Getting Dirty with Product Design

Brad Eiben

Executive Director, MS in Product Management
Go see, ask why, show respect.

— Fujio Cho —
Go see, ask why, show respect.

— Fujio Cho —

In 6 words, this is 90% of today’s message.
DESIGN ACTIVITY #1
ACTIVITY #1 -- Sketch a superhero problem solver.

Don’t sketch this one...

... create your own.

Eyes like an owl...
Ears like an bat...
Heart like an lion...
Build like a beaver...

Source: patch.com
Teamwork like a beehive...
My superhero “sketch...”
Homework:

When facing a problem and you don’t know where to begin, ask, “Where is the sandbox?” and go there!
TODAY’S DISCUSSION
Broad definition of “Product”

- Software
- Hardware
- Service
This discussion is a product
This discussion is a product

Your goals >> my goals.
Assumed Goals

- Why? Importance of “getting dirty.”
- What next? Resources and activities.
Assumed Goals

- Why? Importance of “getting dirty.”
- What next? Resources and activities.
Assumed Goals

- Why? Importance of “getting dirty.”
- How? Exploring a problem..
- What next? Resources and activities.
Assumed Goals

- Why? Importance of “getting dirty.”
- What next? Resources and activities.
Interaction

- Have fun. No wrong answers.

- Have a sketch / notepad.

- Conversational. Ask questions.
Interaction

- Have fun. No wrong answers.
- Have a sketch / notepad.
- Conversational. Ask questions.
Interaction

- Have fun. No wrong answers.
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Interaction

- Have fun. No wrong answers.
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- Conversational. Ask questions.
DESIGN ACTIVITY #2
ACTIVITY #2 – Design a toothbrush.
Who had a user in mind?

- For a dentist?
- For an astronaut?
- For a traveler?
A better starting point...

Travelers need a way to clean their teeth because they don’t always have access to water.
Solving users’ problems?

Opportunity statement / POV madlib

Source: Stanford d.school
Solving users’ problems?
Power Rechargeable Electric Toothbrush with Bluetooth Connectivity, White Edition

4.5 out of 5 stars - 6,357 ratings | 503 answered questions

Amazon's Choice in Rotating Power Toothbrushes

-41% $95.00 ($99.99 / Count)
List Price: $159.99

& FREE Returns

Pay $17.26/month or less for 6 months with Affirm. Learn more

Available at a lower price from other sellers that may not offer free Prime shipping.

Style: White Electric Toothbrush

Brand

Age Range (Description) Adult

Special Feature Bluetooth, Deep Clean, Whitening, Sensitive, Travel Case

Power Source Battery Powered

Color White Edition

About this item

- Bluetooth communication between brush and smartphone provides real-time feedback on brushing habits, helping you achieve amazing results.
<table>
<thead>
<tr>
<th><strong>Power Rechargeable Electric Toothbrush with Bluetooth Connectivity, White Edition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Star Rating</strong>: 4.8 out of 5 stars</td>
</tr>
<tr>
<td><strong>Price</strong>: $95.00</td>
</tr>
<tr>
<td><strong>Shipping</strong>: FREE</td>
</tr>
</tbody>
</table>

Available at a lower price from other sellers that may not offer free Prime shipping.

**Style**: White Electric Toothbrush

**Brand**: [Brand Name]

**Age Range (Description)**: Adult

**Special Feature**: Bluetooth, Deep Clean, Whitening, Sensitive, Travel Case

**Power Source**: Battery Powered

**Color**: White Edition

**About this item**

- Bluetooth communication between brush and smartphone provides real-time feedback on brushing habits, helping you achieve amazing results.
Connecting your toothbrush to your Smart Phone

Download the [app] for free from App Store™ or Google Play™. This app gives you the opportunity to use your toothbrush more efficiently, chart your brushing progress and customize your toothbrush settings (for more benefits see the app instructions).

- Start the app and let it guide you through the Bluetooth pairing procedure. Note that app functionality is limited if Bluetooth is deactivated on your phone (for directions please refer to your smartphone’s user manual).
- Once you start using your toothbrush by lifting it off the plugged-in charger or pressing any button, it automatically connects to the app. If no connection has been established, briefly press the mode button on your toothbrush handle and wait for a connection.
- Any further app instructions will be displayed on your smartphone.
- Keep your smartphone in close proximity when using it with your toothbrush handle. Make sure the smartphone is safely positioned in a dry place.

