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GE

Wacom Handwriting Tablet Research

Project Overview

Client Needs:
- Understand digital pen and paper trends in the market
- Understand potential users better - they only did research internally with employees
- Do a prototype test to see how well the device was functioning to users

Our Approach:
- Conduct generative research to inform the client about their potential users and their needs
- Conduct a prototype study to inform how the product need to be improved to fit users' needs and desires
- Conduct a final workshop with research participants to determine what functions and features must be in place for the product to be desirable in the first generation

This product is now on the market as the Wacom Bamboo Folio

Research Preparation

Design and prototype research

This project asked for a lot in terms of understanding the user and getting answers to a prototype test at the same time. We had to be diligent in how the research plan was designed in order to get the most out of participants in every phase. Only two internal company studies had been done to understand the user. We wanted to give Wacom fresh insights to not only inspire the development of this product, but insights to also inspire future product development.

We began with aligning on an overall research goal and research questions with Wacom. We then used those research questions to finalize our research plan and recruiting criteria for research participants.

Research Goal:
To gather user insights to inform a successful category-creating digital stationery product.

Research Questions:
1. What types of users will find this product compelling?

2. Per user type, what characteristics and features of note-taking are most important?

3. Per user type, what are possible product categories and differentiators?

Research

Research Phase 1: One-on-one interviews

The first phase of this research was to conduct one-on-one interviews with 20 potential customers of this new product in their work environment. The interviews were used as a means to understand how users take notes, where are they taking notes, what are they using to take notes, and what do they think about digitizing their handwriting. The interviews were broken up into three segments to get to these insights:

1) **Discovery conversation:** Interview of their note-taking process and showing us the tools they used

2) **Observation:** We played a 5 minute segment of a TED talk that we asked them to take notes on

3) **Prototype test:** Have them interact with a prototype of the digitized handwriting tablet Wacom was building

Users were starting to parse themselves into potential categories by the way they reacted to the prototype. This led us to deciding who we would want to do a full prototype test of the product in phase two.

1 **Discovery conversation**
Uncover what participants use to take notes and what they take notes on

2 **Observation**
Watch the participant take notes on a lecture and ask questions about what they did

3 **Prototype test**
Interact with the new prototype and give their thoughts on how they would want it to work

Research Phase 2: Prototype test

Five participants from the first phase were selected to do a prototype test for ten days. This phase of the research was meant to answer how should this product work in its final iteration to make it more desirable for users? The prototype was not a final design, but worked to the point that the research participants could use and save their notes and/or sketches.

They were asked to log their interactions, opinions, and thoughts throughout the week. Their thoughts and interactions would serve as a "debrief" point for a co-design focus group they would participate in at the end of the prototype test phase.

Examples of the notes made done by the participants that were digitized by the prototype
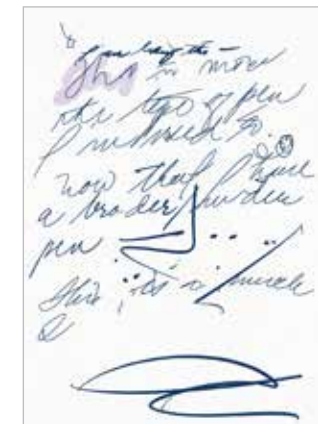
Research Phase 3: Participant co-design session

Following the prototype test, the five participants came in for a co-design focus group. The goals of this session was to get down to a list of the most important functions that the design would have to have in order for these five users to purchase this product. The participants went through three different activities to reach this consensus:

1) **Prototype week debrief:** Each participant gave a debrief on how their week was with the prototype and what their excitements and frustrations were with the product

2) **Ideal product experience sketch exercise:** Participants drew out their ideal product experience with the technology offered in the prototype. They got to express what was most useful to them individually

3) **Minimum Viable Product exercise:** The session was completed with a focused discussion on which functions and features should exist in the near term for the product to be desirable by all participants

1 Prototype debrief
Participants gave their week long experiences with the new product prototype

2 Ideal product
Based on their prototype experiences, participants got to design their ideal product experience

3 Minimum Viable Product
A consensus discussion to list what valuable features all participants wanted the device to have

User archetype construction

Following the three stages of research, transcripts and video were utilized to analyze the data of the 20 research participants. What was uncovered was that there were not any patterns relating to the individual paper and writing utensils people were using to take notes and sketch. Patterns emerged when we took a step back and asked ourselves, "Who and what are they taking notes for?" That is when our key 2x2 matrix was created. This helped us understand what drove people to take the types of notes that they did and what tools they used to do it.
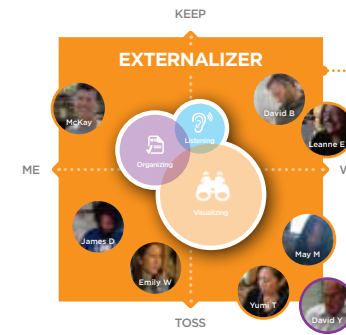
Three groups emerged out of these participants. Each had their own unique set of criteria that they had for taking notes and what prompted them to take notes and either keep or throw away their notes. These categories gave insight to other products that could be designed for the users.

The data from the prototype test and the final co-design focus group session were used to verify what type of person was involved in phase two and three of the research and what features and functions were required of the product for them to want to use it in their daily life?
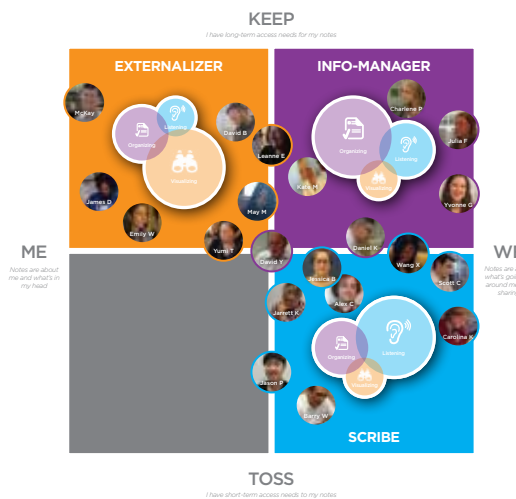
Bamboo digital paper

After identifying different archetypes in the research, one group was identified as being the most viable for wanting to purchase and use the Wacom paper tablet. Needs for the how the product should work were defined for these users. The design of the product was modified based on these needs. A mock-up of a sales pitch on Uncrate.com was used to invigorate excitement for the marketing team.

Wacom CAD Cintiq Research

Project Overview

Client Needs:

- Understand use cases and user behavior surrounding the Wacom Cintiq
- Understand what users predominately use their Cintiq for in their workflow
- Uncover if the Cintiq could be a useful tool for CAD work

Our Approach:

- Conduct generative research to inform the client about their potential users and their needs
- Conduct individual interviews to understand CAD use in an overall design workflow
- Conduct a workshop with research participants to determine what functions and features must be in place for the Wacom Cintiq and Expresso Bar to be useful for CAD

This project was a new iteration for the Wacom Cintiq Expresso Bar

Research Preparation

Design research

The Wacom Cintiq team's *primary question was to find out if designers would use their Wacom Cintiqs for CAD work.* They wanted to understand specifically if they would use the digital pen that they use for drawing to use in CAD. Along with that came the question of utilizing the Cintiq "Expresso Bar" for "hot keys" or "short cut keys."

