UX Night with UX Salon: Design Beyond Devices

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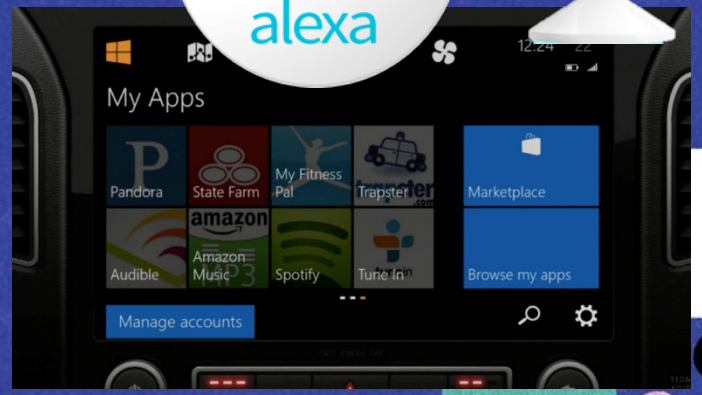
We're designing products at the final frontier.

Your customer has 5 senses and a small universe of devices. Why aren't you designing for all of them?

Computer, who is Cheryl?

- Author of **Design Beyond Devices**
- Original UX Designer on Echo Look team
- Original designer for Alexa Notifications
- Voice, systems, and multimodal design: Alexa, Cortana, Windows Automotive, Dynamics Power Virtual Agents
- Shipped one of the first speech-enabled Nintendo DS games (Disney Friends)
- Creator of several Alexa skills



DESIGN BEYOND DEVICES:

CREATING MULTIMODAL, CROSS-DEVICE EXPERIENCES

"Your customer has five senses and a small universe of devices. Why aren't you designing for all of them? Go beyond screens, keyboards, and touchscreens by letting your customer's humanity drive the experience—not a specific device or input type. Learn the techniques you'll need to build fluid, adaptive experiences for multiple inputs, multiple outputs, and multiple devices."

For more detail on the topics covered today: available from rosenfeldmedia.com or major online booksellers.

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WHAT WILL WE COVER TODAY?

We're going to take a holistic look at the content from my new book on multimodal and cross-device design, Design Beyond Devices. There's content here that applies to everything from traditional websites to virtual reality.

- Definitions
- Multimodal design themes
- Spectrum of Multimodality
- Putting it all together

PROLOGUE

Definitions

The website has been declared dead many times already.

Yet the web still thrives – but it lives on many devices, and via many modes of interaction.

And what waits to replace the dearly departed website?

2016: Join the mobile-first revolution!

Forbes

Jun 7, 2016, 09:00am EDT

10 Ways To Win The Mobile-First Revolution

Forbes Technology Council COUNCIL POST | Paid Program
Innovation

POST WRITTEN BY
Forbes Technology Council

Successful CIOs, CTOs & executives from Forbes Technology Council offer firsthand insights on tech & business.

Designing your website or app with a mobile-first strategy is increasingly important as consumers do more and more of their shopping via their smartphones. But for companies that started with a more traditional web presence, this can be a challenge.

To help you embrace the mobile-first revolution, 10 members of Forbes Technology Council offer their best tips for designing and executing a

2017: Never mind, it's Voice First!

Menu

NN/g Nielsen Norman Group

Voice First: The Future of Interaction?

Summary: Devices which include screens, but employ voice as the primary input method point the way towards a more integrated and useful holistic user experience.

By Kathryn Whitenton on November 12, 2017
Topics: Human Computer Interaction

Voice and screen-based interaction are converging, from two directions:

- **Screen-first** devices like smartphones, tablets and televisions are being enhanced with the addition of voice control systems.
- **Voice-first** devices like smart speakers are being enhanced with screens, such as the Echo Show (no doubt soon to be followed by similar offerings from other brands).

We should not expect speech to completely replace written communication, despite common science-fiction portrayals. But it's clear that standard human–machine communication is rapidly expanding to encompass both written and spoken interaction. Currently voice interaction is primarily within the realm of personal and home use. But as people become accustomed to it, they will come to expect it in

Our natural instinct to seek a winner is missing the point. There is no one true interface. And most of the devices your customers are using? They're multimodal.

The future is multimodal, because humans are multimodal.

A **mode** (in this context) is a type of communication, and humans communicate using their senses.

A **multimodal interaction** is an exchange between a device and a human being where multiple input or output modalities may be used simultaneously or sequentially depending upon context and preference.