Note: Your smartphone must support Bluetooth 4.0 (or higher) in order to connect to your toothbrush handle.

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FIVESTAR Bluetooth can be turned off!!! Easy to use, leaves teeth feeling very clean :)!

Reviewed in the United States on November 15, 2016

I had a Phillips Sonicare electric toothbrush for several years, and it finally died. I decided to replace it.

Rechargeable Electric Toothbrush with Bluetooth Connectivity... and I am very pleased with this new toothbrush. It leaves my teeth feeling very clean, I like the battery indicator and the travel case. Also, the instructions say that a full charge enables up to ten days of regular brushing (twice a day, 2 minutes). While researching this toothbrush, I had several questions which I wasn’t able to find answers for: now that I have this toothbrush, I can answer those questions: 1) Can you turn off the Bluetooth? - Yes, press and hold both the on/off and mode button for 3 seconds 2) Does it come with any brush holder? - So what kind? - Yes, it comes with a 4-brush
Solving users’ problems?

Is this using tech to solve a nonexistent problem?
How might this have happened?
The manager who comes up with the right solution to the wrong problem is more dangerous than the manager who comes up with the wrong solution to the right problem.

— Peter Drucker —
How do we avoid solving the wrong problem?
So, what is design?
Engineer a tech gadget because we can.

Solve your customer’s problems.
Homework:

Write a madlib for your product.

Why does it exist and for whom?
FOUNDATION & PHILOSOPHY
If you know the way broadly you will see it in everything.

~ Miyamoto Musashi
Foundation at Toyota in lean culture.
• Create Value
• Hands-On
• Customer-Focused
• Problem First
Based on manufacturers' data.

Source: Vimont Toyota Laval - YouTube
Research & Development

Engineering & Manufacturing

Source: https://www.toyota.com/usa/operations/
Not just true at Toyota

working backwards

Insights, Stories, and Secrets from Inside Amazon

Colin Bryar and Bill Carr
Not just true at Toyota

The McKinsey Go & See program creates opportunities for organizations considering a large-scale transformation program to learn from peers at other organizations who have undertaken a similar journey. These visits may focus on topics such as embarking on a new digital strategy, agile at scale, data and analytics, and reimagining customer journeys, among others.
Not just true at Toyota
DESIGN PROCESS
DOUBLE DIAMOND FRAMEWORK
If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.

— Albert Einstein —
DOUBLE DIAMOND

Problem Space

Solution Space

Iterate Throughout

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
DISCOVER
DISCOVER - IMPORTANCE
Goals:

- Collect Data
- Empathize
- Observe
Mindset:

- Respectful
- Inquisitive
- Hands-on

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
The user is not like me!

11/13/2016: Source: https://www.nngroup.com/articles/computer-skill-levels/
Tactics:

- Contextual Interviews
- 5 Whys
- Journey Mapping
- Stakeholder Mapping
DISCOVER – Frustration Is Data

DISCOVER – Contextual Interviews
DISCOVER – 5 Whys

WHY
• Shipment was wrong

WHY
• Tracking system error

WHY
• Scanner was broken

WHY
• IT Department didn’t respond

WHY
• Understaffed and point person on vacation
DISCOVER – Journey Mapping

Air Travel Customer Journey

Main Actions
- At home: researching and ordering tickets.
- In the car: driving to the airport.
- Ticket check-in at the airport.
- Luggage check-in at the airport.
- On the airplane.
- Luggage pick-up at destination.

Emotions and Touchpoints

Thoughts
- Where do I want to go? How do I order?
- I am stuck in traffic. What happens if I miss my flight?
- I do not have time for this. I’m in a hurry!
- Is my flight on time? Did I hurry for nothing?
- I made it! Now I can relax for a while.
- I hope my luggage is not missing and is here on time.

Ideation
- A check-in app would make it possible to check-in at home or on the way to the airport, and ease stress for our customer.
- The app or another service could also notify the customer about delays and luggage status.

