blink

When and Why To Start a Hardware User Research Program

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When and why to start a hardware user research program

From wearables to smartphones to VR headsets, it's a tale as old as technology: After months — sometimes years — of development, companies hype the impending release of their newest bleeding edge product that consumers are not only sure to love, but that will revolutionize the industry as we know it. Then, as initial reviews start to trickle out, public perception begins to turn.
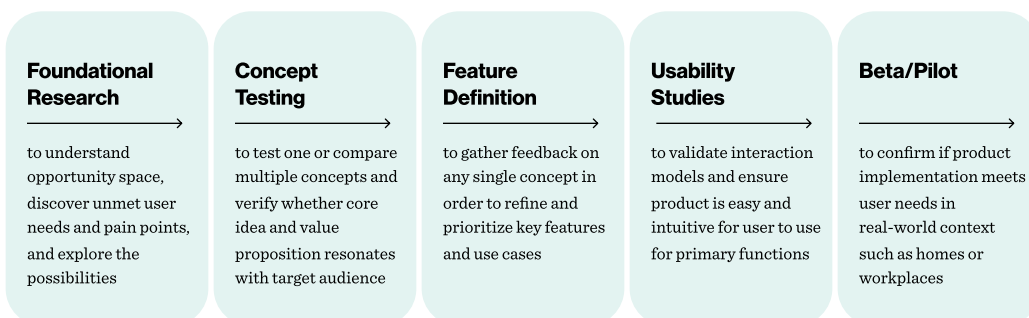
"Why didn't the company think about X?"
"How did they neglect something as simple as Y?"
"Until this hardware supports Z, which should have been obvious, it's not worth your money."

In an era where 88% of consumers look to online reviews before purchasing a product, these fumbled release stories can tarnish reputations and hinder adoption of new experiences. One way to avoid these mistakes is to engage in hardware user research throughout the product development lifecycle.

As you'll read, there are many considerations in defining and executing a successful hardware user research program. We hope these stories inspire you to consider the opportunities that you might uncover through user research and testing. Whether you're just getting started or need to scale your efforts, Blink is here to help.

User Research Inputs In The Hardware Development Process.

Foundational Research →	**Concept Testing** →	**Feature Definition** →	**Usability Studies** →	**Beta/Pilot** →
to understand opportunity space, discover unmet user needs and pain points, and explore the possibilities	to test one or compare multiple concepts and verify whether core idea and value proposition resonates with target audience	to gather feedback on any single concept in order to refine and prioritize key features and use cases	to validate interaction models and ensure product is easy and intuitive for user to use for primary functions	to confirm if product implementation meets user needs in real-world context such as homes or workplaces

When is the right time to test hardware with users?

Simply put: early and often

In our experience, you can learn invaluable information by just observing and talking to the people who would use your product (even if it doesn't exist yet).

Many product teams skip foundational research and get to the last mile with a product that is destined to be off the mark. Other teams have the right idea from the outset but skip evaluative testing and somehow get the execution wrong. Meanwhile, some teams manage to design and release a great product but fail to understand why people like it and can't market it effectively.

Here's what we recommend

When you have an idea for a product, foundational research uncovers end-user needs, motivations, and context of use — informing great design.

Test early concepts and features with users to help define and narrow the product's form factor, capabilities, and basic interactions.

Once you have a prototype or working product, evaluative testing identifies opportunities to improve the experience.

When your product is on the market, further qualitative UX research and quantitative data both shed light on what people do with a product.

Foundational user research helps you answer important questions.

Who is our target audience?
What needs or pain-points do they have?
What are their current behaviors, preferences, or motivations?
What is the big problem we are trying to solve?
What features should our product include?
Does our proposed design match user mental models and workflows?
How well is our current solution working?

Why is hardware usability testing important?

In short, because it will help you succeed

Many technological advances we can't live without today were scoffed at when they debuted: the automobile, the personal computer, the touchscreen smartphone. Over time, new versions of these technologies emerged that were more efficient, cheaper, more comfortable, and catered to specific use cases that people enjoyed and learned to rely on. In short, their design improved.