COMMUNICATION MODALITIES

Modality	Description
Visual	Projection or rendering of a stimulus that will be interpreted over optical channels—like traditional GUIs and e-readers.
Auditory	The use of acoustic waves to communicate meaning: music, sound effects, or language.
Haptic	Communicating meaning with changes to the physical environment: pressure, vibration, force feedback, or direct manipulation like taps or clicks.
Kinetic	Communication based on movement or orientation in space.
Ambient	Inferred meaning driven by environmental or biometric conditions: temperature, heart rate, lighting, etc.

As defined in the book; there is some debate about how to split the Kinetic and Ambient categories.

Note that these don't align 1:1 to the human senses.

What is multimodal design?

DEFINITION

Multimodal design seeks to coordinate the delivery of multiple input and output stimuli to create a flexible, coherent experience for our customers.

PRACTICE

Multimodal design is an additional layer of design rigor added on top of our existing modality-specific designs, like voice UI (VUI) designs.

You're still going to need to do full voice or GUI designs for multimodal experiences.

MULTIMODALITY JUST ADDS ONE MORE LAYER OF COMPLEXITY.

THEMES

What multimodal designers need to know

WHY INCLUDE BOTH "MULTIMODAL" AND "CROSS-DEVICE" EXPERIENCES?

Wasn't just multimodality complicated enough for one book?

It's short-sighted to assume ANY experience exists in a vacuum. **Our customers are swimming in devices.**

Even websites are cross-device now: most websites must function on desktop and mobile, which means interruption, context, and notifications become relevant.

The limits of multimodality on one device **may cause a customer to turn to another device.**

THE BOOK CAN BE DIVIDED INTO FOUR THEMES.

Each chapter fits into one or two of these core themes, each a critical piece of the puzzle you'll need to complete to become a responsible, resilient multimodal designer.

1. Customer context & ethics
2. Multimodal frameworks
3. Ideation and Execution
4. Emerging technology

Let’s briefly preview the content from each of the themes.

THEME 1: CUSTOMER CONTEXT AND ETHICS

In addition to these dedicated chapters, you'll find this theme woven throughout the book: like the Opti-Pessimism guidelines for creative and ethical ideation included in the chapter on exploration.

Creating the World We Want to Live In

Key concepts like disability and inclusive design, anti-racism, and anti-neutrality.

Capturing Customer Context

An improv-inspired framework for defining your customer's context more fully.

Understanding Busy Humans

To create an etiquette framework for your software, the first step is modeling human behavior in the context of your experience.

Should You Build It?

A new framework for ethically querying your work: "PICS or It Shouldn't Happen." Take a look at your PICS: Problem, Inclusion, Change, and Systems.

THEME 2: MULTIMODAL FRAMEWORKS

In addition to these formal frameworks, you'll find tons of helpful content – like a whole chapter on the types of transitions you'll need to design for, and another chapter on common traps.

Activity, Interrupted

Instead of coming up with unique designs for every potential interruption, learn to apply patterns and turn them into an interruption matrix.

The Spectrum of Multimodality

Turn 2 dimensions of your customer's context into answers about what devices and interaction models will be most appropriate in the moment.

Let's Get Proactive

Not all interruptions are created equal. Learn to interrupt responsibly, without re-inventing the wheel every time you design a notification system.

From Envisioning to Execution

After iterating on your design with other techniques, create a multimodal design system by extending Brad Frost's Atomic Design model for multimodal interactivity.

YOUR INTERRUPTION MATRIX

Learn from my experience on systems like the Alexa platform and discover how to abstract large and complicated systems into manageable patterns of predictable interruptions.

