quantities in special cells, ducts, or glandular hairs in the roots, leaves, bark, stems, and flowers of plants, which is quite different from the commercial fragrances marketed to consumers for skin or bath (Marberry and Zagon, 1995; Pearce 2007). Abundant research has demonstrated the human responses to essential oils. The book states that some oils, such as peppermint, rosemary, jasmine, lemongrass, and grapefruit, stimulate and have an uplifting effect. Others, such as lavender, rose, geranium, sandalwood, and ylang-ylang, have a relaxing or sedating effect (Essential Science Publishing, 2004, pp.6-13, cited in Pearce, 2007, p.287). All of these may have applications in the care of residents with dementia, to stimulate memories, decrease pain, lower blood pressure, relieve anxiety, and promote sleep (Marberry and Zagon, 1995; Pearce 2007).

![Figure 2.10 Seniors Smelling Plants](a) jezebel.com; (b) www.dreamstime.com; (c) www.recreativeresources.com)
2.5.4 Touch

The tactile sense is an important element in a therapeutic garden where plants and flowers should be inviting to touch. The texture of plants can surprise and delight people. According to Minter, "even if just a particular time of year, such as spring when, unfurling beech leaves are delicately soft before they toughen up as summer progresses" (2005, p.134). Minter (2005) suggests that if the garden is designed so that people feel free to safely touch and explore, plants have to be arranged in groups that are large enough to withstand a little damage. He also recommends using plants that have leaves, petals, or stems with interesting textures or shapes, or that release their scent when touched. The use of carefully designed raised beds with low-growing plants can be handled easily and may help wheelchair-bound patients to get closer to the plants. Most importantly, care should be taken to avoid the use of toxic plant materials (Ghose, 1999; Minter, 2005).

Leaves, petals, or barks of plants display an enormous variety of textures. For example, some plants, such as Myrica pusilla (Drawf Wax Myrtle) and Ilex vomitoria (Yaupon Holly), have waxy leaves; others, like Canna generalis (Canna), have huge smooth leaves; some have rubbery leaves like Nelumbo nucifera (Water Lotus). The barks of some trees feel quite unusual; it is an interesting sensation to touch the attractive exfoliating bark of river birch with closed eyes. According to Minter (2005), it is a real pleasure to walk around a garden in summer and touch petals “as they expand, particularly those with a satiny sheen” (p.135).

Figure 2.11 Tactile Experience of Leaves, Barks and Petals (Source: (a) www.topsygardening.com; (b) photos.tdcat.com; (c) dianachai.blogspot.com)
2.5.5 Taste

According to Minter (2005), herbs can enhance the enjoyment and delight in the taste of delicious food, and also can be used to aid digestion. An “edible garden” in a special care unit can provide interest for the users in seeing “a landscape that gives back both aesthetically and nutritionally” (Burnett, 1997, cited in Ghose 1999, p.29). Particularly in a long-term care facility, an herb or vegetable garden maintained by residents as part of horticultural therapy can elicit fond memories of family and can provide a healing of the soul. Because most of the plants take little space, residents and caregivers can find ways to have their own small edible garden even in small spaces such as window box. Figure 2.8 shows different types of edible garden.

Figure 2.12 Different Types of Edible Garden (Source: (a) ifwtwa.org; (b) www.topsygardening.com; (c) www.jillbert.com (d) www.finegardening.com; (e) media.treehugger.com)

2.6 Horticultural Therapy Blooming as a Profession and a Practice
2.6.1 Horticultural Therapy Definition

Horticulture involves the use of living plant material and can be an occupation that fulfills a person’s physical, mental, emotional, and spiritual needs – creating fun and enjoyment as well as social and recreational opportunities for people of all ages (Gibson, 1996, cited in Chalfont, 2008). Horticulture is also therapeutic. Horticultural Therapy (HT) is defined as “the application of horticultural practices and principles in a therapeutic setting to improve the physical, emotional, and/or spiritual state of your clients” (Dennis, 1994, p.xv, cited in Chalfont, 2008, p.35). The purpose of an HT activity is a therapeutic intervention facilitated by the professional and benefiting the participants, a “blending of gardening and horticulture science with the therapeutic aspects of life and well-being” (Dennis, 1994, p.xv, cited in Chalfont, 2008, p.35). HT programs can be used for schools, healthcare agencies, social service agencies, retirement facilities, community gardens, community organizations, and corporations (Keltner, 2002, p.311). As an emerging profession, HT continues to utilize the techniques practiced by many related health and human service fields, most notably psychology, occupational therapy, vocational rehabilitation, social work, therapeutic recreation, and education (Haller, 2006, p.1).

According to Haller (2006), an adaptation of figure within the process of an HT interaction, shows the relationships of the key elements (see Figure 2.13). This model includes four elements: client, goals, therapist and plant.

The client is the person being served – usually someone with an identified need for intervention to improve cognitive, emotional, physical, or social functioning. Goals are those treatment goals and objectives defined by the client and the treatment team. The therapist is the professional who is trained in the use of horticulture as a modality for therapy, rehabilitation, and wellness – the horticultural therapist. The term plant is used here to signify those gardens – and plants – related activities and tasks used to provide therapeutic opportunities to the client (Haller, 2006, p.6).
Historical and recent literatures in environmental psychology and horticultural therapy demonstrate that the psychological, social and healing benefits are widespread throughout many cultures and social classes. The therapeutic benefits of peaceful garden environments have been understood since ancient times. The practice of horticultural therapy has progressed from an 1800s’ belief that working in the agricultural fields could benefit mental patients, to the use of gardening as an activity and therapy for physical rehabilitation in the early 1900s (Haller, 2006). According to Gerlash-Spriggs et al., (1998), Dr. Benjamin Rush, a signer of the Declaration of Independence during the American Revolutionary era and considered to be the “Father of American Psychiatry”, wrote in his 1812 essay on the diseases of the mind:

Man was made to be active. Even in paradise he was employed in healthy and pleasant exercises of cultivating a garden. Happiness, consisting in folded arms, and in pensive contemplation beneath rural shades, and by the side purling brooks, never had any existence, except in the brains of mad poets and love-sick girls and boys (p.28).

Rehabilitative care of hospitalized war veterans in the 1940s and 1950s greatly expanded the practice of horticultural therapy. By the mid-1970s in the United States, HT offered new ways of integrating garden into many types of programs and setting, from hospitals offering acute care and rehabilitation to those specializing in long-term care facilities (Gerlash-Spriggs, Kaufman, and Warner, 1998). Research in environmental psychology and horticulture
demonstrates that the act of gardening has a positive psychological and therapeutic effect on people generally (Kaplan and Kaplan 1989, Stoneham 1990, cited in Cooper Marcus and Barnes, 1999).

According to the American Horticultural Therapy Association, HT is “not only an emerging profession, but also a time-proven practice”. Today, it is recognized as a practical and viable treatment with wide-ranging benefits for people in therapeutic, vocational, and wellness programs. HT is now taught and practiced throughout the world in a rich diversity of settings and cultures. There are now numerous cases where facilities have been incorporated to enable such activities to be pursued by people with temporary or permanent disabilities.

2.6.2 Benefits of Horticultural Therapy

HT shows positive effect on mood and emotional well-being, self-esteem, intellectual and sensory stimulation, sense of accomplishment, physical and cognitive functioning, range of movement, exercise, socialization, anxiety and stress reduction, release from depression and pain, outlet for creativity and imagination, the experience of pleasure and fun, and is an ideal activity for both the young and the old to share (Brawley, 2006; Hewson, 2001, cited in Chalfont, 2008). According to Brown et al. (2011), empirical research has proven the benefits of horticultural therapy in many areas, including:

Physical:
1. Improves strength, stamina and mobility.
2. Increases energy and endurance.
3. Exercises hand-eye coordination.

Social:
1. Encourages social interaction.
2. Improves coping skills and motivation.
3. Helps build good work habits and attitudes.
Psychological:
1. Reduces anxiety, stress, and tension.
2. Increases confidence and hopefulness.
3. Rewards nurturing behavior.
4. Stimulates senses through observing, touching, tasting, and smelling plants.

Cognitive:
1. Improves concentration and ability to focus.
2. Teaches new skills and provides job training.
3. Improves problem-solving and planning skills.
4. Exercises the memory and promotes positive thinking (p.2).

While people can benefit from simply viewing and growing plants, the benefits of people-plant interactions can be focused and enhanced with guidance from a horticultural therapist (Brown et al., 2011, p.2).

HT programs are increasingly being incorporated in horticultural activities in long-term care facilities to involve older people with dementia. In these facilities, where individuals are most often in the care-receiver role, the HT program can provide an outlet for the participants to give care to the plants and to other people as well (Catlin, 2006). Participants who have gardened in the past can learn or relearn adaptive strategies for indoor or outdoor gardening. Even if a participant has no prior gardening experience or skills, he or she is able to enjoy plants with minimal effort and involvement (D'Andrea et al., 2007-2008). The evidence base has been growing steadily, with research showing the benefits of horticultural therapy for people with dementia. The result proves Kaplan and Kaplan's (1989) statement: “even passive involvement with gardens has been shown to reduce stress and depression, increase concentration, and increase the ability to focus attention” (D'Andrea et al., 2007-2008, p.16).

In a study of nursing home residents, those in an experimental group were given plants to care for while those in a control group were given plants but told the nurses would care for them. A statistically significant improvement on measures of alertness, active
participation, and sense of general well-being was reported for the experimental group (Langer and Rodin, 1976, cited in Carstens, 1998, p.239).

2.6.3 Creating a Therapeutic Program Indoors and Outdoors

HT programs may be categorized into three types – vocational, therapeutic and social (Haller, 1998, cited in Haller, 2006, p.8). In therapeutic programs, the focus is on recovery from mental or physical illness or injury. Within each of these program types, participants may work on specific goals in some or all of the developmental areas that are potentially impacted by HT services, including cognitive, emotional, social, and physical development (Olszowy, 1978, cited in Haller, 2006).

Table 2.1 Types of Horticultural Therapy Programs (Source: Haller, 1998, p.43)

<table>
<thead>
<tr>
<th>HT Program Types</th>
<th>Models</th>
<th>Focus/Goal for Patient/Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocational</td>
<td>Rehabilitation</td>
<td>Employment</td>
</tr>
<tr>
<td>Therapeutic</td>
<td>Medical</td>
<td>Recovery from illness or injury</td>
</tr>
<tr>
<td>Social</td>
<td>Wellness</td>
<td>Quality of life, wellness</td>
</tr>
</tbody>
</table>

An HT program can incorporate indoor and outdoor activities and requires activity spaces (size, work areas, tables, seating, arrangements and design), storage spaces (bulk items, inventory and safety), growing space (light carts and windows), office space for storing records, a budget, and professional expertise to carry out the program. There are also specific program requirements for indoor space, adaptive tools and equipment, safety precautions and accessibility (Airhart and Airhart, 1989, cited in Chalfont, 2008). Whether working outdoors or indoors, horticultural therapists use a broad range of activities depending on the needs and abilities of the participants and the physical setting. When outside, there are physiological benefits derived from exercise, fresh air and vitamin D from sunlight, and psychological benefits such as looking forward to something and feeling successful (Chalfont, 2008, p.121). Such activities are a good way to test concentration and retention, and as such can be incorporated into an interdisciplinary assessment and treatment approach. Gibson (1996) describes
horticulture as a “unique treatment medium, entailing the use of living material” and thus “paralleling human growth and development” (p.203, cited in Chalfont, 2008, p.36). According to Lewis (1996), “major differences between the effects of urban gardening and HT are a matter of perspective and detail” (p.75). HT is concerned with people-plant interactions and the purpose is to promote the well-being of individual patients, and plants become byproducts of the healing process (Lewis, 1996).

One example is that the HT program is certainly gaining momentum in Bon Secours Charity Health System (BSCHS) in New York State. In spring, activities include transplanting and repotting indoor tropical plants and learning about the difference between these and native foliage. Residents recall the annuals and perennials that once grew in their gardens and shared their favorites with each other and with nursing staff (see Figure 2.14a). In winter, residents get their hands dirty and fingers working on this season’s horticulture project which filled the room with the scents of evergreen plants. The table is filled to capacity with residents bundling white pine branches to create fresh holiday swags and learning about some of the evergreens. As the various “greens” make their way around the table, memories of holidays past are shared (see Figure 2.14b-c).

![Spring HT Program](image1.jpg)  ![Winter HT Program](image2.jpg)

Figure 2.14 Horticultural Therapy for Indoor Activities (Source: Bon Secours Charity Health System, 2012)
Ranger (2010) reported, “residents living at the Bupa Harts House Nursing Home in Woodford Green, will be getting their hands dirty as part of a drive to promote the health benefits of gardening and growing their own fruit and vegetables” (p.1). They worked alongside volunteers to plant seedlings and cultivate plants in the care home's gardens. Community affairs assistant Elisha Gardner, who is pictured alongside resident Vera Rice, 92, said: “Community Crops has also highlighted how such projects really help our dementia residents.

“Not only does it give us an opportunity to encourage reminiscence about ‘dig for victory’, but many of our residents were keen gardeners before they moved into our homes so it has provided a chance to talk about their own experiences of growing fruit and veg.” (see Figure 2.15a)

Figure 2.15b shows that Bupa resident Leslie Chapman, 82, enjoys sowing and growing with the help of HT program executive Helen Thurston and Bupa's community affairs assistant Caroline Davy (Adkins, 2011).

Horticultural activities, as opposed to a structured therapy session, can be carried out by care practitioners, volunteers or family caregivers. While such activities are not conducted for the specific purpose of a therapeutic intervention, they are often quite enjoyable and beneficial, and are therefore worth organizing and carrying out. Working with plants can provide an
opportunity for people to reminisce about their early associations with family members and outdoor nature. Little things can make a big difference. A successful garden can enable even dementia residents to engage in simple tasks, such as watering a window box or re-potting a geranium (Zeisel and Tyson, 1999, p.444).

In HT a sequential task can be chosen by the therapist for the participant – a task which has several stages to be completed over time. Successful completion of the task depends on the practitioner prompting or assisting with stages as needed.

When beginning to work with an individual, selecting familiar and enjoyable activities will help to create a sense of safety and belonging for the participant. After a person has been in the horticultural therapy program for a period of time, it might be beneficial to expand the focus of activities to include new and unfamiliar ideas (Catlin, 2006).

Rutgers Master Gardeners of Union County, New Jersey, offer an eight-session program, *Introduction to Horticultural Therapy*, to agencies that serve people with special needs. Objectives of the program are to: introduce administrators to horticultural therapy; teach people with disabilities basic horticultural skills; and provide guidance so that horticulture becomes an on-going activity. Inputs include Extension staff, volunteers, supplies, donations, and a small budget. Outputs are volunteer training, site recruitment, and support and horticultural therapy activities. Increased awareness of horticultural therapy, new career opportunities, and incorporation of horticulture into regular activities for people with special needs are outcomes of the program (DiNardo, 2007). Figure 2.16 shows a logic model for horticultural therapy program.
2.7 Principles and Recommendations for Planting Design

Design principles provide a framework on which to build functional solutions to the specific problems of Alzheimer’s patients, their families, and the staff that care for them. Various researchers in the fields of design for dementia patients have studies specific design principles. A review assist with selecting the most appropriate principles for this study.

These design principles are formulated to create therapeutic gardens in long-term care facilities that preserve privacy, provide a variety of spaces that promote positive feelings of wellness, and approach the design holistically. Positive outcomes for users can be achieved by “creating an outdoor environment that capitalizes on an individual’s strengths and compensates for his or her weakness” (Rauma, 2003, p.50). These principles are being applied to the creation of long-term care facilities for both healthy and cognitively impaired residents.

Cohen and Wesman, the professors of the Institute on Aging and Environment at the University of Wisconsin-Milwaukee, developed therapeutic goals for the design of dementia
facilities (Stevens, 1996). This work was based on analysis of early successful facilities, such as the Weiss Institute in Philadelphia, the Corinne Dolan Center in Ohio and the Alzheimer's Care Center of Gardiner, Maine. Based on this work, the therapeutic goals for design can be described as promoting (pp.25-26):

1. A safe, secure environment – both actually and perceptually
2. Improved resident awareness and orientation via a visually present environment
3. Maximum use of remaining functional ability
4. Control of the quantity and quality of stimulation – enhancing therapeutic and minimizing harmful stimulation
5. Enhanced social interactions
6. Privacy via resident control of intrusion
7. More opportunities for personal control, based on individual choice
8. Maintenance of links to past environments and life patterns

On the basis of the theory of supportive gardens (see pp.23-26) and Gilson's study (1994), for the purpose of this research, the principles can be summarized as four categories:

1. Design to ensure safety and security of the residents
2. Design a cue to orientation
3. Design to provide an appropriate degree of stimulation
4. Design to maximize autonomy, self-esteem, and dignity

2.7.1 Safety and Security

2.7.1.1 Avoid Dangerous Plants

Safety is an important concern for the elderly, many of whom may take longer than usual to recognize and react to dangers around them. Plants can be considered a hazard to an elderly group, even though they present virtually no problem to active young people (Carstens, 1998). At some stages of the disease, dementia patients may randomly pick leaves or flowers to
eat. Therefore the specific recommendation is to avoid plants that are poisonous, thorny, produce unpleasant sap, that sting or cause allergies (Carstens, 1998; Kennard, 2006b).

Some conditions, such as Alzheimer’s disease or other related dementia, can have particularly devastating effects on a person’s ability to take cues from their surroundings, and their behavior can become quite unpredictable. Accordingly, it is not sufficient to rely on the usual standard of common sense, particularly with regard to poisonous plants. According to Stoneham and Thoday (1996), it is especially important to avoid the attractive ones, such as those with bright red or purple berries.

