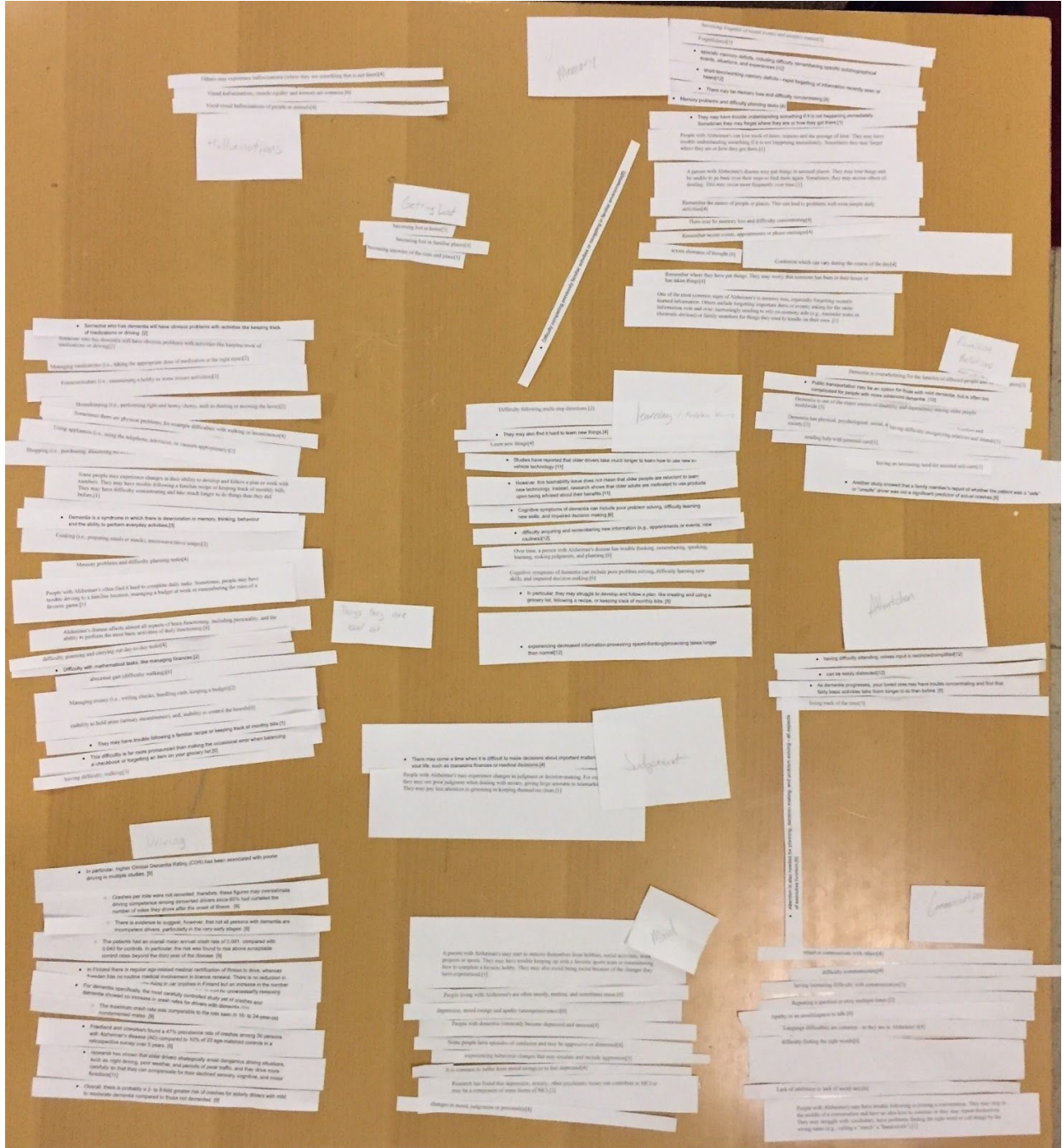


Thanks 35/35

Project Installment 3: Conception Gestation

a. Affinity Diagram



3/3

b. Attributes

- Motivation
- Self-sufficiency/Independence

3/3



- Memory
- Ability to learn new technology (expand a bit more on this)
- Problem Solving & Learning Ability
- Attention

