## User Centered Design Methods

<table>
<thead>
<tr>
<th>UCD Method</th>
<th>Description</th>
<th># of Users</th>
<th>Pros and Cons</th>
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<td><strong>Empirical Methods</strong> (obtaining data directly from users through observations and interviews)</td>
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| **Card Sort**   | Items of information are written on individual index cards which are then sorted by users into categories according to predetermined criteria; users explain why they have categorized the items in a particular way | 10-20 users | (+) quick and cheap  
(-) challenging to capture results from a complex session  
(-) does not reveal interface problems |
| **Contextual Inquiry** | A specialized form of field study where designers and project team members visit actual users in their workplace to analyze their work habits, activities, flows, and environmental factors. | Varies (few-many)  | (+) provides an opportunity to see actual users perform their actual work in their actual environment  
(+/-) helpful in earliest stages of design for a new system or overhaul of an existing system  
(-) can be time-consuming and challenging to arrange  
(-) little structure to observations |
| **Focus Group** | Users participate in a facilitated discussion where they share their ideas and opinions about the system. Meet with groups until responses become repetitive | 6 - 10 users/group | (+) raises objections and insecurities regarding a system or its use that might not be discovered through other means  
(+/-) can generate large amounts of data in a relatively short time  
(-) requires an experienced facilitator  
(-) subject to ‘domination effect’ in which one participant sways the discussion to a single point of view  
(-) subject to known inconsistencies between what people will say in a group and what their actual behavior may be |
| **Interview**   | Interviewer asks semi-structured questions either face-to-face or by telephone. Those interviewed may include stakeholders, content experts, support staff, and users themselves. Both parties may choose to view a system online during part of the interview. | Varies (few-many) | (+) low-cost, direct way to gather data  
(+/-) effective for identifying users’ needs and opinions  
(-) will not reveal any information that subjects wish to remain hidden or that they do not consciously know  
(-) dependent on participant’s memory and willingness to contribute  
(-) can be challenging to schedule with busy users  
(-) can be challenging to both record data and facilitate the interview (audio-taped transcripts are recommended for long interviews) |
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| Log File Analysis           | User’s actions with a system are collected from server logs and examined later for usage patterns and potential problem areas. | None       | (+) provides a historical trace of usage traffic for a system  
(-)  quick, easy way to gather data on user behavior without having to actually recruit users.  
(-)  log files do not indicate why users made certain actions or avoided making others  
(-)  log files do not indicate if and how users recovered from errors |
| Paper Prototype Test        | Users try out a low fidelity version of the system, explaining their choices and interpretations as they use the system to complete given tasks. | 5-7 users/group | (+) cheap and fast to conduct  
(+)(+) allows quick testing of individual components of a software design without the investment of actual coding  
(+)(+) low fidelity encourages users to freely comment and suggest changes (unlike a polished product which may seem like it is already finished)  
(-)(-) it is de-contextualized; individual components should be tested again in the real product  
(-)(-) can be difficult to accommodate designs that offer users multiple paths |
| Survey                      | Users are asked a standard set of questions on paper, in person, by telephone, or by electronic mail. | Varies     | (+)(+) can gather data from many users quickly  
(-)(-) can be a challenge to develop a reliable instrument  
(-)(-) self-reporting may not be an accurate representation of user behavior  
(-)(-) dependent on users choosing to participate in the survey  
(-)(-) most valuable questions (open-ended) are often left unanswered |
| Task Analysis               | Through observation and/or interviews with both expert and novice users, designers identify all the steps required for users to reach their goal(s) using the system. | At least 5 users/group | (+)(+) can reveal new information that is exploitable in the software design (e.g. short cuts that expert users take)  
(-)(-) can be time consuming to carry out  
(-)(-) if not observing an expert user, you can inadvertently reproduce an inefficient way to complete a task  
(-)(-) if you do observe an expert user, you may not find out the problems specific to beginners |
| Usability Test (electronic prototype) | Users work with a computer prototype to perform given tasks. Evaluators and designers observe users’ performances and behaviors using the actual system to determine usability problems. Having users ‘think-aloud’ helps the observers understand the users’ actions. | 5-12 users | (+)(+) a small number of users can identify numerous problems in a relatively short amount of time  
(+)(+) finds more authentic problems than inspection methods  
(-)(-) user’s performance may be affected depending on the perceived unreality of the session, their nervousness, and the effect of being observed  
(-)(-) the meaningfulness of the data collected rests on the authenticity of the users and tasks involved  
(-)(-) time consuming to plan and analyze |
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<td><strong>Inspection Methods</strong> (means to obtain data indirectly from users, often referred to as <em>discount usability</em> methods)</td>
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| Expert Review       | Design experts examine the system or a prototype of it and comment in detail on its adherence to principles of good design based on their expertise. Multiple experts are recommended to increase the probability that they will identify the main problems. | 3-5        | (+) resolves some issues that users should not have to worry about in later usability testing  
(-) constrained by the expert’s knowledge of the audience for which the system is intended  
(-) not sufficient on its own (developers will not catch the same problems as users will) |
| Guided Walkthrough  | Facilitator leads a user through a representation of the system asking questions either during or after the walkthrough to gauge the user’s understanding of the system.                                                                 | Varies (few-many)  | (+) does not require a high-fidelity prototype  
(+), can reveal attitudes and expectations that the user might not otherwise express  
(-) must be conducted carefully to avoid accidentally leading users to conclusions or misinterpreting their actions  
(-) subjective point of view will keep developers from recognizing some problems  
(-) user performance may be affected by observation, nervousness, or other assessment factors |
| Heuristic Evaluation| A team of evaluators with HCI experience systematically apply a set of user-centered heuristics in order to evaluate the system. Multiple experts are recommended to increase the probability that they will identify the main problems.               | 3-5        | (+) inexpensive, quick, and easy way to identify usability problems  
(-) constrained by the evaluator’s knowledge of HCI and knowledge of the audience for which the system is designed  
(-) possible to identify usability problems that actually may not be a problem of the user  
(-) not sufficient on its own (developers will not catch the same problems as users will) |