Source: UXPressia
DISCOVER – Contextual Interviews
DEFINE - AFFINITY

https://uxplanet.org/free-sketch-template-for-building-a-meaningful-affinity-diagram-during-the-ux-process-f832e081782d
Design Activity #3
ACTIVITY #3 – Sketch a hypothetical user’s journey of your product or that of a competitor.
Homework:

Make it real.

Use your own product and map your journey. Do the same for a competitor’s product.

Follow a user through your workflow. Observe their pain points and moments of joy. Do the same with a user of a competitive product.
DISCOVER – STAKEHOLDER MAPS
DISCOVER – STAKEHOLDER MAPS
DISCOVER – STAKEHOLDER MAPS
Design Activity #4
ACTIVITY #4 – Sketch your own stakeholder map.
Homework:

Do you have adequate communication with all stakeholders?

Do you understand how their needs affect your design process?

How confident are you?
DOUBLE DIAMOND

Problem Space

Solution Space

Iterate Throughout

Source: https://www.nicepng.com/maxp/u2t4r5q8t4a9e6u2/
WRAP-UP
Go see, ask why, show respect.

— Fujio Cho —
Assumed Goals

- Why? Importance of “getting dirty.”
- What next? Resources and activities.
Resources

The DESIGN of EVERYDAY THINGS
DON NORMAN

NN/g Nielsen Norman Group
World Leaders in Research-Based User Experience

We provide research-based UX guidance, by studying users around the world.
Resources

Dan Olsen

The Lean Product Playbook

How to Innovate with Minimum Viable Products and Rapid Customer Feedback
Resources

Carnegie Mellon University

Tepper School of Business + School of Computer Science

MS in Product Management
Contact me...

Brad Eiben
beiben@andrew.cmu.edu
DEFINE
DEFINE

Goals: interpret, synthesize, prioritize

Mindset: analytical, collaborative

Tactics:

• Affinity Diagram
• Decision Matrix
• Personas
https://uxplanet.org/free-sketch-template-for-building-a-meaningful-affinity-diagram-during-the-ux-process-f832e081782d
DEFINE - PERSONA

THE LIFER

I frequently use VA services and plan to continue doing so. I look to the VA to play a supporting, community building role in my life. I am grateful for my VA benefits, but I get frustrated when problems arise which break up the continuity of my care - like when my doctors change too frequently and when I can’t transportation to VA facilities. Generally, I try to speak highly of the VA and want to contribute to making it work better for fellow Vets.

- I just want quick transactions
- I’ll take care of it
- I don’t use the VA
- I want a relationship
- Do it for me
- I use VA services

EXPECTATIONS

- That the VA cares and takes the time to understand my needs and story
- Cost of VA services won’t rise
- That I can reach someone at the VA anytime I need anything

NEEDS

- I don’t want to tell my story over and over, especially after using the VA for so long
- I want to know what’s going on with my services and especially my benefits
- I’d like patient, nurturing healthcare

DESIGNING FOR THE LIFER

Allow me to pause and ask questions, and to have access to a VA professional to speak with frequently and in a timely manner. Include info about local Veteran support chapters in communications. Provide me with a single online tool or a call center where they can refill prescriptions, see test results, and maintain all aspects of the VA needs. Give high level of feedback loops so that I can be assured my request was submitted and is being handled.
DEFINE - PERSONA

THE LIKER
I often use VA services and plan to continue doing so. I look to the VA to play a supporting, community building role in my life. I am grateful for my VA benefits, but I get frustrated when problems arise which break up the continuity of care - like when my doctor changes too frequently and when I can't get an appointment to VA facilities. In short, I try to speak highly of the VA and want to contribute to making it work better for fellow veterans.

THE TRANSACTIONAL
1. I work quickly. I’ll take care of it. I use the VA services.
2. I don’t use the VA services. I did it for me.

EXPERIENCES
1. That VA cares and takes the time to understand their needs and story.
2. Cost of VA services isn’t worth it.
3. I expect someone to call me anytime.

NEEDS
1. I want to tell my story over and over, especially after learning the VA did so for so long.
2. I want to know what’s going on with my benefits and services.
3. To feel patient, nurturing healthcare.

