JS|HELD

PERSPECTIVES

Inside the Healthcare Industry: The Impact of Human Factors & User Experience in Healthcare

Our perspectives feature the viewpoints of our subject matter experts on current topics and emerging trends.

INTRODUCTION

Human Factors and User Experience testing play an important role in healthcare settings and in the development of healthcare products. They can greatly impact the delivery of care, and the patient experience delivered by provider-based organizations and healthcare technology companies.

In this abridged Q&A conversation from a more extensive interview that healthcare expert Magi Curtis conducted with human factors / user experience experts Robert Rauschenberger and Joseph Pauszek, several important topics are discussed – from the role human factors play in medical and patient safety and in medical product design, to how consumer desires and demands are changing the way leaders in the healthcare and life sciences industries are thinking about user experience as they design products, workflows, and more.

Magi: Robert and Joe, you have both recently joined J.S. Held to build out our human factors and user experience capabilities. I know your team has an extensive background applying your expertise to help leaders of healthcare and life sciences organizations determine how human factors work impacts everything they do – both proactively and reactively.

For those not familiar with human factors, can you please explain generally what it is and how it is applicable in healthcare?

Robert: Human factors is the scientific discipline that studies human capabilities and limitations to inform product design, product interactions, and interactions in occupational settings.

Joe: To add to that, human factors isn't so much one field as it is a combination of many separate fields including domains like cognitive psychology, developmental psychology, and biomechanics. These all focus on different aspects of human cognition and behavior that are critical components of human factors.

Magi: What types of expertise does your team bring to healthcare and life sciences organizations?

Robert: Currently we have a number of cognitive and perceptual psychologists. The cognitive psychologists study how people think about things, how they make decisions, and how they remember things. Perceptual psychologists study how we take things in through our eyes, how we process them, and what we pay attention to. We also have developmental psychologists, who study the development of humans throughout their lifespan, from infancy all the way to old age – which is important because children, as patients or as users of medical devices, have different needs from geriatric patients.

Finally, we have biomechanists on the team who study the human body as a mechanical system. They examine how we move our limbs and what forces are applied to them. Biomechanists overlap the field of kinesiology, which studies the movement of people. So that's critical for the flow of hospital staff through environments.

Joe: We also have experts who specialize in the psychology of purchasing behavior and consumer behavior, which is particularly relevant for life sciences and device companies.

Magi: Given that, how can or should leaders of healthcare companies be thinking about leveraging human factors to make care safer and to improve patient experiences?

Joe: Making a device that works or a healthcare product that works and that is logically sound in its design is half the battle. The other half of the battle is the person on the other side of that device or that product. Product developers should ask: how do we expect them to use it, but also how are they actually using it? You may feel like you have a brilliant design, a brilliant product, but if the user can't figure out how to use it properly, he or she may abandon it.

Human factors work focuses on the interaction between the device or the service and the person. It's understanding all of the nuance and unpredictable situations that arise when different people with different backgrounds or different assumptions are trying to use or execute the same thing with the same goal.

We seek to inform the design to cater to all the potential people that could come into contact with the product or the service. At the highest level, that's the throughline in improving patient experiences – leveraging human factors research to understand how people are going to use your device or services in the real world and how it could be optimized to make it as safe, effective, usable, and as useful as possible.

Magi: Can you give some examples of how a healthcare organization or life science company has leveraged expertise offered by human factors and user experience teams?

Robert: In one case, we documented the workflow that users were taking through a hospital information system. At various critical junctures, they were breaking out paper and pencil. The whole system was intended to support the entirety of the workflow. Yet users were breaking up the system by using paper. This created vulnerabilities every time they did that because they had to transcribe the data accurately to paper and then transcribe the data back correctly. This had the potential to introduce all sorts of errors, some of them critical.

We helped redesign the process, so they no longer resorted to paper and the entire workflow was supported digitally. This reduced the risk of errors.

Another example involved new technology for a large healthcare system client consisting of hundreds of hospitals across the country. At the introduction of the technology, adoption was 0% because no one had thought about how the device fit into the existing workflow and into the existing process of the user. So, we went in to understand the existing process, the mental model of the users, and the users' concerns. We helped redesign the process and the technology in such a way that it fit hand-in-glove.

Magi: Joe, I've heard you mention that very few submissions to the Food and Drug Administration (FDA) succeed on their first try. Given that, how can life sciences and medical device companies leverage human factors and user experience early on in the design process to ensure FDA approval readiness the first time?

Joe: The FDA has estimated that less than 10% of first-time human factors submissions are accepted outright, which is shockingly low. One of the common reasons is that unexpected issues arise during the validation study.

