“To design is much more than simply to assemble, to order, or even to edit: it is to add value and meaning, to illuminate, to simplify, to clarify, to modify, to dignify, to dramatize, to persuade, and perhaps even to amuse. To design is to transform prose into poetry.”

-Paul Rand
What is the work we are engaged in?
Who is this work for?
Human Centeredness

Tool Builders

Users

Tool
Human Centeredness

Tool Builders

Users

Design Research

Tool
Human Centered Design

Need
- Distinguish symptoms from root causes

Context
- Seek out appropriate responses

Sustainability
- Look for solutions that stand the test of time
So why *Design* Research?
What is Research?

In the broadest sense of the word, the definition of research includes any gathering of data, information and facts for the advancement of knowledge.
The strict definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question.
What is Research?

*methodical* study to prove a *hypothesis* or answer a specific *question*. 
What is Research?

a way of knowing
what + how leads to result

(thing) (working principle) (observed)

Dorst "The nature of design thinking"
DEDUCTIVE REASONING

what + how leads to ????

(thing) (working principle) (observed)

Dorst  “The nature of design thinking”
INDUCTIVE REASONING

what + ????? leads to result

(thing) (working principle) (observed)

Dorst “The nature of design thinking”
What is Design?

making
/ˈmākiNG/

noun

1. the process of making or producing something.
   "the making of videos"
   synonyms: manufacture, mass-production, building, construction, assembly, production, creation, putting together, fabrication, forming, molding, forging
   "the making of cars"

2. informal
   money made; earnings or profit.
What is Design?

**Tangible, creative manifestation** of an idea through an **intentional** process that is to be consumed by **humans** that blends both the **emotional**, and cultural with the **scientific**, and rational.
actual soft solutions
What is Design?

a way of doing
What is Design?

Bringing something into the world
INDETERMINATE

- No definitive conditions or limits
- No exhaustive list of operations
- Depend on the perspective of the solver or user
- Nested problems (more complex)
- Are always unique
- Solver takes ownership of the solution
- Supports human activities
ABDUCTIVE REASONING

what + how leads to value

(thing) (scenario) (aspired)

Dorst “The nature of design thinking”
ABDUCTIVE REASONING

??????? + how leads to value
(thing) (scenario) (aspired)

Dorst  “The nature of design thinking”
ABDUCTIVE 2 REASONING

what + ???? leads to value
(thing) (scenario) (aspired)

Dorst “The nature of design thinking”
ABDUCTIVE REASONING

what + how leads to value

(thing) (scenario) (aspired)

frames

Dorst “The nature of design thinking”
a way of **knowing** through **doing**
What is Design Research?

A strategic and methodical study to gain insight and answer specific questions during the process of design addressing indeterminate problems.
Research through Design
What is Design Research?
Stages of Design

Observation:
- Observations

Analysis:
- Themes
- Stories
- Opportunities

Ideation:
- Brainstorming

Refinement:
- Prototypes
- Solutions

Implementation:
- Implementation
Stages of Design

Observation
Collecting Materials
The action or process of observing something or someone carefully in order to gain information.

Analysis
Finding Patterns and Insights
Detailed examination of the elements or structure of something, typically as a basis for interpretation.

Ideation
Solution Exploration
The formation of ideas and concepts.

Refinement
Narrowing Ideas and Concepts
The improvement or clarification of something by the making of small changes.

Implementation
Communication
The process of putting a decision or plan into effect.
**Observation**

*Defined as:*

1. The action or process of observing something or someone carefully or in order to gain information.
   "She was brought into the hospital for observation."

2. A remark, statement, or comment based on something one has seen, heard or noticed.
   "He made a telling observation about Hugh."

**Approach**

The observation phase focuses on accurate need assessments and developing a holistic understanding of the problem. Students build an understanding of the problem by cataloging environmental factors, understanding stakeholder perspectives, and researching multidisciplinary applications of related concepts. It's a Look, Listen and Learn phase. This is accomplished through a variety of activities that are focused on deep learning and seeing. We utilize three different perspectives in these activities. We use a first-person perspective to immerse ourselves in the experience. We employ a second-person perspective to learn from another. We use a third person perspective to understand what others are saying about the experience through literature reviews.

**Outcomes**

Rich and robust set of materials and data to understand the issue from the three perspectives. A repository of data that can be used throughout the process to validate, relate, and connect with the design work.