This required us to design a research plan that involved going out and observing/interviewing designers that used Wacom Cintiqs. We wanted to understand how the might use their Wacom Cintiq for CAD work and not just sketching. We also wanted to uncover how the Cintiq workflow would need to change in order to allow efficient CAD workflow.

Research Goal:

To gather user insights to inform if the Wacom Cintiq and Expresso Bar would be useful tools for CAD

Research Questions:

1. What types of users will find this product compelling?

2. Per user type, what characteristics and features of the Wacom Cintiq would be useful for CAD?

3. Per user type, what are possible product categories and differentiators?

Research

Research Part 1: One-on-one interviews

The research was conducted in two parts over the course of a week. The first part involved interviewing 14 designers from both corporate and consulting agencies. At the conclusion of the interviews, we wanted to have an understanding of: the designer's workflow from first sketches to final design, how they use CAD software in their work, what they use their Wacom Cintiq for, and what are their thoughts on using the Wacom Cintiq for their CAD software work. The interview was broken up into three main parts:

1) **Initial conversation:** The initial interview gave us context of who the designer was, what their workflow is, how often they use CAD, and how they use their Wacom Cintiq

2) **CAD workflow cards:** The participants gave their thoughts on 20 cards with different future scenarios of using CAD on Cintiq

3) **Mock test:** The participant gave their thoughts on what they think it might be like using CAD on a Cintiq

1 Initial conversation
The initial conversation covered what their design workflow was like, how they use CAD, and how do the use a Cintiq

2 CAD workflow cards
The participants gave their thoughts on a list of cards that illustrated potential Cintiq CAD workflows

3 Mock test
After viewing the cards, the participant mocked what it might be like using the pen instead of the mouse for CAD work

Research Part 2: Focus group design session

The second part of the research involved four other designers in a focus group co-design session. Co-design sessions allow for more ideas to flow between participants as ideas, thoughts, and frustrations get shared. Based on where they worked, their design roles varied. This influenced what tools they used and how often. We took this group through three different exercises to uncover what the ideal CAD experience on a Cintiq would be:

1) **Initial conversation:** Each participant got a chance to talk about their design workflow and what they use their Cintiq for

2) **Ideal Cintiq CAD experience:** The participants got to design their ideal CAD experience using a Cintiq would be

3) **Cintiq Demo:** The participants gave their thoughts on Wacom's ideas on how they saw CAD working on the Cintiq

1 Initial conversation
Each participant got to talk about their design workflow, how they use their Cintiq and how they use CAD software

2 Ideal experience
Each participant got to design their ideal experience using CAD on a Cintiq based on their daily workflow

3 Cintiq demo
The participants gave their thoughts on the future ideas of how CAD would be designed for the Cintiq
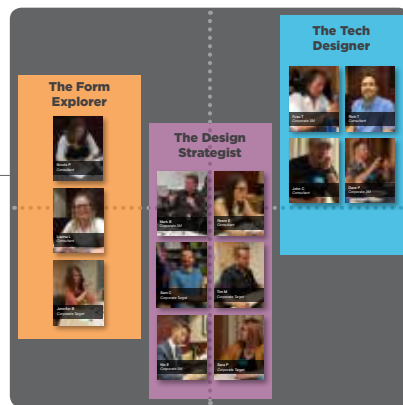
Analysis & synthesis

Following the research, raw data was analyzed and synthesized into models and matrices to understand what we had learned from the field research. We uncovered three different archetypes based on how they were using CAD software for their work. This affected their thoughts on how they would use (or not use) CAD on a Wacom Cintiq screen. The archetypes were built out to show their needs and design goals.

Different workflows, different needs

We uncovered that there were different needs pertaining to CAD use based on what each archetype needed to use CAD for. Some weren't using CAD software too much because their designs were getting pushed to engineering. Others used CAD to get their designs down to minute specifications so it could be engineered properly. This showed the value and the limitations of using CAD software on a Cintiq device. Potential workflows were sketched out to take to the design team for further development.

My motivation for using 3D CAD

Extrinsic
Motivated by the precise engineering realization of their design

The Tech Designer

The Form Explorer

The Design Strategist

How I use 3D CAD

Loose
Use 3D CAD to explore form quickly

Exact
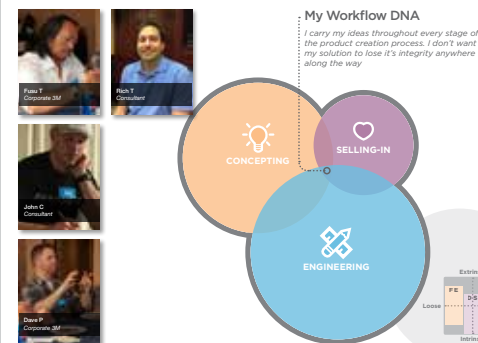Use 3D CAD to finalize for production

Intrinsic
Motivated by exploring and identifying the right design

The Tech Designer Archetype
3D CAD is a tool to realize my ideas

The archetypes are derived from patterns of behavior. They provide the product creation team with a superior understanding of an objective target model for design and marketing direction

My Workflow DNA
I carry my ideas throughout every stage of the product creation process. I don't want my solution to lose it's integrity anywhere along the way

Fusu T
Corporate 3M

Rich T
Consultant

John C
Consultant

Dave P
Corporate 3M

CONCEPTING

SELLING-IN

ENGINEERING

My Ideal Process

1. **Sketching is a mindset**
Sketching is a very personal task to the Tech Designer. They know that they have to be in the right mindset in order to ideate and sketch successfully

2. **3D CAD is a constructing tool**
3D CAD not only helps the Tech Designer build form, but also provides them with immediate visual and technical accuracy. They are master shortcut users

3. **Effective technology**
Technology must bring efficiency. The software is core and everything else is a peripheral to it. They want tools that work seamlessly with their software

4. **Ergonomic tools**
The Tech Designer is mostly concerned with how comfortable their tools are to them. They don't want tools that cause them to fatigue quickly

5. **Production ready**
The Tech Designer develops 3D CAD data with the intention that the "A" surfaces are production-ready and do not have to be rebuilt by engineers

Quotes

"That feeling of how well you sketch affects how you think. That experience affects your creativity"
-Fusu T

"I do enjoy 3D CAD...you're building something... it's almost like a Lego set"
-Rich T

"Once you start adding more functionality... you start wondering why it's even there"
-John C

"The 24" screen was great because it was big, but it didn't offer the physical rotation that I like"
-Fusu T

"We're not really handing it off to engineering, we're working with them on prototyping"
-Rich T

The Tech Designer My Needs
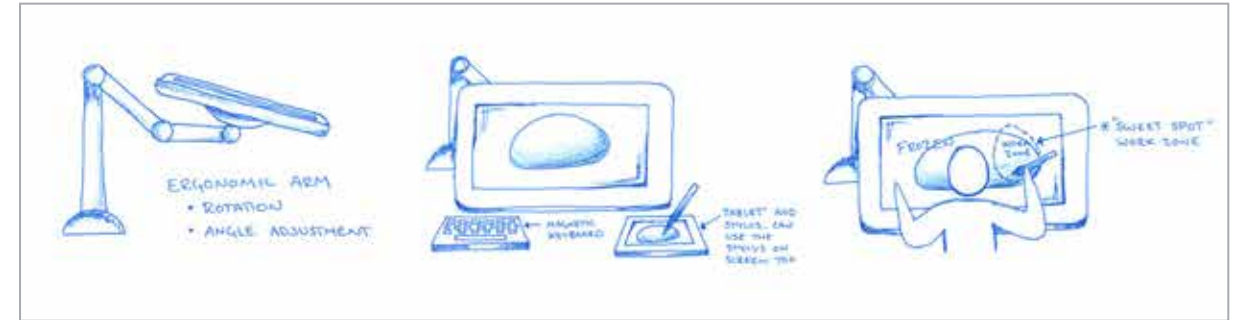## 3D CAD is a tool to realize my ideas