2.7.1.2 Ensure that Outdoor Space Is Enclosed

Because Alzheimer’s patients have a tendency to try to find their way home, an unenclosed site creates enormous stress for the staff, residents, and their families. A garden needs to be enclosed by the building it serves, or with high, opaque fencing, preferably screened with plantings and vines so that the image of enclosure is diminished (Carstens, 1998; Zeisel and Tyson, 1999; Chalfont, 2008). According to Tyson (1998), trellised screens with plants can help create comfortable pockets, protected from outside distractions, prevailing winds, and intense heat from the sun (p.68).

A secure dementia garden forms part of the overall care home for its clients in Sunrise Senior Living, Cardiff (see Figure 2.17). Residents are able to enjoy either a sunny location or a shaded setting due to the location on the ground floor, which allows for assisted access to the rest of the garden to suit individual needs. The built-in garden club area, water features, and circular walkway all form key elements in this garden. The safe walking surface of colored concrete, to prevent glare, was the material of choice at the time and provides a clear route for residents to use. Vines, trees, and perennial plants partially cover surrounding fences and the locked gate.
2.7.2 Orientation

2.7.2.1 Use Color Cues and Color Codes

Although other mental functions diminish with age, the memory of color names and color preferences stay intact longer, even in severe cases of Alzheimer’s. Older people, in particular those with dementia, may be more dependent on color information than younger people (Gohar, 2009). Various studies highlighted that when color is used appropriately, it facilitates recognition memory of various tasks (Marberry and Zagon, 1995; Innes and McCabe 2007; Wijk, 2007; Gohar, 2009). This indicates that using color cues and color codes in the indoor or outdoor living environment of dementia residents could improve orientation and enhance their quality of care.

Hue, saturation and lightness are aspects of color in the red, green, and blue (RGB) scheme. Hue is the perceptual attribute associated with elementary color names. It indicates whether a color looks, red, green, yellow, orange, etc. People with normal color vision report that hues follow a natural sequence based on their similarity to one another. Saturation refers to how pure a color is. A fully saturated color is the truest version of that color. Primary colors (red, yellow, and blue) are fully saturated colors. Lightness refers to the amount of light that is
reflected by a color. Bright colors high up in the color wheel reflect a lot of light while colors
down at the bottom reflect very little light and are therefore less bright (Gohar, 2009, p.6). The
three perceptual attributes of color that can be envisioned as a solid (see Figure 2.18). Hue
varies around the solid; lightness varies from top to bottom, and saturation is the distance from
the center (Arditi, 2005).

According to Arditi (2005), there are three rules for making effective color choices:

1. Increase lightness differences between foreground and background colors, and
   avoid using colors of similar lightness adjacent to one another, even if they differ in
   saturation or hue (see Figure 2.19a-b).

2. Choose dark colors with hues from the bottom half of the hue circle against light
   colors from the top half of the circle (see Figure 2.19c). Avoid contrasting light
   colors from the bottom half against dark colors from the top half (see Figure 2.19d).

3. Avoid contrasting hues from adjacent parts of the hue circle (see Figure 2.19e),
   especially if the colors do not contrast sharply in lightness (see Figure 2.19f).
2.7.2.2 Seasonal Display

Planting schemes for people who experience their world mainly through their immediate surroundings for contact with the outside world such as the elderly or people with reduced capabilities must heavily incorporate seasonal changes into the design. Flowering trees, shrubs, and perennials that change through the year reinforce people's awareness of life's rhythms and cycles. In Paine et al.'s (1998) case studies of existing spaces, color is often mentioned as
lacking in the planting design. “You can hardly have enough flowers” is a typical response (pp.327-328). When designing gardens for dementia patients, it is important to recognize the value of every season and to ensure that plant displays and interest are spread throughout the whole year. Only “focusing attention on a single splash of summer color neglects the important part the garden can play in people’s lives during times of the year when severe weather reduces mobility, even though most of the pleasure then comes from viewing the garden from indoors” (Stoneham and Thoday, 1996, p.159).

According to Stoneham and Thoday (1996), the spring display can be selected from a wider range of plants, trees, shrubs, and other herbaceous plants. Spring is the season that the planting design needs to provide a succession of colorful flowering displays from April to June. By this time, the weather is nice enough for people to spend time in outdoor gardens, and displays can be sited near sheltered sitting areas and alongside paths. Plants for summer can be chosen from a whole range of types, especially those that can provide shade for residents sitting outside so that they can enjoy the fresh air outside without sunburn in this severe weather. In North Texas, autumn is the season when people spend a lot of time in the garden. The displays rely heavily on flower blooming, foliage or colorful stems and berry displays. “Some summer flowering plants, such as Sedum spectabile, are also useful because they retain attractive dead stems or flowers”. Winter is the season which is disregardful in many landscapes, which is the very time when elderly people are least mobile and most dependent on their immediate environment. A whole range of plant features can create interest during wintertime, including foliage, bark, stem color, and berries (pp.159-160). Figure 2.20 shows a multi-seasonal garden in action.
2.7.2.3 Outside Views from the Inside

According to Chalfont (2008), consideration must be given to outdoor areas that are not visible from inside the building. This becomes an issue because people may decline an offer to go outside simply if they have not had any opportunity to see outside. Therefore, there may not be an incentive to go there, or there may be anxiety associated with an unknown place. Carstens (1993) states that many older people spend considerable time viewing the outdoors from a seated position. Viewing outdoor activity and attractive outdoor natural settings from inside a building is an extremely popular activity, especially among the less active and those who are housebound during harsh summer or winter months in Texas (Carstens, 1993; Ulrich, 1999).

As Tyson (1998) says, "outdoor spaces should reflect life indoors" (p.61). Access to views of the outside can be achieved by placing windows along corridors looking into communal
areas so people can preview the space before they arrive at the entrance into the area (Tyson, 1998; Chalfont, 2008). Furthermore, “visual access to outdoors – in particular in rooms with windows looking in more than one direction – affords people a sense of orientation both within the building and in relationship to outdoor surroundings” (Chalfont, 2008, p.104). On the other hand, residents’ rooms need to be buffered from direct outdoor activity by an appropriate distance or plantings (Tyson, 1998).

![Diagram of Overhang and Trees to Reduce Glare](Source: Carstens, 1993, p.138)

In Meyer’s (2007) research, Hazelrigg suggests that when working in SCUs, one way to make the experience more homelike would be to interview people about their own past gardening or nature experience. Landscape designer Henry Ozga mentioned that before he designed the Presbyterian Home of Ingleside at Rock Creek, he interviewed residents to determine what type of landscapes they had experienced as children. Then he designed a view from each person’s window that “reminded them somehow of their youth – a certain plant, a
fragrant and colorful flower – working them all into the whole plan so that everyone had a personal imprint and connection with the landscape” (Meyer, 2007, p.23).

2.7.3 Stimulation

2.7.3.1 Habitat and Ecosystems

Another way to increase people’s experience of natural outdoor elements is to ensure the presence of wildlife in their living environment. Incorporate the habitat for the desired wildlife into the design: goldfish need ponds, birds need trees, etc. (Chalfont, 2008). Rural locations more readily support wildlife through the availability of habitat, however, diverse and nearby habitats in urban environments can be a greater challenge. Nevertheless, residents in urban area facilities may benefit even more from exposure to wildlife than their rural counterparts. Therefore, it is essential to explore every possible avenue to incorporate habitats. “Any foliage thereby created, if evergreen, affords the possibility that a bird may land on it or possibly nest in it” (Chalfont, 2008, p.80). According to Chalfont (2008), if an area of lawn is not being used it can be converted into a habitat by sowing a “pictorial meadow” with a flowering mix of hardy native annual seeds, which is an inexpensive and low-maintenance way to provide a natural habitat, bio-diversity, and scenic beauty from summer through to late autumn (p.80). Habitats for butterflies consist of plants for nectar and structural plants for laying eggs, such as ornamental grasses. Also, Tyson (1998) suggests that locating groups of large fruiting plants away from pathways can attract more birds to the garden. Placing some feeders or specimen trees near window could encourage people to watch form indoors.

2.7.3.2 Employ Memory Triggers

Because Alzheimer’s disease involves increasing memory loss, it has been suggested that it may be useful to incorporate items evoking personal or cultural memories in the design of special care units. For example, research has shown that placing a display window featuring personal items from residents’ childhood or earlier life next to the door of their room assists them in finding their way home (Carstens, 1998). According to the literature which was
introduced in the previous section, plants can awaken the senses (see pp.27-34). Such plants involved in the therapeutic garden can be a functional stimulus to dementia residents in long-term care facilities. Integrate the types of farm tools, garden displays, and even porch furniture that was popular during the younger days of the residents into the design while taking into account any regional or cultural nuances (Carstens, 1998).

One whiff of lilac is all it takes to transport me back to my mother’s garden. Lilac is known as the “flower of memory”, perhaps because the gentle scent of lilacs has the uncanny ability to evoke fond memories, moments long locked away (Brawley, 2006, p.287).

2.7.3.3 Climate and Weather

Older people who are sensitive to temperature may tend to feel the cold more easily. They may have mobility issues if they are uncomfortable therefore their use of outdoor spaces may be affected by climate and weather (Carstens, 1998; Chalfont, 2008). Attention to temperature is not just about clothing but everything a person touches outside (Chalfont, 2008). Exposure to sun, wind, and extremes in weather has to be moderated. Approximately half of the patio area needs to be designed to supply varying degrees of shade, using landscape elements such as trees, shrubs, or vines (Carstens, 1993; Carstens, 1998). Figure 2.22a shows that patio location, orientation (not primarily western or northern exposure), and detailing are key for moderating temperature and glare. Figure 2.22b shows that landscape treatment can control wind, reflective glare, and heat.
2.7.4 Autonomy

2.7.4.1 Raised Plant Beds

Using raised working planters, for ambulatory and non-ambulatory persons, allows them to view the plants closely without stooping (Carstens, 1993). Carstens (1993) suggests that edging and low level planters need to be avoided because they may cause a fall if plants are not easily seen; conversely, planters above 40 inches may obscure views (see Figure 2.23a). This is also important when patients will be in residence for some time and/or a horticultural therapy program is proposed or in place (Paine et al., 1998). Parallel-approach planters maximize opportunities for socializing while gardening (see Figure 2.23b); however, adequate clearance must be available for those passing by (Carstens, 1993).
According to Chalfont (2008), plants for horticultural therapy can be chosen that:

1. are non-poisonous,
2. are multi-dimensional with uses such as culinary and crafts,
3. have a distinctive color, shape and texture,
4. are easy to propagate and grow,
5. provide sensory stimulation,
6. stimulate memory and creativity, and
7. provide meaningful activity (p.37).
2.7.4.2 Plan Seasonality Use

Catlin (2006) suggests, in long-term care facilities, the therapist may create a calendar of activities for the year. This process helps the therapist to plan the activities with the goals of the individuals being served in mind, and to incorporate horticultural resources in a meaningful way. Caregivers can list the major holidays that are relevant to individuals or the community, and celebrations or special events that the facility has. After that, an indoor/outdoor garden-planting schedule can be created for both cool and warm seasons.

2.8 Preliminary Design Recommendations

Based on literature review, a number of designers and researchers in the field of therapeutic garden design have suggested plants or planting design for creating a better environment for dementia patients. Accordingly, the following set of preliminary planting design recommendations have been set up. The recommendations are summarized by category of the four selected design principles (see p.44):

1. safety and security,
2. orientation,
3. stimulation, or
4. autonomy.

The overall set of design recommendations is cumulative (Gilson, 1994). For example, a suggestion listed under safety and security may also apply to orientation, however, it is not listed again.

The recommendations are listed as the following table,
Table 2.2 Preliminary Design Recommendations in Therapeutic Garden for Dementia Patients

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendations</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Security</td>
<td>Ensure that the outdoor space is securely enclosed using screening fences with plants and vines. Avoid outside views form the space which could agitate or entice residents (parking lots, open landscape).</td>
<td>Carstens, 1998; Tyson, 1998; Zeisel and Tyson, 1999; Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Create comfortable pockets protected from outside distractions, prevailing winds, and intense heat from the sun with trellised screens covered in plants.</td>
<td>Tyson, 1998</td>
</tr>
<tr>
<td></td>
<td>Avoid the use of toxic plant materials or small loose objects which could be ingested.</td>
<td>Stoneham and Thoday, 1996; Kennard, 2006; Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Avoid the use of hazardous plant materials with sharp, spinney leaves or thorns.</td>
<td>Stoneham and Thoday, 1996; Carstens, 1998</td>
</tr>
<tr>
<td></td>
<td>Avoid the use of plants that produce unpleasant sap, that sting or cause allergies.</td>
<td>Stoneham and Thoday, 1996</td>
</tr>
<tr>
<td></td>
<td>Establish direct access to outdoor areas for staff to observe or assist residents.</td>
<td>Tyson, 1998</td>
</tr>
<tr>
<td></td>
<td>Design interventions such as large, strategically placed windows allow greater visibility, which helps staff comfort levels.</td>
<td>Brawley, 2006</td>
</tr>
<tr>
<td></td>
<td>Avoid dark, shadowy areas. People with Alzheimer’s or other types of dementia can misinterpret these areas for negative events.</td>
<td>Kennard, 2006</td>
</tr>
<tr>
<td>Orientation</td>
<td>Use a pathway through a garden filled with trees, plants, and flowers that returns to the starting point; allow one enjoy walking in a natural environment without the frustration of figuring out how to return.</td>
<td>Epstein, 2002; Brawley, 2006</td>
</tr>
<tr>
<td></td>
<td>Use contrast color codes to provide spatial cues for way-finding.</td>
<td>Marberry and Zagon, 1995; Minter, 2005; Innes and McCabe, 2007; Wijk, 2007; Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Have seasonal color and points of interests.</td>
<td>Stoneham and Thoday, 1996; Tyson, 1998; Carstens, 1998</td>
</tr>
<tr>
<td></td>
<td>Choose shapes, heights, or placements for planters to ensure they will not be mistaken for a toilet.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td>Category</td>
<td>Recommendations</td>
<td>References</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Design green roofs on new buildings as well as when modifying or renovating older ones.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Incorporate views of the garden from transitional area with seating as well as indoor spaces. Plants may be placed to open or frame a view. Do not place dense trees in front of windows or in the line of sight to activity areas.</td>
<td>Carstens, 1993; Tyson, 1998; Ulrich, 1999; Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Use an appropriate or plantings to buffer residents’ rooms from direct outdoor activity.</td>
<td>Tyson, 1998</td>
</tr>
<tr>
<td><strong>Stimulation</strong></td>
<td>Use plants with fragrance and essential oils to evoke memories, decrease pain, lower blood pressure, relieve anxiety, and promote sleep.</td>
<td>Marberry and Zagon 1995; Ghose 1999; Zeisel 1999; Minter 2005; Pearce 2007</td>
</tr>
<tr>
<td></td>
<td>Use plants that have leaves, petals, or stems with interesting textures or shapes.</td>
<td>Carstens, 1993; Ghose, 1999; Minter, 2005;</td>
</tr>
<tr>
<td></td>
<td>Design a diverse landscape of plants, using deciduous, flowering, perennial, and annual varieties which create habitats to attract pleasant wildlife such as birds and butterflies.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Use therapeutic sounds in the garden; such as the sighing and rustling of leaves and stems in the breeze and the tinkling or rushing of water. Use music to enhance the residents’ mood and energy levels in the garden.</td>
<td>Marberry and Zagon, 1995, Ghose, 1999; Minter, 2005; Catlin, 2006; Wijk, 2007</td>
</tr>
<tr>
<td></td>
<td>Design a transitional area or porch with landscape elements such as trees, shrubs, and vines to moderate exposure to sun, wind, and extremes in weather.</td>
<td>Carstens, 1993; Carstens, 1998; Kennard, 2006</td>
</tr>
<tr>
<td></td>
<td>Incorporate plants to supply material for indoor activities, such as plants for drying and pressing as well as plants for kitchen use.</td>
<td>Ghose, 1999</td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td>Provide gardening activities outdoors as horticultural therapy to promote independence and encourage responsibility.</td>
<td>Stoneham and Thoday, 1996; Tyson, 1998; Catlin, 2006; Kennard, 2006; Chalfont, 2008; D’Andrea, Batavia and Sasson, 2007-2008</td>
</tr>
<tr>
<td>Category</td>
<td>Recommendations</td>
<td>References</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Use plants that are easy to propagate and grow for horticultural therapy.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Use raised planting beds for gardening with a secure seating edge and perhaps a</td>
<td>Carstens, 1993; Carstens, 1998; Tyson, 1998;</td>
</tr>
<tr>
<td></td>
<td>safe workbench for handicap accessibility.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Create a calendar of activities for the whole year to incorporate horticultural</td>
<td>Catlin, 2006</td>
</tr>
<tr>
<td></td>
<td>resources in a meaningful way. Caregivers can list the major holidays that are</td>
<td></td>
</tr>
<tr>
<td></td>
<td>relevant to individuals or the community, and celebrations or special events</td>
<td></td>
</tr>
<tr>
<td></td>
<td>relevant to the facility.</td>
<td></td>
</tr>
</tbody>
</table>
Beckwith and Gilster (1997) suggest a model for a “paradise garden” which would work equally well for any long-term elderly care setting. The paradise garden has four key elements—enclosing walls, water, canopy, and hill. The enclosing walls are of particular significance because it creates the space of the garden and provides physical and emotional security, soothing caregivers who worry about their patients getting lost. According to Beckwith and Gilster, water is also an essential feature lending coolness, sound, and sensory pleasure and a fountain can serve as a node or landmark to aid in orientation. They go on to discuss the role of the tree canopy and the hill as sources of stimulation to the residents and as symbols of paradise and refuge. They also describe the application of this “paradise garden” model to the construction of three gardens at the Alois Alzheimer Center in Cincinnati, Ohio, which were designed to fit the different physical, environmental and social needs and requirements of dementia residents in progressive stages of the disease.

