

Alzheimer's Care Garden Design; Principles, Case Studies and Empirical Review.

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This paper investigates design principles for a therapeutic garden specifically for Alzheimer's patients. By first examining the Alzheimer's condition, the subsequent needs of sufferers are identified and the theoretical benefits that the garden environment can offer recognised. Examples and case studies are then illustrated and empirics analysed before a checklist of theoretical design principles is constructed for the intended use of assistance to a realised design and build project.

Alzheimer's condition.

Information on the physical and mental effects of Alzheimer's must be considered so that the needs and restrictions from a healing garden can be constructed.

Alzheimer's is a degenerative disease experienced predominantly by the elderly. The condition affects a brain at differing speeds, and in varying orders. Around fifteen years into the disease up to 40% of the brain mass will be effected, however, even into late into the disease some 80%-90% of brain function continues, sometimes sporadically.

Much of the degeneration to the brain that Alzheimer's disease causes can be broken down to distinct effects. The following is not an exclusive list; instead is more concentrated towards the effects that have direct relevance to design considerations.

Degeneration to the hippocampus.

This organ within the limbic area of the brain serves two primary purposes; it tags events and recalls previous ones to the cognitive mind, damage to this function is comparable to a healthy mind under the influence of alcohol or drugs. The hippocampus is damaged early with Alzheimer's. It is worth noting that locational memories, cognitive maps, are also controlled by the hippocampus, and are typically harder to "tag" than image or smell sensory experiences.

Damaged declarative learning.

A reduced ability to learn through study is experienced. There is also a reduction in procedural learning abilities, however, this is a less severe deterioration than on declarative learning.

Reduced thalamus, orbito-frontal cortex and hippocampal.

The regions of the brain that controls and suppresses impulse, such as when subjected to stress, aggression or sexual situations. When damage has been sustained to these regions patients experience less restraint against dangerous or inappropriate behaviour.

Loss of complex sequencing executive function.

The process of identifying and understanding micro activities places within a macro activity is damaged by Alzheimer's, such as cooking a meal or dressing in the correct order. This lack of understanding of sequence or outcomes can make an unfamiliar environment threatening to a sufferer, as it strongly affects the short run memory. Long run patterns that are embedded within the mind are less severely deteriorated.

Damaged supra-chiasmatic nuclei, (SCN).

These cells are the brains timekeepers that interact with the body's timekeeping functions, for instance feeling tired at a regular bedtime. Without external temporal support from Zeitgebers, such as clocks or sunlight, confusion can be experienced over ones place within the day, or even seasons.

Damage to the amygdale.

It is worth noting that damage to the amygdale, the small almond shaped organ through which emotion is experienced, is experienced late into the disease.

Needs.

The subsequent needs and restrictions Alzheimer's condition imposes onto a garden environment are now considered. Many of these "needs" will be inextricably linked into the next section; theoretical benefits. Also included in this section are the more practical restrictions, such as health and safety.

Access

Due to the mature population under consideration gardens must be easily accessible, exhibiting open, even paths, patios and functional items, such as benches and tables.