**Methods**

- Timeline (First person)
- Artifact Gathering (First person)
- POACE (First person)
- 5 Human Factors (Second person)
- Stakeholder Map (Second person)
- Sticky Note (First person)
- Literature Review (Third person)
- AEIOU (First person)
What is the goal?

Thing, Activity, Person
UX Design Process

Research: Vision, Analysis
Design: Ideate, Test, Prototype
Learn: Build & Deploy, Measure

Discover > Define > Ideate
Test > Prototype > Build & Deploy

Business goals
Business requirements
Technical constraints
User information

Business metrics
Product flow
Information architecture
User experience

Layout design
Interaction design
Motion design
Visual design

Working product
Web analytics
User feedback
Bug reports

Stakeholder interviews
Ecosystem map
Competitive audit
Content audit
Task analysis
User surveys
User interviews
Personas

Value proposition
KPIs
User stories
Storyboards
User journey map
User experience map
Taxonomies
Sitemap

Sketches
Wireframes
Moodboards
Style tiles
Design language
Usability tests
Prototypes

Structural markup
Dynamic markup
Scripts
Style Sheets
Graphic elements
Pattern library
Style guide

Metrics analysis
Heuristic analysis
Accessibility analysis
Improvement plan
Enhancement plan
How do you do it?

First person
Second person
Third person
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RESEARCH METHOD

45 Graffiti Walls

Graffiti walls provide an open canvas on which participants can freely offer their written or visual comments about an environment or system, directly in the context of use.

The graffiti walls method encourages participation through natural means of facilitating casual, anonymous remarks about an environmental space, system, or facility. Large-format paper is temporarily adhered to a wall or other surface, with markers left to a dining or otherwise made readily available for open-ended comments to be posted. The paper may be left blank, or a guiding question may be posted to direct comments on a particular theme. Depending on the environment, the materials are typically posted in an intentionally casual way.

The method can be used almost anywhere, but it is particularly useful in environments or situations in which it may be challenging to collect information through traditional methods such as interviews or observation, for instance, where respect for privacy or personal behaviors may prevent an ethical issue. The method has been used effectively for design research projects in public bathrooms, eliciting candid feedback on behaviors and perceptions of current spaces, specific issues such as sanitation, and desires for change. The method is also effective here owing to the natural context of graffiti in public bathrooms.

Photos of each graffiti wall should be taken at regular data intervals, as the paper may often deteriorate, or may be mistaken for vandalism and removed by maintenance staff, depending on location. The graffiti wall itself is removed at the end of the study and can be analyzed as a research artifact for inspiration, comparison, or evaluation with "walls" collected from other locations and content analysis.

Graffiti walls are a low-cost and time-efficient method with which to easily collect information from a range of participants, typically requiring no more materials than large format paper and pens, and a camera for documenting results. Limitations of the method are that there is little control over who participates in the method, and a lack of clear knowledge about who has contributed to the information collected. However, as an informal method triangulated with other means of exploratory research, graffiti walls are ideal for collecting baseline information and guiding design inspiration.

Further Reading


Graffiti walls are an ideal method for capturing informal opinions about an environment directly in the context of use. Here the method has been used effectively for research on perceptions and attitudes about public bathrooms, by facilitating an opportunity for participants to express themselves. Walls collected from various locations can be compared and consolidated to look for common themes and patterns.

Photos should be taken with a Flash-free Pentax Pentax.
| Behavioral | Quantitative | Innovative | Exploratory | Particpatory |
| Attitudinal | Qualitative | Adapted | Generative | Observational |
|            |            | Traditional | Evaluative | Self reporting |
|            |            |            |            | Expert review |
|            |            |            |            | Design process |

160  Universal Methods of Design
INTERACTION DESIGN IN THE ICU

Examples
INTERACTION DESIGN IN THE ICU
PROCESS:
- RESEARCH
- SYNTHESIS
- DESIGN
- VALIDATION
- CONCLUSION
RESEARCH
CONTEXTUAL OBSERVATION
RESEARCH