Figure 2.24 Perspective of the Alois Alzheimer Center in Cincinnati, Ohio (Source: Google map)
The sunroom provides a cheerful, sunny place where residents can watch the birds and enjoy the flowers and plants in the outdoor garden (see Figure 2.25a). One of four outdoor therapeutic gardens designed for the center by a landscape architect. The soft canopy provided by the trellis holds the hanging flowering vines providing shade on a bright day. The mums lining the pathway provide a beautiful visual direction for those taking a walk and a beautiful vision to those simply enjoying the scenery (see Figure 2.25b). All four gardens provide a safe place to walk and provide seating areas to enjoy the sun (see Figure 2.26a). The gazebo provides a space to rest and relax – to listen to the sound of the birds chirping, or to smell the lavender and mint arising from the garden (see Figure 2.26b).
The American Society of Landscape Architects (ASLA) in 1999 initiated a program to build 100 parks to commemorate their 100th anniversary, which include nine therapeutic garden projects in collaboration with the Alzheimer’s Association. The goal of the Alzheimer’s Garden Project is to create pleasant, safe and secure outdoor areas for the needs and enjoyment of individuals with Alzheimer’s disease (Carman, 2002). Epstein (2002) describes a unique public process undertaken for one of those public gardens, the “Portland Memory Garden”, in Portland, Oregon (see Figure 2.27 and Figure 2.28).

The “generic” design includes a circular main path with secondary paths leading to a central lawn area, and small intimate seating areas off the main path. A trellis marks the garden entrance and allows a vista over the entire garden. Plantings are lush, yet ordered, including some in raised planters of different heights. A “rain-catcher” water
A feature, a touching garden, and a symbolic orchard were proposed as memorable features within the enclosed space of the garden (Epstein, 2002, pp.105-106).

Figure 2.27 Illustrative Site Plan of Portland Memory Garden (Source: Epstein, 2002, p.106)
Ashton (2010) reported that neighbors continued to maintain this memory garden in August 2010. Inside the single entrance and wire fences, caregivers can feel safe and comfortable bringing people who are memory-challenged (see Figure 2.28a-b). Throughout the
four seasons, there is always some kind of plant blooming, even in the darkest days in January. Many planting beds of roses sit waist-high, which allow people not to have to bend to see, touch, or smell the flowers. The texture and scent of the specially-chosen plants, such as coral bells, marigolds, cosmos, and other old-fashioned plants, help stimulate memories and the raised beds make it easy for people to sit and enjoy the greenery (see Figure 2.28c-d). Sidewalks designed to form a loop avoid the confusion for dementia patients of dead ends or turns, and make the park easy to navigate (Figure 2.28f). All paths in the garden lead back to the pavilion near the center gate. If people are anxious to return, the pavilion structure serves as a “way-finding marker” that helps people keep from feeling lost (see Figure 2.28e).

2.10 Summary

This chapter explores the importance of therapeutic gardens, including the role of nature, and the benefits that therapeutic garden bring to dementia residents, staff, and family members in long-term care facilities. A theory of supportive gardens is addressed, to better explain that how restorative and coping resources provided by gardens can improve health outcomes. The meaning of plants and their function of stimulating the senses are briefly introduced. Horticultural therapy, which is both a profession and a practice, is shown to be beneficial in long-term care facilities as an activity that brings physical, mental and social benefits to the residents. Planting design principles and recommendations are summarized in four categories, to provide recommendations for dementia residents in long-term care facilities. Also, a model for a “paradise garden” and an ASLA project are briefly introduced to show examples of well-designed therapeutic gardens.

There is a wealth of information available for designers to draw from when contemplating a therapeutic garden project. This literature review provides practitioners a good start on surveying the medical, historical, and sociological writings that can guide them in designing an effective and beautiful landscape to improve the health, safety, and well-being for
the elderly, especially for Alzheimer’s and other related dementia patients. The preliminary recommendations test with the research methods in the next chapter.

Planting design is one part of the environment created to provide for the dementia patients. The success of design recommendations for the outdoor spaces in therapeutic gardens depend on the integration of care, staff training, and activity programs.
CHAPTER 3
RESEARCH METHODS

3.1 Introduction

This chapter focuses on the methodology that addresses the research questions presented in chapter one. The research methods are primarily informed by *Introduction to Qualitative Research Methods* (Taylor and Bogdan, 1998) and *Evaluation* (Rossi et al., 2004). According to Lawton (2001), the descriptive materials used in many environmental assessments do not fit into evaluations intended to measure how well design elements meet the users' needs. Cooper Marcus and Barnes (1999) propose that the methodologies used in empirical research on human interaction and the environment generally involve one or more of the following ways of gathering information: self-report, direct behavior observation, and physiological measures.

Accordingly, two methods of data inquiry, face-to-face interviews and passive observations, are adopted in this research to collect information. The research data is then analyzed and synthesized in the form of qualitative summaries and descriptive statistics in order to evaluate planting design and its impacts in therapeutic gardens in long-term care facilities. The following sections provide detailed explanations of facility selection criteria, as well as research design, data collection methods, data analysis approaches, and limitations of the study in this research.

3.2 Selected Facilities

Since the purpose of this study is to explore the impact of planting design and produce the most appropriate planting design criteria for therapeutic gardens in SCUs, selections were made from a list of Texas Alzheimer's facilities provided by the official website “Care Planning Council of Texas”. The first step was to make a non-judgmental evaluation of the therapeutic gardens in long-term Alzheimer's or dementia units in the Dallas-Fort Worth metroplex. The
second step was to make a face-to-face, telephone or email survey of the basic information of the facilities. In order to be selected, the long-term care facilities have met the following requirements (Gilson, 1994; Ghose, 1999; Bengtsson and Carlsson, 2006):

1. Have been in operation for at least one year
2. Is a long-term care residential facility primarily serving different stages Alzheimer’s disease patients or other related dementia patients
3. Have a therapeutic garden which is dedicated and is well-designed
4. Have a number of planting elements or qualities in the space as discussed in the planting design recommendations in Table 2.2.

Unfortunately, while searching for potential sites, only 45 percent of facilities were found to emphasize or include a landscaped outdoor space or therapeutic garden. Among those that included a space, usage was low.

Two facilities were chosen as follows:

![Figure 3.1 Map of Site Locations in the Dallas-Fort Worth Metropolitan Area (Source: Google Map)](image)

Figure 3.1 Map of Site Locations in the Dallas-Fort Worth Metropolitan Area (Source: Google Map)
3.3 Research Design

3.3.1 Interview Techniques

In order to better understand the planting design and its impacts on outdoor therapeutic garden spaces, interviews were conducted with the users of these gardens. Since the patients themselves were unable to answer questions regarding their experience, it was decided that the next best approach was to interview key informants; directors and staff of the facilities and the family members who have experience with the residents in the outdoor settings.

Focus group methodology is an “ideal” approach for examining the stories, experiences, points of views, beliefs, needs and concerns of individuals and is a useful in exploring and examining what people think, how they think, and why they think the way they do about the issues of importance to them without pressuring them into making decisions or reaching a consensus (Krueger, 1998, cited in Bengtsson and Carlsson, 2006; Zeisel, 2006; Kitzinger, 2005, p.57, cited in Liamputtong, 2011, p.5). In this research, it is used to explore the staff and families’ view of how the residents experience and use of the outdoor environments. The focus group technique is considered “the most suitable since it is the extent of the participants’ views that is sought after and not their individual opinions” (Morgan, 1998, cited in Bengtsson and Carlsson, 2006, p.3).

At each site, staff members assisting residents, as well as the director of the long-term care facility were selected for interviews. Along with them, family members were also interviewed. The interview questions were open-ended with guideline questions and opportunities to volunteer information or opinions. In the first section, questions were asked regarding the potential benefits of therapeutic garden and plants. The second section dealt with the evaluation relating to the principles of preliminary planting design recommendations.

3.3.2 Passive Observations

In order to prove the statements of respondents and better understand the people-environment interactions, onsite inspections and passive observations were conducted for
secondary data in the facilities and photographs were taken. Passive observation has the advantage of minimizing possible influence which the user experiences from the researcher. According to Zeisel (2006), “observing behavior is empathetic and direct, deals with dynamic phenomena, and allows researchers to vary their intrusiveness in a research setting” (p.193). The observation date and time follows the monthly activity calendars and daily life schedule of the chosen facilities. The existing planting design qualities of materials and elements in therapeutic garden were reported according to the preliminary design recommendations in Chapter Four.

3.4 Data Collection Methods

3.4.1 Interview Questions

Face-to-face interviews were set up as the first step for data collection. Before each interview, basic research information was explained to each of the respondents. Institutional Review Boards (IRB) approval for the protection of human subjects at The University of Texas at Arlington was obtained and informed consent forms were shown to respondents (see Appendix A).

After an introduction to the thesis, formal open-ended interview questions were asked as follows:

To staff
1. Do you think there are benefits of plants in therapeutic garden for dementia residents?
2. What characteristics/features of plants in this garden have an impact on residents?
3. How do the residents respond to the principles of__________?

3.1 Safety and security

When you are in the therapeutic garden, what features of plants influence safety and security to the residents?

3.2 Orientation
3.2.1 When residents have activities in the garden in different seasons, do you think plants help them recognize seasonal change?

3.2.2 What elements of plants used for garden design do you think make a homelike atmosphere?

3.2.3 Do you think plants can help as spatial cues for way-finding?

3.2.4 Do you think there is a need for residents to have a beautiful view from windows in their own rooms?

3.3 Stimulation

Do you think plants in therapeutic gardens help in reminiscence therapy?

3.4 Autonomy

3.4.1 Do you think horticultural therapy bring benefits to the residents?

3.4.2 Is your facility using this therapy for the residents?

4. Have you noticed any changes of behavior or mood after residents have activities outside?

5. How do you evaluate the efficacy of planting design in this therapeutic garden?

6. As a caregiver, when you are with residents in the garden, do you think plants and planting design help you to reduce stress?

To Family Members

1. Do you think there are benefits of plants in the garden for dementia patients?

2. What characteristics/features of plants in this garden have an impact on your _____?

3. How does your _____ respond to the principles of___________?

3.1 Safety and security

When you are in the therapeutic garden, what features of plants influence safety and security to the residents?

3.2 Orientation
3.2.1 When your _____ has activities in the garden in different seasons, do you think plants help him/her recognize seasonal change?

3.2.2 What elements of plants used for garden design do you think make a homelike atmosphere?

3.2.3 Do you think plants can help as spatial cues for way-finding?

3.2.4 Do you think there is a need for residents to have a beautiful view from windows in their own rooms?

3.3 Stimulation

Do you think plants in therapeutic gardens help your _____ awake the senses?

3.4 Autonomy

Is your _____ interested in gardening when he/she is young? If so, do you think gardening activity indoor or outdoor bring benefits to him/her?

4. Have you noticed any changes of behavior or mood after your_____ has activities outside?

5. How do you evaluate the efficacy of planting design in this therapeutic garden?

6. As a resident’s family member, when you are with your_____ in the garden, do you think plants and planting design help you to reduce stress, and even make your visit more pleasant?

Each interview lasted approximately 15-30 minutes and was digitally recorded with iPhone 4s software. These digital files were emailed to cabbagetreesolutions.com for a transcript. Transcripts were emailed back to the researcher as Microsoft Office Word documents.

3.4.2 Interview Participants

At each long-term care facility, seven staff and family members participated in this study. To obtain information-rich cases among the research participants, the executive director at each facility was asked to recommend participants among the staff who work closely with the residents and who have had experience using the outdoor spaces. Altogether 14 people
participated in this research; 12 of which were women. They have been working at the two healthcare facilities from three months to nine and a half years.

Table 3.1 Participants at Selected Study Facilities

<table>
<thead>
<tr>
<th></th>
<th>Site A</th>
<th>Site B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of staff participants</td>
<td>6 (2 male+4 female)</td>
<td>4 (female)</td>
</tr>
<tr>
<td>Number of family members participants</td>
<td>1 (female)</td>
<td>3 (female)</td>
</tr>
<tr>
<td>Total number of participants</td>
<td>7 (2 male+5 female)</td>
<td>7 (female)</td>
</tr>
</tbody>
</table>

According to Taylor and Bogdan, “it is difficult to determine how many people to interview in a qualitative study”; however, the researcher should has an idea that he/she has reached the right number of interviews when “interview with additional people yielded no genuinely new insight” (1998, p.83). Therefore, the size of sample was determined after the interviews that the data had begun to repeat itself.

3.4.3 Observing Physical Traces and People-Environment Behavior

When making an observation, it is imperative to make descriptive behavioral notation. Notes, graphic plans and photographs were recorded by the researcher working alone when the observed (residents with nursing staff) had activities in the settings. Using wide right margins is helpful because when observations are written in the left column, the right side is open for individual analysis (Zeisel, 2006). The sample form of human behavior observation notes is attached in Appendix B.

A structure for looking at environmental behavior is useful when observing people. When designers understand how the people they design for interact with physical settings and how they interact with other people in those settings, they can overcome behavioral side effects and make better design decisions (Zeisel, 2006). To increase the control over the behavioral side effects of design decisions, behavior can be described in terms of actor, act, significant
others, relationships, context, and setting (see Table 3.2). In this study, the actor is dementia residents, who have activities such as talking, walking, and relaxing with other residents or staff in the therapeutic gardens.

Table 3.2 Elements in Environmental Behavior Observation (Source: Zeisel 2006, p.204)

<table>
<thead>
<tr>
<th>Elements in Environmental Behavior Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is</td>
</tr>
<tr>
<td>Actor (Dementia patients)</td>
</tr>
<tr>
<td>doing what</td>
</tr>
<tr>
<td>Act (activities, such as talking, walking, drinking)</td>
</tr>
<tr>
<td>with whom?</td>
</tr>
<tr>
<td>Significant Others (other residents or nursing staff)</td>
</tr>
<tr>
<td>In what relationship,</td>
</tr>
<tr>
<td>Relationships (together)</td>
</tr>
<tr>
<td>visual, aural, tactile, olfactory, symbolic</td>
</tr>
<tr>
<td>in what context</td>
</tr>
<tr>
<td>Sociocultural Context</td>
</tr>
<tr>
<td>situation, culture</td>
</tr>
<tr>
<td>and where?</td>
</tr>
<tr>
<td>Physical Setting (Therapeutic garden)</td>
</tr>
<tr>
<td>props, spatial relations</td>
</tr>
</tbody>
</table>

After the data collection phase, the analysis was summarized to show strong support for interview responds and planting design recommendations. The observation dates and times were also shown in the report.

3.5 Data Analysis Approaches

3.5.1 Approach to Interview

The raw data and the interview transcriptions, were systematized by the researcher using the analytical approach meaning condensation and meaning categorization (Kvale, 1996, p.194). This implies that long statements are compressed into briefer statements in the main sense and coded into categories. These approaches are an empirical phenomenologically based method intended to find “natural meaning units” (Kvale, 1996, p.194) in the interview texts, explicate their main principles, code the principles into meaningful categories and relate principles to the purpose of the study. Phenomenology is helpful; by focusing the respondents on the accumulated experiences of the subject’s life, thus providing meaning for understanding in a qualitative way (Kvale, 1996, p.53).
3.5.2 Approach to Passive Observation

A major step in analyzing qualitative observation data was organizing large amounts of patterns of text and discovering meaningful categories. Taylor and Bogdan (1998) suggest that ongoing discovery – identifying themes as well as developing concepts and propositions – is most important. Field notes need to be carefully read and then initially eliminated, combined, or subdivided by generating numerous category codes. Repeating ideas are the same idea expressed by different subjects of observation, while a theme is a larger topic that organizes or connects a group of repeating ideas.

3.6 Limitations of the Study

Due to the incapacity of the residents to communicate their own experience, the researcher has to rely on secondary opinions. The main limitation of this method is the difficulties that people with dementia experience both in evaluating their environment and in sharing this information with others. When addressing people’s feelings or possible therapeutic effects of the space, self-reporting and observation are the methods that must be used. According to Cooper Marcus and Barnes (1999), the most accurate method is monitoring physiological changes by physical measures (heart rate, blood pressure, galvanic skin tests, flickering of eyelids, movement of smile muscles, etc.) as an indicator of emotional shifts (p.108). This study lacked the time, resources and funding to monitor the participants. Besides, observation analysis was based on the researcher’s knowledge background and subjective perspectives, which cannot make the study fully comprehensive.

In addition, there was a potential language discrepancy between the interviewer (international landscape architecture student) and the respondents (English as the primary language of staff and residents’ families). There is difficulty with the respondents regarding specific professional terms used in the interviews, such as characteristics/features of plants and design elements.
The small sample size may limit the applicability of the study. Due to the short time span (August, 2012-November, 2012) the research time is somewhat insufficient. Also, only a few existing long-term care facilities in Dallas-Fort Worth metropolitan area provide permissions to be subjects of the research. It is difficult to determine the statistical significance of relevant data. In this research, 14 staff and family members were interviewed, which are in no way representative of all the users in long-term care facilities for dementia patients. This small sample size may limit the applicability to a certain segment of the population and the analysis of the impacts of plants on residents.

Each resident is distinct; their experience with plants varies as the disease progresses, and the change of their mood and behavior is affected from summer to winter or from morning to afternoon. Gilson (1994) states in her research that “one negative experience with an environmental feature may cause a staff member to criticize the feature regardless of its potential benefit to other patients” (p.70). Also, according to the daily schedule in different long-term care facilities and the interview appointment schedule, the behavior of patients may experience bias due to the presence of sun or shade, wind, or other natural conditions.

3.7 Summary

Qualitative research methods using observation and conversational, open-ended interviews are chosen as the best way to address the research questions. Part of the aim of this study is to share information, with expert groups as well as the larger population of landscape architects and horticultural therapists who work in therapeutic garden design and programming.