The archetypes are derived from patterns of behavior. They provide the product creation team with a superior understanding of an objective target model for design and marketing direction

Make it comfortable.
Make it precise

Extrinsic

TD

FE

D/S

Loose

Exact

Intrinsic

My Workflow DNA

Fusu T
Corporate 3M

Rich T
Consultant

John C
Consultant

Dave P
Corporate 3M

BRAND	WORKFLOW	ERGONOMICS	INTERFACE	3D CAD
"I couldn't find anything online about using 3D CAD on a Cintiq"	"I am constantly moving my 3D CAD drawings and models around"	"It has to be comfortable because I may be in 3D CAD for very long days and weeks at a time"	"I know all the shortcuts on the keyboard. The mouse has 4 buttons - a stylus only has 2"	"3D CAD is exact. If I say 'I want 3 inches' it will be 3 inches"
Communicate solutions that inspire	Design solutions that address flexibility in their physical and mental workflow	Create solutions that are comfortable to use for long periods of time. Counter fatigue, bad posture and repetitive stress issues	Design solutions that specifically target today's 3D CAD functionality. Ensure accessories can be added over time without replacing the "core" Cintiq	Celebrate and enhance the precision of their tools

3M Endoscope Reprocessing Research

Research Preparation

Research

Prototyping

Project Overview

Overall Problem:
The medical industry is concerned about the infection rates occurring from endoscopes. The cleaning process is complex and steps are often skipped. 3M identified ways to reduce the number of steps with new prototypes

Client Needs:
- Test two different new concepts to reduce infection in endoscope reprocessing. Finalize the designs for engineering

Our Approach:
- Conduct an initial workshop with the 3M team to understand the design parameters and identify any opportunity areas
- Conduct design and prototype research in endoscope reprocessing centers to garner the most amount of context and insights with users

The project led to new developments of how to improve the endoscope reprocessing process

### Initial workshop and prototype construction
This project began with a workshop that allowed us to study and understand the endoscope reprocessing process. Endoscope reprocessing is the act of cleaning an endoscope after it is used for an operation. We discovered with the 3M subject matter experts that when done properly, the reprocessing of an endoscope has over 130 steps involved! Not surprisingly, steps get skipped and overlooked by reprocessing technicians. We explored how these new products could not only test for infections, but also looked at what new products could be created in order to combine or eliminate steps in the process without sacrificing sanitation and infection prevention. We took these ideas and applied them to sketches and prototypes that were going to be taken into the field for testing.
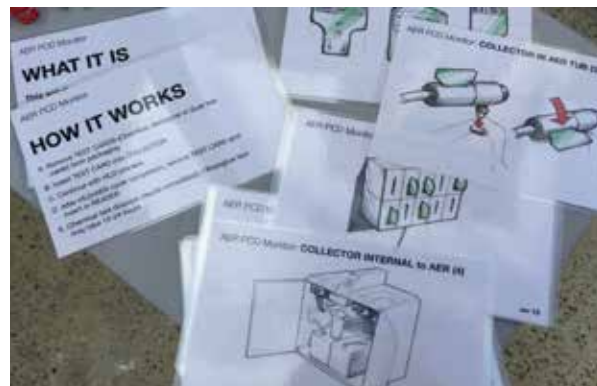
Reprocessing fieldwork
After we constructed foam models and sketch mock-ups of the new products, we took them out in the field for testing. We visited in-hospital and in-clinic reprocessing facilities. We utilized three different methods to uncover our findings and insights for this research depending on which facility allowed what type of research to be done:

1) **Observational research:** In a couple of cases we were fortunate enough to see the reprocessing being done in real time and we were able to talk to the technicians directly about the new prototypes

2) **Walk-thrus:** When we couldn't observe the process directly, we would be shown the reprocessing room and then would have a separate one-on-one discussion with the lead technician

3) **One-on-one interviews:** One-on-one interviews were utilized when we were not allowed to conduct research in the facility at all. We were able to focus more on prototype testing in these instances.

1 Observation research
Watch reprocessing technicians take us through the journey of cleaning an endoscope at their facility

2 Reprocessing walk-thrus
When observation couldn't take place, we utilized walk-thrus to gather information about other reprocessors

3 Interviews
Interviews were conducted with technicians to understand their key painpoints about the cleaning process

Reprocessing prototyping
After being in the field for a week observing and interviewing endoscope reprocessing staff, we took the findings and began prototyping new product experience flows. The focus of the prototyping was how could we combine steps or eliminate steps in the reprocessing workflow to ensure steps are not skipped or overlooked. We studied in-depth of how the product ideas could change in order to change behavior.
We explored new setups based on the restrictions we saw in different endoscope reprocessing rooms. Not every hospital has a reprocessing room with a place that could conduct one of the infection studies. We experimented with different non-countertop solutions in order to combat this problem. We explored cart solutions, AER reprocessor caddy attachment solutions, and "fanny pack" solutions.

Product solutions and experience flows

Utilizing what we learned in the field as well as what we learned from industry experts, we created ideal experiences of the endoscope reprocessing testing kits. We wanted to streamline the process for the people who clean the endoscopes. We created four different scenarios that increase in technology advances in order to consolidate some of the steps without cutting out important steps that need to be performed in order to maintain sanitation and lowers infection rates. We wanted to give reason to not skip reprocessing steps and potentially make the process less tedious for the endoscope reprocessing staff.
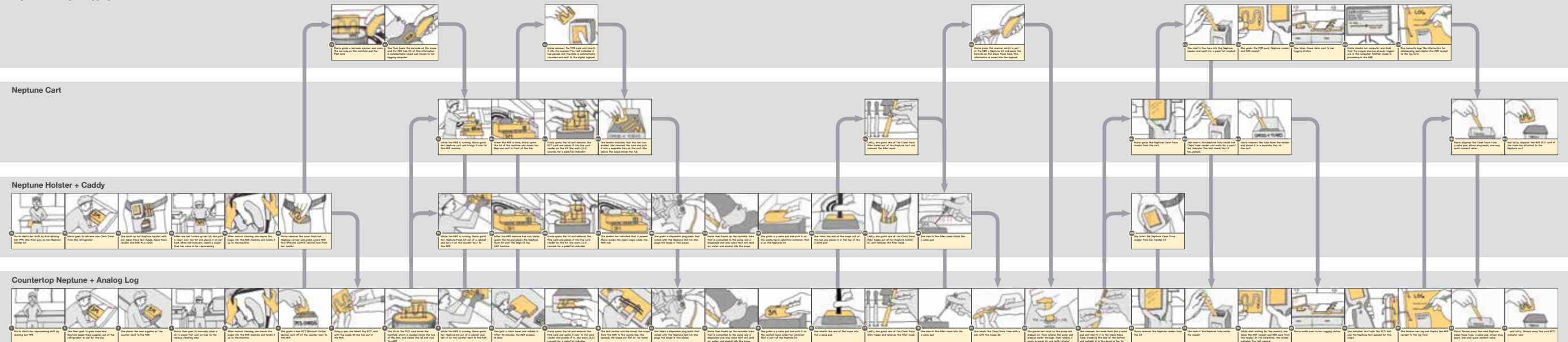