WORKFLOW MAPPING
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitors the patient's urine output.</td>
<td>Administering Medication</td>
</tr>
<tr>
<td>Checks urine output.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Checks vitals on computer assessment.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Number of pain medications is subjective, but chart it anyway.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Notes chart on chart that patient said she was in pain but didn't want pain meds.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Ensures chart is kept.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Uses pump to give insulin.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Computer said that he needed to give the patient a med, but it conflicted with the med the pharmacy had just ordered so he wanted the old med on order now and made a note of why it wasn't given.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Checks a sliding scale on computer to see what level of insulin patient needs with her blood sugar level.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Double checks (asked him) written chart to make sure the patient's blood sugar level was correct in the computer so that he knows he is giving the right amount of insulin.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Goes to the room to get insulin.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Prints all of the insulin that will be administered throughout the day.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Gets out notebook to write down temp.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Writes down urine output.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Notes urine output on paper.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Administers Medication. (Incapable)</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Asks patient how she is feeling, asks her to try her pain (1 to 10) is that comfortable? she says no. She asks if she wants something for the pain, she says no. Puts on her glove. Get out syringe, gets specified amount out of bottle, walked around the bed and connected it to the IV. Takes the patient a thank you.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Assessment: tells patients he is going to listen to her heart. Gets out stethoscope. Listens to heart. Asks her easy questions, what hospital she's in and what month it is. Listens to lungs, bowels, pupiles, pupiles. Replaces sheet on patient. Takes temperature.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Assessment: Gets out stethoscope, listens to lungs, listens to bowels, asks patient to squeeze his fingers, give me the peace sign. asks patient to wiggle toes, checks pulses in feet. Preparero patient for flashlights in eyes, checks pupiles. Ask patient to open his eyes. Takes patients temp (after getting new cap).</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Bathing rubs on gerson, does urine output while others are sticking with water and towel ready. Nurse removes patients bed pan and takes it to the disposing room. Adjust the fan for her. Begins drying patient down. Other nurse returns. asks if she wants her feet washed or not. Dries towel in water and washes her off (hair towel every time). Stays laundry traded to towels to a better location. Patient is awake enough to read and turn for them (makes it easier). Ask patient how she is doing. Change sheets and adjust patient to make his most comfortable.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Goes to the computer to chart. Charts intake.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Flushes the IV. Gets the syringe with saline, puts the IV line and injects saline. Serves off Syringe, throws it away, needs the IV.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Unit care: every 4 hours when patient is sedated.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Gets off the wheel. Silences ventilator, rises to 100% oxygen, asking what is going on to the patient. Cleans around tubes and inside the mouth, alarm sounds and he asks patient if he is in pain. Hours alarm, turns off feeding tube (which can cause patient when oral cleaning is going on). Throws away in mouth. Lets patient know that he is going to cut out his breathing tube.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Patient asks for apple sauce, nurse remembers her diet restrictions (don't pass swallow test), he offers to get her some Instead.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Knocks on patient's door, tells her they only had apple. Pours it into a cup. Looks for a spoon but cannot find one. Looks in food room for spoon. Don't know where to look. Finds one and brings it to patient. Starts taking the food up, explaining to her that she has to be at 90 degrees to drink liquids. This to feed patient but she doesn't want him to. Hands cup to husband.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Nurse walks into the room to check out respiratory tubes.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Nurse goes washroom for RT.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Repositioning patient. Finds nurse to help reposition patient, put on gloves, unstrap patients arms, lower bed so that it is likely fall, pull patient to one side and remove pillows that were underneath him, lay patient flat again. Inform the patient that they are repositioning him, push patient to other side, move around pillows, led steps back down.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Ask patient if he is hot and whether or not he wants a cool wash cloth.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Leaves to go get a wash cloth from the linen room. Goes washroom and asks the room family is paying as he leaves the room. Returns when the sand is finished. Gets washcloth, washes it in patients forehead and washes out</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Suctioning: lets know what he is doing. Pushes button down, suction, &quot;Sorry&quot;. States he'll measure patients mouth, asks if he likes that, asks if he would like to be suctioned out again, patient says yes. He does it, &quot;Sorry&quot;.</td>