The interviews were administered to seven respondents at each facility for a total of 14. The responses for each site were tabulated, summarized, and carefully analyzed. Because of the cross-disciplinary nature of this research, some of the interviewees asked the researcher to explain certain findings from the literature review, such as the contents of planting design recommendations.
Through this process of interviewing, the therapeutic gardens were evaluated in terms of therapeutic benefits and elements or qualities of the space that contributed to outdoor spaces in long-term care facilities of dementia patients. Both subjective as well as objective reactions to specific design elements were measured and qualitative judgments were made in order to produce design recommendations.
CHAPTER 4
ANALYSIS AND FINDINGS

4.1 Introduction

This research seeks to discover the benefits of therapeutic garden for dementia residents in long-term care facility. Caregivers, such as staff members working with the residents and residents' family members were asked about the characteristics of planting design that would be most usefully in therapeutic gardens for dementia patients. Finally, primary users, the residents, were observed to provide supportive data for the study.

Interviews of caregivers and passive observations of residents were used to collect data. First, the information was analyzed using the meaning condensation and categorization approach which referenced work from Kvale (1996). As themes emerged, selected categories were used to develop a core concept and reduce the large interview texts into briefer, more succinct formulations. These categories are described in this chapter.

Many comments and recommendations for the therapeutic garden design were offered by the respondents in the study. These were analyzed after the discussion of the research questions. The additional categories of meaning are valuable indicators for practitioners in the field of therapeutic garden design for dementia patients, especially for the individuals with Alzheimer's.

4.2 Evaluation of the Selected Study Facilities

The two selected facilities were visited, photographed, and given an on-site evaluation. The description of each site including photographs follows.

Background information about each of the sites was obtained through face-to-face and email conversations with administrative or marketing staff and executive directors. Information
was also gained through facility brochures and from their official websites. Table 4.1 shows the basic information of the selected study facilities.

**Table 4.1 Basic Information of Selected Study Facilities**

<table>
<thead>
<tr>
<th></th>
<th>Site A</th>
<th>Site B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Fort Worth, TX</td>
<td>Fort Worth, TX</td>
</tr>
<tr>
<td>Number of residents</td>
<td>77 residents</td>
<td>85 residents and 30 people in day care program</td>
</tr>
<tr>
<td>Number of staff</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>(including all administrative, marketing and nursing staff)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor areas</td>
<td>Seven outdoor areas including five courtyards for resident activities, plus lobby courtyard and rehab courtyard which are only accessible from non-resident areas.</td>
<td>One therapeutic garden with wire fence for all the residents, one rooftop patio on the 2nd, 3rd, and 4th floors for small resident group activities.</td>
</tr>
<tr>
<td>Area of outdoor spaces (Square feet)</td>
<td>10,000</td>
<td>8,025</td>
</tr>
</tbody>
</table>

4.2.1 Site A

This is a special care unit that has been open for 16 years in a private, for-profit nursing home facility. There are 77 residents on the unit, which can accommodate 120 patients, all suffering from dementia. Approximately 75 percent of the residents are Alzheimer’s patients. Recently, this facility was given five stars under the new ratings system released by the Centers for Medicare and Medicaid Systems (CMS). Their philosophy of care is “always to do the right things”.

The nursing home facility is located within a half mile of two hospitals and only 10 minutes from the downtown hospital district. Along with a specialized Alzheimer’s care unit, Garden Terrace of Fort Worth also specializes in rehabilitation for those suffering from dementia and related illnesses. The building is a single story, stone-and concrete-faced building with an overhanging roofline.

Seven outdoor spaces are located in different wings of the facility. Five courtyards are directly visible upon entering the unit through a wall of window in the activity room and
accessible from their respective resident wings. Two of the spaces, including the lobby courtyard and Rehab courtyard, are only accessible from non-resident areas. Each outdoor space for residents is visible from the nursing station. The resident courtyards have at least two mag-lock control doors that exit direct from their wings. They also possess two mag-lock gates for emergency exits. All exterior doors and gates can be controlled by their nurse’s stations.

Two courtyards in B Wing and D-G Wings (Figure 4.1) are the focus of this study.

![Figure 4.1 Focused Open Space Locations at Site A (Source: Google map)](image)
The courtyard for D-G Wings (Courtyard DG) presents a peaceful garden impression (see Figure 4.2a, Figure 4.3). The plan is simple and easily understood at a glance because of the small size. A gazebo stands in the center of paved brushed concrete and is surrounded by grass and shrubs, such as roses. Two six foot tall crape myrtle trees with red and pink flowers are planted on the north and south side of the gazebo. Dwarf evergreen shrubs such as dwarf yaupon holly are planted along the foundation of the building. The pavement is level and in good condition. There is some movable furniture, such as a metal round table and metal chairs with fabric seats.

The courtyard in Wing B (Courtyard B) includes a reniform golf course in the center covered with plastic grass which has a good quality (see Figure 4.2b, Figure 4.4). Grass coverage around it connects with the concrete path. A small white trellis acting a gate, with paved square, brick-red stone paving, emphasizes the entrance of the golf course. Next to it, an eight foot crape myrtle tree with reddish-purple flowers and a 20 foot live oak are planted in the
grass. At the end of the grass, there is a gazebo which is the same size and style as the one in Courtyard DG. Along the path, shrubs are clipped into rounded shapes in different sizes and colors.

A six foot wooden, double slat fence along with concrete columns and an invisible locked gate encloses the sections of the space that are not surrounded by the building in each courtyard. The spaces have a very secure feeling with a simple, yet aesthetic design which benefits from the building and the fences. However, there are no plants in front of it or vines covering it. In each of the courtyard gardens, approximated 50 percent of the area is landscaped but with very few varieties of plant materials. There are not enough partially shaded or shaded areas for residents to have group activities. Also, gardening activity is not provided in the outdoor spaces without the design of raised planting beds.

Figure 4.3 Site A: View from the Entrance of Courtyard DG

Figure 4.4 Site A: View from the Entrance of Courtyard B
4.2.2 Site B

This is a non-profit, long-term-care residential facility and Senior Adult Day Program for individuals with Alzheimer's disease and related dementia. It opened in 1993. This center has a 100-bed facility, plus an adult day care program for up to 25 people. By participating in meaningful research and sharing its experience and knowledge, the center is committed to enriching lives now and in the future. Their philosophy of care is “to be there for those who need us, to find deep understanding of their needs as individuals, and to constantly improve our services so that we remain true to our mission”.

The brick-faced building has four stories with an overhanging roofline. There are four secure outdoor spaces available for all the residents and seniors in the day care program. One space is a therapeutic garden that is located outside the building on the first floor. The others are rooftop patios on the second, third, and fourth floors of the building. The therapeutic garden has two locked entrances; one is from the living room of the day care program, and the other is facing to the parking lots. All the patios are immediately accessible from the common room and the hall to the elevators. They are not visible from the nurse’s station but have locked doors which need both key and a mag-card to open. Because the second floor patio is bigger than the others, this study focuses on the therapeutic garden on the first floor and the patio on the second floor (see Figure 4.5).
Figure 4.5 Focused Open Space Locations at Site B (Source: Google map)

Figure 4.6 Garden Illustrative Plan View at Site B
The therapeutic garden is located on the northeast side of the building. It has light blue metal wire around it and is covered by trees and shrubs (see Figure 4.6). Figure 4.7a shows the entrance from the Day Care Program common room. It has a wire gate which allows visitors a partial view. However, it is a little narrow; two people cannot walk side by side. A high octagonal pavilion is located in the northeast corner of the garden, which provides a big shady area for the users individually, or in groups, on sunny days (see Figure 4.7b, Figure 4.7e). It is an easily identifiable landmark whether viewed from inside the garden or outside from the parking lots or streets. A five foot wide, curvilinear, brushed concrete path circles the relatively 75 by 105 foot space with a wide concrete path in the center which accommodates two planting beds. The small water fountain located next to the pavilion provides therapeutic sound to the visitors who rest under the pavilion (see Figure 4.7c). The size is appropriate with shallow water in the basin. However, it does not work well sometimes.

There are four seating areas off the concrete walkway with wooden benches, which provide different sensations and moods depending on whether they are in sunshine, shade or partial shade. Under the pavilion, there are three small round wooden tables with several similarly styled wood chairs. Several varieties of plants grow well in the planters and around the garden as a whole including trees such as live oaks and Texas red oaks; ornamental trees such as crape myrtle and yaupon holly; shrubs such as rose and American beautyberry; perennials such as autumn sage and purple aster; in addition to ground covers such as mountain pea. Approximately 80 percent of the space is planting and 50 percent is shaded at midday in the summer.
Figure 4.7 Site B: View of Therapeutic Garden
The patio on the second floor is mostly used by the residents living on this floor (see Figure 4.8). There are three entrances, in the north and south residents’ semi-private living rooms and the hall to the elevator. The fourth-floor building is on the north and south side of the patio, which provides an area which is half sun and half shade at noon. A double brick faced wall and a visible locked gate encloses the only section of the space that is not surrounded by the building. Through the gate, noise emerges from kitchen machinery on the first floor. The whole patio is paved with a flat concrete slab. Although the feeling is secure, users may feel very confined by the building, especially when sitting under the cover.

Some planters, with only a few varieties of evergreen and perennial plants, are located along the wall or under the windows of residents’ bedrooms. One three foot tall wooden planter with wheels is located in the center of the patio for horticulture therapy. In it, there are some decorated sculptures and wind chime.

A broken swing is located near a window of a resident’s room. Several piece of black metal wire furniture including tables and chairs, are randomly positioned; some under the ceiling, some in the open space, and some against the wall.
4.2.3 Evaluation against Preliminary Design Recommendations

According to Rossi et al. (2004), there are three forms an evaluation may take: the independent evaluation; a participatory or collaborative evaluation; and an empowerment evaluation (p.51). This study uses the independent evaluation which is that an external party undertakes the evaluation as an example. The two facilities were evaluated against the weighted 25 preliminary planting design recommendations. The researcher gave a score which represented a percentage of possible points for each of the design principles as well as an
overall score for the compliance with the design recommendations. Each had the potential to receive a maximum of five points. The results are shown in Table 4.2.

Table 4.2 Selected Study Facilities Evaluation Scores

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendations</th>
<th>Site A</th>
<th>Site B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Security</td>
<td>Enclosed outdoor space</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Trellised screens with plants</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No toxic plants</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>No hazardous plants</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No plants producing unpleasant sap</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Direct access to outdoor areas</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Visibility to outside from activity room</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No dark, shadowy areas</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total Score of Safety and Security</td>
<td></td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>Total Possible Score of Safety and Security</td>
<td></td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Percentage of Safety and Security</td>
<td></td>
<td>80.00</td>
<td>72.50</td>
</tr>
<tr>
<td>Orientation</td>
<td>Circular path</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Color contrast</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Seasonal color</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Distinguishable planters</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Green roofs</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>View from indoors for residents</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Buffered residents’ rooms</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total Score of Orientation</td>
<td></td>
<td>21</td>
<td>26</td>
</tr>
<tr>
<td>Total Possible Score of Orientation</td>
<td></td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Percentage of Orientation</td>
<td></td>
<td>60.00</td>
<td>74.29</td>
</tr>
<tr>
<td>Stimulation</td>
<td>Plants with fragrance</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Plants with interesting texture or shapes</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Diverse landscape of plants to attract wildlife</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Therapeutic sounds</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Moderate microclimate</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Plants supply material for indoor activities</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total Score of Stimulation</td>
<td></td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Total Possible Score of Stimulation</td>
<td></td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Percentage of Stimulation</td>
<td></td>
<td>53.33</td>
<td>66.67</td>
</tr>
<tr>
<td>Autonomy</td>
<td>Gardening activity</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Plants are easy to propagate and grow</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Raised planting beds</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>A calendar of activities for the whole year</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total Score of Autonomy</td>
<td></td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Total Possible Score of Autonomy</td>
<td></td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Percentage of Autonomy</td>
<td></td>
<td>65.00</td>
<td>80.00</td>
</tr>
</tbody>
</table>
Site A scored higher on safety and security because there is direct access to outdoor areas in each wing and almost everyone can be observed or assisted directly by staff through the access or the windows in the activity room. Site B scored higher on orientation, stimulation and autonomy because the therapeutic garden on the first floor is designed on a high level with a variety of plants that have different colors, shapes and are in different layers. In addition, some plants can attract wildlife such as butterflies, birds, or squirrels. Also, the staff in this facility provides appropriate gardening activities both indoors and outdoors for the residents.

In overall compliance with the preliminary design recommendations, Site A scored 65.60; Site B scored 71.80, both of them have plenty of room for improvement to positively affect the lives of the users, especially for dementia residents.

### 4.3 Respondent Demographics

From the two selected facilities, the breakdown of the gender demographic was two males and 12 females for a total of 14 interviews. The user types included 10 staff members and four family members. The profile of the user groups in the therapeutic garden at the selected facilities is given in Table 4.3 and Figure 4.9.

### Table 4.2 - continued

<table>
<thead>
<tr>
<th></th>
<th>Site A</th>
<th>Site B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Total Score</td>
<td>82</td>
<td>91</td>
</tr>
<tr>
<td>Overall Total Possible Score</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>Overall Percentage</td>
<td>65.60</td>
<td>71.80</td>
</tr>
</tbody>
</table>
Table 4.3 Respondent Profile Information

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Position or Relationship</th>
<th>Time in the facility</th>
<th>Hours/week spent with residents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff Members</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Enrichment Director</td>
<td>4 years</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Plant Operations and Maintenance Supervisor</td>
<td></td>
<td>5-10</td>
<td></td>
</tr>
<tr>
<td>Executive Director</td>
<td>1 year</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Development Coordinator</td>
<td>7 months</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>MDS Coordinator</td>
<td>3 months</td>
<td>15-20</td>
<td></td>
</tr>
<tr>
<td>Activities Assistant</td>
<td>1 year and 8 months</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Assistant Programming Director of Activities</td>
<td>2 years</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Activities Assistant</td>
<td>3 years</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Executive Director</td>
<td>9 and a half years</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Programming Manager</td>
<td>4 years</td>
<td>40-43</td>
<td></td>
</tr>
<tr>
<td><strong>Family Members</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother and daughter</td>
<td>1 and a half years</td>
<td>6-10</td>
<td></td>
</tr>
<tr>
<td>Mother and daughter</td>
<td>2 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother and daughter</td>
<td>2 and a half years</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>Husband and wife</td>
<td>6 years</td>
<td>20-30</td>
<td></td>
</tr>
</tbody>
</table>

(a) Types by Gender
(b) Types by Position

Figure 4.9 Respondent Types
4.4 Analysis of the Interviews

Digital records and interview notes were taken by the researcher while interviews were being conducted. In order to minimize the interviewer’s impact on interview data, the list of design recommendations and recommendations was not provided to the participants. This tactic was consistent with a valuable trait of qualitative inquiry which is based on understanding an actor’s experience with the topic under discussion (Bogdan and Tylor, 1998).

Each interview lasted for approximately 15-30 minutes. After each interview, the researcher reviewed the transcripts and summarized each participant’s responses in a table (Appendix C). Each table included the respondent’s answers to interview questions mentioned in the last chapter (see pp.70-72).

4.4.1 Benefits of Therapeutic Gardens

In this research, the data collected from respondents revealed eight specific benefits to therapeutic gardens. The degree of importance of each characteristic could change depending on one’s viewpoint and experience however, for this study the benefits are discussed in this order; sense of calm, ability or willingness to articulate, social interaction, mental alertness, increased focus, ability to access memories, health improvement, and sense of pleasure.

Some of the staff emphasized that the garden has a double benefit for two different types of residents; some calm down and some talk more. The calming effect was identified as the most important benefit by the majority of respondents, but for people who often live in extraordinary isolation, the stimulus to talk is equally important. Staff and family members reported a sense of peacefulness and relaxation among the residents when they smelled flowers and listened to birds singing in the outdoor gardens.

*When you take them outside, you set them down, you let them see the plant, you let them smell, they begin to be able to focus on one thing and it does bring a calming sense to them* (Respondent S3).

*There is one gentleman. He does not talk very often and very little brings him pleasure as far as activities…But when he is taken down in the garden, he talks…and he talks about the plants, about the weather, about the wildlife. If he sees a bird flying by, he will ask “Oh, what kind of bird is that?”* (Respondent S10).
The outdoor garden space also provides the ability to socialize which reduces the sense of isolation and the potential for depression. All the family members said that when they visit the residents, they go to the garden as a serene and private space, which makes them more comfortable as opposed to spending time in the building along with the staff and other residents.

Almost every respondent believed that the garden wakes residents up and gives them extra energy because they are not just sitting around. As Respondent F2 said, “It picks up the spirit…she is very active… so I think any kind of outside activity is always good just to get outside the four walls”.

A natural byproduct of mental alertness is the ability to focus longer when spending time in the garden. Staff members reported that residents are able to focus on an activity only for about five minutes when they are inside due to excess stimulation. However, if they are in the garden, residents can focus for substantially longer periods – usually 20 to 30 minutes.

The ability to remember, recall, or access memories is another specific benefit to a therapeutic garden. Almost 80 percent of respondents indicated that the garden helps the brain function of the residents to access memories of the gardens they had at their own homes. A staff member noted that the garden allows residents who are from a generation raised without air conditioning to reconnect with nature, reminiscent of their childhood. Many examples were given by the staff and family members in both facilities. One family member said that her mother grew plants when she was younger and now, even if she has nothing else to do, she likes to look at the plants. She talks about the colors and how pretty they are. When she is focusing on the flowers, her conversation makes more sense.

*We had a flag ceremony when we were out here one day and the wind was blowing. It was really nice outside and they were raising the flag… This man was next to me and he never talked… He was talking about being in World War II, and he said “We had a lot of fun!” He was able to tell me what he thought about and exactly what they were talking about. So it was very dramatic to me* (Respondent F4).
Spending time in outdoor spaces with plants and trees can also improve the residents’ health. One family member remarked that in the outdoor space, plants clean the air and give oxygen which is a health benefit for the residents’ physical bodies.

When a person is confined to a long-term care facility, finding pleasure in everyday activities can be a challenge, however when residents engage in outside activities, their mood or behavior can indeed change. According to a staff member, their enjoyment can be seen in their facial expressions and their body movements. When the staff talks about outside as they work with the residents, they can see the improvement in mood. Even residents who cannot communicate with others about their feelings will exhibit increased eye contact with the staff.