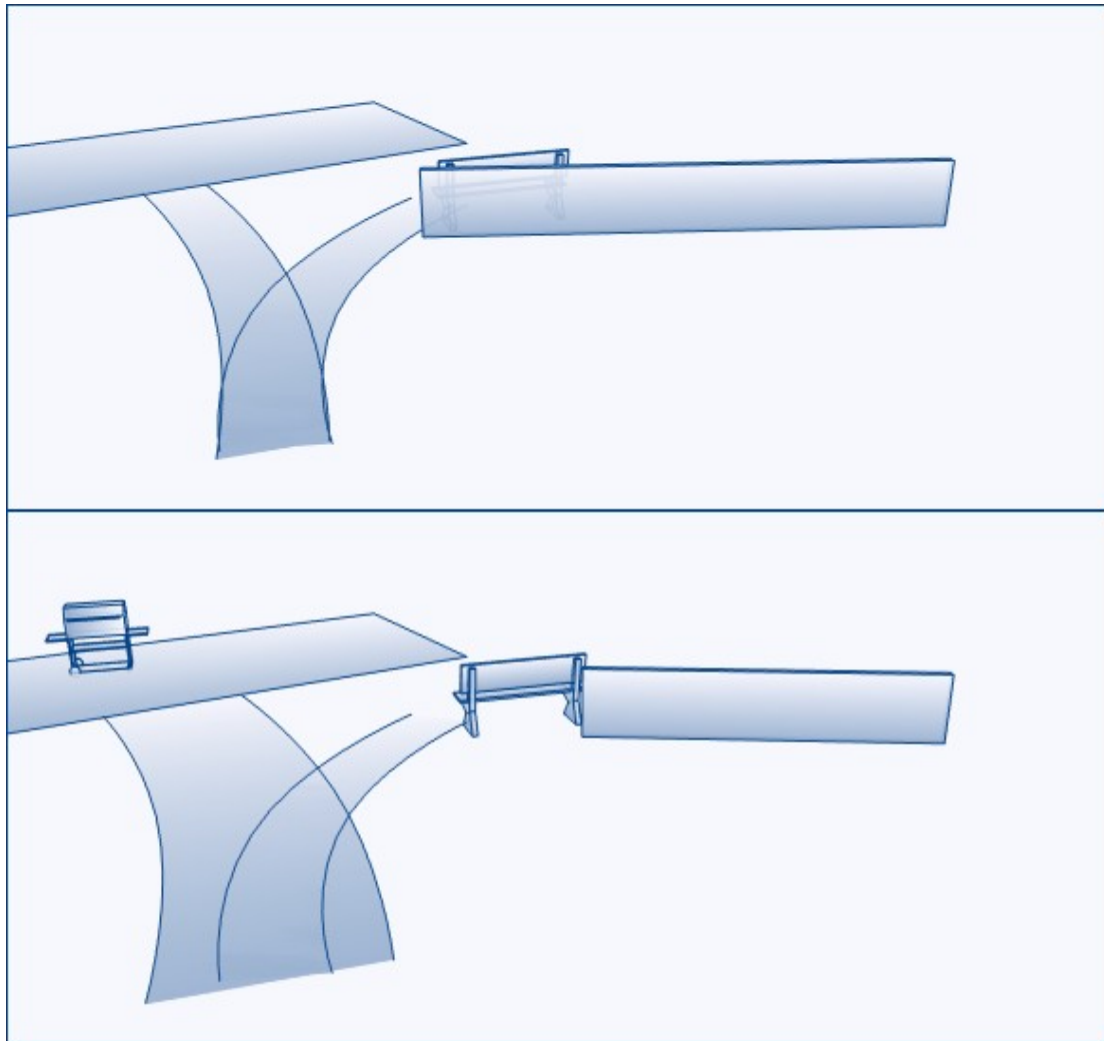
Understandable flow

Due to the damage to the hippocampus reducing cognitive mapping and patients' reduced ability to understand complex sequencing the garden must have an easily understandable layout and structure. This can be achieved through having an open view across areas that exhibit sharp clean dividing lines.

As patients can suffer from anxiety and confusion when in an unfamiliar environment the exit to both areas and the whole garden must be clearly visible and defined with respect to role.

The loss of sequencing abilities and cognitive mapping also requires that all lines of traffic, that guide viewers around the garden, must also be both clearly defined, in terms of their boundaries and objective.

Further to this, choices presented to the agent must be clear cut, offering choice over clearly distinct areas of recognisable function, with an obvious major and minor path option.



Above: presenting patients with unclear choice should be avoided, as confusion can set in. By ensuring a Major/minor choice is offered through varied path widths and clear destination, this is avoided.

Passive sensory inputs.

Whilst deferring the beneficial qualities of calming surroundings until the next section, it is noted that as patients of Alzheimer's condition have reduced impulse control the sensory output of the garden environment should not invoke aggression through disunity.

Carer responsibilities

As therapeutic gardens for Alzheimer's patients will be almost exclusively built in a care facilities setting, the responsibilities of the carers must not be interfered with. For instance, carers will require unhindered visual access to the entire garden for the safety of the patients, as well as space through access ways for wheelchairs and stretchers in the event of an accident.

Internalisation

A barrier to the outside world must be maintained for safety reasons, to prevent patients leaving the safety of the care facility. This must also be a visual barrier as well as physical one to deter curiosity and reduce the sense of entrapment and

confusion over external activity. Naturally, in rural settings views of surrounding countryside should be maintained.

Health and safety

An uncompromising approach to all health and safety issues must be employed when considering the discussed garden's likelihood to be in a care facility setting, in which stringent legal requirements are in place.

Activation simplicity

On a pragmatic note, the loss of ability to understand complex sequencing requires all items of practical interactive function, such as door handles, sun shades and gardening tools, to be of a traditional and understandable style, so that execution of their function is achievable through an embedded action or intuitive learning.

Theoretical benefit.

The theoretical benefits that both the garden environment and individual aspects of the garden have on an Alzheimer's patient are now considered.

Development of complex sequencing, cognitive maps and learning.

