Human Factors International

User Experience and the Business of Healthcare

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This paper, and the podcast series associated with it, focuses on how the design of the user experience in different healthcare contexts can impact the overall quality and effectiveness of healthcare for patients, physicians and the business of healthcare as a whole.

In some contexts, a better user experience can make for a happier customer or a more profitable line of business. In healthcare, a better user experience can save a life.

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The healthcare debate

Healthcare reform has been front page news for much of the past year and at various times for decades now. President Obama has made healthcare reform one of the pillars of his new administration's policy agenda. More specifically, he has stated that we should make a concerted effort to use technology to help provide better health care at a more affordable cost.

"We will restore science to its rightful place, and wield technology's wonders to raise health care's quality and lower its cost."

- President Obama's Inauguration speech 1/20/2009

By now, most of us would acknowledge that there are many flaws in our current health care system. Most of the debate and much of the policy discussion in the recent reform efforts have focused almost exclusively on healthcare cost and coverage—who can get health insurance, what is covered, and how much does it cost. While those are admittedly very important parts of the overall reform debate, there are other factors that may impact the quality and effectiveness of the health care that we all receive.

The Washington Times

"The flaws in our health care system are pervasive and corrosive. They threaten our health and economic security."

- Tom Daschle 1/09/2009

While policy, funding, and political issues will significantly impact what can and will happen with healthcare reform, the design of healthcare experiences can play a critical role in the quality and effectiveness of how healthcare is realized. We leave (at least for now) the policy and other debates to others. This paper and the podcast series associated with it, focuses on how the design of the user experience in different healthcare contexts can impact the overall quality and effectiveness of healthcare for patients, physicians and the business of healthcare as a whole.

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Patients' perspective

Changes to healthcare technology and the policies and infrastructure surrounding the health care system have forced some important changes in how individual patients view, manage, think, and feel about their health care. These changes can be viewed in terms of a set of themes:

- *Ownership*—an increasing desire for ownership of their own health care
- *Fear*—fear of the uncertainties of healthcare coverage and the effects of health problems
- *Complexity*—an increasingly complex world with more information, more options, more policies, etc.

Each of these themes has an impact on general and specific aspects of digital healthcare user experiences.

Ownership

There are many reasons why today's patients are looking for and expecting more ownership of their healthcare information and healthcare experiences. First, technological advances—in particular, information technology—allow users access to information and services that they never had before and the ability to self-treat in ways that used to require trained professionals. For example, many people think nothing of researching symptoms and treatments online before ever talking to a physician.

Second, the design of medical devices and the services that support them has advanced in recent years to the point where patients are able to use them themselves safely. For example, some patients are even comfortable—and prefer—conducting such things as kidney dialysis treatments at home for themselves because the technology is available (and designed well enough) to allow them to do this. The notion of virtual doctors visits (or perhaps they should be called virtual house calls?)—where patients never even have to leave their own homes—is beginning to get some traction now because the technology is becoming available to support the exchange of information in a reliable and safe way.

Finally, the ever-increasing complexity of healthcare coverage and all the policies that surround it has caused patients to worry that they may not be covered if something should happen, they may not be able to afford certain treatments,

and that they simply will not understand what to do. This relates very much to the next theme—fear—but one of the results is that patients, whether they want to or not, feel an increasing need to "dig in" to the details of their healthcare. How many of us have spent time reviewing EOBs or compared service costs at different clinics? Whether we like it or not, we've had to take more ownership of our own coverage.

Fear

Fear, then, is the next theme. We fear that we may not be covered if we get sick. We fear that we may face financial ruin if something traumatic happens. We fear that we may face "gotchas" when it turns out that our health insurance won't cover a pre-existing condition (beware the "rider"!). We fear that we may not be getting the right or the best treatment. All of this fear, as we mentioned, forces us to ask more questions, be more diligent, and worry more about the future.

We also live in a media-saturated, techno-centric world in which we as a society focus on extremes. During the Fall of 2009, did anyone go a day without hearing about H1N1? Have any of us not heard regular scare stories about what would happen to us and our healthcare as a result of the upcoming healthcare reform? And, who hasn't been intimidated by the litany of side-effects for some prescription drug on a television commercial?

These and other factors have created a climate of fear in our healthcare experiences. Whether we fear illnesses, treatments, or policies, we must acknowledge that this climate of fear exists when we think about the experiences we want for patients.

Complexity

One of the primary reasons that patients fear aspects of the healthcare system is that things are increasingly complex. In recent years, we've seen an explosion in the number of treatment options. Do I need the purple pill, or the blue one? What about the pink one? Should I get an MRI, a CT

Scan, an ultrasound, or something else? When humans are presented with too many choices, they have a hard time making any choice.

Many of those solutions are getting more complex too. Managing a complex cocktail of pharmaceutical treatments can overwhelm the best of us. Safely and accurately using medical devices can be troublesome. Perhaps the most complex aspect of healthcare is managing a potential avalanche of information—information about coverage, information about health and medical conditions, information about our own personal health.

Finally, as we've already talked about, the entire healthcare ecosystem is becoming increasingly complex. Benefits, coverage, co-pays, FLEX accounts, networks… it's hard to keep it all straight. In fact, an entirely new professional service has developed—health advocates—to help confused healthcare consumers deal with the complexity.

Physicians' perspective

There is certainly some overlap in the themes for physicians and patients when we think about healthcare user experiences (especially in the area of complexity). However, we'll talk about two additional ones here:

- *Whole-patient information views*
- *Error prevention*

Whole-patient information views

As the healthcare industry has become more and more complex, physicians have tended naturally to become more and more specialized. With all the changes and advances, it would be impossible for anyone to be knowledgeable and proficient enough at everything. It is natural, therefore, to find a specific niche and try to know as much as possible about it. This is not to diminish the role of the general practitioner, but the increasing complexity of the field drives many to specialize.

With specialization has come segregation of information. The endocrinologist may not have a good view of what the GI specialist has determined, the GI specialist may not know what's going on with the nutritionist, and the nutritionist

may not know what the endocrinologist has determined. Patient-specific knowledge is disjointed and under-utilized.

Of course, electronic medical records (EMRs) are an industry-wide attempt to address this issue. The Obama administration has provided a significant amount of impetus to promote and support the widespread adoption of EMRs. While their adoption can and should help with some aspects of the problem, simply having patient data available online and from one information hub may only be a partial answer. If that information is not well integrated in the system, physicians are still left to struggle with isolated views of the patient.

Error prevention

The other significant theme for physicians and other caregivers is error prevention. Error prevention is, of course, extremely important from a patients' perspective—especially as more patients are taking ownership of their own care—but the issue is extremely important to physicians across the board.

The last thing any physician wants to do is make a error that will result in further problems for the patient. After all, the first principle of the physicians' creed is *do no harm*. We've already spoken of increases in complexity across the board in the healthcare space. That, naturally, will create increased opportunities for errors. For example, the proliferation of pharmaceuticals has created a significant risk of dispensing the wrong drug or the wrong dose. A lack of whole-patient information views can certainly create situations where the "right" treatment in one context causes problems in another.

Business perspective

Finally, we look at things from the perspective of the businesses involved in the healthcare industry—providers of healthcare services and technology. As with any business, the fundamental responsibility of the company is to maximize profit and earnings. Of course, we can assume that their mission is to provide quality services and technology to the healthcare industry, but we must remember that

any business needs to think about the bottom line. The two related themes we consider here, therefore, are:

› *Return on investment (ROI)*
› *Litigation and insurance*

ROI is something that every organization will consider when exploring new ideas and new approaches to doing business. Litigation, in the society we live in, is a significant factor in determining corporate-level ROI, but also impacts an organization's brand and long-term viability.

Return on investment (ROI)

Any company that is thinking about designing or developing a new product or service must decide if it makes good business sense to do so. There are numerous factors that go into ultimately determining if a product is profitable. Certainly, the product needs to fill a market need and do it better than the competition. Even if it fills a need, however, the product needs to be perceived as something that consumers want and/or need. If it is not positioned correctly, it won't sell. And even if it fills a need and is desirable, the product must be designed efficiently and in a way that does not require undue revisions, support, or maintenance. Put another way, the total cost of ownership of the product must not overwhelm the benefits from the demand.

We must always remember that under our current healthcare framework, where most of the products and services that are developed and provided are done through private for-profit corporations, every decision must make good business sense. Put less delicately, we must also remember that some aspects of the healthcare system and the resulting experiences it provides are based largely on what is profitable for the companies involved.

Litigation and insurance

For good or for bad, in today's healthcare world, one of the most significant costs associated with health-related products or services is the cost of litigation and related issues. To many people's dismay, as the percentage of the US economy that is devoted to healthcare has more than tripled in size over the last few decades, it has

become a target for litigators. To be blunt, there is money to be had there. The direct cost of paying for litigators and the settlements that inevitably result is a significant drain on the healthcare industry.

To protect themselves against the potentially crippling impact of litigation, many health providers (products and services) have been forced to find insurance for it. The relative costs of malpractice and related insurance policies has continued to climb and is a significant contributing factor in the overall costs of health care and, as a result, the overall profitability and business viability of healthcare products and services.

Perhaps the biggest impact of an increasingly litigious healthcare industry is the secondary costs of defensive medicine. This refers to the defensive strategy of many physicians and other health professionals of providing more treatments or services than they might otherwise feel is warranted. This allows them to protect themselves from litigation claiming that they might not have done everything they could for a patient.

Healthcare user experiences

As we mentioned at the beginning of this paper, there are numerous aspects to the healthcare reform debate. We are focusing here on aspects of healthcare user experiences that make a difference for patients, physicians, and healthcare businesses. We've identified various themes that affect these various audiences—ownership, complexity, fear, whole-patient information, error prevention, return on investment, and litigation. There are certainly other themes that play a role that we have not dealt with.

Each of these themes impacts the user experiences that patients, physicians and other healthcare stakeholders have when interacting with tools, products, or systems in the healthcare industry. We've learned, however, that good user experiences don't just happen, they are designed. We can take the proven principles of user-centered design to create experiences that provide easy-to-use and persuasive experiences that empower patients, help physicians better understand and use complex patient information to do their jobs in a safer and less error-prone way, and at the end of the day, help healthcare organizations run their businesses safer and better so that they can realize better returns on their investments. Let's take a look at one example to see how this can play out.

Example user experience application

When working with a medical device company, there are many factors to take into account, some of which cannot be measured in financial terms alone. HFI had an opportunity to assist in the creation of a more usable solution for gathering information during medical device testing and validation. Our client was tasked with testing an implanted medical device. During the surgical process, data would be gathered on the device, its location in the body, the surgical procedures used during the process, and any notes or other information on patient and device responsiveness.

The problem

The surgical theater can be a chaotic place. Even in the testing environment, the collection of data will always be secondary to the health of the patient on the table. Because of this, there was a great amount of data that was not entered until after the procedure was completed. This delay in reporting set up the potential for inaccurate or forgotten data. In fact, some data entry took place hours or even days after the procedure. On the business side, every week without the FDA's approval of the device reflected close to *a million dollars in lost revenue*. Furthermore, there was the human impact. Patients could not begin benefitting from the device until the FDA approved it.

The solution

HFI worked with this medical device company to provide a user interface that would reduce the reporting time and meet the needs of the physicians, staff, institution and FDA. A remote data entry system was designed so that the entry flow matched the complex procedure that took place during the operation. Smart defaults were made available to facilitate the entry and reduce errors. During the most difficult part of the procedure, visual feedback and dynamic displays provided strong cues that helped optimize data entry.

The result

HFI's design brought confidence back to the client's international end-user community, and offered cost/benefit and productivity gains in the data input, validation and reporting of implant devices. This sped up the approval process, thus saving the company millions of dollars and helping patients live healthier lives.

Conclusions

The specifics may vary, but the story is generally the same throughout the healthcare community. A strategic focus on the user experience benefits patients, physicians, and healthcare organizations. Let us take a moment to review some of the basic activities that take place in a solid user-centered design process and how they impact the user experience.

Know the business

Some design efforts are done purely in the interest of public health and safety. Others are done within the context of profits and losses. There are shades of gray in between and various other motivating factors. The important thing to keep in mind, however, is that designing a user experience is not done in a vacuum and is rarely solely about just creating the best possible experience for users. HFI's CEO Eric Schaffer has talked about how user-centered design might better be referred to as business-centered design. Organizations have goals—whether they be maximizing market share, improving brand perception, speeding FDA approval, or whatever.