…and I see people that go out. They have smiles when they are going in because I see them go by my window (Respondent S9).

Sometimes she is just like this all the time and them we go out into the garden. She gets that pleasant look on her face. So I think it is relaxing or maybe brings back good memories for her (Respondent F1).

The outside gardens make residents feel better by giving them a sense of normalcy. In Site A, there is a gentleman who really loves to stay outside. When it’s time for the residents to come inside, he will not come in and will try to get back to the garden when he is brought inside. A staff member remarked, “I can’t say enough about how good it is to be able to take them out to a beautiful garden or if the patio up there was prettier…so that they could see beauty because they respond to beautiful things”.

4.4.2 Characteristics of Plants that Contribute to the Benefits

All the senses that a person has – sight, smell, hearing, touch, and even taste – can be aroused and enriched by utilizing a variety of plants, trees, and shrubs. By appealing to the maximum number of senses, the maximum benefit is obtained.

All of the respondents mentioned color as important and an obvious characteristic of plants that contribute to the benefits of the garden. Bright and cheerful colors, such as yellow, pink, red, and orange were emphasized because they lift the spirits of residents. Purple was also mentioned. They believed that flowers with beautiful colors bring visual enjoyment for the
residents as well as for the staff and family members. For example, a staff member indicated that a tree with blossoms creates happy associations for residents with their bright, colorful flowers. Two family members stated that azaleas blooming in the spring with bright pink petals and blue violets can draw their loved ones’ attention. Some plants with fascinating fruits were also mentioned by respondents, such as beautyberries with a big cluster of bright purple berries, and Nandina with little red fruits.

Fragrance, as another important element of plants, was mentioned by most of the respondents. A staff member stated that flowers with subtle, soothing fragrances, such as lavender, or scents that remind residents of home cooking, such as cinnamon or pumpkin, are very beneficial for evoking residents’ memories in the past.

Some respondents also indicated that interesting characteristics will also fascinate residents. For example, one family member said that her mother likes sideoats grama because of the seeds on the top of one side. Sometimes, her mother focuses on acorns; picks them up, gives them to her and talks about it with her. Also, she likes grasses because the leaves seem to flow in the wind.

Among all of the plants, roses were mentioned by almost every respondent; possibly because roses can provide both visual and olfactory enjoyment. There are rose bushes with varieties of colors, shapes, and fragrances. Ninety percent of respondents stated that residents can identify roses and they like to watch them bloom. Because roses are familiar, residents can remember what they are and talk about them. Another possible reason for their popularity is that they have an obvious effect on the residents’ minds and bodies. In addition, they are hardy and very easy to grow in these facilities.

Vegetables grown in edible gardens or for gardening activities are appealing. According to a staff member, gardening was an activity that residents really liked to do in their younger days, so they enjoy going out and looking at all the plants and identifying them.
In conclusion, respondents indicated that the characteristics of plants such as color and fragrance, as well as interesting shape, texture, and visual effect in their natural setting, are beneficial to the health and well-being of the users.

4.4.3 Responses to the Principles of Planting Design

4.4.3.1 Safety and Security

Some staff members emphasized the importance of not using any kind of plants that are poisonous because some residents cannot distinguish between safe and harmful plants. Most respondents believed that although roses with thorns might injure residents, they normally do not pick them up; they just like to look at them and take care of them. Also, a staff member said that she brings scissors to the garden when she knows it is the last bloom, and cuts the flowers for the residents.

A respondent said that some plants may connect the garden with a memory of a resident's mother or grandmother eliciting a sense of security for them. As Respondent S9 said, "When I sit in the part that is curved and it has the big shrub behind there, I feel kind of protected and I like that". Also, some respondents think that when residents are in an enclosed location with walls or fences around them, they can look though the window and still feel safe outside.

There was consensus among the staff members that the outdoor space does not need to be visible from the nurse's station. Because they believed that all the doors are locked unless residents are allowed to go out with staff. A staff member is always present in the activity room when residents use the outdoor space, and in Site B, a staff member is always with the residents outside.

One staff member emphasized that gardens need to have raised beds for residents in wheelchairs or for someone who does not want to bend down to look at or smell the flowers. Raised beds reduce the risk of falling for residents who might lose their balance while trying to reach a plant at a lower level.
Noise is another element of safety and security. Respondents from site B mentioned noises such as kitchen machinery could be heard on the patio, and traffic sounds could be heard in the therapeutic garden. Some respondents believed that traffic sounds adversely influenced residents, suggested the importance of a peaceful environment. However, some thought that traffic noise was not an issue for some residents. According to Respondent S8, “You can imagine living inside of a building and not hearing a car honk for a long time”. Traffic sounds are an indicator of life outside the garden.

...they have somebody working on the roadway up there. You can hear a jackhammer and she asked what that noise was, but it didn’t disturb her too much...So I think the noises around her are a good thing because it just gives her something to focus on and comment on, but doesn’t really seem to bother her (Respondent F3).

Some of the staff expressed concerns about uneven surfaces, edges, and joints, especially for wheelchair users. Uneven places in the grassy areas also contribute to falls. At Site B, the drop between the pathway and planters has created safety problems for the residents, especially where the sidewalk is curvy. A staff member at Site B said that sometimes she is responsible for watching eight people. Some of the high-functioning residents need very little supervision as they wheel around by themselves. However, she has to constantly vigilant so that they do not fall off the sidewalk.

One family member thought that a safe water feature would be beneficial. However, she mentioned that the patient was always concerned when their children visit and play around the fountain therefore the water should be potable and very shallow to be totally safe – which would put the patient’s mind at ease.

If there is a gardening activity held in the facility, one staff member indicated that there should be no dangerous gardening tools accessible when residents are planting.

Kennard (2006) suggests avoiding dark, shadowy areas in the garden because people with Alzheimer’s or other types of dementia can mistake it for negative events and become distressed. For instance, they may think that there are holes in the ground. However, in the
research, none of the respondents had noticed residents having negative reactions to shadows in outdoor spaces.

4.4.3.2 Orientation

Fifty percent respondents believed that the way plants relate to the seasons has a positive impact on the residents. For instance, residents interact with each other as well as staff and family members as they discuss the way the plants change seasonally. They can distinguish the time of year by the plants and fruits that are growing. They notice different plants blooming at different times, and when the plants die and come back again. For example, they recognize the changing of the season when they watch oak leaves change color or leaves falling in autumn. During the winter months when they cannot go outside, they watch the evergreens or pansies through the windows. When bright colors appear in the courtyard, they know spring has arrived. In addition, the hot weather and greenery everywhere make them realize that the summer is coming.

They are so knowledgeable, we think that just because they have the Alzheimer’s or they have dementia that they don’t know their seasons, but they remember (Respondent S1).

According to a staff member, all seasons are good if there are color changes in the garden that signal the passage of time and if residents are given the opportunity for outdoor activities. A family member noticed that the gardens always have beautiful views in spring, summer, and fall, however, in winter, almost all of the plants are dead and there are no more colorful things. She recommended using ornamental kale or cabbage with different colored leaves in the winter to provide interest for the residents.

They enjoy all the seasons. I remember one time it was snowing and we had a lady that was from Pennsylvania. It snowed all the time and she couldn’t wait to go outside so we took her outside. She made snowballs and she was so excited to be outside in the winter (Respondent S9).

A residential scale and homelike feeling were mentioned as important attributes of the outdoor space. A lot of respondents suggested that making the environment look like a backyard with lots of flowers, shrubs, and trees can make residents feel at home. Several ideas
were recommended. For instance, using the plants that help residents make memory connections with their past such as roses, or vegetables; placing bushes around the areas and under the windows to create a homelike environment; and using old-fashioned plants such as roses, daisies, and sunflowers instead of trying to introduce modern ones. One staff member also believed that when everything is in smaller scale, such as a plain bird bath rather than a fountain, it makes residents feel like they are going into a beautiful garden in their own yards. Also, one staff member suggested that caregivers could provide whatever residents like depending on where they are in their cognitive level.

A lot of residents here are familiar in Texas. There are a lot of crape myrtles so that is a very comforting and familiar tree that they would like to see (Respondent S7).

It would be probably the chrysanthemums, and crape myrtle that we have one (at home), so that would be more into his liking (Respondent F4).

According to some respondents, the view from the window can enhance the quality of life – a resident wakes up to see greenery or flowers or sunshine. In general, the view helps their mood. They believed that the view from the window is important because it is uplifting and cheers the residents with its brightness. Residents usually have activities in the day living room or their own rooms so they can lift their blinds to see something nice. Two staff members at Site B mentioned that some residents always look out the window to watch the wild cats in the garden. As Respondent F3 said, “It would be nice if everybody had a window facing the garden”. A family member said that her mother’s room has a window that looks at a wall which is very disappointing because the place she was previously had a window which allowed her to look outside a lot.

I think it would help her, yes. In this building because it’s multi storied and it’s looking out on the city of Fort Worth, the views aren’t that great, that’s one thing that I especially like about being able to bring her down to the garden (Respondent F3).

4.4.3.3 Stimulation

All respondents classified sight stimulation as important. Almost all indicated that brightly colored flowers and fruits, as well as interesting or unusual shapes enhance the
residents’ enjoyment of plants. One staff indicated that ground level design is important since the patient’s angle of gaze is downward, especially as the disease progresses. One family member said that the plants in different colors and layers, such as in the therapeutic garden in Site B. In that garden, there is a visual change from little dwarf varieties (Mexican petunias) to taller bushes (beautyberries) to ornamental trees (crape myrtle) to very big tall trees (oak).

According to one staff member, some of the residents cannot see well. In addition, their hearing is more delicate. For instance, they hear more sounds such as crickets or locusts or running water which prompts them to make comments. In both facilities, there is a huge birdcage in the antechamber which draws a lot of residents to watch and listen to the birds’ singing. One staff member at Site B indicated that residents enjoy listening to the fountain in the therapeutic garden. They always turn their head and look to find the origin of a sound.

*The way that our patio is, you know, some of it is covered, so sometimes if it is just a nice rainy day, we will go out there, sit and listen to the rain. They really like that. So I think having part of the patio covered is very important for those days...especially this time of the year, you do get some perfect rainy days that way you can sit out there in the rain* (Respondent S10).

Scent or fragrances evokes memories in a garden and allows resident to talk about their past, encouraging verbalization, socialization, and feedback. So aromatherapy is used in each facility with plants such as roses, lavender, and lemon, etc.

Tactile sensation is another stimulus in the garden. One staff member stated that when residents physically put their hands in the soil, they eagerly look forward to going outside to commune with nature. In addition, one family member said her mother likes to touch lamb’s ear which are as soft as velvet.

Wildlife was mentioned by some respondents. One staff member believed that if there is anything in the garden that attracts birds or butterflies, it will be more stimulating for residents. Every family member stated that their loved one enjoys seeing the butterflies that are drawn to the flowers or berries. Both sites have pets that visit on a regular basis and they are very popular, but the visit takes place inside where more residents can. One staff member introduced
an Eden Project in some other facilities, which keep animals such as dogs, cats, and birds in the building, and keeps other animals such as chickens outside, which is similar to a farm. He indicated that if people are under stress or not feeling well, and even for people that are not cognitive, stroking the back of an animal or pet will generate a sense of calm.

Fifty percent of respondents felt that the residents participate and communicate more outside and they seem more relaxed. They may have memories of when they went to a botanic garden or on a vocation, and then plants help them to remember the experience. They love to talk about plants and will continue to talk for a long time which gives the staff some common ground with the residents.

*Being out there in those circumstances, triggered that memory, and he was able to tell me what he thought about exactly what they were talking... And when he's up there he doesn't talk. So it was very dramatic to me* (Respondent S9).

4.3.3.4 Autonomy

Raised gardening beds were considered a definite benefit as most of the respondents said that the residents enjoy gardening. Beds of different heights make the activity accessible to wheelchair-bound residents as well as ambulatory ones.

Gardening activity outdoors is beneficial because it is “*the whole essence of taking a stroll outside and one of the most important activities*” (Respondent S8). According to a staff member, residents enjoy going out and looking at all the plants and identifying them. Some residents enjoy watching the growth of vegetables from seeds as they did when they were children. A few of the residents grew up on a farm and gathered the vegetables by themselves. So for them, watering the plants and taking care of them, still gives them a sense of independence, responsibility, and accomplishment. One staff member at Site B introduced a Garden Club in their facility. Some residents dig and plant tomatoes, peanuts, and radishes, but the participation level depends on whether the individual can physically handle the activity. It also gives the staff something to talk about with the residents.
Now she is wheelchair bound and not real mobile, but they take her out there and they assist her. I think that’s very important. Just because she can’t do it anymore doesn’t mean to exclude her from it (Respondent F1).

However, there is also an opposite example. A family member indicated that her mother does not make an effort to touch anything in the garden anymore. She found it strange because she thought her mother would enjoy the activity since she was a gardener. Even when the facility has gardening projects on the patio, her mother will not put her hands in the dirt like she used to.

Indoor plants are also important to give residents something to do in cold weather such as, cutting flowers, replanting, or making table decorations. A staff member introduced that the residents to have an activity of arranging flowers that were cut from their gardens or arranging fake flowers in the activity room.

4.4.4 Recommendations for Garden Design from Respondents

Make the garden visually appealing. Ninety percent of those interviewed expressed a desire for more colorful flowers or special plants to draw residents outside, especially foliage that would bring interest in fall and winter. One respondent suggested using a multitude of colors but in sections. One respondent suggested using a multitude of colors but in sections.

Use scent to encourage recollection. If the flowers can provide fresh fragrance or can attract wildlife, they are more appealing. Respondent F2 said, “When you smell things, it just takes you back somewhere. A smell is comforting and maybe the mind cannot go there but the heart does and they feel that in their heart. So something fragrant would be fabulous!” A staff member also encouraged the use of perennials because they are easy to maintain.

Introduce positive sounds. Water features could be utilized in the garden to prove the soothing sound of running water.

Use furniture to foster activities. Furniture, such as a birdfeeder or birdbath, a potting bench, a place where residents can cut flowers or grow vegetables should be introduced to enrich the outside activities for residents.
Pay attention to safety and security. Some respondents suggested that the garden could be bigger and the path could be longer and wider. The dip between the planters and the concrete of the pathway needs attention to make them level. Two respondents also indicated that the garden should have good areas to sit either in the sun or in the shade.

*I think it could be better. I don’t know who set it up or who chose what and now that we have a contact for somebody that does the bit I think they are just regular landscape folks… I am pretty confident that they are not anybody that really talks about the residents that live here and what would be beneficial to them* (Respondent S8).

4.4.5 Benefits for the Respondent Personally

Gardens provide a peaceful oasis for facility staff members. According to most of the staff members, the garden is a soothing and relaxing outdoor atmosphere. Because of the way it smells, the way it looks, and the way it feels, the space to alleviate some of the stresses related to caring for the special needs of Alzheimer’s patients. Staff members go to the courtyard during lunch time to read a newspaper, look at the flowers, or just relax. They believed that the pleasant plants and nature in general, calms the spirit and puts them in a better mood.

Gardens provide a space for staff members to interact with residents on a more personal level. Some of the staff members thought that the garden was a good place to sit with residents and see them smile. Being outside helps residents reminisce, which brings a sense of accomplishment to the staff members.

*I get great joy watching and helping my residents with any activity… Doing gardening and potting with your resident, brings up a lot of memories to them and you get to learn things about your residents that you typically don’t know… And for me as the Executive Director, I carry a lot of stress, it’s a few moment of time that I kind of get to sit back and enjoy my residents and see them smile and I love the garden. So just plants in general – nature in general calms my spirit, so I am able to be in a better mood for my own staff* (Respondent S3).

*Life is so busy…I have a lot of things to do and you tend to spend more time inside, but if you take the time to go out and sit under a tree for 10 minutes and read a book as a person it kind of rejuvenates you* (Respondent S8).

*I don’t use that garden enough but I do always feel really good when I am there. And I think, “Why don’t I come out here more often?”* (Respondent S9).
Gardens provide a more relaxing space for families to interact with residents. A lot of families accompany resident to the garden just to be in their presence because they believe that visiting is easier when they are in the gardens. Pretty areas make it feel less like a prison and it has a calming and peaceful effect to avoid the yelling from other residents. One respondent thought that that garden takes her out of this atmosphere, gives her a sense that things are normal with mom, and gives her a little break from the life that she is living. Another family member said that sitting in the sunshine makes her feel better and makes her mother feel better. It also helps her to know that her mother is feeling more relaxed.

It is calming and it is peaceful... You have a calming peaceful effect; there is no loud noise except occasionally... It just makes me feel better and makes her feel better (Respondent F3).

4.5 Analysis of the Observations

Two observations were conducted in each facility. The schedule (Table 4.4) was determined by research and executive directors following the calendar of daily activity in each facility. Because of the rules of privacy, all the residents in the photos shown below are blurred.

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<th>Sun</th>
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<td>Site B</td>
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4.5.1 Findings in Site A

Residents show a preference for the timing of exercise. At Site A, the observations were conducted in both Courtyard B and DG from 9:30 to 11:00 in the morning and from 1:30 to 2:30 in the afternoon. Both observations showed that the elderly were more active in the
morning than in the afternoon. According to the activity assistants, residents are always eager to do exercises in the morning after breakfast. However, after they have lunch, most of them feel sluggish and want to have a nap in the activity room or their own rooms.

Residents show a preference for the structure of exercise. When they do outdoor exercises together, they would rather sit in a circle and let activities assistant standing in the middle or next to them (see Figure 4.10 a-b). Figure 4.11 shows that residents do different exercises in different courtyards.

When exercising, participation levels differed by gender. When residents did exercises or activities outside, males were more energetic than females. For example, residents did a balloon catching and throwing exercise in Courtyard DG one morning. There were eight male residents outside and all of them participated in the exercise. Conversely, 12 female residents were outside but only six of them sat in the circle. Among them, only three participated in the exercise while the others only watched and relaxed. The same thing happened in Courtyard B.