<td>Task Administration Medication</td>
</tr>
<tr>
<td>Action</td>
<td>Task</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Checks urine output</td>
<td>R Task</td>
</tr>
<tr>
<td>Checks urine output</td>
<td>R Task</td>
</tr>
<tr>
<td>Checking IV line on computer (assessment); updates IV line by clicking at top of column.</td>
<td>R Task</td>
</tr>
<tr>
<td>Number for pain management is subjective, but chart is anyway</td>
<td>R Task</td>
</tr>
<tr>
<td>Notes on chart that patient said she was in pain but didn’t want pain meds.</td>
<td>R Task</td>
</tr>
<tr>
<td>Emer: Charts IP. Makes time and when med was administered (on body)</td>
<td>R Task</td>
</tr>
<tr>
<td>Charts assessment</td>
<td>R Task</td>
</tr>
<tr>
<td>Gets syringe to suck air out of the IV line.</td>
<td>R Task</td>
</tr>
<tr>
<td>Computer said that he needed to give the patient a med but it conflicted with a med the pharmacy had just ordered so he wanted the old med not given and made a note of why it wasn’t given.</td>
<td>R Task</td>
</tr>
<tr>
<td>Checks a sliding scale on computer to see what level of insulin patient needs with blood sugar level.</td>
<td>R Task</td>
</tr>
<tr>
<td>Double checks (assistant’s) written chart to make sure the patients blood sugar level was correct in the computer so that he knows he is giving the right amount of insulin.</td>
<td>R Task</td>
</tr>
<tr>
<td>Goes to room to get insulin.</td>
<td>R Task</td>
</tr>
<tr>
<td>Prints all information about all of the meds that need to be administered throughout the day, and keeps notes on that paper.</td>
<td>R Task</td>
</tr>
<tr>
<td>Gets out necessary to write down temp.</td>
<td>R Task</td>
</tr>
<tr>
<td>Wipes down urine output</td>
<td>R Task</td>
</tr>
<tr>
<td>Notes urine output on paper</td>
<td>R Task</td>
</tr>
<tr>
<td>Administering Medication (Napren), Asks patient how she is feeling, asks her to sit her pain (1 to 10), if she is comfortable, she says no. He asks if she needs something for the pain, she says no. Puts on his gloves. Gets out syringe, gets specified amount of bottle, walks around the bed and connected it to the IV. Tells the patient “Thank you.”</td>
<td>R Task</td>
</tr>
<tr>
<td>Assessment; tells patients he is going to listen to her heart. Gets out stethoscope. Listens to heart. Asks her easy questions, what hospital she’s in, and what month it is. Listens to lungs, bowels, pupils, lungs, pupils. Replaces sheet on patient. Takes temperature.</td>
<td>R Task</td>
</tr>
<tr>
<td>Assessment; Gets out stethoscope, listens to lungs, listens to bowels, asks patient to squeeze his fingers, “gives me the peace sign”, asks patient to wiggle toes, checks pulses in feet. Prepares patient for flashlight in eyes, checks pupils. Checks patient to open his eyes. Takes patient temp (after getting new stethoscope).</td>
<td>R Task</td>
</tr>
<tr>
<td>Bathing: Picks up sponge, devoid urine output, while other nurse gets bucket with water and towel, washes hands. Nurse removes patient’s camp and takes it to the dressing room. Adjust the fan for her. Begins wiping patient down. Other nurse returns. Asks if she wants her feet washed or not. Dries towel in water and washes her off (first towel every time). Sways laundry basket to towels in a better location. Patient is awake enough to roll and turn for them (makes it easier). Asks patient how she is doing. Change sheets and adjust patient to make her more comfortable.</td>
<td>R Task</td>
</tr>
<tr>
<td>Goes to the computer to chart. Charts insulin.</td>
<td>R Task</td>
</tr>
<tr>
<td>Flushes out the IV. Gets the syringe with saline, plugs the IV line and injects the saline. Shakes off Syringe, throws it away. Needs the IV.</td>
<td>R Task</td>
</tr>
<tr>
<td>Unit care; every 4 hours when patient is sedated. Gets patient off the bed. Silences ventilator, reduces 100% oxygen. Making sure what is going on to the patient. Cleans around tubes and inside the mouth, alarm sounds and he asks patient if he is in pain. resets alarm, turns off feeding tube (which can choke patient when oral cleaning is going on). Throws away on the ensuite. Lets patient know that he is going to suture out his breathing tube.</td>
<td>R Task</td>
</tr>
<tr>
<td>Patient asks for apple sauce, nurse remembers her diet restrictions (didn’t pass swallow test), he offers to get her some water.</td>
<td>R Task</td>
</tr>
<tr>
<td>Knocks on patient’s door, tells them she only had apple. Pours it into a cup. Looks for a spoon but cannot find one. Looks in food room for spoon. Didn’t know where to look. Finds one and brings it to patient. Starts making the bed up, explaining to her that she has to be at 90 degrees to drink liquids. Tries to feed patient but she doesn’t want him. Hands cup to husband.</td>
<td>R Task</td>
</tr>
<tr>
<td>Nurse walks into the room to check out respiratory tubes.</td>
<td>R Task</td>
</tr>
<tr>
<td>Nurse gets washcloth for BT.</td>
<td>R Task</td>
</tr>
<tr>
<td>Repositioning patient: Finds nurse to help reposition patient, put on gloves, unsnap patients arms, lower bed so that it is slightly flat, pull patient to one side and remove pillows that were underneath him, lay patient flat again, inform the patient that they are repositioning him, push patient to other side, move around pillows, lift sheets back down.</td>
<td>R Task</td>
</tr>
<tr>
<td>Asks patient if he is hot and whether or not he wants a cool wash cloth.</td>
<td>R Task</td>
</tr>
<tr>
<td>Leaves to go get a washcloth from the linen room. Grabs washcloth and enters the room. Family is paying so he leaves the room. Returns when the family is finished. Gets washcloth wet, places it on patient’s forehead and walks out.</td>
<td>R Task</td>
</tr>
<tr>
<td>Suctioning: gets know what he is doing. Pushes button down, suction. “Sorry”. States he’ll measure patient’s mouth. asks if he needs that, asks if he would like to be suctioned out again, patient says yes. He does it. “Sorry”.</td>
<td>R Task</td>
</tr>
</tbody>
</table>
ICU NURSING CARE