Usability testing developed in the 1980s and '90s as a way to more deliberately test products as part of an iterative design process. Usability testing both hardware and software increases the likelihood of getting the design right early on through structured user observation and feedback.

The idea of carrying around tiny personal computers in our pockets seemed ludicrous just two decades ago. Now, many of us can't remember how we survived without smartphones. Smartphones today have documented standards for their user experience. How we download and interact with apps, how we type, even how they look and fit in our hands, for the most part, is similar regardless of brand or carrier. Despite these standards, there remains room for hardware innovation, and usability testing new concepts and designs helps ensure that familiar and expected interactions are maintained while novel smartphone features are well accepted and optimized for their intended users and uses.
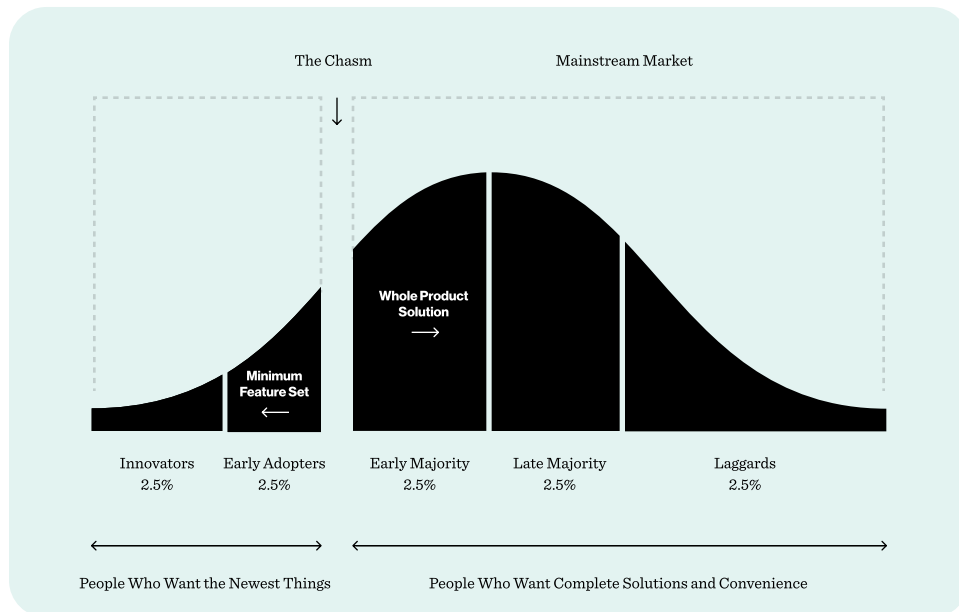
Hardware usability testing can help:

1) Understand the use case
2) Create a better out of the box experience
3) Make better hardware design decisions
4) Position your product the right way
5) Anticipate and mitigate usability challenges
6) Appeal to the right audience
7) Create a cohesive ecosystem

Hardware testing helps you cross the chasm

Mainstream experiences match user needs and behaviors

We work with a lot of companies that create emerging technologies such as wearables, home automation systems, and AR/VR devices that have achieved some success with early adopters. These enthusiastic early users tend to be more accepting of products that aren't perfectly executed. Success with the mainstream market, however, requires that companies find ways for their products to appeal to larger masses of consumers, as Geoffrey Moore described in his 1991 book, Crossing the Chasm. Usability testing helps teams build bridges across the divide by reducing obstacles to easy, intuitive use and optimizing the user experience for all consumer segments, not just early adopters.

Usability testing creates a bridge, helping you cross the chasm to the mainstream market.

The Chasm · Mainstream Market

Whole Product Solution →

Minimum Feature Set ←

| Innovators 2.5% | Early Adopters 2.5% | Early Majority 2.5% | Late Majority 2.5% | Laggards 2.5% |

People Who Want the Newest Things ← → People Who Want Complete Solutions and Convenience

Among its many other benefits, usability testing evaluates how well your design intent matches users' expected interactions, workflows, and mental models. Design flaws (we call them opportunities) are uncovered sooner than they would be otherwise, giving you more time to remediate the issue.

