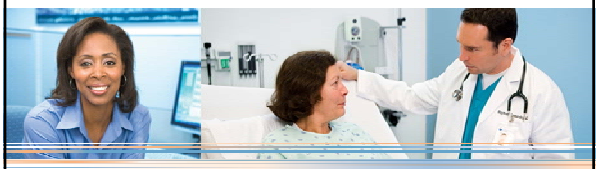
User Research in Clinical Settings



Tricks and Techniques for Getting The Best Requirements

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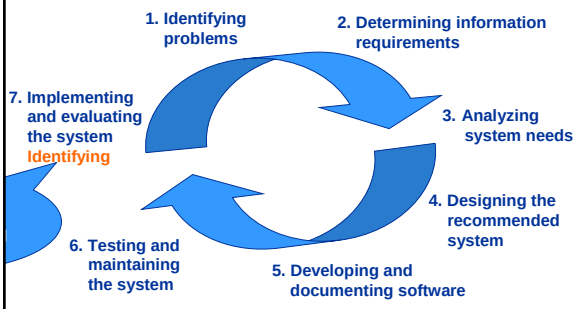
Systems Development Life Cycle (SDLC)



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Why? Unintended Consequences

- New/More Work for Clinicians
- Unfavorable Workflow Issues
- Never Ending Demands for System Changes
- Problems Related to Paper Persistence
- Untoward Changes in Communication Patterns
- Negative Emotions
- Generation of New Kinds of Errors
- Unexpected and Unintended Changes in Institutional Power Structure
- Overdependence on Technology

Campbell, Sittig, Ash, Guappone, & Dykstra, 2006
Ash, Sittig, Poon, Guappone, Campbell & Dykstra, 2007

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The Basics

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Preparation

- Identifying observational goal(s): writing the Research Question(s)
  - Define the problems as exactly as possible – narrow the scope of the question
    - Doesn't have to be the whole project's goals
  - Try to state the problem as a question: "How are Nurses and Respiratory Therapists organizing their medications when administering to a patient?"
  - Keep the question open, but answerable
  - Multiple questions are acceptable, but keep it to a scope you can remember

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Preparation

- Identify your team
  - Groups should be one to two people – more becomes intrusive.
  - If you must bring more people, then try to schedule them on separate units in pairs
  - Experienced Clinicians should always accompany non-clinicians
  - Beware of the team being from within the environment being observed – may affect the results

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Preparation

- Forms that might be helpful
  - Site Visit Planning Document
  - Cover Page with Checklists
  - Observational Record
  - Department Physical Inventory
  - Letter of Introduction
  - Clinician Questionnaire & Cover Letter
  - Clinician Guided Interview
  - Photography Release Form
  - Business Cards

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Preparation

- Permissions from executives
  - There should be an executive sponsor from all involved parties – Facilities, Vendors, Schools, etc.
  - Be very clear about the goals for the research.
  - If true observation is desired, this must be stated and it must be clear that interviews in conference rooms will not suffice.
  - All executives should be informed and approve
  - If photography is desired, it is critical to make this clear at the outset. Explicit executive approval for photography is always required.
  - Institutional Review Board approval is required if publication is a goal

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Preparation

- Communication with the hospital
  - Send advance notice documents at least one week prior to arrival.
    - If you plan to be pervasive in any way, two or more warnings is probably a good idea.
  - You may have to depend on hospital resources to distribute your message about observing
    - Pick someone you can count on
    - Ideally this person will benefit from the research.

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Preparation

- Gather Intelligence on the Hospital
  - Find out about the enterprise
    - Is it multi facility?
    - What kind of population does it serve?
    - How do nurses & doctors interact?
    - Any significant events for the hospital?
  - Try to find out the history of the facility's experience with the process you are observing
    - Is clinical systems implementation process new to the environment?
    - Do the staff have assumptions that you should be aware of?
      - May skew the observed data

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Preparation

- Resources for Preparatory Research
  - Arrange meetings with key personnel within the IT environment
  - Understand the Enterprise Resource Plan for the system being observed