The major hurdle: it is the Human Factors Engineering and Usability Engineering (HFE / UE) validation study that the FDA requires to demonstrate that your device can be used safely and effectively by the intended users. It's not uncommon for the FDA to require you to address any risks you uncover during that study. Oftentimes, that requires redesigning or modifying the user interface of the product. The user interface includes the design of the product itself, the instructions, the supplementary materials, the labeling, the packaging, and anything else the user comes into contact with. So, I usually tell clients that the last thing you want to be is surprised when you walk out of that validation study.

The whole point of that study is to demonstrate to the FDA that you already designed something that users can use correctly. You, as the healthcare or life sciences company, should already know that and have evidence for that going into this submission process. I was working with one company who had a number of critical warnings on a device that they wanted users to see and understand before using it. So, it was extremely important that users saw these warnings before they attempted to use the product. And the company was unsure about where to put them on the labeling and in the instructions in order to make sure that the highest proportion of people would notice them.

So, before the validation study, we conducted an eye tracking study. We got a group of users and had them review the materials and use the product as they normally would. We found significant differences between how many people noticed the critical warnings with one design relative to another design. Company representatives went into the validation study with some justification for why they laid out the document in that way, and with the confidence that they knew the highest proportion of people possible saw and understood the warnings.

Robert: Another positive result from the validation study is that you may also learn other latent needs of users that inspire you to develop new products.

Magi: If you were advising the chief quality officer or the chief medical or nursing officer of a health system, what advice would you give them about leveraging human factors to improve clinician workflow and care delivery?

Robert: Not only can human factors improve efficiency and patient and workplace safety, but it can also attenuate burnout, reduce the physical and psychological burden on staff, and foster greater staff buy-in, all of which will lead to greater adoption and compliance.

Magi: How have you seen human factors work reduce or improve clinician burnout?

Joe: Clinicians' jobs are demanding, high stress, high stakes, and fast paced – every day. Healthcare is extremely unique in that way and clinicians are people. Just like all of us, they get overloaded.

I ran one study in which leadership at a large hospital network wanted to understand their very high rates of turnover. By all metrics they could tell their staff people were very dissatisfied. They were being told: 'we're overloaded, we're burning out.' And the hospital network wasn't able to hold on to good clinicians.

The client had a pretty tight research budget as well. I share that to underscore that it doesn't have to be a large-scale, sophisticated, expensive study. We took a small random sample of different clinicians across different hospitals and different states within the hospital system's network. We shadowed them for a day. It was similar to a contextual inquiry, just to see what their day-to-day workflow was like. Then we conducted in-depth, open-ended interviews with them that generated a list of their pain points and pleasure points.

We talked to clinicians about some realistic changes that could be made to the workflow that would make a big impact. A lot of those changes were very simple things such as suppressing a clinician's emails during a specific time or establishing stringent rules for when patients self-schedule themselves, and that certain types of appointments should be of a specific duration to prevent scheduling backlogs. The feedback that we got from clinicians was remarkably consistent.

Ultimately, we created a list of what the network should start doing, keep doing, and stop doing. It also turned out that leadership already had a hunch about a lot of those things, but they never really had hard data to justify making organizational changes.

Magi: What advice would you give a chief product officer for a medical device company about leveraging user experience testing to improve customer satisfaction of a product in the design stage?

Joe: The important thing to keep in mind is that the landscape of medical devices is rapidly becoming as competitive and variable as the landscape of consumer products. It's starting to become the case that having a medical device that's safe, effective, and works isn't enough for the success of your company. Clinicians and patients expect the user experience with medical devices to be on par with the user experience that they have with consumer products. And those consumer products were designed specifically with user experience in mind to differentiate themselves in a highly competitive market. So, my advice would be to conduct user research with user experience in mind.

Robert: The most basic example I can think of is the choice between two forms of a pill that my mother took. Both products have the same active ingredients. Both function the same mechanically. Both have the same effectiveness, but one is a gel cap that is easier to swallow, and the other one is literally a hard pill to swallow. The user will gravitate toward the gel capsule even if it is slightly more expensive because it is easier to swallow and, therefore, a much better user experience.

The same is true of hospitals. Now, of course, you expect a hospital to treat you. That's why you go there. That's what you pay for. But the choice between one hospital or one device over another can come down to a more pleasant experience. The patient experience is actually changing pretty quickly in healthcare as well because we're going from in-person experiences to virtual experiences.

Magi: How are our user research labs at J.S. Held constructed so that organizations, staff, and consumers can properly and safely use products and services?

Joe: We have intentionally avoided making any irreversible modifications or setups in these labs. One day one of our suites could be set up like a comfortable living room testing virtual reality products. The next day it could be turned into an operating suite with surgical tools and manikins. That flexibility allows us to create a realistic and representative workspace for whatever study we're doing.

Robert: Every client is treated as unique, even if each situation is a repetition of a type of study we've done previously. The methods and approach are always revisited and custom tailored to the specific – not just research needs – but even more so, to the business needs of the client.