AER + Neptune Workflow and Experience Solutions

HUMAN SPARK

Digital Scanning + Logging

Neptune Cart

Neptune Holster + Caddy

Countertop Neptune + Analog Log

3M Littmann Future Stethoscope Technology Research

Project Overview

Client Needs:

- Design a compelling business case for the future of the digital stethoscope - why should the company invest further into this idea?
- Understand what users believe to be the future of the stethoscope and how it relates to the future of healthcare

Our Approach:

- Conduct a generative research study with doctors and nurses to understand what they believe the future of the stethoscope is and what it could do to influence the future of healthcare technology

This project inspired the business team to rethink the opportunities for the future of the stethoscope

Research Preparation

Generative Research

We initially started this project designing it as a design research project where we were going to start confirming design features and forms with healthcare professionals on what the future of the eScope should look like. **We soon found out that what Littmann needed was to make a business case in order to further the support from Littmann to pursue the future of stethoscope technology.**

We pulled back the research to make it more generative. We had to come up with insights that would inspire a business strategy that would have buy-in across the business. Key questions we needed to have answered were:

1. What is the future of the skill of auscultation? How will it be taught in the future?

2. What role will auscultation and the stethoscope have in the future of healthcare?

3. What are the current attitudes and future projections of healthcare professionals on the stethoscope's place in healthcare?

It was important for us to design a generative research plan that would evoke these opinions in our healthcare professionals. We needed to come up with exercises that helped facilitate a discussion on where the skill of auscultation is and where is it going in the future.

Research

Research: One-on-one interviews

The research consisted of one-on-one interviews with 20 medical professionals that covered students, nurses, nurse practitioners, physician assistants, primary care physicians, and educators. **The key stipulation was that the participants had to use their stethoscope every day. In the case of students, this varied.** The interviews were broken up into three segments:

1) **Initial interview:** We wanted to understand how the participant learned and used their skill of auscultation and how it may have changed over time
2) **Futures:** We then showed the participants 3 possible futures the stethoscope technology could go and got their thoughts on those directions
3) **Stethoscope experience:** We completed the interview by having the participant design their ideal future experience of stethoscope technology by arranging cards into an experience they felt was the most useful for the future of healthcare.

1 **Initial Interview**
Uncover what type of healthcare the participant is involved in and what stethoscope do they use

2 **Futures**
Ask the participant their thoughts on three potential futures the stethoscope could go

3 **Stethoscope experience**
Participant then designed their ideal future experience with stethoscope technology

Synthesis

Analysis & synthesis

At the conclusion of the research, interviews were analyzed using transcripts and videos. Key insights were extrapolated from interview notes and debrief discussions. These insights were confirmed and denied by deeper analysis of the research. We also uncovered insights that were overlooked in fieldwork. **We uncovered that the skill of auscultation is still seen as a key tool in the physical exam and the physical exam is still seen as a critical point in population health management particularly for Primary Care physicians.**

We also were able to group our research participants into initial archetypes based on the expectations of their stethoscope performance along with their thoughts and attitudes on the skill of auscultation and where it is going in the future. We found that the vast majority of participants did not want to completely do away with the skill of auscultation, but rather have it be a part of a system of skills that can be used along with other pieces of technology.

Making a business case

After the research had been synthesized, it was important to translate the insights into a business case that would inspire the Littmann stethoscope strategy team to invest in future development of stethoscope technology and possibly, be the leader in creating new technology that could be adopted by the medical field. We came to realize that any research that had been done prior to this research study never concluded with a sound future state that the business could buy into. We needed to reframe the problem in a way that felt new to the business. We took the products they already

had and began to develop a strategy that would develop existing products into a way that would fit into the future vision as described by research participants. The most important thing currently to participants was clarity of sound in their stethoscope, that established a baseline in the expectation of quality. The next thing was including the ideas of remote healthcare into the mix. How could the physical exam and the skill of auscultation change in order to meet the needs of an aging population? How could it meet the needs and concerns of

population health management? All of these future ideas were ideated into a future system that we placed over five years into the future. We worked backwards from there to meet Littmann where it was at today. It was important for us to show them that, while ambitious, they could start to design a future that meets the desires of healthcare professionals and is adaptable to the future of healthcare. The most important insight: it was an expectation of their customer to innovate in this space. They are counting on 3M and Littmann.

Horizon 0 — Today

Value — Electronic stethoscope

Benefit — Increase the volume of sounds

Analysis
- Does not fit neatly within the Littmann line of products
- Technology in search of a market

Horizon 1 — 1-2 years

Value — Hear what I want to hear better

Benefit
- Clear sound amplified
- Tools to help care for patients better
- Seamlessly connect to user tools (smart phones, tablets, EMR's, bluetooth hearing aids, speakers)
- Easily capture, manage and share sounds

Horizon 2 — 2-5 years

Value — Best sound clarity I can invest in

Benefit
- Clear, crisp, focused sound amplified
- Add-on "Connect" module to make any Littmann scope a connected IoT scope
- Advanced tools to aid in achieving better patient outcomes
- Solutions that improve clinician efficiency and effectiveness

Horizon 3 — 5+ years

Value — Smart scope platform — customizable to my needs

Benefit
- Add-on services augment the scope to meet the specific needs of the user. Pay for the scope functionality the user needs, when they need it
- Fully integrated into collaborative health care teams
- Advanced AI assistance, analysis, functionality
- Design manifestations based on contextual user needs

	Horizon 0: Classic Line	Horizon 0: Cardiology Line	Horizon 0: E-Scope Line	Horizon 1: Classic Line	Horizon 1: Cardiology Line	Horizon 1: Clarity Line	Horizon 2: Classic Line	Horizon 2: Cardiology Line	Horizon 2: Clarity Line	Horizon 3: Bionic Line	
Clarity			Everything amplified			Clarity amplified	Good	Better	Best	One level of state-of-the-art sound clarity	
Collaboration	-	-	• Connect (PC)	-	-	• Secure sharing to all platforms • Visualized sound	• Add-on "Connect" module to make mechanical scopes a connected IoT scope • Manage patient changes	• Remote connect • Secure sharing to all platforms • Visualized sound		• Advanced team sharing • Add and subtract services based on your needs (fee for service) • Add-on "Connect" module to	make mechanical scopes a connected IoT scope • Manage patient changes • Secure sharing to all platforms • Visualized sound
Confidence	-	-	• Amplification	-	-	• Easily share sounds • Clarity amplified • Adjustable playback speed	• Sound analysis from the SoundCloud • Easily share sounds	• Clarity amplified • Adjustable playback speed		• Smart sound advisor service • Sound analysis from the SoundCloud • Easily share sounds	• Clarity amplified • Adjustable playback speed
Learning	-	-	• Record	-	-	• Connect multiple scopes • Capture sounds • SoundCloud	• Visualize physiology of sound • Connect multiple scopes	• Capture sounds • SoundCloud		• Learning services • Visualize physiology of sound • Connect multiple scopes	• Capture sounds • SoundCloud
Charting	-	-	-	-	-	• Direct connect to EMR	• Visualized sound charting • Direct connect to EMR			• Charting services • Smart EMR updating and sharing (AI that aids in assessments)	• Visualized sound charting • Direct connect to EMR

