Problems concerning senior living

1. As we age our world slowly becomes smaller and smaller. Because of this we tend to confine ourselves to our dwellings and interact less with society.

2. For some seniors the cost of living during retirement can be a major concern. “Affordability is the single biggest challenge facing the senior living industry for consumers, sponsors, and their design teams.” (Eastman 141).

3. Not all individuals, who we consider as seniors, are ready to live with only other seniors. Most seniors claim to feel younger than their actual age.

Possible design solutions

1. A strong sense of community that fosters interactive engagement.

2. A net zero energy design that will help eliminate several costly expenses for residents as well as building owners, while also keeping residents actively engaged through net zero activities.

3. Provide the option of living within a multigenerational community.
How might the relation of young professionals and seniors manifest in net zero architecture?

Younger individuals ages 25-35, who are interested in a communal net zero living lifestyle.

Older retired individuals aged 65+, who are interested in a communal net zero living lifestyle.

The design produces more energy than it consumes on an annual basis using only renewable energy in the process.
### 1. Research Question
How might the relation of young professionals and seniors manifest in net zero architecture?

### 2. System of Inquiry
- **Emancipatory:** There are multiple realities, but they are overlapping developed through history, social, cultural and empowerment identity.
- **Qualitative:** (socio/cult/anthr)
- **Simulation:** (computer modeling)
- **Holistic Case Studies**

### 3. Strategies
- **Literature Review:**
  - (books or articles on net zero design and senior design)
- **Personal Interviews:**
  - (telephone interviews with experts in the field of senior living and net zero design)
- **Simulations:** (net zero energy modeling, is the design on track?)

### 4. Tactics
- **Eco-Social Design** and **Resilient Design** (little bit of both)

### 5. Philosophy/Theory
- The anticipated design intends to be a participatory design solution to the increasing senior population within a time of social change.

### 6. Role of Design/Architecture
- **Eco-Social Design** + **Resilient Design**

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**RESEARCH AGENDA: DIAGRAMMING A RESEARCH PROCESS**

<table>
<thead>
<tr>
<th>Community Living</th>
<th>Senior (65+)</th>
<th>Young Professional (25-35)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Aging</strong></td>
<td><strong>Promote active aging through building education</strong></td>
<td><strong>Promote environmental advocacy through building education</strong></td>
</tr>
<tr>
<td><strong>Pedagogical</strong></td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td><strong>Promote active aging through the performance of the building</strong></td>
<td><strong>Promote environmental advocacy through the performance of the building</strong></td>
<td></td>
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<tr>
<td><strong>Performance</strong></td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td><strong>Promote active aging through building comfort</strong></td>
<td><strong>Promote environmental advocacy through building comfort</strong></td>
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<tr>
<td><strong>Net Zero Design</strong></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td><strong>Promote active aging through building comfort</strong></td>
<td><strong>Promote environmental advocacy through building comfort</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Comfort</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
</tr>
</tbody>
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1. Literature Review: I read through several literature sources on the topics of senior living and net zero to become more familiar with each. While reading I wrote down specific quotes that I believe helps bring forth the importance of my research question.

2. Personal Telephone Interviews: I interviewed individuals who have experience in senior living design and or net zero design. I interviewed a mix of individuals including, architects and senior living facility CEO’s. During each 30-40 minute interview I asked each individual about senior living design trends, net zero design integration and the possibility of incorporating young professionals into the program.

3. Case Studies: Four case studies were chosen based on their relevance to senior living, net zero or context.

4. Simulation: I conducted a simple energy analysis of the proposed design concept through an Autodesk service called Green Building Studio. This simple simulation presented to me the total annual electrical energy consumption and cost of electrical energy.
Literature Readings
"According to the U.S. Census, 13 percent of the population—over 40 million people—is 65 or older. That represents an increase of more than 5 million since the 2000 Census and makes this the fastest-growing age group: 15 percent per decade." (Eastman 2).

"It is often said that the value and meaning of a civilization can be documented from the record it leaves in the form of architecture, and that the true measure of the compassion and civility of a society lies in how well it treats its frail older people." Regnier 1994, p. vii. (Eastman 5).

"Because people are remaining healthy longer, they are able to age in place, relying on community-based services and family to meet their needs for healthcare and services. They are therefore accessing senior housing and care options later-often after they are very old and frail. This has reduced the demand for assisted living apartments in some markets, as they cater to healthier individuals who now choose to stay at home and access care services brought to them." (Eastman 125).