Sometimes flaws are discovered through testing at the eleventh hour when a comprehensive design change isn't possible. In these cases, you may decide to get ahead of the situation by arming your support team with information to be proactive about through web content, FAQs, known issues lists, etc. Armed with data gathered from usability testing, you can anticipate and mitigate concerns. These are invaluable advantages that the data gathered from hardware usability testing can provide.

Achieving mainstream success demands an inclusive strategy. If you've ever shopped for ski or snowboard goggles, you might have noticed the company Oakley offers two versions: standard fit and Asian fit. Clunky though that moniker might be, the goal of offering an alternative fit is inclusivity. Usability testing across a broad range of customer characteristics provides an opportunity to practice inclusivity throughout the hardware design process. In our experience, inclusivity results in better decisions about design, position, and audience.

At Blink, we advocate for accessibility and inclusivity in hardware design. We make it a priority to seek an appropriate mix of research participants. Our participant screeners are tailored to each client's unique project. The questions on these screeners ensure we recruit a diverse pool of participants. We have successfully recruited for tens of thousands of research studies and have developed best practices for respectfully collecting data such as physical characteristics, medical conditions, and other sensitive traits.

Stories from the field and lab

*Hardware user testing case studies*
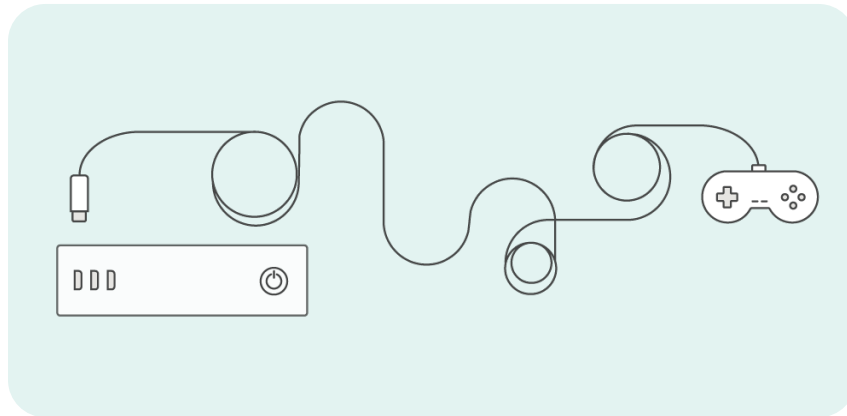
One Meter Saved Millions

Xbox knew their new Kinect experience was awesome but they weren't sure what would happen when all of the hardware components came together in the box.

Blink helped Xbox conduct research sessions in more than 200 homes. Our team took an iterative approach to this fieldwork. Each week, we would test an updated version based on insights from prior sessions. From major cities to rural suburbs, we met participants and took detailed notes about their environment and behaviors. We noted how people opened the box. We also took detailed measurements about the placement of the gaming system. And we observed how participants interacted with content.