Those needs are translated into scientifically controlled research. Then, we make the reverse translation back from scientific outcomes to actionable business decisions. For that, we require and use an infinitely configurable lab.

Joe: This allows our team to do everything from ethics board approval for studies, protocol design, participant recruitment, coordinating and running the study itself, data analyses, and reports tailored to research teams or stakeholders. If you need it, we'll do it; if you don't, we won't.

Robert: Recently we tested a women's healthcare product, and we had to have an anatomically correct manikin. We used that to simulate very realistic conditions and brought patients in to show us how they inserted the product. Worth noting, we had female researchers conduct that study because that made the most sense for the patients who were coming in. I was particularly proud of that team's work because it was an important product for women's health.

Magi: In addition to working directly with companies, I know that your team does a fair amount of litigation work. Talk to me about the types of cases that you have worked on and how human factors played into those scenarios.

Robert: Cases often involve an alleged failure to warn. These cases need to be examined closely in an over-the-counter medication because the only instruction the patient has for how to use the product is whatever is contained in the labeling from the manufacturer.

I believe the litigation work sharpens our non-litigation work. This is because we do a lot of forensics and investigate accidents, failures, misuses, and lack of comprehension of warnings and instructions, or failure to adhere to them. Through litigation cases we can glean insights and make observations that we can bring back to our proactive product research.

Another benefit of our litigation work is that we understand the rules of discovery and evidence, we know how to communicate with clients, and how to design studies so that they are scientifically defensible and meet the criteria for scientific evidence.

Joe: We also understand both the plaintiff and defense perspectives.

Magi: What else is significant for healthcare and life sciences organizations to understand when it comes to leveraging human factors and user experience testing?

Robert: The medical device segment of the healthcare industry is very insular. People work in that field for their entire career, and they don't really get exposed to some of the other industries that we get exposed to, and there are insights that you acquire from other industries, especially the consumer product industry. There are lessons to be learned that we talked about in terms of market differentiation and user experience. For instance, there might be something useful from the automotive industry that you could apply but you would never know because you only operate in the healthcare domain.

I've done this sort of cross fertilization for various clients and different industries, and it's always been extremely beneficial.

Joe: I want to underscore a point that Robert alluded to earlier. We talked a lot about product testing, product development, and workflow optimization. But we don't expect companies to come to us with a detailed research plan and a fully fleshed out product. That rarely happens. Instead, they come to us with their problems. We just help them find a way to better understand their challenges and address them through research.

ACKNOWLEDGMENTS

We would like to thank our colleagues, Magi Curtis, Robert Rauschenberger, and Joseph Pauszek for their insights and expertise that greatly assisted this research.

Magi Curtis is an Executive Vice President and leads J.S. Held's Healthcare Sector Services. She has spent her career in healthcare, in both the policy and business sides of the industry. She has guided some of the nation's leading health systems and provider-based organizations as they navigated enterprise level change management initiatives, strategic partnerships and post-merger integration, strategic positioning, government relations and significant issue campaigns, crisis events, and internal and external engagement efforts. She has also worked closely with the founders of emerging healthcare companies to scale their business and establish operational structures to maximize productivity and enable growth. Prior to joining J.S. Held, Magi was a partner at a top national healthcare consulting firm. Magi also worked in Washington, D.C. in health policy as a staffer in the U.S. Senate, at Navigant Consulting, and the Children's Hospital Association.

Magi can be reached at magi.curtis@jsheld.com or +1 615 626 0023.

Joseph Pauszek, PhD, is a Managing Scientist of Human Factors at J.S. Held. He is based at J.S. Held's state-of-the-art scientific User Research Labs (URL) at the Phoenix, AZ, location, where he performs user research for industry-leading clients, including but not limited to healthcare organizations and medical device manufacturers. He has over a decade of experience conducting research in academia and industry on various topics, including visual attention and distraction, cognitive workload and mental effort, stress, working memory, rational decision-making, perception, information processing, and the user experience, safety, and effectiveness of both consumer products and medical devices. He also has experience utilizing physiological measures, such as pupillometry via eye tracking, to shed light on the underlying cognitive states of individuals in real-time.

Joseph can be reached at joseph.pauszek@jsheld.com or +1 480 914 9228.

Robert Rauschenberger, PhD, is currently the Vice President, Director of Human Factors at J.S. Held. He has more than 25 years of experience conducting research on topics of visual attention and distraction, the organization of perceptual information, product design, user experience, risk communication effectiveness, and consumer decision-making. He leverages this experience in legal cases across industries, including product liability / failure to warn cases, class actions (both at the certification and at the merits stages), Proposition 65, and web design cases, for which he has testified in deposition and at trial, in both federal and state court. Dr. Rauschenberger has also designed and tested products across various industries and will continue to do so in J.S. Held's state-of-the-art scientific user research labs.

Robert can be reached at robert.rauschenberger@jsheld.com or +1 213 304 6598.