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c. Data Sources

Self Sufficiency: 1,2,3,4,6

Motivation: 1,2,3,4,6,10

Memory: 1,3,4,6,8,12

Learning/Problem Solving: 2, 4, 5, 6, 11,12

Attention: 3,5,8,12



1. https://www.alz.org/10-signs-symptoms-alzheimers-dementia.asp Self Sufficiency, Motivation, Memory
2. https://www.dementiacarecentral.com/aboutdementia/othertypes/mci/ Self Sufficiency, Motivation, Learning/Problem Solving
3. http://www.who.int/mediacentre/factsheets/fs362/en/ Self Sufficiency, Motivation, Memory, Attention
4. http://www.rcpsych.ac.uk/healthadvice/problemsdisorders/dementiaandmemoryproblems.aspx Self Sufficiency, Motivation, Memory, Learning/Problem Solving
5. https://www.cbsnews.com/pictures/alzheimers-25-signs-never-to-ignore/ Learning/Problem Solving, Attention
6. http://www.alzheimersreadingroom.com/2016/06/dementia-9-types-of-dementia.html Self Sufficiency, Motivation, Memory, Learning/Problem Solving
7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3571625/ (None)
8. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935289&section=Signs_and_Symptoms Memory & Attention
9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3292210/ (None)
10. https://www.thehartford.com/sites/the_hartford/files/cmme-crossroads.pdf Motivation
11. https://ac-els-cdn-com.ezproxy.proxy.library.oregonstate.edu/S0140673605652695/1-s2.0-S0

[140673605652695-main.pdf?_tid=d2e0ab88-bdda-11e7-9353-00000aacb35f&acdnat=1509413500_a231ebe87c75208c6720986e6be605f7](https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935289§ion=Signs_and_Symptoms)

Learning/Problem solving

12.

https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935289§ion=Signs_and_Symptoms

Memory & Learning/Problem solving & Attention

d. Persona skeletons

Skeleton 1:

Male, age 70-80

Motivation

- To be independent and self-sufficient is their biggest motivation
- Has difficulty in communication since finding the right words is hard, therefore willing to try things that is good for his social relationship

Self-sufficiency/Independence

- Has difficulty to take care of himself well and has some physical problems, like abnormal gait
- Always being alone and avoid communicating with others

Memory

- Has difficulty remembering a sequence of instructions, even after having executed the same procedure multiple times
- Becomes lost in familiar places, like at home
- Asks the same questions repeatedly

Learning and Problem Solving Ability

- Has difficulty in solving mathematical problems, so it is hard to managing money, such as writing checks, handling cash and keeping a budget
- Very hard to learn new stuff or new skills, especially complicated ones

Attention

- Hard to concentrate on a task for a relatively long period
- Has difficulty to do something which requires a serial of steps, easily be lost during the procedure

Skeleton 2:

Female, age 80-85

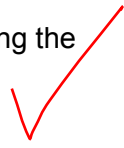
Motivation

- Motivated to use products upon being advised about their benefits [11]
- Would like to be able to attend Bingo night with her friends
- Would like to visit her family more often

Self-sufficiency/Independence

- Does not drive for her own safety

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- Relies on family members to assist her with going to the grocery store, appointments, etc.
- Can only walk short distances
- Lives alone

Memory

- Diagnosed with Alzheimer's that has progressed to middle-stage
- Has short-term/working memory deficits—rapid forgetting of information recently seen or heard[12]
- Has difficulty acquiring and remembering new information (e.g., appointments or events, new routines)[12]

Problem Solving & Learning Ability

- Finds it hard to learn new things.[4]
- Take much longer than the average person to learn how to use new in- vehicle technology [11]
- Quick to give up or be irritated with software that does not make sense to her

Attention

- Can be easily distracted[12]
- Has difficulty attending, unless input is restricted/simplified[12]

Skeleton 3:

Male, age 60 - 70

Motivation:

- Has trouble using public transportation because it get to confusing.
- Wants to be able to visit his friends and family without being a burden and reliant on them.

Self-sufficiency/Independence:

- Currently still drives but gets lost occasionally and has to rely on family to help him get home.
- Is able to go on short walks around the his neighbourhood.

Memory:

- Occasionally forgets recent events, and people's names.[3]
- He sometimes has trouble understanding something if it is not happening immediately, And he may forget where they are or how they got there.[1]
- Misplaces keys in his house, and has to search to find where he last put them.