STATUS OF THE PATIENTS MEDICATION

MAKE MY PATIENT BREATHE BETTER

I WANT TO KNOW HOW MY PATIENT IS DOING

THINGS I NEED TO REMEMBER

INFORMATION THAT I DOCUMENT

MAKE PATIENT SATISFIED WITH THEIR CARE

WE WORK TOGETHER AS A TEAM

SYNTHESIS

AFFINITY DIAGRAM
ICU NURSING CARE

STATUS OF THE PATIENTS

MEDICATION

I want to know how my patient is doing.

Things I need to remember:

- Making my patient breathe better
- Keeping the family informed
- Documenting administered medications
- Administering medication to my patient
- Double checking ordered medication information
- Checking the status of my patient's breathing
- Checking my patients every 4 hours
- Programing the infusion pump to remind me before drug is empty
- Checking the medical record for changes
- Noting what medications need to be administered
- Documenting administered medications
- Administering medication to my patient
- Knowing what medications need to be administered

We work together as a team.

Immediate charting has advantages.

Delayed charting has advantages.

Alarms inform me of what is going on.

How and when I assess my patient

I check my patients' pain levels

Talking to patients about their status and planned procedures is important.

We rely on each other for physical help.

We share our expertise, instructions, and information is relayed to help complete tasks.

I communicate so that we are on the same page.

I make suggestions about patients' medication.

I update the doctor about my patient.

I get an OK from the doctor when I have made a change.

We pass on information.

We need to know the doctor's orders.

I retrieve medication.

I keep medications running safe.

I need to double check every order to make sure they are correct.

I need medication reminders.

I program the infusion pump to remind me before drug is empty.

I check the medical record for changes.

I note what medications are due.

I check the status of my patient's breathing.

I retrieve medication.

I administer medication to my patient.

I double check ordered medication information.

I document administered medications.

I administer medication to my patient.
SYNTHESIS

BROAD SCOPE

medical mode

patient/family mode

nurse mode

communication

family contact

help buttons/menu

electronic charting

to do list

normal vitals

current medication

how to list

alarms

patient history

mode

configuration/override

AT HOME

names of dr/nurse

severe alarms

uploaded photos

uploaded messages

video mail

links to information on diagnosis

alarms (severe)

pictures (default or customized)

positive messages

videos messages from family

dr & nurse’s name

super simplified waveform/value

meal information

normal vitals

trends

family contact info

alarms (severe)

emphasis on specific vitals
nurse mode

**current medication**
time left/flow
more information about med protocol
specific orders
compatibility
new medications
changes
arrival of med

**normal vitals**
trends
suctioning/intubated
specific
vent check
lab results
(recent) w/ time
see select values in other rooms

**mode configuration**
configures own screen
overrides family mode or medical mode

todo list
reminders
organize list
prioritize
sort
check off
turn optional tasks on/off
see required tasks only
remove items w/ or w/o reason
task completed, should I chart
doctors orders - send response
other orders
suctioning/procedures
leave note for self (audio)
prepare list for next nurse
request additional information
different views (by task, source)

**communication help**
call for help by function
nurse, RT, doctor
order meds
send messages
doctor next shift nurse, RT
connect to emergency contacts
see others contacting you

**electronic charting**
automatic charting
vitals, trends
confirmation of auto chart
similar look/format to paper charting
write on screen charts meds
assessments

