

Usability of EHRs: Technology Developer Perspective

athenahealth

At athenahealth, we acknowledge that health care information technology lags well behind other industries in usability. At HIMSS recently, it was clear that we were still introducing the definition of usability to many of our colleagues—that is, specific users in a specific context of use achieving their goals effectively, efficiently, and with satisfaction. Meanwhile, other industries are already supported by far more usable systems, already derive benefits from usability, and certainly no longer struggle with user adoption. We believe that we can learn from their example in order to make our own successful transformation to highly usable, and highly used EHRs.

Consider automated teller machines. The first ATMs weren't at all usable—banks had to station tellers next to ATMs to tell customers how to complete transactions. But for many years now customers have stopped lining up for tellers, and instead walk up to any ATM to successfully make deposits, withdrawals and inquiries. You don't even need an envelope or a pen to deposit a check anymore.

In financial services, it used to be cutting-edge to list transaction forms online, as files available for downloading, printing, filling out with a pen, then mailing back with a stamp. Now not only can you execute a transaction on line, but you can first experiment to your heart's content on calculators, your transactions are confirmed via text or email, and online statements are private, secure and up to date.

Other industries, including quite complex ones, have made similar advances. How did systems across a variety of industries leave their early jerry-rigged days behind and become increasingly usable? **Vendors employed rigorous usability methodologies to inform user-centered design iterations.** The vendors who employed these methods well delivered more usable products. Word got out about their usability improvements, which not only led to greater market opportunities for those vendors, but also raised the usability bar for all competitors in that market. To compete effectively, all products had to become more usable. What was deemed revolutionary in early days was surpassed by new innovations in effective and efficient interactions—creating a beneficial and ongoing cycle of increasing usability. The key is the proven process, executed well. We advocate for education and promotion of rigorous, reliable methodologies.

Any good program should include direct observation of users' behavior, working on tasks that matter, either in their usual context or a reasonable facsimile. It's also important to include a number of methods from the usability toolkit, to better understand motivations, perceptions, mental models, usage levels and order of operations, for instance, in addition to observing behavior directly. And it's critical to strike the correct balance between multiple methods.

Conducting comparative usability tests on less complex applications, especially walk-up-and-use products, can be pretty straightforward. But devising and conducting usability evaluations on a single complex, cooperative work application such as an EHR is considerably more challenging. What then about *comparative* usability ratings of *multiple* EHRs? This looks to be daunting. The ratings' validity would depend on the protocol: including the necessary types of evaluations,

executing them well, and balancing them appropriately. In addition to being reliable and valid, a useful protocol for comparing EHRs would need to scale well and be brisk to execute.

To move briskly, it can be tempting to sidestep techniques such as direct observation. But proxies (such as substituting a demo for hands-on use by a target user) can yield both false positives and false negatives. Keystroke-level inspections seem promisingly reliable, but require prohibitive amounts of support from system experts before they can even start, and the analysis can be out of date before the exercise is even finished.

At athenahealth we're committed to dramatically increasing EHR usability. We employ a rigorous, repeatable process to do so. We:

- Conduct regular ethnographic studies
- Use heuristics and cognitive analysis to assess human factors re risk.
- Devise experiments to directly observe how easily and efficiently target users can complete target tasks.
- Analyze usability issues we discover, and improve the product accordingly.
- Embed these user-centered processes into **all** EHR development projects.
- Marry this robust UX capability to a platform that measures actual clinical usage of the EHR.

Some **things we *don't* do**:

- We don't focus on prettiness alone. If it doesn't also make users' tasks easier and more efficient, we don't make it a priority.
- We don't equate having clinical experts on staff with a full embedded usability program. Instead, clinical expertise is a complement to directly observed experiments.
- We don't confuse user forums with a usability program. They are excellent resources for discovering clues about conceptual models, for understanding perceptions, and for eliciting feedback of many kinds. But self-reported information can't stand alone: it is not a substitute for diagnostic usability activities that allow us to see what people do, rather than what they say they do.

We welcome increased focus on EHR usability—in fact, we believe it is essential, and we'd like to help dislodge some of our industry's misperceptions about how to “do usability”. However, as experienced designers and usability practitioners, **we're less than enthusiastic about mandates for specific design details, or about unreliable comparative protocols that would keep us working on the wrong things**, and would inhibit innovations that would lead to greater EHR adoption. We strongly **recommend that you hold vendors to a high standard in usability methods**—the same methods that have dramatically increased usability in so many other industries. Thank you.