Interruption		Current Foreground Activity		
		Short-running activity (e.g. Weather TTS)	Live Activity (e.g. Active Phone Call)	Long-Runing Activity (e.g. Music Service)
Urgent Notification (e.g. Incoming Call)	VUI	**STOP** Weather TTS ***RING* "Incoming Call from Prof. Plum"**	**CONTINUE** Phone Call ***RING*** *(No Announcement)*	**SUSPEND Music** ***RING* "Incoming Call from Prof. Plum"** **RESUME Music**
	GUI	Full Screen App (Active Call) **("Professor Plum is calling.")**	Full Screen App (Active Call) **("Professor Plum is calling.")**	Full Screen App (Active Call) **("Professor Plum is calling.")**
Scheduled Notification (e.g. Timer)	VUI	**CONTINUE** Weather TTS ***Short Timer Alert Tone***	**CONTINUE** Phone Call ***Short Timer Alert Tone***	**SUSPEND Music** ***Long Timer Alert Tone*** **RESUME Music**
	GUI	[LAUNCH] Full Screen App (Timer) Full text: "Turkey timer is complete"	Full Screen App (Timer) Full text: "Turkey timer is complete"	Full Screen App (Timer) Full text: "Turkey timer is complete"
Standard Notification (e.g. Message)	VUI	**CONTINUE Activity** ***Notification Earcon***		
	GUI	Notifications with preview (e.g. Message): **Banner Notification with the Message preview** Notifications w/o preview (third party skills): **Persistent card on the home screen after screen times out to Home.**		
Customer Speaks to Device (Wake Word)	VUI	**STOP** TTS Only (Retain context of last prompt)	**CONTINUE Phone Call**	**SUSPEND immediately**
	GUI	Display voice chrome and retain context (if user's to-do list was on the screen before the user spoke, it remains)		
Wake Word + Error		**REPEAT** Weather TTS	**CONTINUE** Phone Call	**RESUME** Music
User Requested Live Activity (e.g. Pick up an Incoming Call)	VUI	**STOP** Weather TTS	**STOP** original Phone Call	**PAUSE** Music
	GUI	**SWITCH** to Full Screen App (Active Call)	**SWITCH** to Full Screen App (Active Call) (for the new call)	**SWITCH** to Full Screen App (Active Call)
User Requested Short Activity (e.g. "WW, what time is it?")	VUI	**STOP** Weather TTS	**CONTINUE** Phone Call **START** Short Activity	**SUSPEND** Music
	GUI	**SWITCH** to Full Screen App (Clock)	**SWITCH** to Full Screen App (Clock)	**SWITCH** to Full Screen App (Clock)
User Requested Long Activity (e.g."WW, play Spotify")	VUI	**STOP** Weather TTS	**CONTINUE** Phone Call START Spotify	**STOP** Prime Music
	GUI	**SWITCH** to Full Screen App (Spotify)	Chrome Transport Controls	**SWITCH** to Full Screen App (Spotify)

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THE SPECTRUM OF MULTIMODALITY

Your roadmap to determining what multimodal interaction model makes most sense for your customers based on their context.

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RICH INFORMATION

CLOSE PROXIMITY

LONG RANGE / FAR FIELD

QUADRANT 2

Anchored

Experiences with rich physical presence where a customer is usually nearby.

Fire TV, Xbox One, Cortana on PC

QUADRANT 1

Adaptive

Experiences that support both close proximity and long-range interactions.

Echo Show, Facebook Portal, Google Nest Hub

QUADRANT 3

Direct

Customer and device must be in direct contact or extreme proximity for use.

Fitbit, Google Glass, Hololens, Apple Watch

QUADRANT 4

Intangible

Hands-free experience where close proximity to the device is not required.

Echo (original) Google Home

SCOPED INFORMATION

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We'll dive a bit deeper into the Spectrum of Multimodality later in the talk – stay tuned.

THEME 3: IDEATION & EXECUTION

In addition to these formal frameworks, you'll find tons of helpful content – like a whole chapter on the types of transitions you'll need to design for, and another chapter on common traps.

It's a (Multimodal) Trap!

Learn about the questions seasoned veterans of multimodal and cross-device design already know to ask – where you'll find your areas of highest risk.

Lost in Transition

You probably learned how to design individual modalities, not move between them. Learn what to look out for and how to cope with transitions.