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Etiquette

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Etiquette

- Dress appropriately
  - no jeans or sneakers; business casual; Picture ID is required!
  - Ask the local staff what dress is most appropriate
  - Be careful about wearing the right clothing underneath required safety garb – can get very warm!
  - Comfy shoes for all-day standing
  - Pockets are essential – consider a fanny pack or small purse
- Essential To Have
  - Appropriate Writing Surface/Notebook
  - Water
  - Phone (but it may have to be off)
  - Cash for food

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Etiquette

Introductions

- Let the local staff know you're on the unit
  - Talk to the Charge Nurse
- Introduce yourself to any curious staff, patients or visitors
  - Explain your mission
- Take extra time to discuss any time a staff member looks anxious or concerned
  - It's their house

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Etiquette

Normal observational behavior

- Your Role: Complete Observer
  - You won't participate in the work; just watching
- Lurk, don't Hover
  - Try to remain in the background
  - Never interrupt a conversation or task unless someone is about to get hurt

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Etiquette

- If staff or patients ask you what you're doing or what you're writing,
  - Be open about exactly what you're doing.
  - Show them your notes; give them your business card
  - Reassure them that no patient or staff identities are captured and that it's all about the tasks, not the person.
  - Use judgment in telling them your complete mission
  - Be ready to accept any and all criticism of any aspect of any software or process and to pass it on to the appropriate resource

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Etiquette

Avoiding the Hawthorne Effect (Observer Effect)

- The Hawthorne Effect is a form of reactivity, and describes a temporary change to behavior or performance in response to a change in the environmental conditions, with the response being typically an improvement.
  - The term was coined in 1955 by Henry A. Landsberger when analyzing older experiments from 1924-1932 at the Hawthorne Works (outside Chicago).
  - Landsberger defined the *Hawthorne effect* as: a short-term improvement caused by observing worker performance.
- Try to remain in the background
- Note when it's obvious that the user or patient are affected by your presence – and back off!

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Etiquette

- Speak the Local Language
  - Find out the terms local personnel use for software and processes
- Prepare for the unexpected
  - Be ready to change plans on the fly should hospital operations negate your first plan
  - Sometimes staff are too resistant in some nursing units – go to another one

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Etiquette

Photo-taking

- A picture is worth 1,000 words – TRUE
  - Commonly attributed to Confucius
  - More accurately attributed to Fred R Barnard, Advertising Man, in 1921.
- Always ask permission when taking pictures of personnel
  - Is a form required by the hospital?
- Never take pictures of patients' faces
  - get permission and a release if you do
- Avoid photos of personal information, but do it if necessary. You should obtain permission to take such pictures on condition that they will be de-identified.
  - De-identified means that names or other unique identifiers cannot be read after working on the picture ('Smudge' tool in PhotoShop)
- Pictures of computer screens are OK, but screen shots from within the PC are better

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Etiquette

Patient privacy preservation

- Don't photograph patients in any identifiable way if possible
- Never write down a patient's actual name in your notes
- If reference is essential, try an alternative identifier, such as room/bed number

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Etiquette

Special Responsibilities for Experienced Clinicians

- Clinicians have an advantage and additional responsibility to use their historical knowledge of the domain to describe situations where software has imposed itself upon normal processes and thus changed it
  - For example: barcode med admin forces users to prep meds at the bedside, not the nurses station
- Clinicians should be at the ready to accompany non-clinicians and act as guides to the observed location.

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Etiquette

- Always deliver an executive summary report to the manager who approved the research
  - Half-page or less
  - State the goal and whether it was met.
  - Include the significant events that occurred.
  - Include any significant staff relationship findings.
  - Be prepared to write a scrubbed version for the observed unit(s)

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Note-taking and Artifact Collecting

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Note Taking and Artifact Collecting

Critical elements to capture in each observed behavior

- **Goal** – what is the observed person trying to accomplish?
- **Process** – how was it accomplished?
- **Result** – was the observed person successful? Why not if no?
- **Historical Context** (if applicable) – discuss any reasons you can ascertain for why the process is done that way

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Note Taking and Artifact Collecting

Artifacts

- Collect any forms or paper that you see in use
  - Best to ask staff for copies of forms that have been completed so you can see how they're actually used
  - Make it clear that the copy is de-identified
- Pictures are priceless when you can get them
- The hospital may have maps of the nursing unit
  - Could save some time in documenting the physical layout

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The Psychology of Design Interaction

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It's all about the **User Goals**

- Remember every observed task starts with a User Goal (or Goals)
- The user will attempt to achieve the goal – your job is to see whether the goal was met
  - Did the system support it well?
  - Is there a gap that we could fill with software?

