BIOE 200

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Hear, Create, Deliver (HCD)

**Hear** – prepare for and conduct field research, interviews, observations in a community. Observe needs and desires.

**Create** – translate field research into ideas that may be prototypes, opportunities, other solutions that are technically and organizationally feasible to meet needs.

**Deliver** – realize solutions with financial sustainability in mind to launch tangible solutions in community.
Let’s look at some needs from the first assignment...

- [endocarditis robotic surgery] The steps and extra time being taken by the surgeons may be due to a lack of familiarity with the technology, or a low response rate by the robot itself.

- [aortic valve replacement] The surgeons constructed the bypass prostheses conduit on a table in the back. This engineered piece involved 3 different components that were sewn together using a silicone base. This time spent by the surgeons and their staff could be prevented if this conduit was prepared prior to the procedure.

- [craniotomy] The area looked very disorganized because there were cords crossing all over the patient between different types of equipment.

- [total hip arthroplasty] This process requires precaution due to its impactful insertion, and could be improved with the use of a more precise device.
Defining the Problem

• Evaluate problems based on the inputs
  • Why does the problem occur?
  • What are the possible explanations and causes?
  • What are the medical implications of the problem?
    • Anatomy, Physiology, Epidemiology, etc.
  • Who are the stakeholders? Who is impacted?
    • Patients? With what specific conditions?
    • Providers? What type, and in what specialties?
    • The overall healthcare system? In what ways? Other Stakeholders?
  • How are they negatively impacted?
    • Clinical outcomes, safety/risk, inconvenience, recovery time, ease-of-use, productivity, cost, etc.

• How severe is the problem?
• In what setting does the problem occur?
Converting Observations to Needs Statements

 USERS (Be very specific)  NEEDS (verb)  Surprising INSIGHTS

 needs to

 because

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Patient has a history of no one paying attention to their history.

See EMR for details...
Converting Observations to Needs Statements
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 USERS (Be very specific)  
 needs to  
 NEEDS (verb)  
 because  
 Surprising INSIGHTS

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<table>
<thead>
<tr>
<th>Guideline</th>
<th>Customer Statement</th>
<th>Need Statement-Wrong</th>
<th>Need Statement-Right</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What Not How</strong></td>
<td>“Why don’t you put protective shields around the battery contacts?”</td>
<td>The screwdriver battery contacts are covered by a plastic sliding door.</td>
<td>The screwdriver battery is protected from accidental shorting.</td>
</tr>
<tr>
<td>Specificity</td>
<td>“I drop my screwdriver all the time.”</td>
<td>The screwdriver is rugged.</td>
<td>The screwdriver operates normally after repeated dropping.</td>
</tr>
<tr>
<td>Positive Not Negative</td>
<td>“It doesn’t matter if it’s raining, I still need to work outside on Saturdays.”</td>
<td>The screwdriver is not disabled by the rain.</td>
<td>The screwdriver operates normally in the rain.</td>
</tr>
<tr>
<td>Attribute of the Product</td>
<td>“I’d like to charge my battery from my cigarette lighter.”</td>
<td>An automobile cigarette lighter adapter can charge the screwdriver battery.</td>
<td>The screwdriver battery can be charged from an automobile cigarette lighter.</td>
</tr>
<tr>
<td>Avoid “Must” and “Should”</td>
<td>“I hate it when I don’t know how much juice is left in the batteries of my cordless tools.”</td>
<td>The screwdriver should provide an indication of the energy level of the battery.</td>
<td>The screwdriver provides an indication of the energy level of the battery.</td>
</tr>
</tbody>
</table>
Observation at a sleep lab in a nearby hospital
Converting Observations to Needs Statements

**USERS**  (Be very specific)

**NEEDS**  (verb)

**Surprising INSIGHTS**

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Your assignment this week

• Rewatch your video
• Write down an observation
• Write down a needs statement for that observation
• Try to do at least 5 in the new format!
Future journals...

- You will log a journal any time you have a clinical experience (tour or sim) and repeat this process.
  - Take notes
  - Write down observations and needs statements
  - Identify stakeholders
Research the clinical unmet need

• Try to identify and briefly describe the current treatment options for your clinical unmet need.
  • Comment on any new focus areas and new treatments that might come to market

• List 4-5 specific stakeholders that are invested in this unmet clinical need?
  • Identify 3 potential conflicts and/or alignments between these stakeholders and detail for what specific reasons (ethical, competition, cost, resources, reputation, outcomes, competition, workflow, risk, economic impact safety, ease-of-use) this relationship might exist.
Resources

• Literature
  • PubMed, Harrison’s online, UpToDate, eMedicine

• Agency for Healthcare Research & Quality (AHRQ)

• Summary Data
  • HCUPnet, MEPS Data, US Census Bureau

• World Health Organization (WHO)

• Professional Societies
  • For example: American Heart Association

• Industry-specific news resources
  • Such as Medtech Insight, InVivo, Start-Up Magazine, and Qmed
Stakeholder Analysis

• Learn to identify important stakeholders.
• Understand each stakeholder’s perception of the medical need (initially) and the proposed solution concept (eventually).
• Recognize which stakeholders are in conflict and/or alignment with one another and for what reasons.
Types of Medical Stakeholders

- Patients
- Patient advocacy groups
- Physicians
- Professional associations
- Nurse practitioners
- Health care facilities
- Facility trade groups
- Private payers (Medicare/Medicaid)
- Public payers
- Government officials/legislators

Medical need
Defining the Problem

• Research the questions on the previous slide
• Summarize the most important data gathered
  • Refine the Problem Statement as necessary
• IMPORTANT: It is too soon to begin thinking about solutions. Resist the tendency to allow solution biases to constrain your understanding of the problem
  • The problem statement should be a short narrative describing the problem, while staying free of solutions