Breathe Life into the Unknown

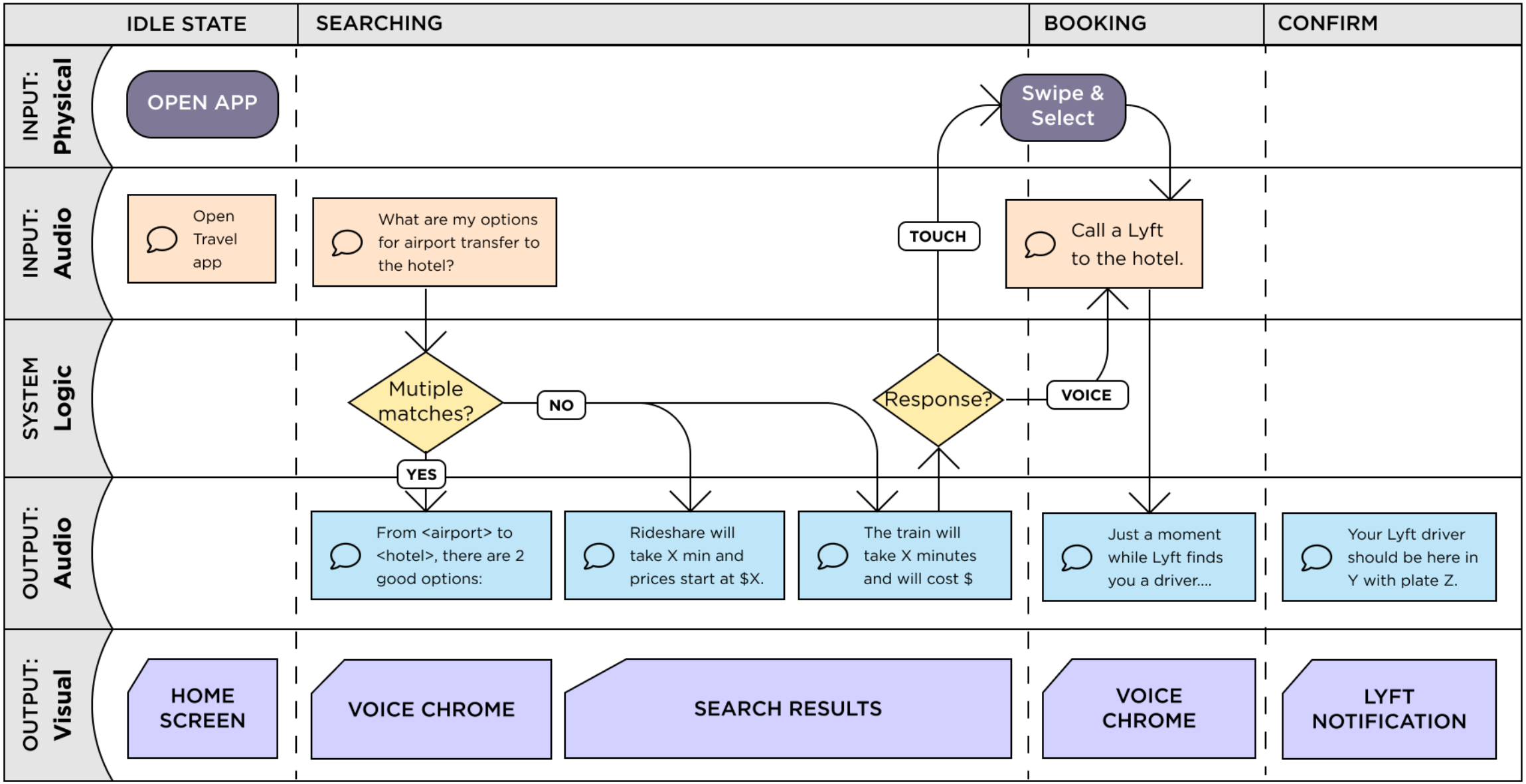
A variety of techniques to kick-start your attempts to move from the blank page to feasible, scalable ideas – from Opti-Pessimism to storyboarding & prototyping.

From Envisioning to Execution

Learn a common visual language for multimodal flows, multiple techniques for documenting your time-bound multimodal flows, and explore design systems.

Multimodal swim lanes:
Smart Watch Airport Transfer

INPUT: Touch, Dial, Voice
OUTPUT: Audio, Screen



THEME 4: EMERGING TECHNOLOGY

Catch up or future-proof your understanding of multimodal design with a look at, novel input and output technologies, inclusive design, artificial intelligence, and extended reality.

The Language of Devices

A complete inventory of the available OUTPUT modalities available to you, along with inclusivity considerations and case studies along the way.

Expressing Intent

Explore the current state of INPUT technologies, from natural language understanding through gestural interfaces – along with inclusive design and case studies.

Beyond Devices: Human + AI Collaboration

It's near impossible to work with multimodal systems without AI. Learn the basics: types of machine learning, bias, and how to cope with designing for AI.

Beyond Reality: XR, VR, MR, AR

Learn the difference between virtual reality, mixed reality, and artificial reality – and what makes design for these bleeding-edge extended reality experiences different.

THEME REVIEW

Each chapter fits into one or two of these core themes, each a critical piece of the puzzle you'll need to complete to become a responsible, resilient multimodal designer.

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2. Multimodal frameworks
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DEEP DIVE

The Spectrum of Multimodality

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From the Echo to automotive, smartwatches to your television - not all multimodal experiences are created equal. How do you choose the right interaction model?

Dimensions driving multimodality

How rich is your information?

- Low information density

  Smart watch or wearable

- High density

  Book or computer screen

How close is the device to the customer?

- Close proximity

  Wearable to arms-reach

- Long range

  3-10 feet

THE SPECTRUM OF MULTIMODALITY

By plotting information density and proximity on a grid, you can place all current and future experiences in one of four categories.

RICH INFORMATION

CLOSE PROXIMITY

LONG RANGE / FAR FIELD

QUADRANT 2

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Experiences with rich physical presence where a customer is usually nearby.

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Hands-free experience where close proximity to the device is not required.

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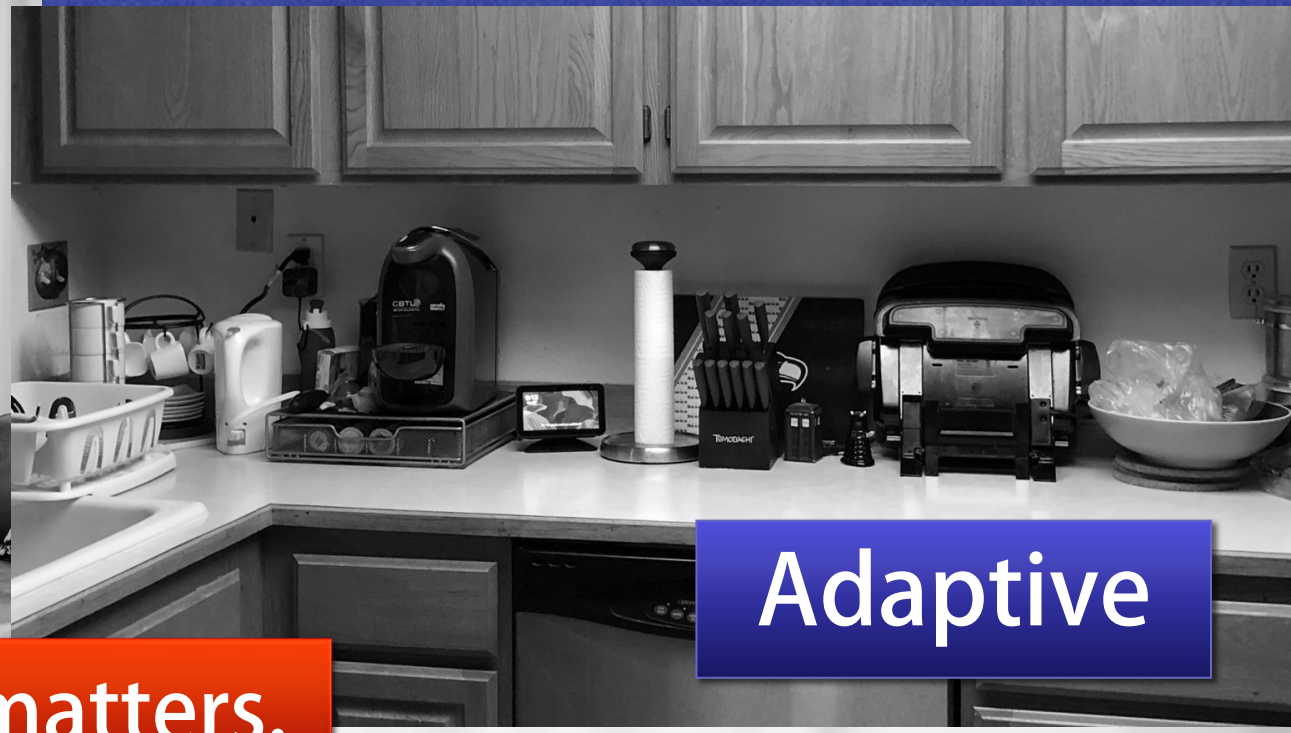
HOW DO YOU CHOOSE?