"One of the myths about older adults is that they want to be segregated with people their own age, enjoying views of the countryside. In fact, most would prefer to stay in their own community..." (Eastman 129).

"The world consumption of energy was 522 quads, and our nonrenewable reserves were more than seventy times greater than world energy consumption. So theoretically, if demand does not go up, we have seventy years of nonrenewable energy." (Maclay et al 8).

"Is there a similar issue with renewable supply? No. In fact, renewable could produce more than 7,000 times as much power as is needed at today’s world consumption levels—every year, forever." (Maclay et al 8).

"Net zero Project. This accounts for projects where some or all of the renewable providing energy to the building are located beyond the confines of the building property." (Maclay et al 23).

"Net zero property. A building qualifies as net zero property if all the renewable used to cover the building’s consumption are located within the confines of the project property." (Maclay et al 23).

"Net zero footprint. To meet this classification, all of the renewable used to cover the buildings loads must reside within the footprint of the building itself, most often on the roof of the building..." (Maclay et al 23).
"Knowing how to live sustainably doesn’t necessarily make people want to live sustainably. Knowledge helps but it can’t trump desire.” (Reeder 237).

“Paisano Green Community is different from a net zero energy office or school, DeSousa said. It is a truly democratic building. Nearly everyone who lives and works on the site has a hand in determining how it performs.” (Reeder 238).

“It is helpful to educate users in the project goals and the design strategies used to achieve them. This can help occupants understand the impact of their actions on the building’s success. Occupants will also need to learn how to operate the building efficiently.” (Reeder 253).

“Not surprisingly, most users are unwilling, or would be unhappy, to sacrifice their comfort for a building’s energy efficiency.” (Reeder 253).

“Occupants moving into a net zero energy building might need time to adjust to differences compared to a conventional building.” (Reeder 254).

“The difference in residential buildings is that the residents behave as they wish, without an employer or organizational culture to influence them.” (Reeder 255).

“One of the earliest attempts to explain the position of old age in modern society is the disengagement theory of aging (Cumming & Henry 1961). The disengagement theory looks at old age as a time when both the older person and society engage in mutual separation, as in the case of retirement from work.” (Moody & Sasser 10).

“At the opposite pole from the disengagement theory is the activity theory of aging, which argues that the more active people are, the more likely they are to be satisfied with life.” (Moody & Sasser 12).

“The continuity theory aging makes a similar point, noting that as people grow older they are inclined to maintain as much as they can the same habits, personality, and style of life they developed in earlier years (Costa & McCrae, 1980).” (Moody & Sasser 12).

“One role well suited to older people in such an environment might be mentoring, or guiding the next generation in the capacity of teacher, coach, or counselor (Neikrug, 2000). Older adults who are serving as mentors, however, still have to develop up-to-date skills and attitudes if their advice is to be respected by younger workers.” (Moody & Sasser 17).

“Creativity and wisdom depend on cognitive development over the life course. Whether our society cultivates such qualities among older people will depend, in the end, on creating more imaginative policies and institutions.” (Moody & Sasser 27).
Top Take Aways

- “Today’s 50- and 60-year-olds don’t see themselves as “old” and don’t view aging as a time of physical decline.” (Jernigan, Johnston, McAlister & Lin 182).
- “Connectivity - The ability to maintain relationships with neighbors, coworkers, family, friends, and community members—both in-person and online.” (Jernigan, Johnston, McAlister & Lin 184).
- “Choice - Living in a location that fits one’s particular preferences, participating in activities that one chooses, and makes one’s own decisions about health-care.” (Jernigan, Johnston, McAlister & Lin 184).
- “Independence - Relying on others as little as possible for personal care and getting around, including use of public transportation, ride-sharing, and walking.” (Jernigan, Johnston, McAlister & Lin 184).
- “Wellness - Not only staving off disease but also managing long-term illness to lead to a productive and fulfilling life.” (Jernigan, Johnston, McAlister & Lin 184).
- “If and when a move is required, this population is seeking a different type of aging community. Stress urban living with “active aging” amenities.” (Jernigan, Johnston, McAlister & Lin 184).