Problem Solving & Learning Ability:

- Struggle to develop and follow a plan, like creating and using grocery list, following a recipe, or keeping track of money.[5]
- He has a slight problem learning new things[4]
- Has problems remembering multi-step directions[5]

Attention:

- Occasionally loses track of time [3]
- Can be easily distracted.[12]



e. Skeleton priority

1. Skeleton 2
2. Skeleton 1
3. Skeleton 3

2. Mainstreamers

a. Ideally, our product would be used by all people. Human error in driving is still one of the largest causes of death in first world countries, and it is not unlikely that manual driving will become illegal in the field of public use. There are many options for who our mainstreamer could be represented as, but there are some specific characteristics that will discern our mainstreamer from our underserved population. One of the most important characteristics is our assumption that our mainstreamer is relatively young and already has a lot of experience using technologies. We can make some design decisions without worrying about losing our mainstream population. The system can be substantially more complicated and utilize gestures that could have been learned from interaction with other technologies such as touch gestures on a smartphone.

b. There are many users who will find themselves in situations where it would be uncomfortable for them to have to drive the car manually, such as users who are exhausted after a long day of work, or those who want to do something other than focus on driving. One of the key features to implement in our design is the ability to serve our underserved population without making the "normal" interface suffer or annoy mainstreamers.

c. Mainstream Skeletons

Skeleton #1:

Male, age 30-40

Occupation: Office Worker

Motivation

- Motivated to use new products on principle
- Would like the ability to do work or relax while commuting

Self-sufficiency/Independence

- Drives to work on a daily basis
- Lives with a family

Memory

- Good at remembering tasks and things they have learned before.
- Memory deteriorates a little bit at the end of the day from fatigue.

Problem Solving & Learning Ability

- Has a job that requires frequent mental effort and problem solving skills
- Likes to have new technology, but prefers that the interface remain relatively consistent.

Attention

- Can easily focus on tasks.

- Attention deteriorates a little bit at the end of the day from fatigue.

Skeleton #2:

Female, age 15-19

Occupation: High Schooler

Motivation

- Wants to be able to take the car out to the mall with her friends
- Would like to be able to take the car to school
- Her parents want her to run errands occasionally

Self-sufficiency/Independence

- Lives with parents
- Does not own the car, but has access to the family car

Memory

- Good at remembering tasks and things she has learned before.

Problem Solving & Learning Ability

- Spends lots of time with new technology and does not consider it a burden on her life.
- Quick learner
- Already familiar with other technological devices

Attention

- Can easily focus on tasks when required.
- Frequently distracted, especially if other people are in the car.

d. Mainstreamer priority: 1,2

Factoids:

Self Sufficiency:

Abnormal gait (difficulty walking)[6]

Sometimes there are physical problems, for example difficulties with walking or incontinence[4]

Having difficulty walking[3]

Inability to hold urine (urinary incontinence), and, inability to control the bowels[6]

Difficulty planning and carrying out day-to-day tasks[4]

Related to Problem Solving:

They may have trouble following a familiar recipe or keeping track of monthly bills.[1]

They may have trouble understanding something if it is not happening immediately. Sometimes they may forget where they are or how they got there.[1]

Someone who has dementia will have obvious problems with activities like keeping track of medications or driving. [2]

Someone who has dementia will have difficulty following multi-step directions.[2]

Difficulty with mathematical tasks, like managing finances.[2]

Dementia is a syndrome in which there is deterioration in memory, thinking, behaviour and the ability to perform everyday activities.[3]

Some research has shown a relationship between the development of cognitive impairment and life-style related risk factors that are shared with other noncommunicable diseases. These risk factors include physical inactivity, obesity, unbalanced diets, tobacco use and harmful use of alcohol, diabetes, and midlife hypertension. Additional modifiable risk factors include depression, low educational attainment, social isolation, and cognitive inactivity.[3]

They may also find it hard to learn new things.[4]

There may be memory loss and difficulty concentrating.[4]

Memory problems and difficulty planning tasks.[4]

There may come a time when it is difficult to make decisions about important matters in your life, such as managing finances or medical decisions.[4]

As dementia progresses, your loved ones may have trouble concentrating and find that fairly basic activities take them longer to do than before. [5]

In particular, they may struggle to develop and follow a plan, like creating and using a grocery list, following a recipe, or keeping track of monthly bills. [5]

This difficulty is far more pronounced than making the occasional error when balancing a checkbook or forgetting an item on your grocery list.[5]

Cognitive symptoms of dementia can include poor problem solving, difficulty learning new skills, and impaired decision making.[6]

Difficulty completing previously familiar activities or navigating in familiar environments[8]

