Part I: Understanding Goal-Directed Design

When to test: Summative and formative evaluations

In his 1993 book *Usability Engineering*, Jakob Nielsen distinguished between summative evaluations, which are tests of completed products, and formative evaluations, conducted during design as part of an iterative process. This is an important distinction.

Summative evaluations are used in product comparisons, to identify problems prior to a redesign, and to investigate the causes of product returns and requests for training and support. Summative studies are generally conducted and thoroughly documented by professional, third-party evaluators. In some cases, particularly in competitive product comparisons, summative studies are designed to yield quantitative data that can be tested for statistical significance.

Unfortunately, summative evaluations are often used as part of the quality assurance process near the end of the development process. At this point, it’s usually too late to make meaningful design changes; that train has left the station. Design should be evaluated before the coding begins (or at least early enough that there is time to change the implementation as designs are adjusted). However, if you need to convince stakeholders or programmers that there *is* a usability problem with the current product, nothing beats watching real users struggle through basic tasks.

Formative evaluations do just this. These quick, qualitative tests are conducted during the design process, generally during the Refinement phase. When effectively devised and moderated, a formative evaluation opens a window to the user’s mind, allowing the designers to see how their target audience responds to the information and tools they’ve provided to help them accomplish their tasks.

Though summative evaluations have their uses, they are product- and program-management activities conducted to inform product lifecycle planning. They can be useful “disaster checks” during development, but the costs of changes at this point — in time, money, and morale — can be high. Formative evaluations are conducted in the service of design, during the design process.

Conducting formative usability tests

There are a wide variety of perspectives on how to conduct and interpret usability tests. Unfortunately, we’ve found that many of these approaches either presume to replace active design decision making, or are overly quantitative, resulting in non-actionable data about things like “time to task.” A good reference for usability testing methods that we’ve found to be compatible with Goal-Directed interaction design methods is *Testing Usability* by Shneiderman and Plaisant.
design methods is Carolyn Snyder’s *Paper Prototyping*. It doesn’t discuss every testing method or the relationship between testing and design, but it covers the fundamentals well and provides some relatively easy-to-use techniques for usability testing.

In brief, we’ve found the following to be essential components to successful formative usability tests:

- Test late enough in the process that there is a substantially concrete design to test, and early enough to allow adjustments in the design and implementation
- Test tasks and aspects of the user experience appropriate to the product at hand
- Recruit participants from the target population, using your personas as a guide
- Ask participants to perform explicitly defined tasks while thinking aloud
- Have participants interact directly with a low-tech prototype (except when testing specialized hardware where a paper prototype can’t reflect nuanced interactions)
- Moderate the sessions to identify issues and explore their causes
- Minimize bias by using a moderator who has not previously been involved in the project
- Focus on participant behaviors and their rationale
- Debrief with observers after tests are conducted to identify the reasons behind observed issues
- Involve designers throughout the study process

**Designer involvement in usability studies**

Misunderstanding between the designer and the user is a common cause of usability problems. Personas help designers understand their users’ goals, needs, and points of view, creating a foundation for effective communication. A usability study, by opening another window on the user’s mind, allows designers to see how their verbal, visual, and behavioral messages are received, and to learn what users intend when interacting with the designed affordances.

Designers (or, more broadly, design decision makers) are the primary consumers of usability study findings. Though few designers can moderate a session with sufficient neutrality, their involvement in the study planning, direct observation of study sessions, and participation in the analysis and problem-solving sessions are critical to a study’s success. We’ve found it important to involve designers in the following ways: