**OB****SERVATION: THE RICHEST HUMAN FACTORS ENGINEERING METHOD TO KNOW THE USER**

*Janey Barnes, PhD (BAC); Naomi Glasscock, PhD (Human Factors Engineering); Kurt Ruark, MBA (Human Factors Engineering*

A foundational principle associated with human factors engineering is “know the user, know the context of use, and know the user’s tasks and workflows.”

Sound familiar? That’s because in the last newsletter we wrote about fully understanding the underlying characteristics that define users who interact with a system, product, or service. As a reminder, the “Know the Users” article described characteristics that define representative end users, compared and contrasted representative end users with the typical user and “stand-ins” (e.g., super-users, subject matter experts (SMEs), and/or project stakeholders), and highlighted the importance of including representative users in requirements gathering, user research, and other data collection activities.

In order to design, build, buy, and/or implement a solution that meets end user needs, we must collect reliable and valid data from representative end users. We should aim to match the data collection sample to the known population of users. The greater the match between the sample and the known population of users, then the closer we will be to collecting reliable and valid data (i.e., truly knowing the end user). The greater the mismatch, then the greater the risk of collecting data that is neither reliable or valid (i.e., further from knowing the end user).

**What is Observation Research**

The richest data collection method to learn about the user, the user’s context of use, and the user’s actual tasks and workflows is direct, non-intrusive observations of representative users. Borrowing from ethnographic research used by anthropologists, sociologists, and psychologists, Observation Research falls along a continuum of “No Intervention and No Manipulation” to “Minimal Intervention and No Manipulation.” Observation Research ; involves watching the user doing his or her work in the actual workplace. Observation Research includes several related methods. Examples include naturalistic observation, ethnographic research, contextual observation, field research, observation and interview, and others. The goal of these Observation Research methods is to identify Socio-Technical Systems (STS) factors (e.g., people, processes, technology, policy, etc.) that impact the user and the user’s tasks. Observation is typically conducted early in the design, development, and/or acquisition process and is used to uncover pain points and unmet user needs, identify opportunities, and inform requirements.

**Planning Observation Research**

As with all research methods, a study plan is needed to define activities to ensure the research objectives are properly addressed. An Observation Research study plan describes who and where to observe, how many observations will take place, the level of detail to include in documenting the observations, and the data collection tools. An observation guide is created that outlines activities defined in the study plan and is used by the observer to facilitate each session and structure data collection. The best planned Observation Research includes familiarization and preparation on what to observe with contingency plans because unexpected situations always present during observations “in the wild.”

**Executing Observation Research**

Observation Research conducted in the context of user research is typically focused on a specific workflow or set of workflows for which teams are designing, developing, purchasing, and/or implementing a solution to support the user in his/her tasks. When executing Observation Research, the observer needs to be physically close enough to the user (and the work) to accurately see and hear but far enough away from the user (and the work) so as not to interfere with the user (and the work). The observer must guard against contributing to the user changing his/her behavior because the user is being observed (Hawthorne Effect).

The observer needs to invoke both a wide lens over space and time and a narrow lens within the workflows of interest. A wide lens over space includes observing the full environment. The observer must look all around the area where the work is taking place and document the STS factors that impact the user and the work. A wide lens over time includes observing the user before, during, and after the workflows of interest and documenting the STS factors that impact the workflows. A narrow lens over space is where much of the observation is focused right where the user working. A narrow lens over time is similar in that much of the observation is focused on documenting the STS factors during the time of the workflow of interest. Without a wide lens over space and time and a narrow lens within the workflows of interest, there will be gaps in the understanding of the user, the user’s context of use, and the user’s tasks and workflows.

During Observation Research the details of what the observer documents are dependent on the research objective. Examples of what observers document include the steps the user takes before, during and after the workflows of interest, sketches of the physical environment, notation of work aids (e.g., stickie notes on the computer monitor with work tips), identifying all the people (roles) with which a user interacts with during a workflow, and the time it takes the user to complete discrete tasks within a workflow.

Three common observation aids include video recording, the presence of subject matter experts, and a notebook. Observation Research is complex in that there is so much to observe and the users are expert in their domain. While tradeoffs and logistics must be considered, video recording during observation provides a means to document the user’s behavior and the environment for more detailed post-observation coding. If video recording is used during observation, it is important to note that consent must be obtained from all users being recorded and there is a higher risk that user behavior could be altered. Including a subject matter expert in the observation activity allows for deeper understanding of user behavior that many times is not evident to an observer lacking domain expertise. Having a notebook available during sessions offers a hard surface for writing or sketching and allows the observer to move freely in the environment if needed.

The various Observation Research methods (e.g., Naturalistic Observation, Contextual Observation, Observation and Interview, etc.) share the foundation of observing the user in their natural environment. The methods differ in terms of specific details associated with the research activity such as variability in structure of the observation, combining other research methods (e.g., interview) to augment the observation, and artifacts collected (e.g., forms, checklists, policies, etc.) Selection of the specific method(s) will be driven by the research objective, project timelines, budgets, and resources.

**What Do We Get from Observation Research?**

Data collected from Observation Research can be qualitative or quantitative based on the research objective and study plan. Even with an effective study plan, data compilation, coding, and analysis is time consuming. The ability to identify patterns and variability in the data require data manipulation and visualization.

Typical deliverables from Observation Research include personas (archetypes representing different users based on user characteristics), journey map (visualization of the interaction of users, sts factors, user needs and opportunities), documented use cases and workflows, system interaction maps (flow of information into and out of various technology systems), and user needs that result in user requirements.

**Observation Research: Barriers and Solutions**

Observation Research is rich data because it comes from observing what users actually do rather than what users say they do. However, it can be expensive in terms of time and money. Observation Research is frequently limited by travel funds and/or access to sites and users. Potential solutions to achieve observations include use of virtual technology, access to local facilities to limit travel needs, and use of resources within or local to a facility.

It is important to consider the cost-benefit trade-off when choosing Observation Research compared to other lab-based research methods. The further we are removed from direct, non-intrusive observation, the more we risk gathering data that do not represent the user’s work, do not represent the user’s need, and will not lead to reliable and valid information. Said a different way, the further we are removed from observation, the more we risk relying on work as recalled or imagined and not relying on the way work is actually done. Let’s optimize data collection so we truly know the user, know the context of use, and know the user’s tasks and workflows. To learn more about collecting qualitative and quantitative data through observation followed by interviews, visit the Human Factors Engineering SharePoint page.