Attention is also needed for planning, decision making, and problem solving—all aspects of executive function.[8]

Friedland and coworkers found a 47% prevalence rate of crashes among 30 persons with Alzheimer's disease (AD) compared to 10% of 20 age-matched controls in a retrospective survey over 5 years. [9]

Overall, there is probably a 2- to 8-fold greater risk of crashes for elderly drivers with mild to moderate dementia compared to those not demented. [9]

Info on previous study:

There is evidence to suggest, however, that not all persons with dementia are incompetent drivers, particularly in the very early stages. [9]

The patients had an overall mean annual crash rate of 0.091, compared with 0.040 for controls. In particular, the risk was found to rise above acceptable control rates beyond the third year of the disease. [9]

The maximum crash rate was comparable to the rate seen in 16- to 24-year-old nondemented males. [9]

Crashes per mile were not recorded, therefore, these figures may overestimate driving competence among demented drivers since 65% had curtailed the number of miles they drove after the onset of illness. [9]

In particular, higher Clinical Dementia Rating (CDR) has been associated with poorer driving in multiple studies. [9]

Another study showed that a family member's report of whether the patient was a "safe" or "unsafe" driver was not a significant predictor of actual crashes.[9]

Public transportation may be an option for those with mild dementia, but is often too complicated for people with more advanced dementia. [10]

In Finland there is regular age-related medical certification of fitness to drive, whereas Sweden has no routine medical involvement in licence renewal. There is no reduction in the number of older people dying in car crashes in Finland but an increase in the number of those dying as pedestrians and cyclists, possibly in part by unnecessarily removing drivers from their cars. [11]

For dementia specifically, the most carefully controlled study yet of crashes and dementia showed no increase in crash rates for drivers with dementia.[11]

research has shown that elder drivers strategically avoid dangerous driving situations, such as night driving, poor weather, and periods of peak traffic, and they drive more carefully so that they can compensate for their declined sensory, cognitive, and motor functions[11]

Studies have reported that older drivers take much longer to learn how to use new in- vehicle technology [11]

However, this learnability issue does not mean that older people are reluctant to learn new technology. Instead, research shows that older adults are motivated to use products upon being advised about their benefits [11]

Related to memory:

episodic memory deficits, including difficulty remembering specific autobiographical events, situations, and experiences [12]

short-term/working memory deficits—rapid forgetting of information recently seen or heard[12]

difficulty acquiring and remembering new information (e.g., appointments or events, new routines)[12]

Attention

can be easily distracted[12]

having difficulty attending, unless input is restricted/simplified[12]

experiencing decreased information-processing speed-thinking/processing takes longer than normal[12]

One of the most common signs of Alzheimer's is memory loss, especially forgetting recently learned information. Others include forgetting important dates or events; asking for the same information over and over; increasingly needing to rely on memory aids (e.g., reminder notes or electronic devices) or family members for things they used to handle on their own. [1]

Some people may experience changes in their ability to develop and follow a plan or work with numbers. They may have trouble following a familiar recipe or keeping track of monthly bills. They may have difficulty concentrating and take much longer to do things than they did before.[1]

People with Alzheimer's often find it hard to complete daily tasks. Sometimes, people may have trouble driving to a familiar location, managing a budget at work or remembering the rules of a favorite game.[1]

People with Alzheimer's can lose track of dates, seasons and the passage of time. They may have trouble understanding something if it is not happening immediately. Sometimes they may forget where they are or how they got there.[1]

For some people, having vision problems is a sign of Alzheimer's. They may have difficulty reading, judging distance and determining color or contrast, which may cause problems with driving.[1]

People with Alzheimer's may have trouble following or joining a conversation. They may stop in the middle of a conversation and have no idea how to continue or they may repeat themselves. They may struggle with vocabulary, have problems finding the right word or call things by the wrong name (e.g., calling a "watch" a "hand-clock").[1]

A person with Alzheimer's disease may put things in unusual places. They may lose things and be unable to go back over their steps to find them again. Sometimes, they may accuse others of stealing. This may occur more frequently over time.[1]

People with Alzheimer's may experience changes in judgment or decision-making. For example, they may use poor judgment when dealing with money, giving large amounts to telemarketers. They may pay less attention to grooming or keeping themselves clean.[1]

A person with Alzheimer's may start to remove themselves from hobbies, social activities, work projects or sports. They may have trouble keeping up with a favorite sports team or remembering how to complete a favorite hobby. They may also avoid being social because of the changes they have experienced.[1]