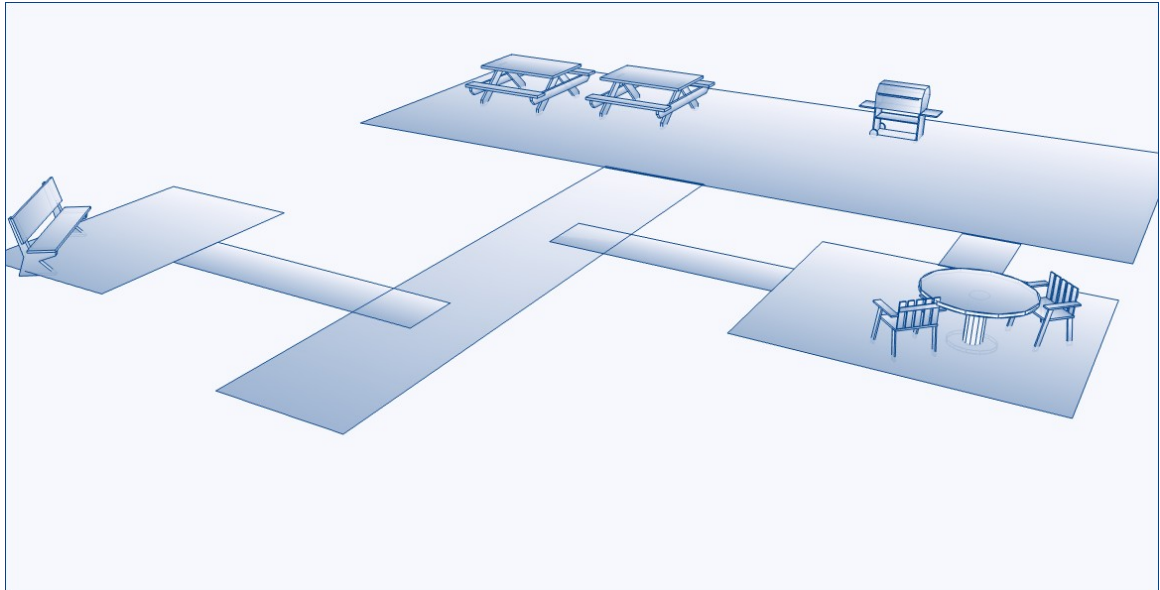
When an engrossing environment has a clear layout and sub-set of purposes a patient can enhance their understanding of the area. Their understanding can be learnt through procedural learning - cognitive and bodily repetition of routes and areas - as well as through making use of their relative strength of the amygdala late into the disease. The hippocampus creates stronger bookmarks onto events that hold strong emotional meaning, such as ones first kiss. Considering the axiom that strong sensory inputs can invoke emotive response, it is inferred that experiencing sensory input aids in creating memory of the place and event. For instance, a strongly scented rose at seating height beside a bench will teach a patient the position of the bench.

Integrally entwined to the ideas of cognitive mapping, sequencing and procedural learning is the concept of Natural Mapping. Natural mapping is the process of breaking down routes and procedures into segments. If described through critical path analysis terminology, examples would be; the learning process of taxi drivers cognitive maps, and systematic sequencing function being broken down into paths – streets - between nodes – junctions – and landmarks – destination or bridges -. This process is present within smaller functions as well, such as the design of i-pod user interface being constructed from paths - user actions – between nodes – menu screens – and landmarks – home screen and destination function -.

The natural mapping process is present when anyone undertakes learning and interacting with areas of paths and areas, and so when designing for agents within a damaged ability to understand the surrounding such areas must have recognised and controlled nodes and landmarks positioned to aid understanding of place and direction. Naturally, such nodes can fulfil other functional and emotive requirements. It is also noted that familiarity aids in memory recall.

Additionally to the benefits of clarity over an area's function, consideration of the private/public nature of areas should be considered. Both areas of isolation for private

thought and communal areas for interaction are of benefit to patients. Again, the area's purpose must be clearly defined.



Above: this simple layout illustrates areas of differing public/private roles.

Zeitgebers.

Due to the damage to patients supra-chiasmatic nuclei, timekeepers, external temporal stimulus can be incorporated into the garden to offer information to time, both of the time of day through shadow, clear view of the sky and even clocks, and time of the year, through deciduous planting and other seasonally adjusting plants. Such zeitgebers will also aid in events being tagged to times, aiding in recall.

Calming environment.

Aside from the more universal benefits that calming environments offer to the health and wellbeing of people, Alzheimer's patients furthermore benefit from the stabilizing effect of such surroundings through reduced anxiety. Reduced stress allows for clearer thought for learning and memory recall.

Case studies

Existing Alzheimer's healing gardens are examined for the purpose of illustration of the ideas presented within the previous two sections; needs and benefits.

The Alois Alzheimer Center
Greenhills, OH, USA

Courtyard Garden



One of four outdoor therapeutic gardens designed for the Alois 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.

