

UX Research in the Product Lifecycle

I incorporate how users work into the product early, frequently and iteratively throughout the development lifecycle. This means selecting from a suite of methods and tools based on the current set of constraints.

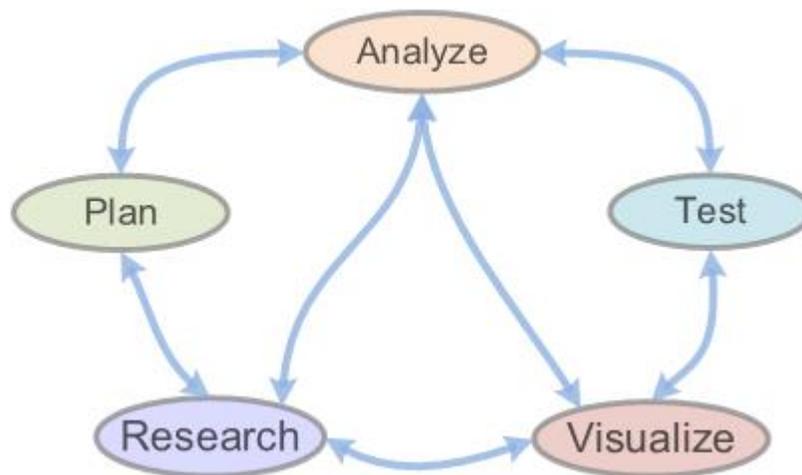
- Constraints can be anything: politics, time, money, access to users, product architecture, etc.
- The methods and tools are variety of observation, test and analysis techniques
- The results are an additional set of design criteria or constraints that should increase the match between users and the product.

Since UX research by and large means interacting with users, behavioral analysts (psychologists, anthropologists and sociologists, etc) often have the best underlying skill set in using the appropriate methods and tools. These skill sets with design experience enables a UX researcher to work the whole lifecycle. However, one of the bastions of strength is people skills - The better the people skills the easier to get users to tell you everything without telling them anything until after the evaluation.

The Basic Goal

The goal or intent of UX research is to provide the insights to designers that reduce market risk at product release.

The Usual Design and Development Process



UX research is basically concurrent engineering, conducting all phases in lockstep with the design and development phase. The process is to understand how users work, design to that understanding, then test whether the design fits the user.

- 1) user investigation followed by
- 2) concept formation and testing (focus groups or card sorting), then
- 3) evaluating mockups piecemeal as they get developed, then
- 4) more interactive evaluations with functional pieces until

5) conducting a more full blown test before the final push for product release.

6) After each evaluation cycle, time must be available to make changes otherwise what's the point.

As a basic rule of thumb, the further along in the development cycle, the more formal the representation needs to be of the user, the system and their interaction.

Understand

Work with customers to generate customer requirements. This user investigation should begin in tandem with marketing before development begins, which it rarely is and therefore it's usually a game of catch-up after that.

1. Contextual Inquiry
2. Ethnographic Analysis
3. User-Centered Interaction Analysis
4. Project Needs Assessment
5. Market Planning & Research

Design

1. Translate customer requirements into design requirements that developers can use.
2. Create visual and mental representations to model user's work flows.
3. Design User-Centered interactions
4. Prototype functional designs and visual design elements.

Test

Test usability throughout the product lifecycle and turn results into new user requirements.

Testing within a corporate environment must be very flexible to get data that's timely and valid. Even a simple test can introduce a fair bit of complexity and therefore can be very difficult to design and conduct in order to ensure valid results. You get what you ask for - literally!

The following list describes some of the major testing methods used throughout the lifecycle. Each one of these can be modified slightly to create the variety needed to meet the flexibility and complexity of corporate development demands. In all of the following, the reviewer uses experience that's grounded in the understanding of the user gained from a casual or in-depth user investigation (basically any available user knowledge).