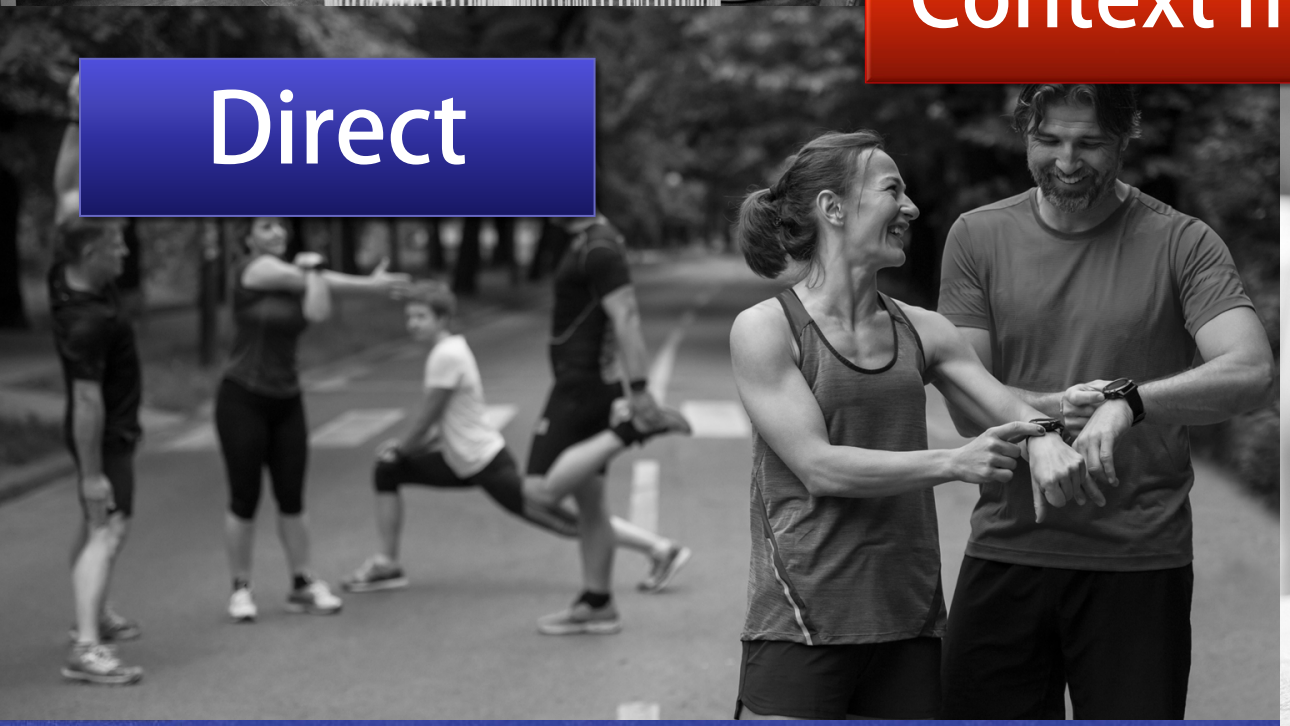
You must understand your customer's context to know what interaction model makes sense in the moment.

Anchored



Adaptive

Context matters.



Direct

Intangible

And MOST of our assumptions about the way the world works have changed since March 2020!

Office environments? Education?
Public transportation? Travel?
Family gatherings?

WHERE DO SMARTPHONE INTERACTIONS FIT IN?

Smartphones are difficult to classify, as it depends on the type of content you're presenting.

For productivity scenarios, smartphones belong in the Direct quadrant: short range with a constrained screen when compared to full laptop screens.

But optimized experiences like gaming land more in the Anchored quadrant, and voice-enabled apps like Alexa are pushing into Adaptive.

Which Interaction Models are Right for You?

Different tasks in your customer journey might lend themselves to different interaction models.

Anchored

- Best when you need to convey a lot of information.
- Multimodality is largely useful as a shortcut for search and navigation.

Adaptive

- Most inclusive
- Most expensive
- Best when customer context is likely to change

Direct

- Best when you have a few key, often-repeated tasks
- Can often infer using sensors
- Not well-suited to text consumption or browse

Intangible

- Well-suited to questions
- Excellent for search scenarios
- Difficult in multi-user environments

Example Scenario:

Your customers are planning and booking a big trip in advance, but they're not doing it from a single location: they're going from a commute to their homes.

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Example Scenario: Plan and Book

The right interaction model for the right context

DIRECT (Close range, constrained UI)
Customer browses potential neighborhoods via company website using touch controls on the small screen and short-lists options during their commute.

ANCHORED (Close range, Rich UI)

Couple browses the short list, using the **laptop screen**, a **keyboard**, and **trackpad** to review additional details and make final selections.

ADAPTIVE (Long range, rich UI)

The family browses the short list of resorts with a **set-top box app** and the **TV remote**. The kids can **ask questions verbally** and see the answers onscreen.

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But how can you enable the transition between modalities in this scenario?

Identity & transition

Your system will need a way to identify one customer from another, and to transition a user's presence between devices during a task.

Portable session context

Your system will need to persist certain search results, but perhaps not all results, for a length of time.

Flexibly structured content

Your content should adapt to multiple form factors and should limit the amount of detail displayed on constrained screens when appropriate.

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Complex, but it’s worth it. Multimodal flexibility isn’t just about arbitrary choice – it’s about inclusion.

THE MORE MODES YOU SUPPORT,
THE MORE PEOPLE YOU SUPPORT.