3M Littmann Master Cardiology Stethoscope Research

Project Overview

Client Needs:

- Understand what a stethoscope would need in order for users to upgrade to a Master Cardiology grade stethoscope
- Understand the stethoscope chestpiece design form that is most desired by users
- Understand what color schemes would be most desired by Master Cardiology users

Our Approach:

- Conduct design research and prototype tests to uncover what types of healthcare professionals would want to upgrade to a Master Cardiology stethoscope
- Run a prototype test to uncover which new stethoscope chestpiece form is most desired by users

This project led to the new design of the Master Cardiology stethoscope

Research Preparation

Design Research

This project was predominately focused around a prototype test to narrow down seven stethoscope designs into two or three that could be taken into a final round of testing to get to a final design. We wanted to expand the study in order to fully understand what the stethoscope would have to have and how it would need to perform in order for the participants to be really inspired to upgrade to a more expensive, higher quality stethoscope. We also wanted to see how they would be purchasing their stethoscope and what would ultimately influence them to either buy in person or online. Some key questions we needed to have answered were:

1. What form factor(s) are most desired by users?

2. How do they currently use and hold their stethoscope? Did that influence their purchase decision?

3. What features or functions would have to be in place in order for a user to upgrade to a higher quality stethoscope?

4. What is their relationship like with their stethoscope? What does the skill of auscultation mean to them?

5. Did color have any influence in their purchase decision?

Research

Research: One-on-one interviews

The research consisted of 20 one-on-one interviews that included EMTs, nurses, nurse practitioners, physician assistants, primary care physicians, cardiologists, and pulmonologists. The key stipulation was that the participants needed to have a higher quality stethoscope or be interested in upgrading to a higher quality, more expensive stethoscope. The interviews were broken down into three segments:

1) **Initial interview:** We first interviewed the participant on their stethoscope use. Then we asked for a demonstration of how they use their stethoscope

2) **Prototype test:** The participants then interacted with seven stethoscopes and selected which design was the most comfortable for them

3) **Color and finish:** We completed the interview by having the participant select a color and finish that they wanted to put on the stethoscope. This helped us understand the colors that were deemed appropriate for a high quality stethoscope
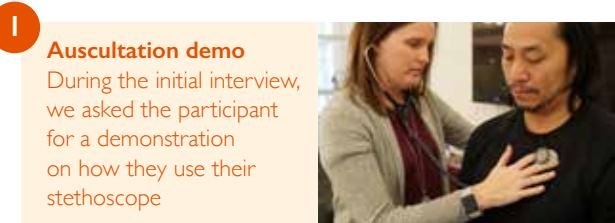
1 **Auscultation demo**
During the initial interview, we asked the participant for a demonstration on how they use their stethoscope

2 **Prototype test**
We had the participants interact with 7 stethoscope designs to see which design was preferred by them
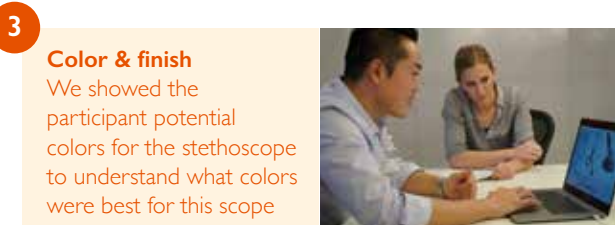
3 **Color & finish**
We showed the participant potential colors for the stethoscope to understand what colors were best for this scope

Synthesis

Analysis & synthesis

Following the research, the interviews were analyzed into key insights using research notes and debrief discussions first and then confirmed with a deep analysis using transcripts, photos, and videos. We knew we needed to articulate what the future design of the new Master Cardiology stethoscope should be. However, we also wanted to support the design by utilizing other key insights. We also wanted to show what types of users would be interested in purchasing or upgrading to the Master Cardiology stethoscope.

What we found was participants would upgrade based on whether they would or would not adapt to new technologies. It also depended if they wanted to break their current habits to utilize a new piece of technology. The most important factor throughout any stethoscope study with participants is sound quality. The level of comfort with the ear tubes and ear buds are second. Everything else beyond that is personal preference.
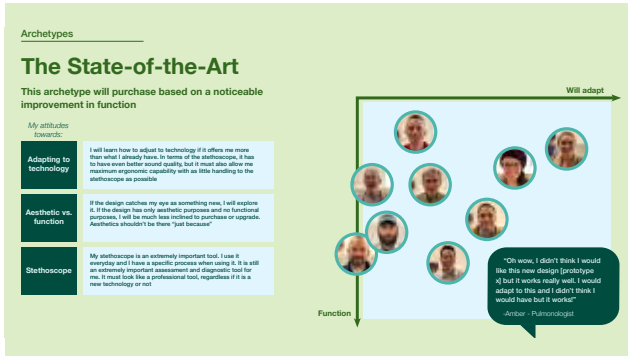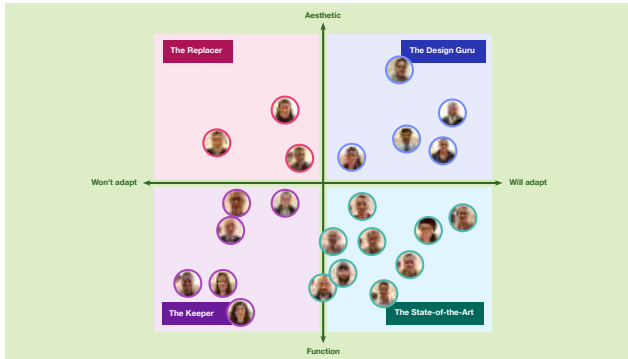
The future design of the Master Cardiology stethoscope

At the conclusion of the analysis and synthesis phase of the project, we had uncovered both strategic and tactical insights. Tactical insights answered the direct questions Littmann had about the future design of the Master Cardiology stethoscope. We were able to narrow down to three out of the seven prototypes that the vast majority of users preferred. We articulated modifications that needed to be made for a final round of testing. We also uncovered strategic insights that influenced the future strategy of Littmann's product portfolio. Many of the strategic insights were congruent with what we learned in the Future Stethoscope project (see above project). We wanted to show that while the Master Cardiology stethoscope is still a great stethoscope currently, the market is looking for the next big innovation in stethoscope technology and auscultation.

