



Using Human-Centered Design to Improve Products & Gain a Competitive Edge



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When it comes to product development, it's a common misconception that industrial design takes place after the engineering is complete and before the product reaches the user—those final touches that apply colors, logos, and styling to the product. The reality—especially for medical device development—is that industrial design goes far beyond last-minute aesthetics. It explores deep-seated and often unmet user needs, delivering improved form and functionality, and influencing the entire development process from start to market adoption.

Before creating the look and feel of the product (its size, texture, contours, material, ergonomics, etc.), we must first understand and solve how the product interacts with the user and the environment—at point of sale, during use, while being stored, after use, and at disposal. A solution that addresses the entire user experience has become a primary point of concern in healthcare, resulting in a sea change in the approach to product development. The key to staying competitive is keeping the user experience at the forefront of design.

Why the Greater User Focus?

As available healthcare information and treatment options continue to grow, consumers (patients in this case) are exerting more influence on the decision-making. This is forcing the healthcare industry to consider the complete continuum of care and listen to input from all expert users, patients, and healthcare stakeholders. Today, Medicare reimbursements are partly tied to patient satisfaction. Hospitals are asking patients to rate their experience from the moment they enter the hospital to the minute they leave. And care at home is becoming an extension of care at the hospital, sometimes with the same devices, systems, and products being used in both places and shaping the overall customer experience. The healthcare industry is more motivated than ever to deliver positive user experiences, knowing that unhappy customers can *and will* take their business elsewhere.

How Industrial Design Adds Value

Users of medical devices—whether healthcare professionals, caregivers, or patients at home—are becoming more and more savvy. Not only do they expect a product to effectively serve its purpose (e.g., deliver medicine or track a heartbeat), they want a positive experience when interacting with the product. They now look for comfort, control, ease of use, and a feeling of confidence. They consider how products provide therapy and seek devices with minimal disruptions to their lives and reduced stigma, giving them the chance to live more “normally”. With more options on the market, they do their research and select the products that deliver on all fronts. By addressing the full range of the user experience when developing a product, industrial design makes medical products far more valuable to the user, earning their trust and loyalty.

Solving the Right Problems

Companies that offer medical products are learning that the quality of the user experience is a key differentiator when buyers are comparing devices. As such, they often instruct their development partners to make the device “easy to use” or “intuitive”—admirable goals, but before diving in, more information is needed. “Easy to use” could mean that something is more physically comfortable to use (perhaps requiring less muscular effort) or it could mean that the steps are simple (say, requiring only the push of two buttons). “Intuitive” could suggest that a device is quick to learn or that a non-expert caregiver is able to provide care to a loved one in a more professional manner.

It’s important to understand the intention behind the words as well: is the hope to reduce risk, deliver better results, improve the workflow and case throughput, or something else altogether? By drilling down with these questions, we identify the measurable attributes that create value. Tending to them from the start of the development process ultimately provides products that work better for the user and give one product—and company—a distinct competitive edge.



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Understanding the User & Their Requirements

Users of medical products take many forms, from surgeons and nurse techs in hospitals to health aids and everyday people caring for loved ones at home. Each user and their unique set of needs must be considered when developing a device to ensure that the product truly works for them. Naturally, when a product works well for the user, patients and the organization providing the service benefit as well.

This leads to additional questions for the product developers: How will the user be able to best set up, take down, clean, re-process, or dispose of the device? What resources (in knowledge or equipment or space) does the user have? What has worked well for them in the past and where are the pain points? If a device is challenging to set up before a procedure, for example, specialists will need more time to prepare it, pulling their attention and energy away from other cases and responsibilities.

And what about how the user interacts with the device during treatment? To better understand the opportunities to improve or evolve the current paradigm, a combination of observing practice and asking questions is critical.

- **How is the device held? In one hand or two?**
- **How accessible are the controls?**
- **How much effort is needed to actuate the device? Does it induce fatigue?**
- **What is the user’s body position relative to the patient?**
- **How does the user access the therapy site and how can the device support the delivery of therapy?**
- **What is the burden to use the device on the users?**
- **How easy is it to learn and remember how to use the device?**

One therapy may be simple and turnkey (e.g., an inoculation), while another requires caregivers to be on their feet in a delivery position for several hours, standing at the ready, holding tools in place. Having a device configured to make the process as comfortable, easy, effective, and efficient as possible for the user can be a gamechanger for the caregiver, patient, and organization alike.

Taking the time to understand all potential product users across the continuum of care and designing solutions that address their needs will create a complete product solution that can improve workflows, reduce fatigue, reduce waste, increase the number of procedures done, improve the facility’s bottom line, and perhaps reduce a patient’s stay in the hospital. These improvements will move the needle toward a purchasing decision of one product over another and provide a measurable preference for that product.

Considering the Environment

The treatment setting also greatly impacts user experience and offers up opportunities for design improvements. Will the device be used in an operating room, an ICU, a regional clinic, an ambulance, a tiny apartment, a palatial house? Each comes with its own environmental considerations, including lighting, sound, cable management, storage options, set-up space, and space available, for treatment.

For example, if the area's lighting is poor, the user may have trouble distinguishing between the colors of the ON and OFF buttons, potentially leading to harm. If the area is noisy, device sounds conveying critical information may not be heard. If the user needs to move around the patient during the procedure, can the device be made wireless so there is no risk of tripping over cables? An OR that is purpose-built for a certain procedure—with well-organized tools, customized lights, ideally proportioned work spaces, adjustable tables, etc.—will enable the user to interact with the device much differently than a cramped home bathroom with a small sink, narrow medicine cabinet, little storage space, and few electrical outlets.

Interestingly, designing a device to fit seamlessly into an environment is not always the best choice. In some cases, it's important to make the device more visible and attention-grabbing. If it "blends in" too well, users might forget to do their treatment or won't be prompted to make the habit changes necessary for success.

The goal for designers is to grasp how the device will fit into the user's lifestyle and environment or stand apart—each has its benefits—and what will create the best user and patient experience.

Finding the Right Development Partner

By taking into consideration the entire ecosystem around the product and service—its value to the patient, care-provider, hospital, and corporation alike—design within healthcare can ultimately create a complete experience that can be measured in preference, adoption, and sales. This focus on the user and on their needs, expectations, and satisfaction is at the core of a human-centered approach to product development.

It's advisable for any company seeking to develop a successful medical product to find a development partner whose ethos is human-centered. Ximedica has been bringing human-centered design to medical, drug delivery, and diagnostic devices for almost three decades and thrives on solving innovation challenges.

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Ximedica is a full-service product development firm. For 30 years Ximedica has provided a unique growth platform enabling organizations to successfully deploy medical technology products into the market.