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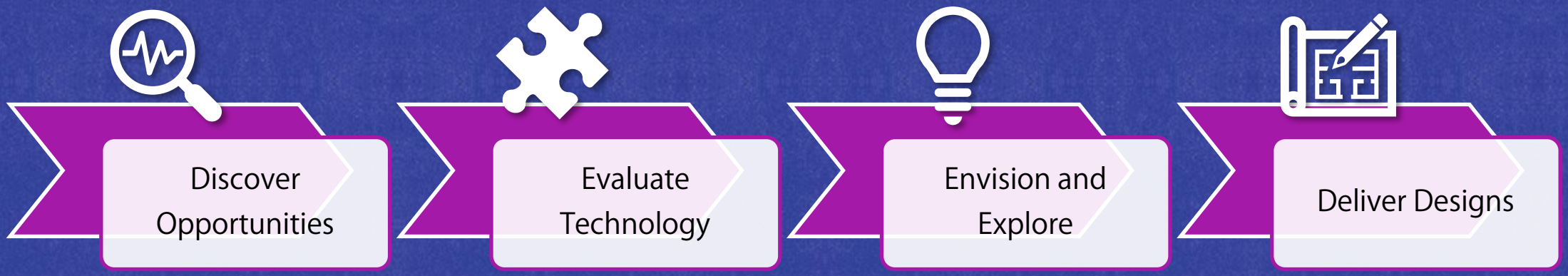
THE BIG PICTURE

Putting it all together

All of the concepts covered in the book fit together to give you an end-to-end process for multimodal and cross-device design.

Putting it all together



- 2: Capturing Customer Context
- 3: Understanding Busy Humans
- 13: Beyond Devices: Human + AI Collab
- 7: Spectrum of Multimodality

- 5: Language of Devices
- 6: Expressing Intent
- 14: Beyond Reality: XR, VR, MR, AR

- 4: Activity, Interrupted
- 8: It's a (Multimodal) Trap!
- 11: Breathe Life into the Unknown
- 15: Should You Build It?

- 9: Lost in Transition
- 10: Let's Get Proactive
- 12: From Envisioning to Execution

As I tell folks outside the software industry, I hope this book will be the design manual for folks who want to design the bridge of the Starship Enterprise.

Someone's going to build this... will it be you?

But whether you're working with new hardware or simply adding new modes of interaction to make your website more accessible, there's something here for you.

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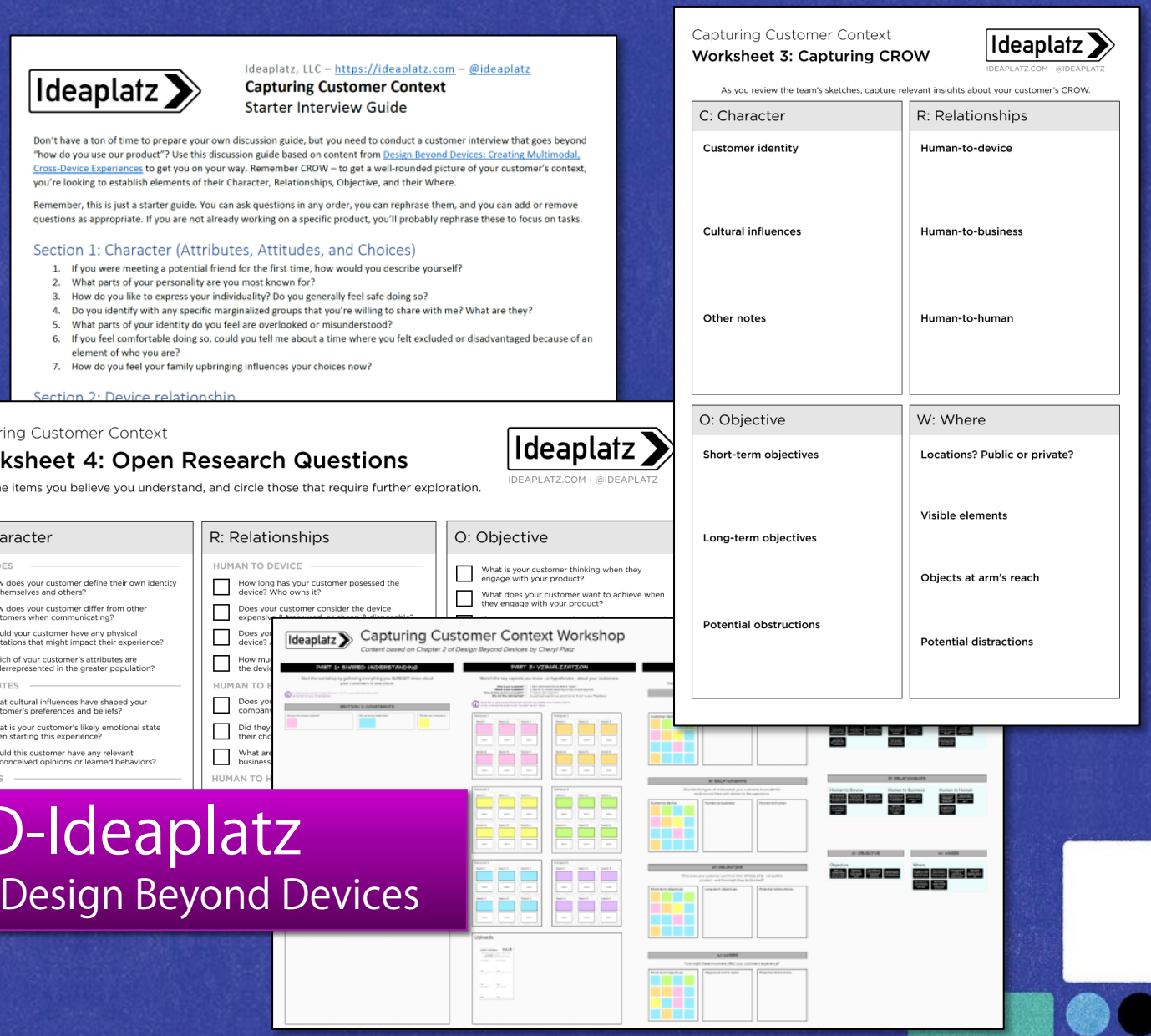
VISIT THE BOOK SITE ONLINE