The mood and personalities of people with Alzheimer's can change. They can become confused, suspicious, depressed, fearful or anxious. They may be easily upset at home, at work, with friends or in places where they are out of their comfort zone.[1]

Research has found that depression, anxiety, other psychiatric issues can contribute to HCI or may be a component of some forms of MCI [2]

Repeating a question or story multiple times [2]

Difficulty following multi-step directions [2]

Difficulty with mathematical tasks, like managing finances [2]

Someone who has dementia will have obvious problems with activities like keeping track of medications or driving[2]

anxiety can affect a person's cognitive abilities (problem solving, attention)[2]

Managing money (i.e., writing checks, handling cash, keeping a budget)[2]

Managing medications (i.e., taking the appropriate dose of medication at the right time)[2]

Cooking (i.e., preparing meals or snacks, microwave/stove usage)[2]

Housekeeping (i.e., performing light and heavy chores, such as dusting or mowing the lawn)[2]

Using appliances (i.e., using the telephone, television, or vacuum appropriately)[2]

Shopping (i.e., purchasing, discerning between items)[2]

Extracurriculars (i.e., maintaining a hobby or some leisure activities)[2]

Dementia is a syndrome in which there is deterioration in memory, thinking, behaviour and the ability to perform everyday activities. [3]

Dementia is one of the major causes of disability and dependency among older people worldwide.[3]

Dementia has physical, psychological, social, and economical impact on carers, families and society.[3]

Forgetfulness[3]

losing track of the time[3]

becoming lost in familiar places[3]

becoming forgetful of recent events and people's names[3]

becoming lost at home[3]

having increasing difficulty with communication[3]

needing help with personal care[3]

experiencing behaviour changes, including wandering and repeated questioning[3]

becoming unaware of the time and place[3]

having difficulty recognizing relatives and friends[3]

having an increasing need for assisted self-care[3]

having difficulty walking[3]

experiencing behaviour changes that may escalate and include aggression[3]

Dementia is overwhelming for the families of affected people and for their carers[3]

difficulty planning and carrying out day-to-day tasks[4]

difficulty communicating[4]

changes in mood, judgement or personality[4]

Learn new things[4]

Remember recent events, appointments or phone messages[4]

Remember the names of people or places. This can lead to problems with even simple daily activities[4]

Understand or communicate with others[4]

Remember where they have put things. They may worry that someone has been in their house or has taken things[4]

Understand that there is anything wrong with them. They may become cross when someone tries to help them[4]

There may be memory loss and difficulty concentrating[4]

Language difficulties are common - as they are in Alzheimer's[4]

It is common to suffer from mood swings or to feel depressed[4]

Some people have episodes of confusion and may be aggressive or distressed[4]

Others may experience hallucinations (where they see something that is not there)[4]

Sometimes there are physical problems, for example difficulties with walking or incontinence[4]

Memory problems and difficulty planning tasks[4]

Confusion which can vary during the course of the day[4]

Vivid visual hallucinations of people or animals[4]

Trembling of hands, muscle stiffness, falls or difficulty with walking[4]

People with dementia commonly become depressed and anxious[4]

Cognitive symptoms of dementia can include poor problem solving, difficulty learning new skills, and impaired decision making.[6]

Behavior changes can include fear, insecurity, anger, and often, depression like symptoms.[6]

Over time, a person with Alzheimer's disease has trouble thinking, remembering, speaking, learning, making judgments, and planning.[6]

People living with Alzheimer's are often moody, restless, and sometimes mean.[6]

Alzheimer's disease affects almost all aspects of brain functioning, including personality, and the ability to perform the most basic activities of daily functioning.[6]

Alertness and severity of cognitive symptoms may fluctuate daily.[6]

Visual hallucinations, muscle rigidity and tremors are common.[6]

Apathy or an unwillingness to talk.[6]

Changes in personality and mood, such as depression[6]

Lack of inhibition or lack of social tact.[6]

Obsessive or repetitive behavior, such as compulsively shaving or collecting items.[6]

severe slowness of thought.[6]

feeling disorientated and confused[6]

memory loss and difficulty concentrating[6]

difficulty finding the right words[6]

severe personality changes, such as becoming aggressive[6]

depression, mood swings and apathy (unresponsiveness)[6]

abnormal gait (difficulty walking)[6]

inability to hold urine (urinary incontinence), and, inability to control the bowels[6]