Even nonparticipants have interest in outdoor activities. Sometimes, one or two residents do not go outside with the others because of the weather or their own physical situation. However these residents are still interested in the outdoor activities. They will sit inside and watch the others through the windows (see Figure 4.12a).

When residents go outside, they enjoy the garden in different ways. They like to sit and relax along the wall where the eave provides a shaded area. Some residents in wheelchairs move around by themselves to look at roses, shrubs, or other plants (see Figure 4.12b). Some residents interact with the plants. For example, when a staff member picked up a rose for one female resident, she smelled it again and again, smiled, and then tried to pick up another one by herself (see Figure 4.12c).
Figure 4.10 Garden Plan Views and Residents Activity Locations at Site A

Figure 4.11 Therapists Lead Activities in Courtyard DG and B at Site A
4.5.2 Findings in Site B

At Site B, two observations were conducted in the therapeutic garden, one from 9:30 to 11:00 in the morning and the other from 1:30 to 2:30 in the afternoon. During these two observations, the same result as Site A was observed; the elderly were more active in the morning than in the afternoon.

There are a total of five sitting areas, including the gathering space under the big pavilion (see Figure 4.13, Figure 4.14). The sitting area in front of the brick wall is not protected by plants therefore the residents rarely use the area (see Figure 4.14b).

Female residents prefer to sit in peaceful areas such as the one under the trees on the west side or the one in front of the shrubs on the east side. They talk with the staff, enjoy the fresh air and beautiful views there (see Figure 4.15a).

When staff members have a large group, they use the space under the pavilion. Residents may sit in a circle or randomly to talk with each other. Sometimes a staff member provides a radio so they can listen to music and dance (see Figure 4.15b). Usually they spend 60-90 minutes outside depending on the weather.
Figure 4.13 Garden Plan View and Residents Activity Locations at Site B
(a) Residents' Preferred Sitting Areas

(b) Rarely used Sitting Area

Figure 4.14 Sitting Areas in the Therapeutic Garden at Site B
4.6 Summary

This study shows the benefits of open-ended, conversational qualitative research very well. Even though the questions were narrow, they prompted an expansive discussion of many issues involved in therapeutic garden design for dementia residents in long-term care facilities. Respondents answered the questions about the benefits of therapeutic gardens and characteristic of plants that contribute to the benefits. Facility staff and family members provided views on the principles of planting design such as safety and security, orientation, stimulation, and autonomy. In addition, respondents evaluated the existing pattern of use in their own facilities and also made many valuable recommendations for garden design. Finally, they emphasized that the gardens in long-term care facilities not only provide benefits for residents, but also have a positive impact for the caregiver themselves.

Observations as supporting data show similar results. Residents doing outdoor exercises prefer shaded or partially shaded areas to sit because of their sensitivity to sunshine. Residents have some reactions with plants, such as looking at colorful flowers, smelling fragrant plants, talking about interesting fruits, birds, butterflies, etc. In addition, when relaxing and enjoying the outdoors, or when doing exercises, they enjoy listening to music.
CHAPTER 5

CONCLUSION

_Psychosocial approaches, in particular, are underappreciated, even though these offer some of the best contributions to maximizing quality of life during the course of this tragic disorder. Indeed, thoughtful psychosocial, behavioral and environmental approaches can often have a faster, safer and more effective impact than pharmacological interventions in treating a range of secondary symptoms in Alzheimer’s disease._

— Gene D. Cohen, MD, PhD, Director Center on Aging, Health and Humanities George Washington University (Brawley, 2006, p.27)

5.1 Introduction

This chapter summarizes the design recommendations from literature reviews and interviews, and provides an enhanced list of planting design recommendations (see Table 5.1). In addition, it discusses some of the design implications that arise from the supporting categories identified through the research. Finally, the ideas for future research are indicated.

In this research, interview and observation notes are informative, especially as they combine with and relate to the reviews of literature. One of the main findings is that dementia residents, their families and the staff working with the residents would like to use therapeutic gardens or other outdoor spaces to enjoy fresh air, relax, rejuvenate, experience outdoor environment, or get away from the stress in long-term care facilities. The users also indicated that outdoor spaces make them feel peaceful, positive, and calm. Another important finding is that generalizations are difficult due to the multiplicity of site situations and program variables, and the unique and special environment of this special population – dementia patients. Any design guideline needs to contain flexibility and tolerance for individual circumstance depending on its own situation.
5.2 Design Recommendations

5.2.1 Safety and Security

Garden must be perceived as safe and secure by staff. The garden should be securely enclosed with design features, such as plants and vines camouflaging gates or fences. According to the respondents, residents are not adversely affected by views to open spaces or parking lots; therefore, the preliminary guideline “no views from space to agitate or entice (parking lots, open landscape)” has been removed.

The need for a peaceful environment which makes residents feel safe and protected is important. Appropriate noise, such as traffic sounds, does not disturb residents depending on their physical or mental situation. However, the residents’ outdoor space should be free of noise created by facility equipment.

The recommendation to eliminate toxic or hazardous plant materials is considered to be very important, especially for the older people who have little cognition to distinguish and react to dangers from the surrounding environment.

There is a need to establish direct access to outdoor areas for staff to observe or assist residents, especially for those who use wheelchairs but are able to move around by themselves. Design interventions such as large, strategically placed windows allow greater visibility, which helps the staff’s comfort levels (Brawley, 2006).

In this research, residents did not display sensitivity to dark or shadowy areas in the outdoor environment. However, according to several literary sources, in some cases, it is important and worthy of consideration depending on the stage of the patients’ disease, therefore, this recommendation remains in the list of recommendations.

Due to safety concerns based on experiences with residents in wheelchairs or those who use walking aids, the guideline to “make sure the pathway is even and is at the same or lower level than planters to avoid a dip on each side” is added. These dips occur because landscaped areas with no boundary will sink over time due to some level of soil loss. Another
suggestion is to use upward beveled edges on both sides of concrete walkways or ramps which can keep wheelchairs from rolling into lawns or landscaped beds.

Although the presence of a water feature can bring therapeutic sound to the garden, the guideline to ensure the feature is safe needs to be considered. Water should be potable and very shallow to enhance the safety of the fountain or water feature.

In facilities that use horticultural therapy with, it is important to restrict resident access to dangerous gardening tools.

5.2.2 Orientation

A pathway through a garden filled with trees, plants, and flowers that returns to the starting point is a very important design support. Providing multiple orientation cues reduces demands on the users. A lot of well-designed Alzheimer’s gardens use circular paths without ends, which allows one to enjoy walking in a natural environment without the frustration of figuring out how to return.

Due to the patients’ confusion of way-finding, the guideline is emphasized to use contrasting color codes to provide spatial cues. The color chosen can follow the direction of effective color contrasts in chapter two (see pp.46-48).

Seasonal colors and other interests are necessary, not only to provide visual enjoyment to the users, but also to help residents perceive seasonal changes. In North Texas, both summer and winter displays need to receive attention with plants that have special characteristics that can be seen from a distance, because residents cannot go outside frequently during these extremely hot and cold times.

A green roof cannot be considered by all of the facilities due to their own design. However, for the ones that have multiple floors with views of a patio, a variety of colorful plants can be used for the residents who cannot go to the garden outside the building.

Providing views of the garden from transitional areas with seating as well as from the indoor spaces is important to residents. Plants materials may be used to open or frame a view.
Avoid using dense trees in front of windows or the line of sight to activity areas. However, residents’ rooms need to be buffered from direct outdoor activity by either an appropriate distance or plantings.

Cultural objects, old-fashioned plants, and Texas native plants which are familiar to the residents from their childhood can be used as landmarks to make the garden a home-like atmosphere. Using a small scale, such as a birdbath instead of a big water fountain, makes residents feel like they are going into a beautiful garden in their own yards.

5.2.3 Stimulation

Of the five senses, visual stimulation is considered the most important. Using a good assortment of annuals or perennials, shrubs and tree to make a big area of one color that attracts residents’ attention is recommended. Also, consider using plants and trees with interesting shapes of leaves. Fruits or nuts can also draw a resident's attention.

Plants that can provide fresh fragrance and essential oils are very popular to evoke the memories, decrease pain, lower blood pressure, relieve anxiety, and promote sleep for residents. Consider using rose, lavender, lilac, mint, violet, etc.

Design a diverse landscape of plants, using deciduous, flowering, perennial and annual varieties creating a habitat to attract pleasant wildlife such as birds, butterflies, hummingbirds, and squirrels. Perennials are best because they are easier to maintain. In addition, introduce other garden ornaments such as a birdbfeeder, birdhouse or birdbath, in order to provide a variety of interesting associated tasks or activities for residents. The “Eden Project” can be introduced to provide a farm-like environment and pet therapy for residents.

Introduce therapeutic sounds into the garden such as the sighing and rustling of leaves and stems in the breeze and the tinkling or rushing of water. Enhance outdoor activities and exercise with music from the 1940s or 1950s to bring energy and comfort to the residents.

Exposure to sun, wind, and extremes in weather must be moderated. A transitional area or porch with landscape elements such as trees, shrubs, and vines is needed. A space with
sunny, partially shaded and shaded areas in the garden is important to allow residents to choose where they would like to sit depending on the weather. Especially in Texas, protection from the severe summer sun is very important as certain medications can make the skin more prone to sunburn.

In addition, plants should be included to supply material for indoor activities, such as drying, pressing, organizing, as well as providing plants for kitchen use.

5.2.4 Autonomy

Gardening, the simple act of getting one’s hands in the soil, can be therapeutic and stimulating. Providing outdoor and indoor gardening activities are beneficial for the residents to promote independence, responsibility, and encourage self-esteem. Plants for horticultural therapy need to be easy to propagate and grow so that residents can have a very strong sense of accomplishment during harvest season. Raised planting beds accessible to the handicapped, with a secure seating edge and perhaps a safe workbench are important. Also, creating a calendar of activities for the whole year is a meaningful way to keep residents busy and happy with something to do almost every day.

5.3 Developed Design Recommendations

The following list (see Table 5.1) represents the developed design recommendations for planting design in therapeutic garden for dementia residents in long-term care facilities as enhanced by the additional input of facilities evaluation, key informant interviews and observations. Further research and experience are required to continue the process of enhancement and refinement of these recommendations.
Table 5.1 Developed Design Recommendations in Therapeutic Garden for Dementia Patients

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendations</th>
<th>References</th>
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<tbody>
<tr>
<td>Safety and Security</td>
<td>Ensure that the outdoor space is securely enclosed using screening fences with plants and vines.</td>
<td>Carstens, 1998; Tyson, 1998; Zeisel and Tyson, 1999; Chalfont, 2008</td>
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<td></td>
<td>Design using camouflaging for gates or fences. Avoid using stark fencing which creates an enclosed, finite atmosphere which can feel stifling for the residents.</td>
<td>Respondents</td>
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<td></td>
<td>Create a peaceful environment which makes residents feel safe and protected.</td>
<td>Respondents</td>
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<td>Create comfortable pockets protected from outside distractions, prevailing winds, and intense heat from the sun with trellised screens covered in plants.</td>
<td>Tyson, 1998</td>
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<td></td>
<td>Avoid the use of toxic plant materials or small loose objects which could be ingested.</td>
<td>Stoneham and Thoday, 1996; Kennard, 2006; Chalfont, 2008</td>
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<td></td>
<td>Avoid the use of hazardous plant materials with sharp, spinney leaves or thorns.</td>
<td>Stoneham and Thoday, 1996; Carstens, 1998</td>
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<td></td>
<td>Avoid the use of plants that produce unpleasant sap, that sting or cause allergies.</td>
<td>Stoneham and Thoday, 1996</td>
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<td></td>
<td>Establish direct access to outdoor areas for staff to observe or assist residents.</td>
<td>Tyson, 1998</td>
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<td></td>
<td>Design interventions such as large, strategically placed windows allow greater visibility, which improves the staff’s comfort levels.</td>
<td>Brawley, 2006</td>
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<td></td>
<td>Avoid dark, shadowy areas. People with Alzheimer’s or other types of dementia can misinterpret these areas for negative events.</td>
<td>Kennard, 2006</td>
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<td>Use different heights of plants to avoid confusing residents.</td>
<td>Respondents</td>
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<td>Make sure the pathway is lower than the planters or even with the planters, to avoid the dip on each side. Use upward beveled edges on both sides of concrete walkways or ramps which can keep wheelchairs from rolling into the lawns or landscaped beds.</td>
<td>Respondents</td>
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<td>Use very shallow, potable water to ensure water features are totally safe.</td>
<td>Respondents</td>
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<td>Ensure dangerous gardening tools are not accessible when residents are planting.</td>
<td>Respondents</td>
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### Table 5.1 - continued

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<td><strong>Orientation</strong></td>
<td>Use a pathway through a garden filled with trees, plants, and flowers that returns to the starting point. This allows the resident to enjoy walking in a natural environment without the frustration of figuring out how to return.</td>
<td>Epstein, 2002; Brawley, 2006</td>
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<td></td>
<td>Use contrasting color codes to provide spatial cues for way-finding. Place colors in section to provide orientation cues.</td>
<td>Marberry and Zagon, 1995; Minter, 2005; Innes and McCabe, 2007; Wijk, 2007; Chalfont, 2008; Respondents</td>
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<td></td>
<td>Have seasonal color and points of interests.</td>
<td>Stoneham and Thoday, 1996; Tyson, 1998; Carstens, 1998</td>
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<td><strong>In winter displays, use plants with characteristics that can be seen from a distance.</strong></td>
<td>Respondents</td>
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<td>Choose shapes, heights, or placements for planters to ensure they will not be mistaken for a toilet.</td>
<td>Chalfont, 2008</td>
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<td></td>
<td>Design green roofs on new buildings as well as when modifying or renovating older ones.</td>
<td>Chalfont, 2008</td>
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<td></td>
<td>Use cultural objects, old-fashioned plants, and Texas native plants which are familiar to residents from their childhood as landmarks to make the garden a home-like atmosphere (rose, crape myrtle, hydrangeas).</td>
<td>Respondents</td>
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<td><strong>Use a small scale to make residents feel like they are going into beautiful gardens in their own yards.</strong></td>
<td>Respondents</td>
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<td>Incorporate views of the garden from transitional areas with seating as well as from the indoor spaces. Plants may be used to open or frame a view. Avoid using dense trees in front of windows or in the line of sight to activity areas.</td>
<td>Carstens, 1993; Tyson, 1998; Ulrich, 1999; Chalfont, 2008</td>
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<td></td>
<td>Use an appropriate or plantings to bugger residents’ rooms from direct outdoor activity.</td>
<td>Tyson, 1998</td>
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<tr>
<td>Stimulation</td>
<td>Use an assortment of annuals and perennials, shrubs and tree to make a big area of one color to attract the residents’ attention.</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Use plants with fragrance and essential oils to evoke memories, decrease pain, lower blood pressure, relieve anxiety, and promote sleep.</td>
<td>Marberry and Zagon 1995; Ghose 1999; Zeisel 1999; Minter 2005; Pearce 2007</td>
</tr>
<tr>
<td></td>
<td>Use plants that have leaves, petals, or stems with interesting textures or shapes.</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Design a diverse landscape of plants, using deciduous, flowering, perennial, and annual varieties which create habitats to attract pleasant wildlife such as birds and butterflies.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Use a birdfeeder, birdhouse, or birdbath to provide a variety of interesting tasks or activities for residents.</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Consider using the &quot;Eden Project&quot; to provide a farm-like environment and pet therapy for residents.</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Use therapeutic sounds in the garden; such as the sighing and rustling of leaves and stems in the breeze and the tinkling or rushing of water. Use music to enhance the residents’ mood and energy levels in the garden.</td>
<td>Marberry and Zagon, 1995, Ghose, 1999; Minter, 2005; Catlin, 2006; Wijk, 2007</td>
</tr>
<tr>
<td></td>
<td>Design a transitional area or porch with landscape elements such as trees, shrubs, and vines to moderate exposure to sun, wind, and extremes in weather.</td>
<td>Carstens, 1993; Carstens, 1998; Kennard, 2006</td>
</tr>
<tr>
<td></td>
<td>Create a space with sunny, partially shaded and shaded areas to allow residents to choose where they would like to sit depending on the weather.</td>
<td>Respondents</td>
</tr>
<tr>
<td></td>
<td>Incorporate plants to supply material for indoor activities, such as plants for drying and pressing as well as plants for kitchen use.</td>
<td>Ghose, 1999</td>
</tr>
<tr>
<td>Category</td>
<td>Recommendations</td>
<td>References</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Autonomy</td>
<td>Provide indoor and outdoor gardening activities as horticultural therapy to promote independence and encourage responsibility.</td>
<td>Stoneham and Thoday, 1996; Tyson, 1998; Catlin, 2006; Kennard, 2006; Chalfont, 2008; D'Andrea, Batavia and Sasson, 2007-2008</td>
</tr>
<tr>
<td></td>
<td>Use plants that are easy to propagate to grow for horticultural therapy.</td>
<td>Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Use raised planting beds for gardening with a secure seating edge and perhaps a safe workbench for handicap accessibility.</td>
<td>Carstens, 1993; Carstens, 1998; Tyson, 1998; Chalfont, 2008</td>
</tr>
<tr>
<td></td>
<td>Create a calendar of activities for the whole year to incorporate horticultural resources in a meaningful way. Caregivers can list the major holidays that are relevant to individuals or the community, and celebrations or special events relevant to the facility.</td>
<td>Catlin, 2006</td>
</tr>
</tbody>
</table>
5.4 Relevance to Landscape Architecture

The main goal of this study is to investigate the benefits of plants in therapeutic gardens by probing the experiences of principle users in long-term care facilities and enhance the environment and the quality of life though the development of design recommendations for outdoor spaces for these residents, their families, and the staff.

Because the need for design of outdoor spaces related to healthcare facilities is growing, the list of developed design recommendations can be used for planting design of outdoor spaces in long-term care facilities. The list can be used for evaluation of existing and proposed patterns of use in facilities. Although the list of recommendations can be further refined and enhanced, dementia residents could benefit in terms of safety and security, orientation, stimulation and autonomy through outdoor spaces.