- Free downloads, guides, and templates
- Podcasts and sample chapters



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Capturing Customer Context
Starter Interview Guide

Don't have a ton of time to prepare your own discussion guide, but you need to conduct a customer interview that goes beyond "how do you use our product"? Use this discussion guide based on content from Design Beyond Devices: Creating Multimodal, Cross-Device Experiences to get you on your way. Remember CROW – to get a well-rounded picture of your customer's context, you're looking to establish elements of their Character, Relationships, Objective, and their Where.

Remember, this is just a starter guide. You can ask questions in any order, you can rephrase them, and you can add or remove questions as appropriate. If you are not already working on a specific product, you'll probably rephrase these to focus on tasks.

Section 1: Character (Attributes, Attitudes, and Choices)

1. If you were meeting a potential friend for the first time, how would you describe yourself?
2. What parts of your personality are you most known for?
3. How do you like to express your individuality? Do you generally feel safe doing so?
4. Do you identify with any specific marginalized groups that you're willing to share with me? What are they?
5. What parts of your identity do you feel are overlooked or misunderstood?
6. If you feel comfortable doing so, could you tell me about a time where you felt excluded or disadvantaged because of an element of who you are?
7. How do you feel your family upbringing influences your choices now?

Capturing Customer Context
Worksheet 3: Capturing CROW
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As you review the team's sketches, capture relevant insights about your customer's CROW.

C: Character	R: Relationships
Customer identity	Human-to-device
Cultural influences	Human-to-business
Other notes	Human-to-human

O: Objective	W: Where
Short-term objectives	Locations? Public or private?
Long-term objectives	Visible elements
Potential obstructions	Objects at arm's reach
	Potential distractions

Capturing Customer Context
Worksheet 4: Open Research Questions
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Check the items you believe you understand, and circle those that require further exploration.

C: Character
ATTITUDES
- How does your customer define their own identity to themselves and others?
- How does your customer differ from other customers when communicating?
- Would your customer have any physical limitations that might impact their experience?
- Which of your customer's attributes are underrepresented in the greater population?

ATTRIBUTES
- What cultural influences have shaped your customer's preferences and beliefs?
- What is your customer's likely emotional state when starting this experience?
- Would this customer have any relevant preconceived opinions or learned behaviors?

CHOICES

R: Relationships
HUMAN TO DEVICE
- How long has your customer posessed the device? Who owns it?
- Does your customer consider the device expensiv
- Does you device? A
- How mu the devic

HUMAN TO B
- Does you company
- Did they their cho
- What are business

HUMAN TO H

O: Objective
- What is your customer thinking when they engage with your product?
- What does your customer want to achieve when they engage with your product?

Capturing Customer Context Workshop
Content based on Chapter 2 of Design Beyond Devices by Cheryl Platz

PART 1: SHARED UNDERSTANDING
PART 2: VISUALIZATION

http://bit.ly/DBD-Ideaplatz
or Ideaplatz.com > About Us > Design Beyond Devices

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Questions?
Have fun at the final frontier!

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