Summary

Designing for a hospital context of use will provide users with the most versatile tool, in the most demanding environment and will get the most eyes on product resulting in greater awareness and upgrade opportunities

Do this:

1. Design for the hospital environment

2. Focus on the *Design Guru* and *State-of-the-Art* archetypes needs, wants and desires

3. Demonstrably improve grip type #1 (over the top) relative to all the prototypes and existing design

4. Design aesthetics should be an iteration of J, S, D

5. The weight of the chestpiece should be very close to the existing product. The chestpiece should lay flat when at rest on a table

6. Make new prototypes and conduct design and usability testing with Amber, David, Dolores, Heather and Henry

Don't do this:

1. While grip type #2 (under the tube) has very important qualities and is critical in how users move between auscultation points, it should not negatively impact the quality of grip type #1 (over the top)

2. Don't focus on converting the *Keepers* and the *Replacers* to a new product

3. Don't ignore exposing real products to real people in social situations

Philips NICU Digital Dashboard UX Flow

Work Session Preparation

Work Session

Synthesis
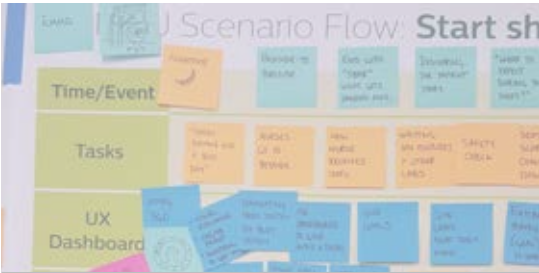
Project Overview

Client Needs:
- Conduct a workshop to align subject matter experts of the NICU space with designers to come up with effective uses of a digital dashboard
- Develop NICU care scenario experience flows and storyboards for the UX team to design the digital dashboard experience

Our Approach:
- Become learners of the NICU experience to accurately capture what the needs are of NICU users. This includes infants, parents, nursing staff, doctors, and technical staff
- Design experience flows the UX team can design within in order to maintain continuity between subject matter experts and the design team

This project led to the UX design developments of the digital dashboard

Preparation

To begin this project we first took a deeper dive into understanding what currently goes on in the Neonatal centers of hospitals. We also took time to study the future visions of NICUs in order to understand where digital technology would be placed and integrated into the larger hospital system.

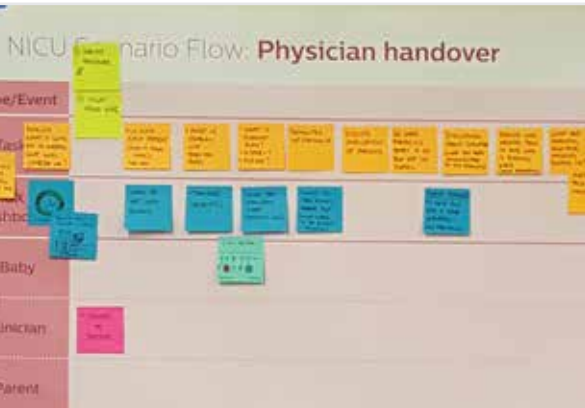This led us to developing lose frameworks of seven care scenarios that would be filled in during our work session with subject matter experts. We wanted to treat the work session as if it were a research interview more than an ideation workshop. We wanted to conclude the session knowing that the team got what they needed in order to further develop the maps into use cases to build the UX NICU dashboard design.

Working with subject matter experts

The working session consisted of two subject matter experts and one UX designer. Our focus was to extrapolate the needs of NICU users and how those needs could be met using the future digital dashboard.

A hypothetical story was created in order to "give life" to the scenarios we were working with. Seven scenarios were ideated on and covered key players within those scenarios. The seven scenarios covered:

  1) Emergency code
  2) Care delivery
  3) Communicating with family
  4) Educating parents
  5) Shift handover
  6) Multi-disciplinary rounds
  7) Physician handover

Synthesis of work session information

The information from the work session was synthesized using basic flow sketches first. We wanted to make sure that we covered all of the key steps in each scenario that the UX team needed to build to. We also explored how we would show these flows in the most clear ways so that the UX design could match the flow of the future scenario. We wanted to clearly illustrate where each step would go and when the dashboard would be used in which steps.

We also decided to build a user story that followed a hypothetical family through a journey in order to tell a more "real life" story of the NICU. This was built in order to further sell and develop the idea within the business.
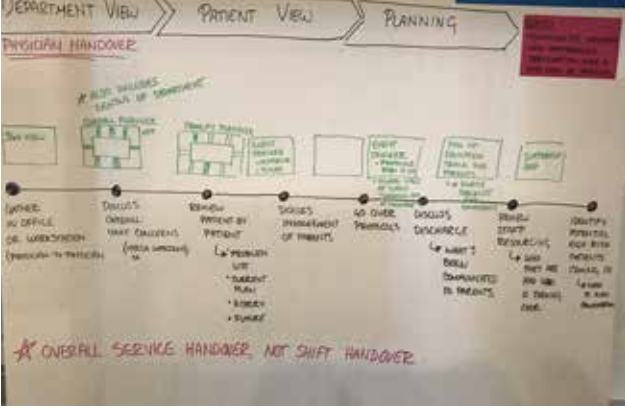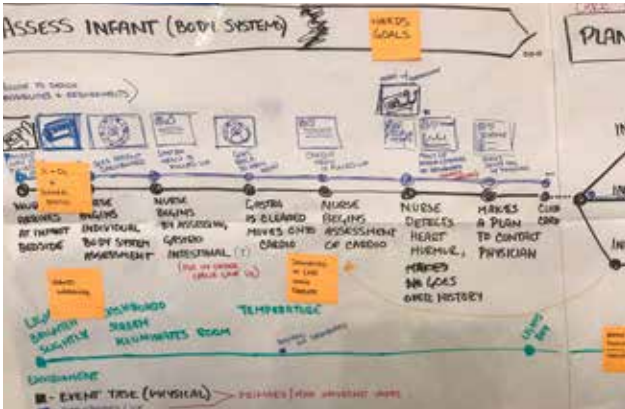
Final UX Design Flows

Story and UX design flows

Each scenario was built into its own experience flow. Each flow included key parts of the journey, a description of those key parts, the physical event taking place, the key players in the scenarios, and boxes describing what would appear on the dashboard in each step. The flows were brought to life by including illustrations on each key step to give context into what is happening in each step.

The same idea was repeated with the storyboard hypothetical family journey that was going to be used to have further buy-in from the business on the development of this dashboard as well as future NICU medical technologies. The story was completed with detailed illustrations and was titled "Baby Emma's Story"

Preparation
Before entering the room, nurse washes hands at the cleaning station and her badge turns green showing compliance.

Diaper status
The nurse checks baby's diaper. She finds that it is wet and changes the diaper. She weighs the diaper and records that information onto her tablet.

Begin body assessment
Nurse starts the baby's individual body assessment and proceeds system by system. All updates are recorded into her tablet.

	Assessment of infant	Care planning	Care delivery
Journey titles	Assessment of infant	Care planning	Care delivery
Description	Nurse checks each individual infant by body system	Nurse plans and updates care delivery schedule for each infant	Care goals and schedule are carried out

Kimberly-Clark Pharmaceutical Manufacturing Innovation Workshops

Project Overview

Client Needs:

- Workshop new product ideas for the pharmaceutical manufacturing space
- Understand how they could influence the B2B customer experience with new products and services to make their customers' experiences and work more efficient

Our Approach:

- Conduct a large ideation workshop that took participants through five different exercises with different opportunity areas to inspire new product and service developments
- Conduct another service focused workshop on how different channels can work together to help their customers introduce new products into their workplaces efficiently

The project inspired new products and breaking down silos between channels

Design and Prototype Research

The pharmaceutical manufacturing business had not seen innovation in a decade. Kimberly-Clark wanted to utilize an ideation workshop based on research to come up with new product ideas to influence the industry. To get us prepared for the ideation workshop, we were first taken through the experience of "donning" the protective wear pharmaceutical manufacturers wear during their work. It is a complicated process that immediately inspired ideas of how we could improve the experience. However, we had to take those ideas and turn it into a series of exercises to take the larger Kimberly-Clark team through in order to inspire innovation ideas across their individual channels.