In the educational field, many universities and colleges have certificate programs in therapeutic healing garden design, such as The University of Washington, or landscape architecture programs or specialties in therapeutic site design, such as Texas A & M University Center for Health Systems and Design and the University of Virginia Center for Design and Health. The landscape architecture curriculum could benefit from the specialty in healthcare design. There is an opportunity and a need to teach theory and practice, as well as develop programs for special user groups in the modern world. Because of their special physical and psychological situations, landscape architects and designers need to pay even more attention to design principles and conditions than in other garden settings. As Gilson (1994) indicated, the use of the emphatic model, and design based on operational philosophies, can assist the landscape architects devising a design which serves and satisfies the therapeutic, restorative, and functional purpose.
5.5 Summary

“When I walk out of my house, I feel young, lovely, and anxious to see beautiful flowers and green grasses. Generally, it lightens my spirit. I feel like dancing.” Resident (Zeisel and Tyson, 1999, p.440)

Within the next 30 years, 78 million “baby boomers” will enter their senior years as more knowledgeable, assertive, computer-savvy, and vocal consumers than the current generation of seniors (Brawley, 2006, p.95; Kodner, 1993, cited in Desai and Grossberg, 2010, p.418; Alzheimer’s Association, 2012). These baby boomers will present unique challenges with their expectations of healthcare and information sources based on differences in their lifestyles. They will expect access to natural outdoor environments and services that appeal to their particular interests and hobbies as opposed to their age (Desai and Grossberg, 2010).

Although there is no cure for Alzheimer’s disease or some other related dementia, there are a range of treatment options for the patients and their families (Brawley, 2006). As Alzheimer’s progresses, patients experience increasing difficulty in communicating, navigating their living space and interpreting environmental information. Family members and facility caregivers may be at a loss as to how to spend time with and take care of the patients (Carman, 2002; Brawley, 2006). The dilemma is exacerbated because even small changes in the environmental may cause adverse reactions in dementia patients if they misinterpret normal stimuli as overstimulation (Brawley, 2006).

Since it is well known that the introduction of natural elements produces positive behavioral results, it is easy to extend that reasoning to people with special needs or conditions (Carman, 2002). The garden provides a safe, comforting environment for residents where visits with family and friends can be enjoyed. A properly designed garden with calm, structured surroundings can help reduce confusion, agitation and other challenging behaviors for an individual with dementia. It also offers many opportunities for socialization, sensory stimulation, as well as meaningful and fun activities, which encourage a sense of well-being and provides effective therapy for residents’ good health in long-term care facilities (Carman, 2002; Brawley,
According to Brawley (2006), society is beginning to understand the value of gardens and the outside environment as part of a comprehensive therapeutic program for the elderly. “Nature elements, such as trees, flowers, water, and sunshine, are strongly soothing to older adults with Alzheimer’s disease” (Mooney and Nicell, 1992, Beckwith and Gilster 1997, cited in Carman 2002, p.112).

In this research, the stages of Alzheimer’s of the disease are introduced. Special care units, as unique long-term care facilities, have been built to provide better quality care than the traditional nursing home setting for dementia patients. Principles of design for dementia patients are numerous, however, the most applicable to therapeutic gardens are chosen as design to ensure safety and security, design as a cue for orientation, design to provide an appropriate degree of stimulation, and design to maximize autonomy. In addition, a review of literature in the fields of planting design for dementia provides important input into the development of the design recommendations.

Two long-term care facilities were studied in the Dallas-Fort Worth metropolitan area. The sites were evaluated against the preliminary design recommendations from the literature. In each facility, seven staff and family members as secondary users were interviewed to determine the benefits of therapeutic garden in outdoor spaces for dementia residents as well as for the staff and family members personally. Then, observations were conducted as supporting data to better understand the residents’ behaviors when they relax, participate in activities, or exercises in outdoor settings. Finally, the list of developed design recommendations was provided according to the literature review and the respondents from the respondents.

5.6 Future Research

Cooper Marcus and Barnes (1999) indicate that the most accurate method is monitoring physiological changes by physical measures as an indicator of emotional shifts. Accordingly, more empirical research is needed to quantify the therapeutic benefits when residents have activities or exercises in outdoor spaces, even though in the field of dementia, it is both
expensive and complex. Also, tests need to be conducted to determine the benefits of therapies for residents, such as reminiscence therapy, aromatherapy, and horticultural therapy, to help convince developers and managers of long-term care facilities that this investment is worth the time, money, and effort. Certainly, the outdoor testing needs research attention. According to Gilson (1994), “the use of color contrast in the landscape to orient patients, the pleasing garden environments, etc., should be tested to determine applicability” (p.108).

In addition, more research needs to be performed to link patient behavioral outcomes with specific outdoor environmental features. In this research, it is proven that observation could provide useful data to document the benefit in therapeutic gardens for dementia residents. However, due to the limited time span, observations were only conducted twice and each lasted for only 60-90 minutes. In order to better understand the human-environment behavior, there should be more concentration for observations, behavior mapping and other approaches of data collection and analysis.

In this study, participants’ responses were mostly on regional climate and landscape, such as trees and flowers in North Texas (Appendix D). Therefore, landscape architects need to develop a list of design recommendations, a palette of plants and materials as well as a maintenance schedule that would resonate with residents in different regions by interviewing the users, studying with gardeners, and horticulturists, as well as awareness of the appropriate plants of that area. Also, the cost and feasibility of the palette and the schedule needs to be tested in long-term care facilities in future studies.

The level of knowledge and commitment in the landscape architecture profession to horticultural therapy is very important. Caregivers and landscape architects need to work together to identify methods of getting information to the consumers, such as patients and their families, so they will demand more horticultural therapy for beneficial outcomes.

According to Texas A&M University (2012), although several landscape design recommendations have been published, very few outcome-based studies have attempted to
measure the effect of landscape features on outdoor usage. Future research could study the lack of evidence by measuring how the landscape impacted outdoor usage and measure the difference in outdoor usage between an existing environment in which one of the landscape features had been modified. This flowchart below (see Figure 5.1) shows how research can be disseminated to diverse stakeholders in long-term care facilities, with subsequent informed decision making leading to supportive landscape design and improved health outcomes.

More and more disciplines are beginning to recognize the influence of the environment on physical and mental health as well as the social benefit. Environmental psychology is a relatively new discipline that specifically addresses the impact of the environment on psychological well-being (Tyson, 1998, p.14). As Uzzel and Lewand (1990) said, “More research is therefore needed to understand the psychological consequences and benefits of landscape design for particular groups of people in particular environments” (p.34, cited in Tyson, 1998, p.14). According to Cooper Marcus and Barnes (1999), “these disciplines are now beginning to address this connection by studying the effect that surroundings have on a number of factors – or processes – which indicate how an individual may be reacting to his or her environment” (p.107). Therefore, landscape architects or designers who are involved in therapeutic garden design need to associate with other experts, professionals, and researchers in the healthcare and environmental psychology disciplines. For example, landscape architects can join the Healthcare and Therapeutic Design in Professional Practice Network (PPN) for
American Society of Landscape Architecture (ASLA), to learn, share knowledge, and communicate with more open dialog. Figure 5.2 shows the variety of approaches to designing therapeutic gardens in special care units.

![Figure 5.2 The Variety of Approaches to Designing Therapeutic Gardens in Special Care Units (Source: Cooper Marcus and Barnes, 1999, pp.107-108).](image)

In accessing the future of the profession of landscape architecture, Lane Marshall, author of Action by Design (1983), stresses responsible design and the importance of integrated efforts between design and user needs. Although he recognizes the fact that behavioral research methods are seldom applied: “Few design clients demand their use, and fewer still are sensitive to their value; if quality of life is to be our ultimate goal, however, we must incorporate these techniques in the design decision-making process” (Tyson, 1998, p.13).
APPENDIX A

IRB APPROVAL LETTER
Institutional Review Board
Notification of Exemption

September 11, 2012

Cuiyan Mei
Dr. David Hopman
School of Architecture
Box 19108

Protocol Number: 2013-0017

Protocol Title: PLANTING DESIGN AND ITS IMPACT ON EFFICACY IN THERAPEUTIC GARDEN DESIGN FOR DEMENTIA PATIENTS IN LONG-TERM CARE FACILITIES IN NORTH TEXAS

Type of Review: Exemption Determination

The UT Arlington Institutional Review Board (IRB) Chair, or designee, has reviewed the above referenced study and found that it qualified for exemption under the federal guidelines for the protection of human subjects as referenced at Title 45 Part 46.101(b)(2). You are therefore authorized to begin the research as of September 9, 2012.

Pursuant to Title 45 CFR 46.103(b)(4)(iii), investigators are required to, “promptly report to the IRB any proposed changes in the research activity, and to ensure that such changes in approved research, during the period for which IRB approval has already been given, are not initiated without prior IRB review and approval” except when necessary to eliminate apparent immediate hazards to the subject.” Please be advised that as the principal investigator, you are required to report local adverse (unanticipated) events to the Office of Research Administration; Regulatory Services within 24 hours of the occurrence or upon acknowledgement of the occurrence.

All investigators and key personnel identified in the protocol must have documented Human Subject Protection (HSP) Training on file with this office. Completion certificates are valid for 2 years from completion date.

The UT Arlington Office of Research Administration; Regulatory Services appreciates your continuing commitment to the protection of human subjects in research. Should you have questions, or need to report completion of study procedures, please contact Robin Dickey at 817-272-9329 or robind@uta.edu. You may also contact Regulatory Services at 817-272-3723 or regulatoryservices@uta.edu.
APPENDIX B

SAMPLE HUMAN BEHAVIOR OBSERVATION FORM
# HUMAN BEHAVIOR OBSERVATION FORM

Cuiyan Mei, MLA

The University of Texas at Arlington, 2012

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
<th>Weather:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Facility Name:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Location:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Field Notes Based on Observations</th>
<th>Reflections: Methodological Notes, Theoretical Notes and Personal Notes</th>
</tr>
</thead>
</table>

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APPENDIX C

INTERVIEW NOTES
## INTERVIEW NOTES

### Staff Member #1

<table>
<thead>
<tr>
<th>Benefits of therapeutic garden</th>
<th>Calms residents down</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residents are able to focus on an activity for only five minutes when inside due to excess stimulation however, they can focus for 20 to 30 minutes in the garden</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics of plants that contribute to the benefits</th>
<th>Brightly colored roses and even some greenery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flowers with subtle, soothing fragrances, such as lavender, or scents that remind residents of home cooking, such as cinnamon or pumpkin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respond to the principles of planting design</th>
<th>Safety and Security</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any kind of plants that are not poisonous because some residents cannot distinguish between safe and harmful plants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Seasonal: Residents can distinguish the time of year by the plants and fruits that are growing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evocative: Hydrangeas remind residents of Mother’s Day</td>
</tr>
<tr>
<td></td>
<td>Homelike: Make the environment look like a backyard with lots of flowers, bushes and trees</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stimulation</th>
<th>Winter: Take residents out around lunch time in nice weather</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fragrance/Aroma therapy: Scent evokes memories encouraging verbalization, socialization, and feedback</td>
</tr>
<tr>
<td></td>
<td>Recollection: Reminiscing in a garden allows residents to talk about their past</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Autonomy</th>
<th>Horticultural therapy gives residents a sense of independence and responsibility</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Recommendations for garden design</th>
<th>Utilize more flowers and plants draw residents outside which reduces their stress levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incorporate gardening activity in the springtime</td>
</tr>
<tr>
<td></td>
<td>Utilize water features such as a small waterfall</td>
</tr>
<tr>
<td></td>
<td>Include plants that can attract butterflies or birds</td>
</tr>
</tbody>
</table>

| Benefits for the respondent personally | A soothing and relaxing outdoor atmosphere to alleviate some of the stresses related to caring for the special needs of Alzheimer’s patients |
INTERVIEW NOTES-CONTINUED

Staff Member #2

<table>
<thead>
<tr>
<th>Benefits of therapeutic garden</th>
<th>Allows residents who are from a generation that were raised without air conditioning to reconnect with nature reminiscent of their childhood</th>
</tr>
</thead>
</table>
| Characteristics of plants that contribute to the benefits | • Use colors to create a calming atmosphere  
• Use colors that residents like, such as yellow and red |
| Respond to the principles of planting design |  |
| Safety and Security | • Do not have anything that produces berries, such as Nandina or any plants that have thorns |
| Orientation | • Eden Project – keep animals such as dogs, cats and birds in the building, and keep other animals such as chicken outside, similar to a farm  
• Use plants that help residents make connection with their past  
• Vegetable and roses were common in that generation |
| Stimulation | • Planting: When residents physically put their hands in the soil to plant, and water the plant daily, they are eager to go outside to communicate with nature  
• Nature watching: Residents love to look at the birds in the main hall  
• Pet therapy  
• Stimuli: A tall Chinese privet bush draw residents’ attention |
| Autonomy | • Planting something and watering it, reminds residents of the days they went outside and started gardening with their parents |

Recommendations for garden design

Benefits for the respondent personally
### INTERVIEW NOTES-CONTINUED

#### Staff Member #3

| Benefits of therapeutic garden                                      | The colors and scents in nature are calming and serene elements to the minds and bodies of the residents  
|                                                                      | Reminiscing brings back memories of happy times to the residents  
| Characteristics of plants that contribute to the benefits           | Scent: Bushes and plants such as roses that have different colors and a variety of scents  
|                                                                      | Cherry blossoms create happy associations for residents with their beautiful bright color flowers  
| Safety and Security                                                 | Rose bushes may connect the garden with a memory of a resident’s mother or grandmother which brings a sense of security to them  
| Orientation                                                         | Seasonal: Residents recognize the changing of the season when they watch the cedars and other trees change colors in fall, and even during the winter months when they can’t go outside, they watch the evergreens through the windows, then there are bright colors in the courtyard in the spring  
|                                                                      | Homelike: Typical plants such as rose bushes, with which residents have a lot of memories connected  
|                                                                      | The view from the window can enhance the quality of life – a resident wakes up to see greenery or flowers or sunshine - in general, the view helps their mood  
| Stimulation                                                         | Vegetable garden, lavender and edible herbs  
|                                                                      | Aroma therapy with scents and fragrances  
|                                                                      | Textures (fabrics) used indoors and plants used outdoor  
| Autonomy                                                            | Rehab therapy - planting pots and watering flowers – depends on residents’ cognitive processes and physical ability  
| Recommendations for garden design                                   | Improve colors, especially in the fall and winter  
|                                                                      | Introduce water features, lighting features, different types of desert plants or rock gardens  
| Benefits for the respondent personally                             | A lot of families accompany resident to the garden just to be in their presence because it is beautiful  
|                                                                      | A lot of staff members spend time in the courtyard because of the ways that it smells, the way that it looks, and the way that it feels  
|                                                                      | The garden is a place to sit with residents and see them smile  
|                                                                      | Plants, and nature in general, calms my spirit and puts me in a better mood  

**INTERVIEW NOTES-CONTINUED**

**Staff Member #4**

<table>
<thead>
<tr>
<th>Benefits of therapeutic garden</th>
<th>A lot of residents like to plant because it keeps their mind busy, and keep them active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of plants that contribute to the benefits</td>
<td>Bright, cheerful colors lift the spirits of residents</td>
</tr>
<tr>
<td><strong>Respond to the principles of planting design</strong></td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
</tr>
<tr>
<td>Seasonal: In the summer, there are plants growing well in the garden – use different plants for the different seasons</td>
<td></td>
</tr>
<tr>
<td>Homelike: Use typical plants</td>
<td></td>
</tr>
<tr>
<td>The view from window is important because it uplifts and cheers the residents with its brightness</td>
<td></td>
</tr>
<tr>
<td>Stimulation</td>
<td></td>
</tr>
<tr>
<td>Residents may have memories of that they went to some flower garden or a vacation; plants help them remember this experience</td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td></td>
</tr>
<tr>
<td>Gardening is beneficial because the activity makes residents remember something that they enjoy doing</td>
<td></td>
</tr>
<tr>
<td><strong>Recommendations for garden design</strong></td>
<td></td>
</tr>
<tr>
<td>Benefits for the respondent personally</td>
<td></td>
</tr>
<tr>
<td>The Garden is calming, so I sit there and read a newspaper, look at the flowers or just relax</td>
<td></td>
</tr>
</tbody>
</table>
### INTERVIEW NOTES-CONTINUED

**Staff Member #5**

| Benefits of therapeutic garden | Makes residents feel like they are in a home environment as opposed to being in an institution – grass grows all the way up the slopes and down to the street, which is much prettier for their eyes to see than asphalt  
When residents have visitors, they will go there as a serene space  
Calms residents down  
Gives them extra energy because they are not just sitting around |
|---|---|
| Characteristics of plants that contribute to the benefits | Gardening was one thing they really like to do and so they enjoy going out and looking at all the plants and identifying them  
It gives the staff something to talk about with the residents who are interested |
| Respond to the principles of planting design | **Safety and Security**  
Do not use stark fence which makes residents feel that they are a finite part – camouflage the gate and the fence  
**Orientation**  
Place bushes around the areas and under the windows – just like a home  
**Stimulation**  
Colorful flowers  
Some residents love to talk about plants and will talk for a long time which gives the staff some commonality with them  
**Autonomy**  
Some residents ask about that and will go outside separately to plant something because they really enjoy it |
| Recommendations for garden design | Camouflage the gate or the fence  
Have more green trees and colorful flowers |
| Benefits for the respondent personally | Pretty areas make it feel less like a prison  
It is nice and pleasant and relaxing there  
It’s uplifting to see residents when they are doing happy stuff – not somebody just in an office |
Staff Member #6

| Benefits of therapeutic garden | Doing outdoor activities in the garden is very helpful to residents’ well-being  
|                                | Residents go outside and like to go past the bushes and flowers  
| Characteristics of plants that contribute to the benefits | Brightly colored ones and fragrance  
| Safety and Security | Residents normally do not pick plants up, they just like to look at them and take care of them  
|                                | Residents are in a secure location with walls around them, and they can look through the windows and can feel safe outside  
| Orientation | Regular bushes and trees that reminds residents of their backyard or their house  
|                                | Residents usually have activities in the day living room or their own rooms so they can lift their blinds to see something nice  
| Stimulation | Residents like to sit in the sun or by the windows depending on the weather  
|                                | The plants that have strong fragrance help to awake the senses for residents  
|                                | Mainly vision and touch  
| Autonomy | Gardening activities help residents feel good – they are taking care of something and when plants start to grow, they feel that they have an accomplishment  

