Usability and VHA’s Human Factors Program

Presentation to:
HIMSS Usability Task Force

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Agenda

• Context
  Jim Demetriades
• Point-of-Care Information Technology (IT) Device Program
  Donna Harrigan-Thrailkill
• Interface Design program
  Nancy Wilck
• Usability Testing & Assessment
  Ross Speir
The Need for Usable Information Systems

• **Users:**
  – Over 6 million unique patients treated last year
  – 68,000 clinicians work at over 1,400 points of care
  – 36,000 physician residents and 25,000 medical students receive training each year

• **Information:**
  – Patient records: 23.4 million
  – Clinical Documents: 1.74 billion + 1.1 million per day

• **Activity:**
  – Physician orders: 2.85 billion + 1.4 million per day
  – Average “cover sheet pulls” per hour: 220,932
Emerging of a Human Factors Program

Emerging Health Technologies Chartered
First Visual Modeling pilot assessment
Cognitive Engineer recruited
Exploratorium and Participatory Design rooms available

2006*
2007
2008
2009
2010
2011

Point of Care IT Device Assessment Program operational
User Interface Design Program initiated
User Experience Program initiated
User Experience Labs Operational

Human Factors Program formally established!

*Informal efforts prior to 2006
User eXperience (UX) Program

Mission
• Partner with Veterans and clinicians to optimize the user experience with VHA health information systems
• Develop capabilities to provide a broad range of UX services tailored to the specific needs of VHA program offices

Areas of Support
• UX Toolset
• UX Reference Repository
• UX Service Offerings
Point of Care IT Device Program

Donna Harrigan-Thrailkill
VHA Technology in Context Model
Point of Care IT Performance Measures

Clinician Productivity
- Speed & Efficiency
- Mobility

Patient/ Clinician Relationship
- Patient Satisfaction
- Interference

Patient Safety
- Accuracy
- Decision Making
- Spread of Contaminant

Clinician Satisfaction
- Technology “Feel”
- Use in Setting
- Use in Task Performance

Quality of Care
- Task Performance
- Clinical Care

Privacy / Security
- Confidentiality
Driven by a Clinician Advisory Council

• Guide the point-of-care project by rank ordering technologies for investigation

• Provide consultation on appropriate clinical settings, roles and tasks for selected technologies
Methodology

• Literature Reviews
  – Case studies
• User Reviews
  – Clinician testimonials of use in the field
• Formal Evaluations
  – Exploratory
  – Experimental
Recent Work Examples

• User Review: Speech to Text
  – Particular strengths included “faster data entry” and increased “efficiency of documentation”

• Formal Evaluation: Touch Pad
  – When asked to identify the main strengths of the technology, portability was the most popular response
  – Nearly everyone agreed that it was easy to use and had the potential to improve the speed and efficiency of a clinician’s work

• Formal Evaluation: Multiple Monitors
  – Technology makes it easy to view and use multiple applications
  – Can become productive quickly using this technology

Note: Results are not intended for generalization
Interface Design Program

Nancy Wilck
User Interface Simulation - What

- Put users in “driver’s seat” by engaging them directly in designing applications
- Use visual simulation modeling tool to design real-time, interactive sessions
- Have used to redesign existing applications and design new ones
- Have used for conventional screens and mobile devices
- Models provide developers with a set of visual requirements
User Interface Simulation - Approach

- Work with 25-40 users in 4-5 sessions to model conceptual designs
- Conduct usability testing to give users hands-on exposure to designs
- Explore usability issues further in validation sessions
- Have users interact further with models in repository; use electronic “sticky note” to provide additional feedback
User Interface Simulation – Lessons Learned

- Ease of use is critical
- Users appreciate being asked for input
- Know your audience when determining the type of design sessions to use (face-to-face or virtual, one-on-one or group) and their length
- Agree on design principles before beginning to model
- Provide scripts to guide users through independent review of models
- Build in usability assessments, particularly in conceptual design phase
Usability Testing and Assessment

Current Services Performed (focus on usability testing and assessment)

• Technology Adoption Study (early adopters)
• Exploratory Study (device-in-context assessment)
• Prototype Assessment (touch tablet app)
• Formative Usability Testing (Electronic Health Record [EHR] clinical reminders, hospital quality measures Website)
• Summative Usability Testing (EHR clinical reminders)
Usability Testing and Assessment

UX Lab approach to service provisioning

• **Customer-centric:** Clinicians have ownership of their user experience with health IT

• **Agile:** Methods and offerings are tailored to unique needs of clinical programs

• **Adaptive:** Offerings are streamlined and Release of Information (ROI) assessed to develop a scalable service
**Usability Testing and Assessment**

**Customer-centric**: Clinicians have ownership of their user experience with health IT

**Prior to the Study**
- Articulation of user experience objectives
- Specification of test objectives (expected generalization of test results)

<table>
<thead>
<tr>
<th><strong>Users</strong></th>
<th><strong>Tasks</strong></th>
<th><strong>Contexts</strong></th>
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</thead>
<tbody>
<tr>
<td>Clinical Role (physician, nurse, patient, family member)</td>
<td>Frequent tasks</td>
<td>Clinical environment (inpatient, outpatient, on-call, home-based care)</td>
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<tr>
<td>Clinical experience (specialty, years of practice)</td>
<td>Complex scenarios</td>
<td>Site type (large integrated facility, small clinic)</td>
</tr>
<tr>
<td>Technology experience (early adopter, tech novice)</td>
<td>Critical functionality</td>
<td>Patient type (episodic symptom, chronic condition, misdiagnosis)</td>
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Customer-centric: Clinicians have ownership of their user experience with health IT

After the study

• Trade-offs associated with conflicting usability objectives (speed vs. error reduction)

• Acceptable risk mitigation strategy for addressing usability problems

• Trade-off associated with addressing minor issues in a redesign and getting the template into the field more quickly
Usability Testing and Assessment

Agile: Methods and offerings are tailored to unique needs of clinical programs

Confidence
- In user performance measures
- In uncovering critical usability problems

Effort
- Planning, preparation
- Clinicians as test participants
- Data analysis and interpretation

Formative testing (iterative process of design, test, redesign)

Summative testing (statistical validation of user performance measures)
Usability Testing and Assessment

**Adaptive:** Offerings are streamlined and ROI assessed to develop a scalable service

**Example:** Usability Engineering for Clinical Reminder Dialogue Templates
- National release process for Clinical Reminder Dialogues
- Memo to VA Informatics Committee
- UX Lab test environment/local hospital test environment
- Management and tracking of usability findings
Usability Testing – Lessons Learned

• Strategy for implementing usability engineering: Work backwards through the design process (testing → design → analysis)
• Have customers clearly articulate experience objectives and test objectives
  – Forces customers to specify design criteria in a way that can be measured
  – Set expectations about the test deliverable. Request process is an articulation of user experience requirements.
• Use of test confederate as a patient enhances scenario context in evaluations at point-of-care
• Remote testing can be carried out with situated context
• Be prepared to address findings related to clinical workflow and practices
Contact Information

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UX Labs

UX Lab methods provide usability assessments throughout the health IT design lifecycle

- User participation in the evaluation of early software design concepts
- Examination of emerging technologies for feasibility and ‘fit’ in the clinical environment
- Rapid user-centered design process of iterative testing, design, and re-testing
- Validation of system design against usability and user performance criteria
UX Labs

Systems-based approach to health IT assessment and usability testing.

- Multi-participant studies for assessing care team collaboration and clinician/patient communication
- Simulation of various clinical environments to incorporate clinical workflow into design and assessment activities
- Simulation of Veteran home environment for assessing home-telehealth products and software