THE JUST IN CASE
I am proud of my service, but don’t need the VA and plan on using it as a backup. My service and organization by nature, I have all of their papers with me and have a list of who I am eligible for.

THE JUST IN CASE
I am grateful for the benefits available to me, but differ from the VA as tradeoff for my time and will likely rely on the VA as back up plan, to make sure my family is taken care of.

THE INFREQUENT
I really don’t think very much about the VA. I have used VA benefits in my lifetime, yet often years will go by between those interactions.

 Diese might be because I live in a place where it is difficult to access VA services, because I am financially comfortable or because it seems too much hassle. I tend to prefer quick interactions - a text message or a call to a contact on a website.

Source: Us Dept. of Veteran Affairs
## DEFINE – DECISION MATRIX

<table>
<thead>
<tr>
<th>ITEM</th>
<th>IMPACT</th>
<th>FEASIBLE + RISK</th>
<th>COST</th>
<th>TIMING</th>
<th>OTHER</th>
<th>OVERALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add / improve PPE. New mechanic style work gloves. Make sure enough equipment is available</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Add safety attitude dialogue to every safety meeting. Get employees to define and find bad safety attitudes</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Implement a safety reward program - Random raffle tickets. Monthly drawing</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Have every employee perform a department safety inspection. Do this weekly until full roster rotation is completed</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Enforce disciplinary action on safety violations</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Chart department accident rates and display. Look a number of accidents VS accident rate</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Create designated walk ways through department. 3 feet wide?</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Ergonomic assessment of the Tool room</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Improve shop work space. Limit number of pallets in the department. Designated storage areas. Overflow area?</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Exercise program – Stretching</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Change dress code to no shorts or sleeveless shirts.</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Setup proficiency tests for Toolmakers. Levels?</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Add new brighter lighting to department</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Most storage racks for long term mold/job storage. *Requires additional forklift added to department</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
DEVELOP
The best way to have a good idea is to have a lot of ideas.

— Linus Pauling —
DESIGN

Goals: ideate, experiment, prototype

Mindset: exploratory, egoless, hands-on

Tactics:

• Prototyping
• Sketching
• “How Might We”
Jeff Hawkins, 1995

“Tested design with this model using a chopstick for a stylus.

He took pretend notes in meetings and counted the steps it took to perform common tasks.”

Source: Computer History Museum
DESIGN - SKETCHING

DESIGN – HOW MIGHT WE

https://www.youtube.com/watch?v=ry55--J4_VQ
DELIVER
Design is not just what it looks like and feels like. Design is how it works.

― Steve Jobs ―
DELIVER

Goals: test, debug, launch

Mindset: critical, entrepreneurial, strategic

Tactics:

• Think Aloud Testing
• Heuristic Evaluation
• Iteration
DESIGN – THINK ALOUD

• Similar to interviews in discover phase
• Performed on your prototype
• Encourage the tester to speak as they perform tasks
DESIGN – HEURISTIC EVALUATION

10 Usability Heuristics

- Visibility of system status
- Recognition rather than recall
- Match between system and the real world
- Flexibility and efficiency of use
- User control and freedom
- Aesthetic and minimalist design
- Consistency and standards
- Helps users recognise, diagnose, and recover from errors
- Error prevention
- Help and documentation

Source: Interaction design foundation
Never give an order that can't be obeyed.

— Douglas MacArthur —
Design – Iterate

Discover
What is?

Define
What if?

Develop
What wows?

Deliver
What works?

Diverge
What is the nature of the problem

Converge
Which problem can we expect the most

Diverge
To consider many options

Converge
To select & make concrete from abstract

Initial Insight/Problem/Statement of work

Plan

Ship

Source: https://www.nicepng.com/maxp/u2t4rS8t4a9e6u2/
BONUS ACTIVITY
THINK ALOUD
Find a partner

Conduct a 5 minute think aloud

Goal is to practice encouraging the interviewee to keep talking as they complete the task

What are the nearest 15 restaurants?
BONUS ACTIVITY

DIVERGENT THINKING
Every child is an artist. The problem is to remain an artist once they grow up.

- Pablo Picasso