Recommendations for garden design  

| Benefits for the respondent personally | Being outside helps residents reminisce about when they were taking care of their own yard, which makes me also have a sense of accomplishment  
|                                | Reduces stress and has a rest/escape from the noise of residents  

### INTERVIEW NOTES-CONTINUED

**Staff Member #7**

| Benefits of therapeutic garden | Residents appreciate the environment and enjoy the garden  
|                               | Some calm down and some talk more, it has a double benefit for two different types of residents  
|                               | Makes them feel better  
| Characteristics of plants that contribute to the benefits | Flowers bring visual enjoyment  
|                                                          | Colorful plants like pansies and roses in different levels, no particular color  
| Respond to the principles of planting design | Safety and Security  
|                                                 | Have some plants that are raised for residents on the wheelchairs or who need to bend down to look at them  
|                                                 | Different heights of plants are important, in case make them confused  
|                                                 | Are not able to reach out or grab something  
|                                                 | Residents will not pick up or eat something  
|                                                 | The sidewalk needs to be wide and cannot have gaps with planters, because their chairs can roll off  
|                                                 | Peaceful environment  
|                                                      | Orientation  
|                                                      | Seasonal: Notice the color change of oak leaves and they know this is fall; when flowers bloom, they will talk about spring  
|                                                      | Homelike: Ferns, roses, and crape myrtle trees  
|                                                      | Stimulation  
|                                                      | Residents enjoy listening to the moving water in the fountain, they will always turn their heads and look to see where that sound is coming from – huge benefit  
|                                                      | The same thing with birds singing  
|                                                      | Different colors and texture  
|                                                      | Fragrance  
|                                                      | Open up and talk when they are in the garden  
|                                                      | Pick up an acorn  
|                                                      | Autonomy  
|                                                      | They seem to be comfortable and happy  
|                                                      | Garden club  
|                                                      | Residents dig and plant little things but the participation level depends on the situation – whether they can physically handle the activity  
| Recommendations for garden design | Bring more fragrance  
| Benefits for the respondent personally | Reduce stress and feel contentment when I stay with residents |
**INTERVIEW NOTES-CONTINUED**

**Staff Member #8**

| Benefits of therapeutic garden | • Brings back memories of their own gardens  
• Anything that attracts birds or butterflies or other things that stimulate their minds  
• In good weather, go to the garden, stop and smell flowers and listen to the birds  
• Peaceful and relaxing |
| --- | --- |
| Characteristics of plants that contribute to the benefits | • Wild and natural garden – on some structured/organized level  
• Everybody can identify roses and watch them blooming  
• A multitude of colors but in sections |
| Safety and Security | • No poisonous things  
• Staff pick up roses for residents to avoid thorns  
• Uneven sidewalks or drops may cause residents to fall off  
• Hearing a car honk is a part of going outside  
• No dangerous gardening tools accessible when residents are planting |
| Orientation | • Plants relate very well to the seasons and residents always discuss them  
• Some residents look out the window to watch the wild cats in the garden  
• Old fashioned plants such as roses, daisies, sunflowers, instead of modern ones |
| Stimulation | • Visual, hearing and smelling stimulation  
• Talk about their own gardens, bring back their memories in their home  
• Residents are interested in the flowers that can attract butterflies |
| Autonomy | • Gardening is the whole essence of taking a stroll outside and one of the most important activities  
• Garden club, plant tomatoes, peanuts and radishes  
• Flower arrangement with fake flowers  
• Cut flowers in the garden when it is the last bloom, bring them inside and put in a vase |
| Recommendations for garden design | • Landscape folks need to talk to the residents to learn what would be beneficial to them  
• The fountain should work well and have the sound of water running |
| Benefits for the respondent personally | • Just the benefits that nature has for most people in general  
• Nature rejuvenates most people if they allow it to |
<table>
<thead>
<tr>
<th>INTERVIEW NOTES-CONTINUED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff Member #9</td>
</tr>
</tbody>
</table>

### Benefits of therapeutic garden
- All the senses that a person has – touch, smell, sight, hearing, even taste – can be touched by a garden
- Helps the person’s brain
- The residents can walk by and touch them, smell them, which reminds them of gardens that they used to have
- Residents can loot out from the windows upstairs and look at all the plants in the neighborhood
- People talk more and more clearly

### Characteristics of plants that contribute to the benefits
- Roses are familiar so residents can remember what they are and talk about them

### Respond to the principles of planting design

| Safety and Security      | All seasons are good when they have a lot of color changes in the garden
|                         | A lady made snowballs in the garden and was excited to be out in the winter
|                         | Seasonal changes give residents more activities
|                         | More casual gardens with birds, a plain bird bath rather than a fountain
|                         | When everything is in small scale, it makes residents feel like they are going into a beautiful garden in their own yards
|                         | Familiar flowers and grass rather than concrete

| Orientation              | The taller bushes behind the part that is curved can make residents feel safe and protected
|                         | The open area has traffic sounds which has a bad influence on residents

| Stimulation              | There are people who cannot communicate well but can interact with plants because it triggers their memories and their senses

| Autonomy                 | The idea of planting something and watching it grow is something that very little children like, and it’s something that residents do not ever forget
|                         | It gives a feeling of accomplishment and they have something to take care of, which gives them some meaning in their lives, it gives something to do
|                         | Plant tomatoes, water them and watch them grow in the daycare program

### Recommendations for garden design
- Have a potting bench, a place where residents could feed birds or have a place where they can cut the flowers, or grow some vegetables on the patios
- Have more variety of color, but better perennials because it is easy to take care of
- Introduce more fresh fragrance

### Benefits for the respondent personally
- Families come there a lot to sit outside there
- Some kitchen employees sit in the garden and have their lunch
- Would like to get a laptop and go there to work
- People would ask, “why don’t I come out here more often”
**INTERVIEW NOTES-CONTINUED**

**Staff Member #10**

| Benefits of therapeutic garden | Wakes residents up  
|                               | Example – one gentleman doesn’t talk very often, but when he is in the garden, he talks a lot about the weather, about the wild life and he loves water garden |
| Characteristics of plants that contribute to the benefits | Residents like planting vegetables and followers from seeds and then watching them grow  
|                                                          | Bright colors and fragrance wakes up residents’ senses |
| **Safety and Security** | Enclosed garden with open views so residents can see the world outside and not be totally blocked with plants  
|                                                          | Make sure that they won’t go off the concrete path and hit the grass area |
| **Orientation** | When residents see the plants blooming they know it is spring, and when they see the color changes of the leaves or leaves falling from the trees, they know it is fall  
|                                                          | Roses, vibrant color, things like they used to plant in their garden at home  
|                                                          | Vegetables because a lot of them were gardeners  
|                                                          | Choose whatever residents like – depends on where they are in their cognitive level |
| **Stimulation** | Pretty colors and pretty smells like that of a rose  
|                                                          | Some of the residents cannot see well, then their hearing is more delicate; they hear more sounds and they will make comments such as when they hear the rain |
| **Autonomy** | Residents can remember things they have done in their past  
|                                                          | Plants indoor are important to give residents something to do in cold weather – cut flowers, replant, make table decorations |
| **Recommendations for garden design** | The dip of the planters can be more level with the concrete of the pathway  
|                                                          | More flowers in different seasons, at least more greenery |
| **Benefits for the respondent personally** | When residents get enjoyment, it also gives me enjoyment |
### INTERVIEW NOTES-CONTINUED

**Family Member #1**

| Benefits of therapeutic garden | Plants clean the air and give oxygen as a health benefit  
| Residents will find it familiar  
| The pleasant looks on residents’ faces, relaxing and bringing back good memories, feeling secure |
| Characteristics of plants that contribute to the benefits | Familiar plants, especially blooming plants  
| Fragrance, the smell of fresh flowers |
| Respond to the principles of planting design | Safety and Security  
| A rose thorn might injure them  
| Traffic noise will be disturbing |
| Orientation | Chrysanthemums would be a sign of fall, roses a sign of spring  
| Use Texas native plants |
| Stimulation | Hearing nature and anything that will attract birds, a soothing waterfall  
| Going outside help the resident enjoy the air and the atmosphere |
| Autonomy | Horticulture therapy makes residents feel like they are at home; that they are back in their own surroundings |
| Recommendations for garden design | More floral blooming types and more Texas native plants  
| Plants that promote birds, attract butterflies and hummingbirds |
| Benefits for the respondent personally | Takes me out of this atmosphere and gives me a sense that things are normal with mom, gives me a little break from the world that I am living |
**INTERVIEW NOTES-CONTINUED**

**Family Member #2**

| Benefits of therapeutic garden | • A real treat for us to walk through those gardens  
| • Colors and smells are both therapeutic  
| • It picks up the spirit, allows us to be active and is always good just to get outside the four walls |
| Characteristics of plants that contribute to the benefits | • Roses because they smell good  
| • Plants of different shapes and colors with different blooms  
| • Very tall plants with purple blooms on the top  
| • Plants that have clusters of berries can catch the eye |

| Respond to the principles of planting design | Safety and Security | • Plants that have thorns shouldn’t be touched |
| Orientation | • Different things bloom at different times, then die and come back again helping residents recognize seasonal changes  
| • Plants that residents recognize makes them feel like they are back home |
| Stimulation | • Sight and smell  
| • Loves the birds and seeing the butterflies that are drawn to the plants |
| Autonomy | • Example: One lady enjoys gardening and loves to water her plants and takes care of them  
| • Likes to have a vase of flowers in the room |

| Recommendations for garden design | • Find some plants that are fragrant but do not have a sharp odor  
| • More windows so the garden can be seen from inside  
| • Make it bigger and have something different such as a bigger fountain and some birdfeeders |

| Benefits for the respondent personally | • Visiting is easier when we’re in the garden |
**INTERVIEW NOTES-CONTINUED**

**Family Member #3**

<table>
<thead>
<tr>
<th>Benefits of therapeutic garden</th>
<th>My mother grew plants and even if she has nothing else to do, she likes to see the plants and talk about the colors and how pretty they are.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>My mother does not want to come inside, she would rather stay outside.</td>
</tr>
<tr>
<td></td>
<td>Cognizant – comments make more senses when she is focusing on flowers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics of plants that contribute to the benefits</th>
<th>Sideoats grama – like the seeds on the side of it</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Focuses on acorns, picks them up and gives them to me.</td>
</tr>
<tr>
<td></td>
<td>Grasses because the leaves are flowing.</td>
</tr>
<tr>
<td></td>
<td>Beautyberries with a big cluster of bright purple berries.</td>
</tr>
<tr>
<td></td>
<td>Azaleas that bloom in the spring with bright pink petals.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety and Security</th>
<th>As long as they are not trying to eat any of the plants.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noise – depends on the individual – she comments on the noise but it does not disturb her.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Comments when the plants are losing all their leaves, she recognizes that the plants go through phases, but does not really comprehend that it is seasonal change.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Different layers of plants – from little dwarf varieties (Mexican petunias) to taller bushes (beautyberries) to ornamental trees (crape myrtle).</td>
</tr>
<tr>
<td></td>
<td>Ornamental kale with colored leaves in the winter.</td>
</tr>
<tr>
<td></td>
<td>The room has a window that looks at a wall which is very disappointing because the place she was before had a window where she looked outside a lot.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stimulation</th>
<th>Different sizes of plants with different colors.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Texture – Lamb’s ear is a soft one with the fuzz on it.</td>
</tr>
<tr>
<td></td>
<td>Roses – she grew up with roses.</td>
</tr>
<tr>
<td></td>
<td>Hearing – likes to listen to the birds that are attracted by berries.</td>
</tr>
</tbody>
</table>

| Autonomy | Gardening does have benefits for some of the residents – touch the dirt, play with it, and get a plant out of this little container and put in the plant box. |

<table>
<thead>
<tr>
<th>Recommendations for garden design</th>
<th>Make it a little bit bigger.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Have good areas to sit in the sun or in the shade.</td>
</tr>
<tr>
<td></td>
<td>A good assortment of shrubs and trees.</td>
</tr>
<tr>
<td></td>
<td>Anything that attracts butterflies, hummingbirds, and other varieties of birds is good.</td>
</tr>
<tr>
<td></td>
<td>When it gets really hot in the summer, the patio will be boiling and it is harder for the plants to survive.</td>
</tr>
<tr>
<td></td>
<td>Have more colorful flowers that can bloom on the patio, not only holly bushes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits for the respondent personally</th>
<th>It has a calming and peaceful effect to avoid the yelling from other residents.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sitting in the sunshine makes me feel better and makes my mother feel better – helps me a lot to find that she is feeling more relaxed.</td>
</tr>
</tbody>
</table>
### INTERVIEW NOTES-CONTINUED

#### Family Member #4

| Benefits of therapeutic garden | He likes to go outside  
|                               | Enjoys having lunch on the patio – solitude  
| Characteristics of plants that contribute to the benefits | Visual enjoyment: Azaleas and blue violets with beautiful colors  
| Safety and Security | There is no danger – no poisonous plants or no plants with thorns  
| Orientation | Seasonal: he likes pansies in the winter; in the summer, he loves to see petunias; in the autumn, he always bought chrysanthemum and poinsettia  
|               | Example: He noticed that the trees turned yellow in the fall and notice that they budded out in the spring  
|               | Homelike: He likes crape myrtle and chrysanthemum because we have them at home  
| Stimulation | Probably sight because as a person with Parkinson, he has a hard time hearing and the sense of smell is diminished  
|               | Music Therapy: He enjoys 40s and 50s music very much  
|               | Example: Some residents do not speak, but when they hear music, they open up and talk about it  
|               | When the grandchildren are here, we go out in the garden and eat; he was concerned that the little children would fall into the little water fountain  
| Autonomy | It could be more organized with furniture and plants  
| Recommendations for garden design | Residents on the second floor would enjoy the patio more than the therapeutic garden because it is a little more confined  
|               | Have more interests such as flowers that can attract wildlife  
| Benefits for the respondent personally | I like to take him outside for lunch because it is a pretty good patio and when it is really sunny, we can get out and sit under the roof  

APPENDIX D

PLANT LIST
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Latin Name</th>
<th>Type</th>
<th>Estimated Bloom/Foliage</th>
<th>Sun</th>
<th>Part Shade</th>
<th>Shade</th>
<th>Low Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Beautyberry</td>
<td><em>Callicarpa americana</em></td>
<td>SH</td>
<td>JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aster</td>
<td><em>Aster frikartii</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autumn Sage</td>
<td><em>Salvia gregii</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Costal Live Oak</td>
<td><em>Quercus virginiana</em></td>
<td>TR</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chrysanthemum</td>
<td><em>Chrysanthemum spp.</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Crape Myrtle</td>
<td><em>Lagerstroemia indica</em></td>
<td>OT</td>
<td>variety colors and time span</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Dwarf Yaupon Holly</td>
<td><em>Ilex vomitoria ‘Nana’</em></td>
<td>SH</td>
<td>Fruit</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lamb’s Ear</td>
<td><em>Stachys byzantina</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lavender</td>
<td><em>Lavandula angustifolia</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexican Plum</td>
<td><em>Prunus mexicana</em></td>
<td>OT</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Mountain Pea</td>
<td><em>Orbexilum pedunculatum</em></td>
<td>GC</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Mexican Petunia</td>
<td><em>Ruellia brittoniana</em></td>
<td>PE</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Nandina</td>
<td><em>Nandina domestica</em></td>
<td>SH</td>
<td>Fruit</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Oak Leaf Hydrangea</td>
<td><em>Hydrangea quercifolia</em></td>
<td>SH</td>
<td>Fruit</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Pansy</td>
<td><em>Viola hybrids</em></td>
<td>A</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poinsettia</td>
<td><em>Euphorbia pulcherrima</em></td>
<td>SH</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rose</td>
<td><em>Rosa spp.</em></td>
<td>SH</td>
<td>variety colors and time span</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Side oats Grama</td>
<td><em>Bouteloua curtipendula</em></td>
<td>GR</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Texas Red Oak</td>
<td><em>Quercus shumardii</em></td>
<td>TR</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas Redbud</td>
<td><em>Cercis canadensis</em></td>
<td>OT</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Yaupon Holly</td>
<td><em>Ilex vomitoria</em></td>
<td>OT</td>
<td>Fruit</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
REFERENCES

Book and Journal Resources:


Internet Resources


BIOGRAPHICAL INFORMATION

Cuiyan Mei was born in a warm family in Tianjin, one of four municipalities of China. She earned her Bachelor's degree in Landscape Architecture in 2008 from China Agricultural University, Beijing, China. After working for one year in landscape architecture in Tianjin, Cuiyan decided to pursue higher education in the field of landscape architecture in the United States. With support from her family, especially from her grandparents, she enrolled in Program in Landscape Architecture at the University of Texas at Arlington from fall 2009 for the master's degree. While at the University of Texas at Arlington, she was honored with the Richard B. Myrick Landscape Architecture Scholarship from 2009 to 2012. She also received the Certificate of Honor for Excellence by the Texas Chapter of the American Society of Landscape Architects (ASLA) in Recognition of Outstanding Academic Achievement in 2012.

Upon her graduation in December 2012, Cuiyan wishes to pursue a career in landscape architecture, and perhaps work on designing therapeutic gardens for the elderly to enrich her interests in native plants, small-scale garden design, and interacting with older people.