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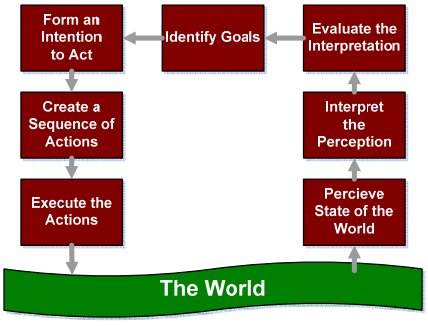
The Stages of Execution



Adapted from: Norman, D. (1988). The Design of Everyday Things. New York: Basic Books, Inc. Page 47

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Knowledge in the World vs. Knowledge in the Head

- Is the knowledge of the worker required and sufficient to cause the appropriately precise behavior? (Knowledge in the Head)
  - **Declarative Knowledge**: Basic domain knowledge
    - Easier to put to work
  - **Procedural Knowledge**: How to do it step-by-step
    - Much harder to retain and recall
- Could software help with better information? (Knowledge in the World)

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The Gulfs of Execution & Evaluation

- **Gulf of Execution:** Does the system provide actions that are appropriate to the goals of the User?
- **Gulf of Evaluation:** Does the system provide a physical representation that can be directly interpreted by the User as actions that meet his goals?
- Were processes interrupted or adversely affected by either of these "Gulfs"?
- Were there actions to meet the goals?
- Was there sufficient feedback from the system?

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Errors: Slips & Mistakes

Slips: subconscious actions that result in errors

- Slips usually occur during procedures we have memorized and don't think about at all
- Slips are the easiest to make but also the easiest to prevent

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Errors: Slips & Mistakes

Types of Slips:

- **Capture Errors**: taking one course of action that is similar to and more familiar than the desired course of action.
  - Example: putting the milk away in a kitchen cabinet instead of the fridge
- **Description Errors**: occur when two objects for action are similar in appearance and too close together.
  - Example: Two identical light switches that control different sets of lights
- **Data Driven Errors**: Data to take an action is known, but another similar piece of data interrupts the thought
  - Example: dialing a phone number while looking at a room number – the room number gets dialed
- **Associative Errors**: internal thoughts or associations that take the place of the intended action
  - Example: pick up the phone and yell "Come in!"
- **Loss-of-Activation Errors**: forgetting why you started to do something, then returning to a different task and realizing you have to complete what you forgot before you can start the next task.

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Errors: Slips & Mistakes

Mistakes: errors that result from conscious thought and decisions but still end up wrong.

- In most cases, the goal is incorrect and the action cannot possibly make up for the error.

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Conclusions

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Observational Research Essentials

- Prepare Carefully
- Communicate Thoroughly
- Stay Flexible
- Obtain Artifacts to support your observations
- Bring your results back and add them to the pool
- Capture **Goal**, **Process**, **Result** and **Context** in every observation
  - Identify Errors and Causes – Can software help?

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Questions?

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Bibliography

- Ash, Sittig, Poon, Guappone, Campbell & Dykstra. (2007). The Extent and Importance of Unintended Consequences Related to Computerized Provider Order Entry. *JAMIA*, 14(4), 415-423.
- Campbell, Sittig, Ash, Guappone, & Dykstra. (2006). Types of unintended consequences related to computerized provider order entry *JAMIA*, 13(5), 547-556.
- Cooper, A. (2003). The Origin of Personas. Retrieved August 20, 2008 from: [link]
- Cooper, A., Reimann, R., Cronin, D. *About face 3: The essentials of interaction design.* Indianapolis, IN: Wiley Publishing, Inc.
- Norman, D. (1988). *The Design of Everyday Things.* New York: Basic Books, Inc.
- Skodol-Wilson, H. (1985). *Research in Nursing.* Menlo Park, CA: Addison-Wesley Publishing Inc.

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