A common theme for articles in the Summer 2017 issue is techniques for gathering clinician input and using it to inform aspects of acquisition and design. Human factors focuses on the needs and abilities of the end user, but clinicians are a particularly difficult group to access and study. The first article, by Donna Baggetta of OIIG HFE, describes a method for assessing user information needs given the task context. In the second article, Tim Arnold and Helen Fuller of the VA National Center for Patient Safety discuss the potential for using natural language processing to design interfaces that speak the user’s language. The third piece in this issue is a continuation of Hasan Shanawani’s interview with Jim Bagian that was introduced in the last issue. Among other topics, Dr. Bagian describes introducing usability testing during the VA acquisitions process. In the fourth article, Jane Robbins and colleagues describe a process for using clinician input to develop clinical scenarios for usability testing.

Finally, in our Spotlight series, Ross Speir describes a new collection of guidance on human-centered design for health information technology in the VHA compiled by the OIIG HFE group. Visitors to the site are invited to review the material and provide suggestions for improvement.

As always, we welcome your questions, feedback, and ideas for new articles via e-mail to VHA10P2HFQ@va.gov.

From the Editor-in-Chief, Helen J.A. Fuller, PhD, VA National Center for Patient Safety

VHA Clinical Cohorts, User-Centered
Design and the Participatory Group Review
Donna Baggetta, Human Factors Engineering, VHA Office of Informatics and Information Governance (OIIIG)

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Jane Robbins, Kurt Ruark, Ross Speir, Ashley Cook, Danielle Hoover, MD, and Abigail Noonan, HFE, OIIG

The range of health information technology (HIT) software at VHA includes websites, Computerized Patient Record System (CPRS) templates, and commercial off the shelf (COTS) products and mobile applications, any of which could be part of an electronic health record (EHR) system. Usability testing is an effective method used at VHA to determine how efficiently and effectively users can accomplish tasks with HIT systems. In a usability test, participants who represent actual users carry out key tasks within HIT system...

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For the past several years, HFE has supported numerous health IT projects representing a wide range of technologies. Over this time, HFE has accumulated much knowledge and created many documents related to human-centered design of health IT systems. In an effort to maintain and reuse this institutional knowledge, HFE has created a repository of work products central to optimizing users’ experiences with VA health IT...

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hour to provide their knowledge and field experience to staff from Human Factors Engineering (HFE) and software development design teams.

Our Cohorts

HFE hosts monthly information gathering sessions with clinical cohort participants. The group includes 49 members from different geographic locations throughout the Veterans Health Administration (VHA) who represent a variety of clinical roles (such as physician, nurse, pharmacist, dietitian and others), specialty areas (such as primary care, mental health, orthopedic, interventional radiology and more) and settings (inpatient, outpatient, emergency care). Because of this diversity, their feedback affords a broad perspective on subject matter, rather than limiting viewpoints from a specific, targeted user type. There are four sessions per month and each session has approximately four to 10 participants. The sessions are held at noon in each time zone, during the lunch hour, to avoid disrupting clinical schedules and promote attendance.

Some Background

HFE provides services for the development of the Enterprise Health Management Platform (eHMP), which is a web application that displays patient information and provides functionality to assist clinicians in the care of their patients. HFE created a technique to obtain feedback from clinicians on early wireframe designs created by the software development design team. The technique is called a Participatory Wireframe Review (PWR), and it is a combination of a group discussion and a usability walk-through (pluralistic, traditional and/or cognitive walk-through) of wireframe designs. The walk-through sessions are held remotely, using Adobe Connect™ for visual displays and the Veterans Affairs National Telecommunications System (VANTS) for audio. Each clinical cohort PWR session is led by an HFE facilitator and a support person, and attended by product development feature designers who listen, first-hand, to comments by participants and ultimately are able to make adjustments to the design iteratively and early enough in the Agile development process to benefit the end-users.

A New Technique

HFE recognized that the scope of the cohort sessions could be broadened by providing a venue for investigating clinical themes related to EHR modernization. Transitioning from wireframe reviews to definition work advances user involvement in design thinking and participation in prospective activities in which to gather data on clinical information needs, workflow and the context in which tasks are performed. The PWR technique was modified to create a Participatory Group Review (PGR) by eliminating the walk-through aspect of the session and focusing on a group discussion with cohort members. The feedback obtained in PGR sessions helps to answer some basic questions at the very beginning of the development cycle and assists with identifying best practices and understanding current challenges to using health information technology (HIT) systems. Analysis of the data yields concepts and evidence that are important for refining problem definition statements and developing objectives for further UCD activities. The data is combined with other sources of information for deeper analysis of a clinical theme.

Table 1. Clinical Themes with PGR Contributions

| Women's Health | Understand women's health issues and caring for women Veterans. Gather feedback related to four specific issues identified by the VA Women's Health organization. |
| Medication Management | Determine how changing health conditions affect medication management and identify medication management scenarios of use. |
| Preventative Health Screenings | Understand how providers think about preventative health screenings, identify priority health screenings and scenarios of use. |
| Patient Record Search | Identify clinical use scenarios and desired software attributes for searching within a patient’s EHR. |
| Finding Patient Information | Identify the specific patient information that clinicians spend time and effort in finding. |
| Finding Patient Information in Context | By clinical role, identify the specific patient information that clinicians need in context of six types of patient visits. For each of the six types, identify the order in which the desired information is needed or preferred. |
| Team Care | Gather user insights on how clinicians think about team care in their work. Learn about formal and informal teams to which they belong, communications with their peers, and how they work with other team members to provide patient care. Acquire knowledge of clinical information needs and scenarios of use. |
| Multi-Patient Board | Gather user insights on the topic of multi-patient boards (groups of patients that meet certain clinical criteria). Acquire knowledge of scenarios of use, as well as the existence of current tools for management of multiple patients. |
| Patient Discharge Follow-Up | Determine characteristics of a successful patient discharge follow-up. Identify medical conditions that necessitate medical discharge follow-up. Determine commonness, individuality, and ownership of the template forms used to capture information related to medical conditions. |
| Self-Alerts | Discuss needs and current solutions for keeping track of patient care related tasks that occur in the future (days, months, or years). Review tools commonly used in VA. |

**An Effective Outcome**

Our clinical cohort participants diligently offer their knowledge and experience to ensure proper decisions can be made and software suitable to their needs becomes available. While there are many variations of techniques to carry out user-centered design, a PWR and a PGR have significant usefulness. The former is a technique used to gather user reactions to specific wireframe designs; the latter serves to provide institutional knowledge and affords a context for creating user interface (UI) designs and/or performing an assessment of the usability and utility of a modernized EHR design. These user-centered design techniques deliver value for ensuring a modernized EHR is effective, efficient, satisfying and acceptable to users.
Natural Language Processing in Facilitating Language Awareness in System Design

Tim Arnold, PharmD, National Center for Patient Safety, Office of Quality, Safety and Value

When we design products, terminology selection can be a frustrating challenge. Words are often ambiguous, leading users to rely on contextual clues, when present, that may or may not disambiguate. Even with our best efforts, users may interpret language features differently. When this contributes to confusion or task excursion, we burden users and introduce uncertainty into the system. This can contribute to user dissatisfaction, inefficiency and patient safety risk. We must balance attempts to reduce ambiguity by introducing additional terminology, with system constraints and concerns over introducing clutter and confusion.

Language features are ubiquitous design elements in the health care environment that are present in patient safety alerts, signage, electronic interfaces, medication labels, clinical guidance and policies. Working through these tradeoffs in design, and deliberating over language features can be time consuming and tedious for design teams.

One rule of thumb in the field of human factors is to design systems that speak the user’s language. General interface design guidance and methods are available to plan for and evaluate language as a design feature. Examples include:

- Methods for facilitating conversational environments
- Word-burden reduction guidance
- Vocabulary development in conceptual modelling
- Standardized interface terminologies
- Context inquiry
- Ethnographic study
- Heuristic evaluations
- Pluralistic walkthroughs
- Usability evaluations

Conceptual modeling and ethnographic study are likely to facilitate language awareness early on, but often such awareness occurs later in the design process after major decisions have defined the path forward. This delay may make it more difficult to identify and rectify conceptual design issues and language features. Realistically, terminology selection is often left to design teams with little human factors expertise. When this is not the case and even with our best efforts to optimize design, we are sometimes left with products that contain confusing terminology or that are not successful in speaking the user's language.

When we are confronted with hard-to-answer questions, we often borrow ideas from other disciplines. Linguistics and natural language processing (NLP) are disciplines whose focus is on language. Methods in NLP and computational linguistics (CL) are widely used in the health care domain during research activities, for informing improvement efforts and clinical decision support systems. These methods are often used for assisting in and expediting information retrieval or supporting the identification and categorization of themes within narrative text. For example, McKnight (2012) describes the use of NLP methods in identifying and categorizing patient safety themes, and Reeves and colleagues (2013) describe the modification of a time tagger for meaningful temporal mapping of patient history events. Next, we will highlight how the confluence of NLP,
linguistics and the field of human factors can guide us in making decisions about language features in our products.

Can NLP methods be helpful for informing the selection of user-facing language features found throughout the design process? We have found NLP methods useful in facilitating language awareness in and in informing the selection of language features by design teams. What might this look like? First, we seek to identify sources of text that share similar language to that of the users, and the tasks that the product is being designed to support. Defining the domain and scope can also assist in identifying available text sources that are representative of the potential user’s vocabulary. These sources will often contain a hybrid collection from organic and controlled vocabularies. We seek to match these sources with the basic degree and depth of word- and vocabulary knowledge demonstrated by potential users.

Once a body of text has been identified and initially evaluated, a simple bag-of-words model, created by tokenizing the text and obtaining counts of words, can help give an overview of the common vocabulary. Articles, prepositions and pronouns, otherwise known as function words (e.g., “the,” “a,” “but”) can be excluded using a stop word list. This may be helpful for filtering and highlighting content words and their relationships, facilitating user- and domain-specific language awareness among design team members. This is not to discredit the power of function words; on the contrary, these words can be some of the most distinguishable lines of the fingerprints of language (Pennebaker, 2011). Stemming, spell correction, and other methods can also be used in preparing narrative text for further analysis; however, it is important to explore how these preparatory methods might influence downstream interpretation and understanding. A depiction of a word co-occurrence matrix (Figure 1) helps one visualize the interrelated nature and connectedness of words in a given body of text.
These are basic examples, but there are many approaches for generating models for exploring natural language patterns. Numerous books (e.g., Manning & Schütze, 1999; Jurafsky & Martin, 2008; Clark, Fox, & Lappin, 2013) and publications provide methods and techniques for processing and comparing natural language. Additional examples of language processing for informing design were shared during a discussion at a recent human factors conference (Arnold & Fuller, 2017). A conference attendee, colleague, and human computer interaction specialist said, “One of the hardest parts of interface design is deciding on the words or terminology,” and using NLP methods to inform selection offers a fresh and promising approach. Will this approach provide overall value? How can this approach be fine-tuned? What are the downsides? These are questions that can only be answered collectively and over time. So, first steps: further disseminate and describe this confluence with the hope the conversation will foster the recognition, revisiting and reshaping of this rich environment.

Lessons Learned from a Career in Patient Safety
Hasan Shanawani, MD, NCPS, Office of Quality, Safety and Value

We interviewed Jim Bagian, who was a physician, engineer, and former astronaut prior to founding the VA National Center for Patient Safety (NCPS) and serving as the VA’s first Chief Patient Safety Officer. We met him at his office at the University of Michigan, where he is director of the Center for Healthcare Engineering and Patient Safety. In the first part of this interview, we learned lessons about engineering and patient safety. In part two of this interview, HFQ editors Hasan Shanawani and Helen Fuller ask him about lessons he learned about the intersection of human factors engineering, system safety, innovation and individual behaviors.

Dr. Bagian commented:

“Culture is a manifestation of what you do. It’s a set of behaviors. What you do defines the culture, not the other way around.”

“We Never Did It” Doesn’t Mean We Can’t Do It

Dr. Bagian: In 40 years of working for the government, I learned that the system will allow you to do the right thing, if you have the will.

We wanted to build a process to purchase things based on merit. We didn’t want medical centers to buy things just on one person’s opinion without data to back that opinion. It needed to be evidence-based—let’s demonstrate a difference [between products] before picking one. We wanted to start usability testing before buying medical devices and equipment.

We first started looking at usability testing prior to purchasing, and we found VA had purchased an ambu-bag that was physically incapable of providing more than six breaths a minute. Now, while that’s OK for many patients, in some cases it’s not, and the providers had no other options. The purchasing people picked the bag off a list, and no testing was done—it was the cheapest bag. We wanted to set a new requirement, to
test the bags before allowing them for purchase, we wanted to test them in a number of hospitals and perform certain predetermined assessments.

We went back and forth with the purchasing people: We were told that testing and setting these standards was not something the government can do. “You’re not allowed to do that, you can’t do it,” they told NCPS. But I had 30 years of experience already working in government, and I knew that there were rules and regulations that allowed you to 1) Make exceptions to the local purchasing policies, and 2) That there were ways to assess products through in-use evaluation and testing as a condition of executing the entire buy. So we (at NCPS) became “experts” in the Federal Acquisition Regulations (FARs). We learned that what we were being told “was not allowed,” was just a statement indicating that the procurement folks had never done it that way before but it was allowed—there was a way to do it.

So we worked out ways to do usability testing, and then we were able to become part of the integrated product teams (IPTs) that reviewed products prior to putting them on a national contract. Soon, we were sending people to the IPTs, and it got to a point where they would insist that NCPS folks participated before purchasing decisions were made. They saw a lot of value in our engineering and human factors input, and they could execute more prudent purchases because we gave them a way to avoid buying poorly performing equipment, something that was hard to maintain, or something that didn’t work the way we thought it did.

Once, there was a device contract that would have cost millions of dollars. We did usability testing, but another federal agency didn’t—and they ended up buying millions of dollars of equipment they couldn’t use. Hence, we were able to show our value—our HFE usability tools brought a completely different way of looking at the purchasing process.

When Leading Change, Test Your Ideas with the Right Audiences

Dr. Bagian: When making the case for changes in process or design, you need to remember: everyone you’re speaking to has different motivations and interests — that’s a key part of leading change and device testing. Everyone doesn’t have the same needs or requirements. One person is thinking money and cost, rate of return, budget. You have advocates making sure the Veterans are happy and well cared for. You have the doctors who want to do the procedure a certain way.

They all are appropriate and have a place—and you need to speak to all of them when making the case. Cost, patient satisfaction, ease of use—these are all important needs that must be addressed, or you won’t get the support you need.

So when you’re considering a major change, there are three key steps you need to consider. The first one is to have really thought out the problem you’re trying to fix, to develop solutions, and to have tests for your solutions.

Next, when you’re thinking your problem through, go to the nay-sayers first. Your friends, even if they think it’s a good idea, may be too polite to tell you the problems with your idea—that’s not helpful. Go to the ones that will tell you, “Your baby is ugly,” they’re the ones you need to talk to first. They aren’t necessarily your friends. They will tell you your idea is stupid, it’s wrong. You don’t have to agree with what the naysayers say. But you DO need to hear what they say. Ask—is what they are saying valid? Have you considered fully their fears and concerns? You need to get unvarnished, critical assessments, and not let your feelings get hurt.

Finally, when you’re ready to pilot-test your idea or product, you get the volunteers who
really support the idea—the ones who are enthusiastic and want to put their best foot forward. If it doesn’t work with these folks who are motivated, you know that you have substantial problems that need correction and you have learned something. If it works with the most enthusiastic people, it doesn’t mean that it is feasible, but just that it is possible. That’s important, because it refutes the prior claims by those who had maintained from the get-go that it was impossible. You still need to move on to the next phase of roll-out where you complete pilot testing to make sure that the typical user can implement successfully - but at least you can show now that it isn’t impossible.

You listened to the nay-sayers who said your idea won’t work, and you tested your idea with people and showed that it can. Once you show something is possible, that is a big step for new designs, new processes, new ideas, and then finally testing it with less interested people. Whenever we tried to change the culture of safety in VA, this was how we rolled out every new endeavor.

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**Always Wear Your Safety Glasses**

**Dr. Bagian:** My dad managed a pipefitting shop, and he didn’t just look at how his folks did their jobs, but how his behavior affected everyone else on the job, and vice versa. Are we leading by example to enhance everyone’s safety?

I remember once I was about seven years old, and it was the weekend and I was going with him to the Navy shipyard. As we’re walking in, one of the other workers wasn’t wearing safety glasses, and he sees my dad and jumps and puts them on. All my dad does is look at him and does this [he makes a gesture and taps his glasses].

A little later as I was walking with my dad into the shop, my dad turns to me and says “put on your safety glasses.” I say “Dad, no one’s even working!” and he looks at me and just says, “In the shop, we wear our safety glasses. You put on a hard hat and safety glasses.”

When my dad took over the shop, the team workers were losing, on average, one eye or two a year—all due to someone not wearing their safety glasses. That’s absolutely avoidable. The solution was for people to wear their glasses—there was no other way to reduce the hazard at the time. So it became important—we don’t want anyone going blind, so you will wear your glasses. There were rules—One warning. The 2nd time you didn’t wear them, you were suspended. And the 3rd time, you didn’t work there anymore. It was that important. People who don’t wear their glasses were a risk to themselves and everyone around them.

So there were signs, and policies, but the best way was to make it a habit. My dad said he agreed—that day, the risk of eye injury was probably nil. But it needs to always be enforced; it needed to be a habit. He said that “my son will not be seen walking through here without glasses,” because if the rule doesn’t apply to the boss’s son, it can’t be applied to my men. Actions speak louder than words and leaders must always be mindful that people pay attention to the actions of their leaders.

One example is the pre-surgical briefing. We showed that an incorrect surgical procedure (commonly but incorrectly and over-simplistically referred to as wrong site surgery) never happened EXCEPT with flagrant non-observance of the five steps. The process, under most circumstances, was triply redundant—so for an incorrect surgery to occur, you had to ignore at least three of the five steps. That’s a robust system. We had six years of data that showed adverse events of this nature only happened when the team flagrantly ignored multiple steps of the pre-procedural checklist—that’s intentionally unsafe. Intentionally unsafe acts are rare but when they occur, individually directed corrective action may be indicated in addition to more broadly applicable
systems-based interventions. Leadership can’t and shouldn’t ignore that leading by example and addressing personal performance issues are management responsibilities in addition to and apart from safety-based interventions.

Good human factors engineering and a safety philosophy recognize individual responsibility, not just for your limited role in a process, but the entire process itself, and for the team’s success. Sometimes, we can’t engineer mechanical solutions to problems. Solutions aren’t just technical. They can be how people interact with one another, barriers to implementation, workflow or hours in the day. Sometimes it’s just, “Wash your hands and put on your safety glasses.”

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**Developing the Most Effective Clinical Scenarios for Usability Testing**

*Jane Robbins, Kurt Ruark, Ross Speir, Ashley Cook, Danielle Hoover, MD, and Abigail Noonan, HFE, OIIG*

**Background**

The range of health information technology (HIT) software at VHA includes websites, Computerized Patient Record System (CPRS) templates, and commercial off the shelf (COTS) products and mobile applications, any of which could be part of an electronic health record (EHR) system. Usability testing is an effective method used at VHA to determine how efficiently and effectively users can accomplish tasks with HIT systems. In a usability test, participants who represent actual users carry out key tasks within HIT system, so an essential component of the usability test is the sequencing of tasks described within the context of a scenario, or the setting in which the test takes place. Testing with realistic and carefully crafted scenarios is important to evaluate any HIT system, but it’s particularly important to test the usability of systems intended for clinicians.

Well-crafted scenarios are critical because user tasks must be clearly understood by clinicians participating in the usability test. Scenarios also need to convey contextual details of the tasks, such as the clinical environment in which tasks will be carried out. This paper reviews some lessons learned for creating clinical scenarios from the HFE team.

Keeping clinician participants such as doctors, nurses, and psychologists motivated – first to agree to participate in usability testing and then to complete tasks during testing – is sometimes a challenge, because they are extremely busy and focused on their patient workload. Scenarios must be written broadly enough to cover differing processes at VA Medical Centers (or different ways that individual clinicians practice medicine), yet granular enough to address the choices being tested. Additionally, the task descriptions and data used must be realistic.

Best practices for writing scenarios include setting the context of the clinical setting, stating the patient’s situation briefly but completely, and explaining the treatment plan activities and tasks in a logical order. Scenarios should be written in clear, unambiguous language without extraneous information, unless including distractions or clinical alerts is the specific intent of the testing. Practitioners should follow best practices to develop effective scenarios for their clinician-facing usability studies.

**Guidelines for Crafting Scenarios**
**Provide Context.** Quickly provide context of use within the scenario. Ideally, each scenario should be no more than a few sentences long, to enable clinicians to retain the information as they complete tasks. However, for Electronic Health Record (EHR) testing, sometimes it is necessary to provide a more detailed scenario. Providing contextual information for a task that is medically consistent and/or a likely patient issue is essential to prevent the clinician from focusing on the inconsistency rather than on the task.

**Granularity.** In writing usability testing task scenarios, provide the proper level of context and detail for the task for every type of participant, especially for clinicians, who typically make decisions based on a complex set of patient data. If not enough information is given in the task description, participants may fall into clinical decision-making mode, rather than paying attention to the task that they have been asked to perform. Alternatively, they may “guess” at the task goal, possibly invalidating the results. On the other hand, if there is too much information about the task or patient involved, the participant may be distracted by their medical opinion of the patient.

**Task Instructions.** Directly instruct the clinician to disregard clinical decision-making and instead focus on how they would perform the task. Straightforwardly stating tasks in clear and easily readable language that highlights that the task is not a medical decision point is important. Direct language is ideal, such as: “You have a 45-year-old male patient with Type 1 diabetes. Task: Use the template to order a blood test for A1C.” This also reinforces the need to perform the task within the scenario and not make a clinical diagnosis. Also ensure that the participant has been told what to do if an error is encountered, to make the task as realistic as possible.

**Range of Scenarios.** Consider developing scenarios that cover both common and uncommon scenarios, (such as edge cases), especially if those scenarios are safety-related (Wiklun, Kendler, Hochberg & Weinger, 2015). It is important to test the main functionality of the software, but the test should also include one or more scenarios or tasks related to less common items, to more fully exercise the software. Although these recommendations are made for EHRs by the National Institute of Standards and Technology (NIST), they easily apply to most healthcare systems and applications.

**Flow & Order.** Another consideration to keep in mind is to organize the tasks in a logical flow that is true to the interface to make the scenario more realistic for the clinician. Additionally, design the scenario to put tasks that are more likely to be complex and lead to failure at the end of the test. This will help ensure that the clinician does not get discouraged and acquire a negative bias for later tasks in the session (User Testing, 2017, p. 9).

**Participant Information.** The National Institute of Standards and Technology (NIST) suggests avoiding directing participants to learning aids or other information that would not be available to a user in the real world (Wiklun et al., 2015, p. 42). However for some scenarios, allowing use of references may be beneficial, since they could be present in the participant’s natural setting. For extremely complex scenarios and/or testing done remotely, sending the scenarios and/or tasks ahead of time to participants may be helpful so that they can be printed out and used during the testing. However, this is advisable only for complex scenarios or those employing an application with which clinician participants are unfamiliar.

**Workflow & Care Types.** Scenarios should test multiple categories of patient care that the clinician is likely to encounter using an application. For an EHR, these categories can include “acute episodes, treatment of chronic conditions and recommended preventative and health promotion activities” (Armijo, McDonnell and Werner, 2009, p. 6). Further, NIST recommends investigating users’ workflows, cognitive task requirements and mental models. (Wiklun et al., 2015, p. 110). An example of the environmental aspects
of the clinical and patient flow from Armijo, McDonnell and Werner (2009, p. 36) is shown below.

![Diagram of EHR System Boundary](image)

**Figure 2. An example of a new or unrelated symptom use case (from Armijo, McDonnell & Werner 2009, p. 36)**

**Personas.** Use personas as representative profiles of patients or fellow clinicians. If there are established personas available and they are appropriate to the testing, using them as empathetic references for patients or clinicians (in an interactive situation) is desirable. This allows persona stories to be built out and provides realistic patients for participants to work with, since personas are based on behavioral data for the user group.

**Stressors.** The practitioner may consider incorporating stressors and alerts into scenarios or tasks. In today’s busy clinical environment, “the form and timing of information presentation must respect the risks of break-in-task and loss of activation events that can be caused by introducing competing tasks and distracting information into the already-saturated workflow” (Armijo, McDonnell & Werner, 2009, p. 10). This allows a more realistic environment for completion of clinical tasks, but it may tend to distract participants from their focus on the test scenario. Some applications may need to be tested under stressors, for patient safety reasons inherent to that clinical software.

**Scenario Reviews**

**Clinical Subject Matter Experts (SMEs).** After the usability practitioner drafts scenarios, they should be reviewed by one or more clinical SMEs, often the sponsors for the project. If the SME is not familiar with the project, the practitioner must clearly establish and communicate the goals of the testing so the SME can properly evaluate the scenarios. Additionally, the clinical SME should be representative of the test participants to help ensure that clinical terminology and accuracy is appropriate for the planned test participants. For example, some terms that are familiar to medical specialists may not be known by primary care providers (PCPs).

**Drafting Scenarios.** Procedurally, if the SME is familiar with the project, it may be optimal for him/her to draft the scenarios first and then send them to the human factors
practitioner. If the project sponsor is not an SME, one or more clinicians must be recruited to assess the scenarios for realism and medical accuracy, because participants may be unable to focus on the task because of data or workflow dissonance.

**Tasks and Data**

Once scenarios have been developed, the usability testing team must create descriptions that outline the tasks that testing participants will perform. Multiple tasks can be written for a single scenario, or each task can have its own scenario.

**Conclusions**

Realistic usability test scenarios are essential to evaluating how a proposed health IT system design will support clinicians in carrying out tasks effectively and efficiently. A well-crafted scenario will capture and maintain participants’ focus, enable the participant to understand the goal and underlying tasks necessary to achieve that goal, allow usability engineers to measure task performance and help the project team improve the usability of health IT designs. Using the scenario best practices described in this paper should greatly improve the quality of scenarios for clinicians and thereby provide insightful usability data about the application being tested.

For more detailed information on this topic, along with examples of scenarios, consult the **UX Guide section on scenarios**.

**References**


HFE Has Created a Repository of Human-Centered Design Guides for VA health IT

Ross Speir, HFE, OIIG

For the past several years, HFE has supported numerous health IT projects representing a wide range of technologies. Over this time,
HFE has accumulated much knowledge and created many documents related to human-centered design of health IT systems. In an effort to maintain and reuse this institutional knowledge, HFE has created a repository of work products central to optimizing users’ experiences with VA health IT.

The User Experience (UX) Guide, created by advocates from several VA organizations, supports the human-centered approach to health IT system design, development, and deployment. Examples of current content include:

- Interaction Design Principles culled from human factors literature,
- User Personas created with and validated by actual clinicians and Veterans, and
- Clinical Scenarios that describe various aspects of work in VA Medical Centers

With the recent release of the Beta version, the UX Guide Working Group is eager to hear feedback and recommendations from individuals involved in VA health IT design, development, and/or implementation. Please visit the UX Guide site, explore the content, and then Contact Us with your suggestions for improvement. We are optimistic this will become a useful institutional resource and we look forward to hearing your thoughts!