**patient history**
medication history
allergies
procedures performed
lab results
previous assessments
visual history (wounds)

**family contact information**
names
pictures
phone number
email

how to list
protocol
procedures
DESIGN
INFORMATION ORGANIZATION
BODY BASED
How could this be improved to help you do your job better?
How could this be improved to help you do your job better?
CONCLUSION
SCREEN BUILDS
CONCLUSION
SCREEN BUILDS
CONCLUSION
SCREEN BUILDS
RESEARCH
Environment Mapping
<table>
<thead>
<tr>
<th>Step</th>
<th>Task: Alaris Medley - 1</th>
<th>Fault mode</th>
<th>Effects of failure</th>
<th>Causes</th>
<th>Mitigation strategies</th>
<th>Detailed explanation</th>
<th>Severity</th>
<th>Probability</th>
<th>Detectability</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low battery alarm sounds</td>
<td>Alarm sounds when user is busy with other tasks</td>
<td>Interruption of important tasks</td>
<td>Remaining battery life is rapidly displayed on the screen</td>
<td>Pump does not interface with record keeping system</td>
<td>Pump automatically enters patient information and infusion data into the electronic record</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Bag pump into main power</td>
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<td></td>
<td></td>
<td></td>
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<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Bag pump into main power</td>
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<td>4</td>
<td>Replace an empty bag during an infusion</td>
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<td>5</td>
<td>Change the bag</td>
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<td>6</td>
<td>Press Reset on the module</td>
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<td>7</td>
<td>Replace fluid bag</td>
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<td>8</td>
<td>Replace the maintenance fluid bag</td>
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<td>9</td>
<td>Enter the fluid details into the record keeping system (Centricity)</td>
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<td>10</td>
<td>Click on the IV line</td>
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<td>11</td>
<td>Click on the drug currently being administered</td>
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<td>12</td>
<td>Press Start Fluids for the current bag</td>
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<td>13</td>
<td>Press Record</td>
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<td>14</td>
<td>Save an infusion</td>
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<td>15</td>
<td>Select the exit for the drug being infused</td>
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<td>16</td>
<td>Stop the infusion</td>
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<td>17</td>
<td>Enter the time the infusion was stopped</td>
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<td>18</td>
<td>Power off pump</td>
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<td>19</td>
<td>Press Channel Off button on “fast” modules</td>
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<td>20</td>
<td>Shut down pump using main screen</td>
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<td>21</td>
<td>Press Options</td>
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<td>22</td>
<td>Press Power Down All Channels</td>
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<td>23</td>
<td>Press Yes</td>
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<td>24</td>
<td>Power button is pressed at the back of the pump</td>
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</tr>
</tbody>
</table>
SYNTHESIS

Environment Mapping
DESIGN
20 Iterations
DESIGN
Overall Strategy
DESIGN
IT Architecture
Books

Developments in Design Methodology  Nigel Cross
Design Research: Methods and Perspectives  Brenda Laurel
Universal Methods of Design  Bella Martin, Bruce Hanington
101 Design Methods  Vijay Kumar
100 Things Every Designer Needs to Know about People  Susan Weinschenk

Measuring the User Experience  Tom Tullis, Bill Albert
Seductive Interaction Design  Stephen Anderson

Journals

Questions?
three main themes emerged. First, participants noted that interaction designers brought a process for engaging massively under-constrained problems that were difficult for traditional engineering approaches to address. Second, designers brought a process of integrating ideas from art, design, science, and engineering, in an attempt to make aesthetically functional interfaces. One described this process as similar to composing music or conducting a symphony, where the job is to bring out the richness in a range of voices to make a singular thing. Third, designers brought empathy for users as a part of the process. In addition to considering their needs and desires from an external-observer’s perspective, designers worked to also embody the people they made things for.
Using our model, interaction design researchers integrate the *true* knowledge (the models and theories from the behavioral scientist) with the *how* knowledge (the technical opportunities demonstrated by engineers). Design researchers ground their explorations in *real* knowledge produced by anthropologists and by design researchers performing the upfront research for a design project. Through an active process of ideating, iterating, and critiquing potential solutions, design researchers continually reframe the problem as they attempt to make the *right* thing. The final output of this activity is a concrete problem framing and articulation of the preferred state, and a series of artifacts—models, prototypes, products, and documentation of the design process.
Research

Understanding

Novel

Practice

Commercial

Refinements