Top Take Aways

- Reduce as much glare as possible.
- Stay away from highly polished surfaces.
- Allow time for the eyes to adjust to new levels of light. (dark to light and light to dark).
- The need for contrast between surfaces helps seniors with vision impairments.
“Resilience is a necessity. It’s also life enhancing, reinforcing connections that define the human experience.” (Gensler Design Forecast (2017) 41).

“Climate change is making resilience more urgent and underscoring the impact we have on the environment. It is the great challenge of our time; it’s also our greatest opportunity.” (Gensler Design Forecast (2017) 41).

“When you address climate change, you are really opening the door to quality of life, and asking: How can design strengthen culture and community and enhance people’s lives?” (Gensler Design Forecast (2017) 41).

“Resilience takes imagination. It springs from place and evolves our history” (Gensler Design Forecast (2017) 41).
Top Take Aways

- Ecumen asked their residents where they like a new facility to be build and the answer was clear, downtown within an urban setting.

- “For aging seniors, driving can be problematic, so the ability to walk to places for errands is appealing. Others like being able to walk to sporting events, countless restaurants, public transit and fine arts attractions that are downtown.”

- “Carole and Doug Baker Sr. moved into Abiitan several weeks ago and enjoy the fact that they’re not isolated, which can be a problem in suburban senior living facilities.”

- “Abiitan has a full bar and restaurant open to the public, its within easy walking distance of several Minneapolis attractions and amenities, and it has roughly 130 units available to seniors.”
Telephone Interviews
**Top Take Aways**

- Took one year to sort out the building systems at The Rose.
- Located within the central courtyard of The Rose is a large community garden for all residents to use.
- The Rose used solar thermal as a renewable energy resource billboard.

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**Top Take Aways**

- Always thought there are some parallels between millennial and seniors.
- Target market 70's and 80's.
- More one bedroom and two bedroom, fewer studio and three bedroom.
- Difficult for customers to justify the extra cost of something like net zero.
- Discounted rent for young professional by helping senior residents.
**Top Take Aways**

- Workshop8 proposed the idea of going net zero for Paisano Green Community senior housing.
- Residents that moved into Paisano Green Community didn’t know how their heating and cooling worked.
- Paisano Green Community residents are not engaged in the net zero design.
- Seniors living at Paisano Green Community are not necessarily interested in net zero, because they don’t have to pay for their energy bill. The housing authority pays for utilities.
- Important to educate the residents on how to save energy.
- Every residential unit at Paisano has a south facing view to let in as much natural light as possible.

**Top Take Aways**

- Tried placing seniors near younger kids in years past, didn’t work as planned.
- Both younger professionals and seniors are interested in the same kinds of amenities. Both are searching for similar environments.
- Seniors are interested in an active lifestyle.
- As you age your world gets smaller.
- How can you make small dwellings cost effective, yet feel like home?
- Corridors can never be too short or never too long. A variety of destination lengths promotes health and wellness.
Top Take Aways

- Gerontology: the study of aging. Four subsets of gerontology - physiology, phycology, sociology & public policy.
- The three plagues of the elderly, loneliness, helplessness, and boredom.
- Aging in your own home can be isolating. Can be less social.
- Seniors are interested in walkable urban environments. Less interested in an isolated location.
- It's all about what is marketable.

Top Take Aways

- Seniors are looking for an opportunity to maintain their independence as long as possible.
- Eight dimensions of wellness, emotional, physical, environmental, financial, occupational, social, spiritual.
- Provide residents with several amenities.
- Elder not the preferred term.
Top Take Aways

- Immersed himself in a senior living community for 24hrs and found it to be more of an emotional realization.
- Open rooms, greater visibility and shorter distances has a positive impact on keeping people engaged.
- Cost implication of net zero will always come up.
- We strive for an intergenerational approach. Helps learning through both generations.
- Friends of Philadelphia, a mixed use population with 30 year olds intermingled with seniors and it works beautifully.
Paisano Green Community Senior Housing

Location: El Paso, TX

Architects: WORKSHOP8

"Paisano Green Community is the first NetZero, fossil fuel free, LEED Platinum, affordable senior housing project in the United States. This 73 unit project is built on a 4.2 acre site, adjacent to the major border crossing between El Paso, Texas, and Juarez, Mexico. The design goals of the project were to create a place sensitive community for elderly residents that would promote healthy living and an environment encouraging the development of interpersonal relationships, all within a well designed set of energy efficient high performance buildings and grounds."