The east viewing terrace of the Alois Alzheimer Center garden demonstrates repeated patterning to aid in memory creation through procedural learning. It also offers a sense of unity in order to calm patients.

Cherry Ridge
Webster, NY, USA
Alzheimer's garden, CCRC



The Alzheimer's garden at Cherry Ridge, NY, exhibits views to the exits from each corner of the garden. A distinguishing rock and plack is placed to act as a node at the junction in the paths.



Seasonal planting acts as a zeitgeber for residents.

Grace Presbyterian Village
The Camellia Wing Garden
Dallas, TX, USA



Solitary, intimate and public seating areas are incorporated into the Camellia Wing Garden at the Grace Presbyterian Village, USA. Note the solitary bench facing away from the private areas, enhancing the privacy, and open design of the garden.



This garden also includes railings and raised beds to aid mobility, such features also encourage participation from residents.

Portland Memory Garden
Portland, OR, USA



The Portland Memory Garden combines repetition to aid in memory creation with memory recall devices such as familiar common plants. The entry point is raised as to both provide a layout of the garden when entering and clear view back to the exit.

Theoretical design

Theoretical design for both the macro and micro aspects of the healing garden is now considered. This is the congregation of information from the three previous sections in the form of a checklist of features and restrictions that a realised healing garden should include.

Access: wide, even paths, patios and entrance ways.

Understandable flow: easily understandable layout and structure, choices presented must be clear cut.

Open views: to exits and each area of the garden.

Passive sensory inputs: the garden environment should not invoke aggression or disunity, but reduce anxiety.

Internalisation: A physical and visual barrier to the outside world.

Safe and simple items: all items must be safe and understandable.

Utilised nodes and landmarks: between paths and open areas of garden.

Emotive nodes and landmarks: sensory input for creating memory of place and event.

Traditional nodes and landmarks: to aid in memory recall.

Public/ Private areas: both included and clearly defined.

Zeitgebers: external temporal stimulus incorporated into the garden.

Bibliography

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Design for Dementia: Planning Environments for the Elderly and Confused, O. Mills, Williams and Wilkins, 1988.

Criteria for Outdoor Space and Human Behavior: A Better Fit for Alzheimer's Disease Patients, K. Gilson, University of Texas at Arlington, 1994

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Healing Gardens for People Living with Alzheimer's: Challenges to proving treatment outcomes, J. Zeisel, Unknown publisher. Unknown publication date.

Natural mapping: The Psychology of Everyday Things, D. Norman, 1988
K. Lynch 1960. The Image of the City. Cambridge, MA: MIT Press Respectively.

Creating a therapeutic garden that works for people living with Alzheimer's, J. Zeisel, Unknown publisher. Unknown publication date.

Investigated Gardens
(Image references incorporated)

The Alois Alzheimer Center
Greenhills, OH, USA
Alzheimer's
The Crane Garden; East Viewing Terrace
Beckwith Chapman Associates, Inc.
www.alois.com

Alzheimer's Memory Garden, Central City Park
Macon, GA, USA
Public garden
www.alzga.org/services_otherlocalprograms.htm
Cherry Ridge
Webster, NY, USA
Alzheimer's garden, CCRC
Clare Bridge Alzheimer's Garden
Oklahoma City, OK, USA

Devon Oaks
Westlake, OH, USA
Alzheimer's

Design for Generations, LLC

www.devonoaks.org

Family Life Center

Sophia Louise Durbridge-Wege Living Garden

Grand Rapids, MI, USA

Alzheimer's and other dementia

Glacier Hills Retirement Community

Wellness Garden Program

Ann Arbor, MI

CCRC

<http://www.med.umich.edu/alzheimers/spring-07.pdf>

<http://www.glacierhills.org/Spring-Summer06.pdf>

Grace Presbyterian Village - The Camellia Wing Garden

Dallas, TX, USA

Alzheimer's

www.gracepresbyterianvillage.org

archweb.tamu.edu/aslatx/projects/99/99cwg/99cwg.asp?which=99cwg

Hearthstone at New Horizons

Marlborough, MA, USA

Alzheimer's

Martha Tyson and John Zeisel

www.thehearth.org/Residences/marlboro/marlboro.html

Hearthstone Alzheimer Care at Heights Crossing - Hearthstone Garden

Brockton, MA, USA

Alzheimer's

Martha Tyson and John Zeisel

www.commonwealthcommunity.com/alzhei/heart.html

Portland Memory Garden

Portland, OR, USA

Public garden for people with Alzheimer's (part of the City of Portland parks system)

information: <http://www.centerofdesign.org/pages/memorygarden.htm>