A skilled designer can design experiences that are optimized in different ways. Are we concerned with error prevention (to avoid litigation issues)? Brand perception (to establish the proper emotional response)? Conversion and volume (to maximize revenue)? Whatever the goal, experiences can and should be designed to support users in a way that aligns with this goal.

Know the users

Healthcare is one of the most complicated and sensitive areas of our lives and professions. Our health and well being and that of our loved ones is paramount. We bring more emotional "baggage" to healthcare experiences than most any other. The consequences of our interactions with healthcare products and services are more critical than most any other—for both patients and care givers.

In order to design experiences that account for and appropriately respect these priorities, we need to very thoroughly understand the users that will be having those experiences. There are many ways to gather the information needed to understand them, and different perspectives that you can take in understanding them. Of course, spending time with users in the context of use—whether that means in the operating room, at home while they're taking their meds, or in a cubicle at work while filling out complex health information forms—is the best way to understand them. There are other ways of gathering information, but the

best way is to spend time in the context of use to fully understand who the users are, what their goals are, and what very important contextual factors will impact the overall experience.

Design for performance and persuasion

Once you understand the business context and everything you can about the users, you need to design an experience that will meet those needs. You may be designing an experience that focuses primarily on performance such as a prescription management system—the primary goals are to fill as many scripts as possible with as few errors as possible. Or, you may be designing an experience that focuses largely on emotions and persuasiveness. Either way, you optimize the design to meet the goals defined.

If you're designing for performance, there are well documented principles of human cognition and behavior that can be leveraged and various design patterns that take advantage of these principles. The lessons learned while understanding the business goals and context and the users and their contexts of use will inform how to optimize those designs.

If the goal is persuasion, then there are also proven psychological principles that can be used to design the optimal experience. The deep understanding obtained in the earlier phases should have identified the blocks, beliefs, and drives that users have. With that information, a good designer can deploy the appropriate tools of persuasive design to create the best possible experience.

Validate the designs

Of course, we never assume that the experiences we've designed have met our goals. We test them. As much as clients understand their business and as much as we understand the users and good design principles, it is imperative to validate that we have met the goals for the design—and, if not, why not. In some contexts, such as obtaining FDA approval of a device or treatment, formal testing is mandatory.

There are various ways of validating a design depending on the type of experience and the goals surrounding it. These may range from rigorous customer satisfaction metrics, to performance measures such as task time or error rate, to more specialized methods such as eye tracking or other tools. The point is to validate that the experience that has been designed has met the business and user goals defined for the product or system in question.

Continuous UX

Once you've designed an experience that meets your business goals and provides users with the experience they want, you're done… right? Wrong. In many ways, designing good user experiences is like good health care. The most fundamental thing to understand is that it is not an event, it is a process. Just like good health care involves more than just treating injuries or illnesses, a good user experience strategy involves more than just the design of an experience. We call this idea *continuous user experience*.

Continuous user experience involves developing the organization, people, tools, and processes needed to ensure successful user experiences… always. It means having appropriate strategic support for UX activities. It means having the right people and skills in the right places in the organization. It means having appropriate tools and standards in place to provide the structure and support needed. In short, it means institutionalizing a culture of user experience excellence.

HFI's Healthcare UX podcast series that accompanies this white paper explores many of these issues and more in more detail. We talk to a number of healthcare UX industry experts from various parts of the healthcare sector.

Please visit www.humanfactors.com for more information on the ongoing podcast series or connect.humanfactors.com for an ongoing discussion related to the topic.

About the author

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Jeff Horvath has been working in the field of user experience and human factors for more than a decade. His background in psychology and his experience in the business world provide a combination of skills and perspectives that can help your organization design solutions for end users that are usable AND that meet your business goals.

Jeff's customer list includes American Family Insurance, Caterpillar, Lands' End, Mapquest, Motorola, and Sprint. He has helped them successfully integrate user centered design best practices at their organizations.

Jeff's experience includes:

- Positioning and growing UX within and across organizations
- Strategic consulting
- Partnering with agencies and developers
- Field research
- Testing & evaluation
- Web analytics and business intelligence
- UX design
- Continuous usability
- Accessibility
- Internationalization & localization
- Web, GUI, mobile

As VP - User Experience Strategy at HFI, Jeff defines and oversees solutions for clients, and manages and mentors HFI's technical staff. Jeff has a doctorate in educational psychology from University of Wisconsin-Madison.

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