Blink researchers sifted through thousands of data points from each household. Over the course of 18 product iterations, we worked with Xbox to address issues with packaging design, setup guides, and the hardware components. In particular, one cable was much too long. It was suitable for the expansive lab at Microsoft and large suburban living rooms where the Kinect had originally been tested, but was overkill for most homes. Decreasing the length of that cable reportedly saved Microsoft millions of dollars in production costs before the product hit shelves.
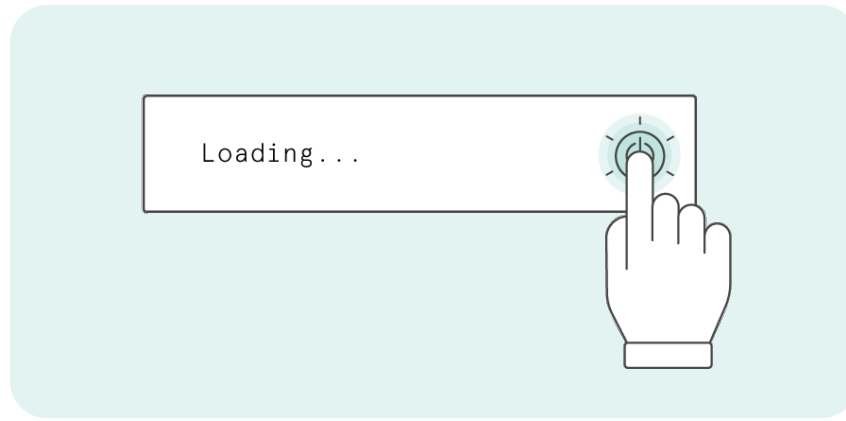
Sometimes the obvious is overlooked

People have developed mental models about how devices work, informed by all the technology we use. These deeply ingrained mental models form the basis of our intuition about how a new device should work.

While testing a much-anticipated new product experience, Blink noted that many participants had trouble recognizing that the system was booting up after pressing the power button. With no light or display in plain sight to indicate the experience was on (but taking a few seconds to warm up), users repeatedly pressed or held the power button, growing more frustrated.

Like so many UX insights, the issue sounds totally obvious after the fact. Without usability testing in which a seasoned user researcher could clearly observe what was happening in the moment, this shortcoming may have never been detected by the product team that was so intimate with the design.

In this case, Blink worked with our client to retroactively fit the experience with a component in the display that would indicate to users that the hardware was powered on, yet still booting up. This was an easy change to the design and streamlined the out-of-the-box experience.
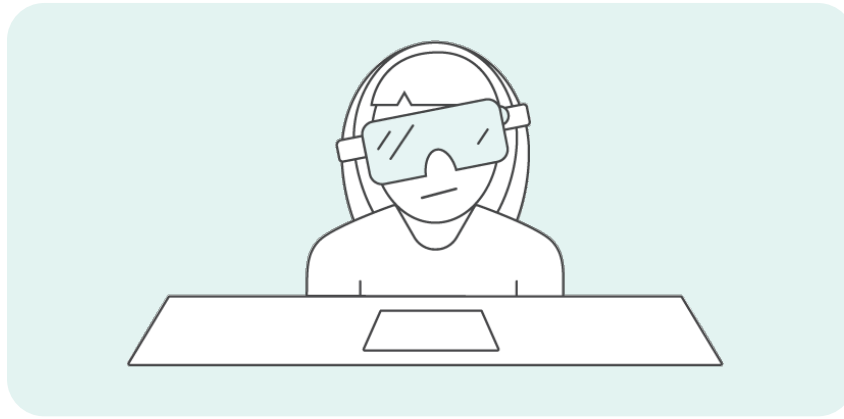
Inclusivity provides invaluable data

One of our clients manufactures a VR headset. Committed to accessibility and inclusivity, they had embarked on an initiative to measure over 100 consumers of a specific ethnicity, creating 3D models of their faces to ensure they were accounting for fits of all shapes and sizes.

While analyzing these data is important, we helped our client understand that there are other inclusivity data points that often are neglected. We encouraged them to recruit "edge users" who, while not necessarily the target, would become loyal customers if they weren't unintentionally excluded.

It was through research sessions with these participants that we discovered that women with sleek or straight hair had trouble keeping the headset in position; the headset would often slide down. We noted that participants who didn't wear a belt found the product harder to use. Some participants expressed concerns about hygiene when asked about sharing this new immersive experience with family and friends.

Our careful consideration about recruiting a diverse pool of research participants helped unearth design flaws that would have cost more money to fix later, and would have damaged our client's reputation.

Evidence is stronger than opinions.

We partner on a diverse range of projects across industries with dedication and creativity.

Get in touch to explore how hardware user research can take your product to the next level.

Email: hello@blinkux.com
Call: 206.447.9551