Much to our surprise, many of the Kimberly-Clark employees that were going to be participating in the workshop had never interacted with their own products before! Since we went through the experience of "donning" the protective suit to get us prepared for the workshop, we saw it fit to take the team members that had never interacted with their products before through the donning experience too. We set-up a pre-workshop meeting to get them to experience firsthand the problems their current customers are facing.

Research Phase 1: One-on-One Interviews

The ideation workshop was crucial in getting the pharmaceutical business team excited about new product opportunities. It was imperative that we take them through new exercises and tasks that would make them feel like they had accomplished new ideas and leave with a strategy on how to move some of those ideas forward. based on qualitative research conducted the year prior, we designed exercises around opportunity areas based on customer feedback. We rotated the team through five different exercises to inspire different types of ideas. The five different exercises comprised of:

1) **Bodystorming** - this was an exercise to get the team to really think about the environment their customers work in and encourage them to think of ways of how to be more comfortable in that space

2) **Business Origami** - icons were made to represent different players in the pharmaceutical business to encourage the Kimberly-Clark team to think of ways to improve their services to their customers

3) **Springboards** - This exercise had a series of mood boards to show how different and unexpected ways technology, nature, etc. influenced innovation

4) **Form exploration** - This exercise explored different forms products could take on for them to be more comfortable, efficient, protective, effective, etc.

5) **Storyboarding** - This exercise focused on thinking about product experiences and introducing digital solutions into their product portfolio

Unexpected additional workshop

We originally were only meant to do the product ideation workshop with the Kimberly-Clark team. However, the business origami exercise that was done in the ideation workshop sparked a lot of discussion about their overall product delivery experience and the plethora of unmet needs that Kimberly-Clark saw that they could provide solutions for. A lot of what they discovered their customers were complaining about were problems with introducing products into their respective pharmaceutical manufacturing facilities. Kimberly-Clark realized that they could create new product ideas, but they won't be adopted by their customers if there aren't certain tests done, paperwork filled out, government approvals, and standard operating procedures written. The CMO requested we do

another workshop centered around the business origami exercise. The sales teams, technical teams, and legal teams were all invited to be a part of the workshop and discuss what the current state is of getting new products approved in the pharma manufacturing space and come up with ways they could have an influence in validating their products for their customers. They not only wanted to provide new product ideas, but Kimberly-Clark wanted to improve the product and service experience of their customer. It was a challenging workshop as it exposed all of the nuances of product validation and how it varies from manufacturer to manufacturer.

Achieving alignment

At the conclusion of the business origami workshop, we had new product experience maps that outlined where exactly Kimberly-Clark could have influence in improving their product experience and help assist their customer in validating new products. The maps illustrated potential breakdown points that Kimberly-Clark couldn't have a solution for. Those places involved other agencies and industries. They were able to achieve alignment on what they were able to do and it was the first time some of the employees had ever met each other. The workshop provided a way to break down silos and allow Kimberly-Clark to have a more collaborative conversation.

Product development

For some of the product ideas that came out of the ideation workshop, Kimberly-Clark was able to develop some of the product ideas that they knew the industry was asking for. Many of those product ideas had to do with the development of the face mask and donning of gloves on the protective suit. They also explored ideas on how to keep face masks sanitary without being wasteful.

Those product ideas were taken into rounds of ideation and detailed sketching so they could be taken into quantitative user testing to gauge customer interest in adopting the products.
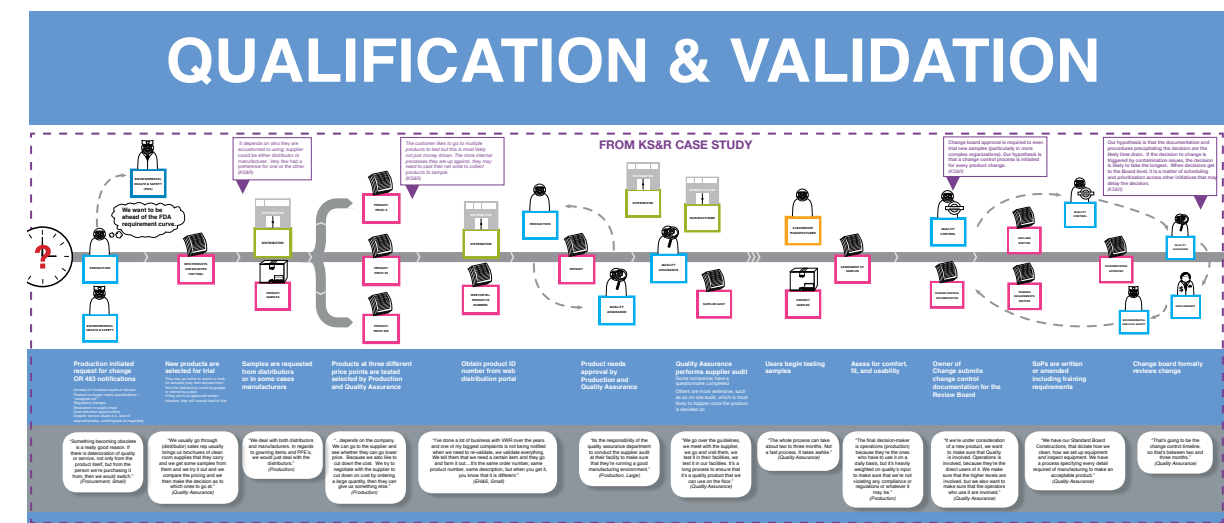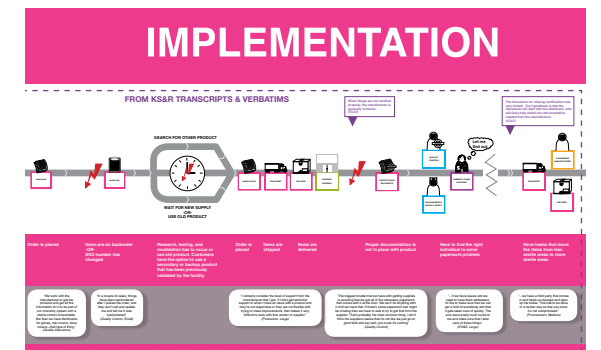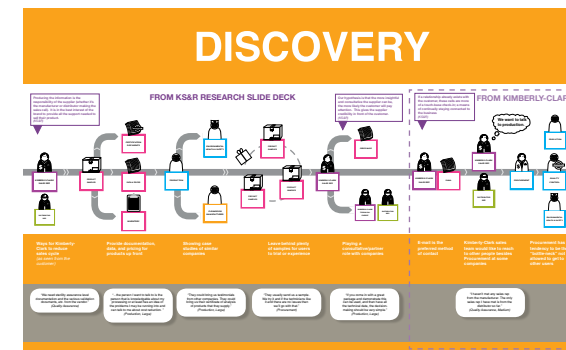
GE Food Inventory Management UX Flow

Project Overview

Client Needs:

- Design concepts that imagine the systems needed to manage food inventory, recommend recipes based on available items and generate a grocery list for shopping
- Consider integrating new technologies to imagine potential opportunities

Our Approach:

- Build momentum within the GE appliance organization illustrating how an inventory management system could work with people and technology
- Understand what technologies could be applied and how they would interface with the needs of people

This project inspired a new incubator design team within GE

Project Preparation

Research review and observational research

When we began this project, we asked for any insight GE already had in terms of research about user needs as it pertained to kitchen appliances, food inventory, storage, meal planning, etc. We looked at two qualitative research studies that were done to understand the end user. The research gave us a jumping off point to dive into more focused needs of users around meal planning and food inventory.