None of these tests is very experimentally sound with respect to statistics. Usually just summary data (averages, modes, counts, and frequencies) and informal trend analysis provide the most useful data. (Similar to a cluster analysis - how do users' issues cluster and how variable are the issues). The primary analysis is finding where users converge or agree on issues and likes. The most statistically valid test would be the formal usability test.

Methods

Methods not requiring user involvement

These are good for early evaluations and/or evaluations with very little available time. These usually are the precursor to any additional testing since the reviewer uses this time to understand the product, but this can also introduce a bias that shows up in later tests.

1. Expert Review: Usability experts review designs based on experience without formal guidelines.
2. Heuristic Review: The same as expert review but includes one of several possible sets of guidelines (e.g., MS Windows 95 guidelines) that the user follows in addition to experience.
3. Guidelines or heuristic walkthrough: Use either an expert or heuristic review, but provide the reviewers use scenarios of user task and work flows created from the user investigations.
4. Cognitive walkthrough: An expert or heuristic review using scenarios of user task and work flows created from the user investigations that focuses on detailed actions and associated thought processes. This is complex and very time consuming. It usually results in a very good task analysis however.

Methods requiring user involvement.

These methods require more planning time to design, conduct and evaluate. They also need some sort of product representation, either a mockup and/or various levels of functioning code. The goal is to start getting subjective data (users preferences, likes and dis-likes) and performance data (time and accuracy).

During user tests, biases introduced during early reviews can show up here. They increase the probability that a tester may interpret results based on earlier personal findings from the review instead of completely from the user point of view. It can be mitigated by more data analysis and less data eyeballing.

Usability Inspection:

Scenarios and tasks provide the users with a task context appropriate to their work environment. Users remotely evaluate product mockups and then meet in groups to discuss their findings. This provides mostly subjective data but perhaps some performance data if the users are willing to record their own time and accuracy. This is usually not very reliable, since you can't assume similar evaluation environments. This can be used fairly early in the development cycle. It can be used to make design decisions and tradeoffs among design alternatives before choosing a more "final" design.

Usability Walkthrough:

This is very similar to an inspection. However, a functioning prototype or combination of a functional prototype and mockup is used. This can be useful during the middle of the development cycle.

Usability Test:

This is the most stringent test aimed at collecting both subjective and performance data in a controlled environment to minimize confounding variables and maximize the validity of the variables of interest (user interface attributes). Care must be taken to select the tasks most representative of the users and the business goals in order to create the scenarios that test the specific aspects of the

product interface. In the final analysis, the results must highlight the pro's and con's of the interface attributes of interest as well as provide an overall picture of the product's usability.

All of this and every other aspect of usability engineering depends on the quality of data collected - Garbage in, Garbage out! Therefore, a good data collection plan is paramount.

Data collection plan template

User requirement's data collection helps determine if design solutions meet customer needs.

1. The data collection plan defines a structure used to determine user requirements. The structure provides three major benefits for user requirements definition:
2. The structure maps project objectives to research objectives.
3. The structure guides data collection.
4. The structure outlines the user requirement's document.
5. The structure is composed of the following major components:

Problem statement <==> Project goals <==> Research objectives <==> Data requirements <==> Research methods <==> User samples

The data collection plan defines these components, establishes clear links among the components, and shows how they impact design solutions.

Plan Component	Definition of Component	Impact on Design Solutions
Problem Statement	What do customers need?	Is the need sufficiently clear to generate solutions?
Project Goals	What are the proposed solutions to the customers needs?	Do the solutions meet the needs?
Research Objectives	Purpose: What information, analyses and decisions are needed to support project goals? Scope: What needs to be clarified, defined, analyzed and recommended?	Is the support applicable to design? Are the research objectives too broad or too narrow to enable design solutions?
Data Requirements	Define: What data exists and what needs to be collected: Usability goals? User profiles? User tasks? User needs? Task scenarios? Justify: What is the purpose of the data requirements?	What are the Potential impacts? Is current information sufficient estimate impacts? How will potential impacts be estimated? Will new data help estimate impacts or guide design?
Research Methods	What are primary and secondary approaches to collect data?	How does the approach produce design relevant data?
User Samples	Relevant target groups? What are critical and frequent tasks? Routine and infrequent tasks?	Will the samples produce reliable and representative data that substantiate design?