(hacep.org)
The Rose
Minneapolis, MN
Architects: MSR

“The Rose is a high performance multi-family housing development in Minneapolis, MN. It contains 42 market rate and 48 affordable dwelling units for people earning less than 50% AMI (Area Median Income) including some efficiency apartments for formerly homeless individuals transitioning to independent living. There are one, two and three bedroom configurations that will enable a broad community of residents to live here. Residents will enjoy the 5,000-square-foot community garden and the 70-foot-wide courtyard between the two buildings – both spaces contain areas for play and socializing. “The building has been designed using the Living Building Challenge (LBC) as a guide,” says Paul Mellblom, AIA, MSR Design’s Principal.”

(architectmagazine.com)
Eltheto Housing and Healthcare Complex

The Netherlands

Architects: 2by4-architects

"In the small town of Rijssen 2by4-architects designed the new healthcare and housing complex ‘Eltheto’ for elderly people. Until recently elderly people were seen as a group that functions outside of modern society and are only in need of care. The contemporary healthcare centers and housing for elderly people are still designed according to his idea. Over the past decennia this resulted in a range of introvert buildings where the main focus is healthcare instead of the quality of life itself." (archdaily.com)
“The cliff dwellings of Mesa Verde are some of the most notable and best-preserved ruins in the North American continent. Sometime during the late 1190s, after primarily living on the mesa top for 600 years, many Ancestral Puebloans began living in pueblos they built beneath the overhanging cliffs. The structures ranged in size from one-room storage units to villages of more than 150 rooms. While still farming the mesa tops, they continued to reside in the alcoves, repairing, remodeling, and constructing new rooms for nearly a century. By the late 1270s, the population began migrating south into present-day New Mexico and Arizona. By 1300, the Ancestral Puebloan occupation of Mesa Verde ended.” (visitmesaverde.com)
Rivers Edge:
An Adult Participatory Net Zero Community
Site Information
SITE INFORMATION : SITE PHOTOGRAPHY

Nearby neighboring context photo study
SITE INFORMATION: CITY LAYOUT ASSESSMENT

City grid analysis

Major axis near site
Views from the site

Views to the site
SITE INFORMATION: WALKABILITY ASSESSMENT

Farmers market

Public transit
SITE INFORMATION : SOLAR SUN STUDY

Jan. 21st 9am-3pm
Feb. 21st 9am-3pm
Mar. 21st 9am-3pm
April 21st 9am-3pm

May 21st 9am-3pm
June 21st 9am-3pm
July 21st 9am-3pm
Aug. 21st 9am-3pm

Sept. 21st 9am-3pm
Oct. 21st 9am-3pm
Nov. 21st 9am-3pm
Dec. 21st 9am-3pm
Solar sun study of existing site condition
SITE INFORMATION : PRELIMINARY WIND STUDY

Southward wind through existing site

Westward wind through existing site

Northward wind through existing site

Eastward wind through existing site
Site area not flooded

100 year flood area
Proposed Design Concept
Proposed Design Concept: Design Thinking Through Sketching

- Boundary geometry as a generator of building form.
- Building at boundary to contribute to street scale.
- Fill site with building to create controlled courts within.
- Building court to create vistas from street.
- Avoid glare of sun reflection.
- Give roof deck to public walk.
- Visual access to front court from road.
- Protect from summer sun & allow winter sun.
- Allow hot air up & out.
- Ventilation for all spaces.
- Avoid glare of sun reflection.
- Give roof deck to public walk.
- Visual access to front court from road.
- Protect from summer sun & allow winter sun.
- Allow hot air up & out.
- Ventilation for all spaces.
Using the property boundary to generate a building form.

South facade is parallel with major north south transportation axis.

South facade is parallel with major north south transportation axis.

Adding a sense of hierarchy at the end of street axis.

Adding a sense of hierarchy at the end of street axis.

Experimenting with subtracting space to create courtyards.
Proposed Design Concept: Contextual Model Study

Using the property boundary to generate a building form.

Experimenting with breaking up the solid building form.

Multi story community hub with street level public/community plaza located in line with street axis

Single and double loaded towers connected through interior atriums.

Using the property boundary to generate a building form.

Experimenting with breaking up the solid building form.

Multi story community hub with street level public/community plaza located in line with street axis

Single loaded towers connected by interior atriums.

Using the property boundary to generate a building form.

Experimenting with breaking up the solid building form.

Multi story community hub with street level public/community plaza located in line with street axis

Single loaded towers creating view windows between.

Using the property boundary to generate a building form.

Experimenting with breaking up the solid building form.

Multi story community hub with street level public/community plaza located in line with street axis

Single loaded towers with view windows filled in with connecting space.

Using the property boundary to generate a building form.

Experimenting with breaking up the solid building form.

Multi story community hub with street level public/community plaza located in line with street axis

Single loaded towers with view windows and connecting space.
Proposed Design Concept: Contextual Model Study

Contextual model design thinking video
Proposed Design Concept: Floor Plan Layout
Proposed Design Concept: Floor Plan Layout

SHEPARD ROAD
MISSISSIPPI RIVER
PHASE (2)
WEST WING
EAST WING
YP(1)
S(1)
S(2)
YP(2)
S(3)
YP(3)
S(4)
YP(4)
S(5)
YP(5)
YP(6)
S(6) YP(7)
S(7)
YP(8)
S(8)
YP(9)
S(9)

Floor 4 - Floor 7
Proposed Design Concept: Floor Plan Layout

SHEPARD ROAD
MISSISSIPPI RIVER
RETAIL (1)
PHASE (2)
WEST WING
EAST WING
GREEN HOUSE
LIGHT WELL
KELLOGG BOULEVARD
GREEN HOUSE
LIGHT WELL
RETAIL (3)
RETAIL (4)
RETAIL (5)
RETAIL (6)
RETAIL (7)
RETAIL (8)
RETAIL (9)
RETAIL (10)

Floor 8 - Floor 9
Proposed Design Concept: Building Impact On Context

Jan. 21st 9am-3pm

Feb. 21st 9am-3pm

Mar. 21st 9am-3pm

April 21st 9am-3pm

May 21st 9am-3pm

June 21st 9am-3pm

July 21st 9am-3pm

Aug. 21st 9am-3pm

Sept. 21st 9am-3pm

Oct. 21st 9am-3pm

Nov. 21st 9am-3pm

Dec. 21st 9am-3pm
Proposed Design Concept: Building Impact On Context

Solar sun study of proposed design concept within context
Proposed Design Concept: Preliminary Energy Consumption Simulation

Run Name: Thesis Net Zero Test.xml

Project Template Applied: Ian Schimke NDSU
Architecture Thesis_default
Location: St Paul, MN

Building Type: Multifamily
Floor Area: 160,546 ft²

Electric Cost: $0.08 / kWh
Fuel Cost: $0.72 / Therm

Base Run

1. Energy, Carbon and Cost Summary
   - Annual Energy Cost: $156,787
   - Lifecycle Cost: $2,135,435

2. Annual CO₂ Emissions
   - Electric: 987.2 tons
   - Onsite Fuel: 559.3 tons
   - Large SUV Equivalent: 140.6 SUVs / Year

3. Annual Energy
   - Energy Use Intensity (EUI): 84 kBtu / ft² / year
   - Electric: 1,146,087 kWh
   - Fuel: 96,437 Therms
   - Annual Peak Demand: 307.5 kW

Carbon Footprint

Create a Design Alternative to improve your building performance.

Net CO₂ Emissions: 595.6 tons
Net Large SUV Equivalent: 54.1 SUVs / Year

Assumptions

Electric Power Plant Sources in Your Region

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Fossil</td>
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<tr>
<td>Renewable</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

Assumptions
Site & building section looking west towards Wabasha Bridge & Raspberry Island
Residents and public picking vegetables in the community public plaza
Residents tending to plantings in the community greenhouses
Residents giving tour of community kitchen
Proposed Design Concept: Private Balcony

Young Professional continuing their education on the latest net zero principles
How might the relation of young professionals and seniors manifest in net zero architecture?

1. Within a public setting, young professionals and seniors work together within the public plaza at the several community retail shops and tending to the public vegetable berms.

2. Within a semi-public setting, young professionals and seniors find themselves working together in the community greenhouses. Tending to, experimenting with, and gathering vegetables and vegetation for the community residents.

3. Within a semi-private setting, young professionals and seniors can be seen giving tours to the public or sharing meals in the residents’ community kitchen.

4. Within a private setting, young professionals and seniors can gather to chat about life and tell stories, or they can use these more intimate spaces to continue their education on communal living and the latest net zero principles.
Thank You For Coming