We also performed our own ad hoc research by going into grocery stores and observing how people shopped. We looked at our own food pantries, and we did a competitive analysis on what meal planning apps and products already existed. We wanted to see what needs were being fulfilled and which needs were not being fulfilled.
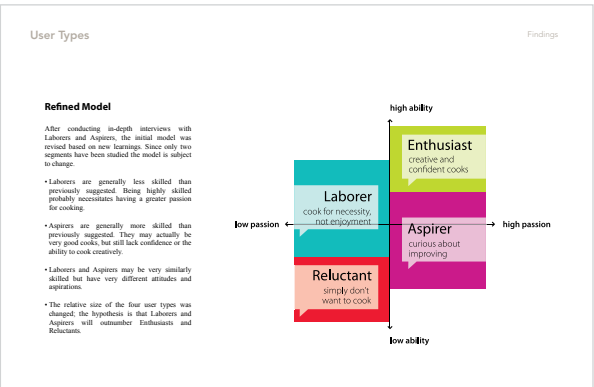

Work Session & Archetype Development

Work Session & Archetype Development

The second phase of the project involved creating three archetypes that were inspired by the previous research, but were more focused in the problems that potential users might run in to when doing food inventory and meal planning. The reason for this, is we wanted to be able to have specific problems and scenarios that the UX designers could design to. We saw in our competitor analysis that there is a plethora of grocery shopping and meal planning apps out there that were designed to mostly very general problems. We saw that there were many problems and features that were being overlooked. We made a list of the unmet needs as well as others that had not had any sort of solution built to it yet and started to create some hypothetical people based on which problems made sense

with which story. We first looked at the popular "busy mother" archetype as that still covers a majority of the market that is having to plan and make meals. She was also a representation of any men dealing with the same issues. We also developed an archetype that had the desire to become a better cook and meal planner, but didn't know where to start. Not only was this archetype concerned about meal planning, they were also concerned about if they have the right tools to make a certain meal. Our final archetype was a representation of a dietary restrictive person. This archetype also represented those that were on diets. The main premise was this archetype restricted certain foods. We utilized these archetypes in a UX development workshop to give more purpose to the solutions
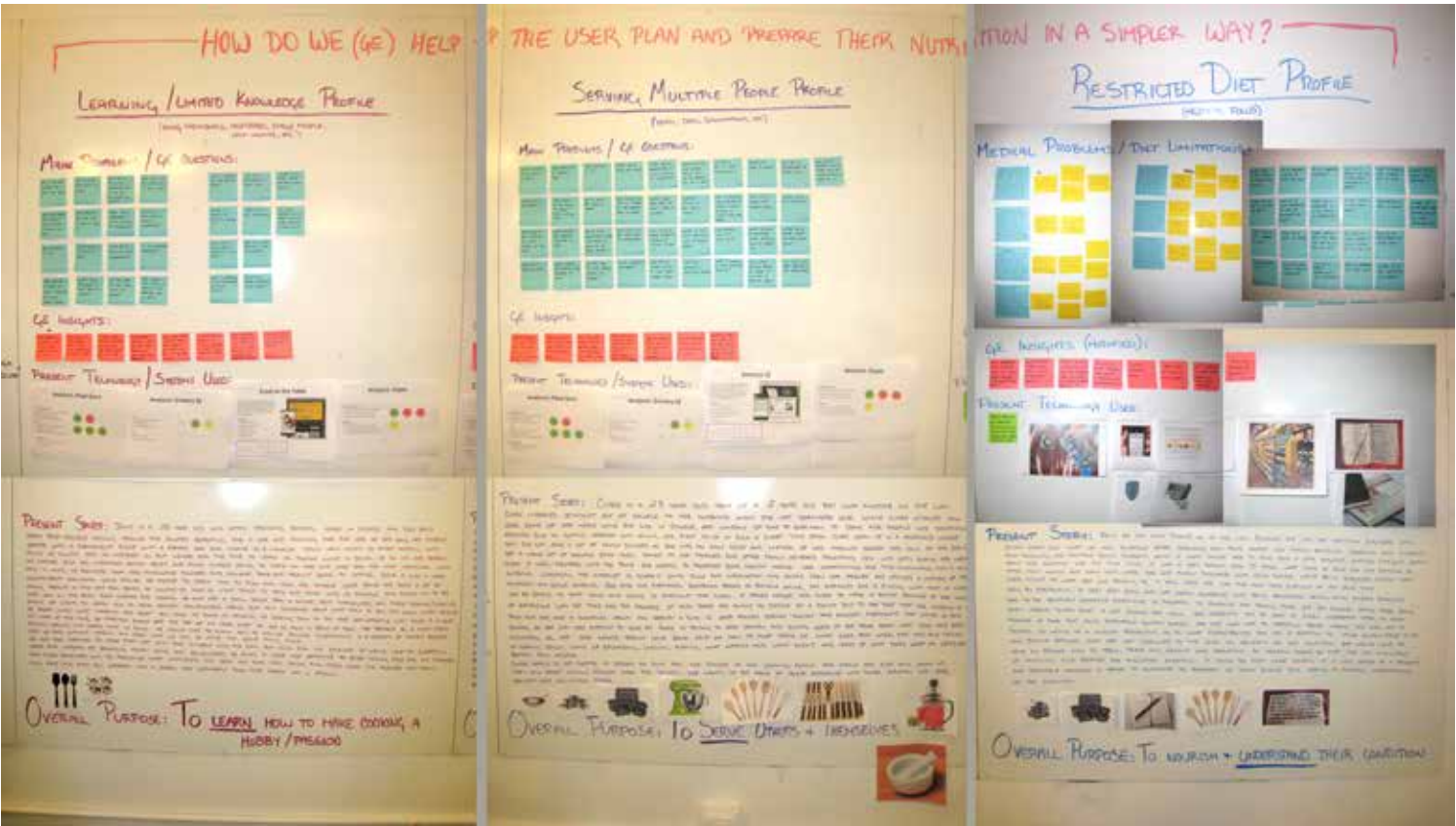
Final journey maps and UX designs

Following the workshop, the archetypes were developed further into finalized journey maps that mapped the UX design solutions to their specific problem areas. These journey maps helped the design team to ideate more on their ideas and digital solutions to create a holistic experience for the end user. Two more products were designed to help enhance the digital experience and give an accurate picture of what people had in their refrigerators and pantries so they could do proper meal planning and food inventory remotely. The app experience covered the specific needs of the three archetypes.

Cataloging Horizon One	List-Making HorizonTwo	Planning HorizonThree
Extend and defend the core business. Fully capable to do today. Shorter term	Build emerging business opportunities. Need to develop or acquire capabilities. Mid term	Create viable options for the future. Capability requirements may be unclear. Longer term
1.1 GE Voice technology	2.1 GE Voice technology	3.1 GE Voice technology
1.2 'Pix' and 'Vue' fridge and pantry camera systems	2.2 'Pix' and 'Vue' fridge and pantry camera systems	3.2 'Pix' and 'Vue' fridge and pantry camera systems
	2.3 Beginning app development of making lists	3.3 Whole app ecosystem developed

Inventory Management: Experience Journey Maps

Kelly

HUMAN SPARK +