Define Problem Statement

The problem statement succinctly states what has to be done by the project team for customers, so the customers can meet their business needs.

Determine Project Goals

Project goals state how the problem statement maps to design solutions. Based on current definition of the problem statement, specify the goals that have been drafted by the project team.

List all project goals

Clarify the project goals

1. Work with the project team to iteratively define project goals until everyone understands what results are expected from the project. The following questions can be asked to help clarify the goals:
 - a. Are the goals high-level goals that need to be further defined?
 - b. Are the goals narrow or broad in scope?
 - c. Can the project goals be easily re-written as objectives that can be measured?

Define Research Objectives

State purpose of research objectives and in general terms the behavioral assessments that human factors will provide to the project team.

List what questions the data should answer to support each of the project objectives. The answers should result in measurable human factors criteria for each goal which describe the specific data that needs to be collected or generated.

1. State scope of research objectives
2. Specify the major aspects of the human factors analysis of the project goals.
3. List general questions that do not support the project objectives. Specify the information decisions, hardware software and users that the research objectives will not focus on to meet the project objectives.

Define Data Requirements

Specify what data needs to be collected and determine existing user requirements data.

List all of the documents that contain information about user requirements that can be used to clarify project or research objectives, pinpoint relevant users, define task performance criteria, and highlight the information that needs to be collected. The following documents are relevant:

1. Market reports
2. Investigative reports
3. User manuals
4. User Requirements documents from similar projects
5. Service Requests
6. Sales response center printouts

Define new data to collect

1. Task lists What tasks are performed?
2. Task matrices: Who performs which tasks?
3. User profiles: How can users be described that highlight differences.
4. Task analysis: When are tasks performed and in what sequence? Which tasks are difficult and why? What is the baseline task performance and how does it change. How does performance change across users? What commands are used most often? Which commands are problematic?
5. Needs analysis: What do users say they need? What does user performance indicate they need? What does marketing say users need, and do they differ from what users do and say they need?
6. Information analysis: What information do users require to perform their tasks? What information aids or artifacts do users need?
7. Task scenarios: What is the environment or context in which tasks are performed?
8. Preference data: What do users say they like? How do their preferences map to their performance?
9. Usability goals: What are the targeted performance criteria and values?

Justify data collection

1. Describe how the new data potentially impacts design solutions?
2. Describe how to estimate the potential impact new data has on design solutions?

Define Research Methods

Using the data defined for data requirements, specify who will collect the data, how it will be collected and from whom it will be collected that ensures appropriate data sampling.

Primary data collection methods

List the data that needs to be collected from users or domain experts and describe how they support the research objectives.

Secondary data collection methods

List the data that can be collected from literature sources and describe how they support the research objectives.

Specify data collection procedures

List the steps that need to be taken to apply the methods, including:

1. The sequence of operations
2. How the data should be processed
3. When the data collection materials should be used.
4. What should be done if the data plan needs to be revised or alternate methods selected.
5. The level of detail to which data should be recorded.
6. The permissible interactions between data collector and subject
7. Any equipment that needs to be used

Define User Samples

Describe characteristics of users that operate the systems implicated by the problem statement.

1. List the customers that have expressed the needs that led to the problem statement. Differentiate between the customers and the end-users
2. List customers that might have similar needs. Review existing data documents to determine this (e.g, sales support lists, responses center lists).
3. Describe what is currently known about the differences among the customers that might be affected.
4. Select customers that seem to represent the differences. If possible, choose several customers for each of the apparent differences.

Determine design of user sample

Specify whether quantitative or qualitative data is required to meet the data requirements and what type of data will be collected from the lists of potential customers.