Choosing the right usability technique:

Getting the answers you need

A workshop for User Friendly 2008
Shenzhen, China

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1 | Goals for this workshop

There are many usability techniques, from heuristic reviews to remote testing. Each has its own advantages and requirements. Selecting the right techniques is critical to a successful project. That first decision affects the resources and budget needed, and can determine whether you can provide useful and effective information to improve a product.

This workshop is based on the assumption that there is not "one right way" to do usability. Instead, usability is a toolkit. Today, we're going to focus on the toolkit of techniques, and how they support the process of creating usable products.

It is also based on the assumption that usability is a critical part of technical communication, and a good set of usability techniques should be part of every technical communicator's toolkit.

What do we mean by "right"?

- The user experience toolkit
- Questions user experience techniques can answer

Choosing techniques

- Identifying techniques that meet our goals, match the stage of a project, and fit our resources

Putting it into practice

- Adjusting creatively to reality
- Understanding the political landscape

My goal is to provide some ways of thinking about usability, user experience that will help you get the most out of your usability and user experience activities.

2 | The user experience toolkit

There is not just one "correct" way to "do usability" (or to "do technical communication" for that matter).   Even focusing on the methods and techniques, there are still many decisions to be made about what activities are "the best."

surveys
problem reports
style guide and templates
card sorting
walkthroughs
workflow analysis
think-aloud protocols
task analysis
site logs
prototyping
rapid, iterative try-outs
of prototypes with users
scenarios
personas
expert review;
heuristic evaluation
watching, listening
to, and talking with
users as they work
summative usability
testing

Each usability technique can answer some kind of questions better than others.

The "right technique" is the one that lets you achieve your goal, and which you can accomplish in your current situation.

What tools from the toolkit do we use?
Let's start with what tools the people in this room use.

Which of these tools have you used at least once in the past year?

- ❑ Informal usability testing (not in a lab)
- ❑ Formal usability testing (in a lab)
- ❑ Heuristic / expert reviews
- ❑ Personas & user profiles
- ❑ User interviews
- ❑ Contextual inquiry / ethnography
- ❑ Requirements gathering (any technique)
- ❑ Task analysis
- ❑ Focus groups
- ❑ Competitive benchmarking
- ❑ Remote usability testing
- ❑ Eye tracking
- ❑ Accessibility reviews and testing
- ❑ Card sorting
- ❑ Surveys
- ❑ Analyze web metrics

What are the most popular techniques?

A survey in late 2007, of over 1500 people in usability, information architecture and technical communication asked what tools they used in their work on a regular basis.

These results are similar to the same survey results from 2005.

More than 70% use…
- Informal usability testing
- Heuristic / expert reviews
- User research (interviews & surveys)

50% - 70% use…
- Personas & user profiles
- Requirements gathering
- Task analysis
- Formal lab testing
- Card sorting

33% - 50% use…
- Surveys (including satisfaction surveys)
- Contextual inquiry / ethnography
- Competitive benchmarking
- Remote usability testing
- Focus groups

Less than 33% use…
- Analyze web metrics
- Market research
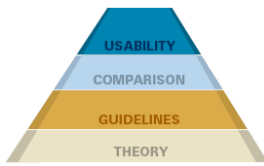- Accessibility reviews and testing
- Eye tracking

What were we trying to learn?

Write down a list of your last 3 - 5 projects:

	What question were you trying to answer?	What usability technique did you use?
1		
2		
3		
4		
5		

3 | What questions can user research answer

When we think about usability techniques, we also need to think about how broadly we intend to apply the results: to one design of a single product, a family or group of products, to all online applications, or to all human behavior.

Tier	Objective	Question	Outcomes
1	Examine usability of a given product	Does it work for the user?	Information on the usability of a product
2	Explore/compare various products and contextual impact on usability	When, where, compared to what does it work?	Comparative information on products and contexts
3	Derive guidelines that can be applied to other designs	How should it work with other similar designs, contexts, and systems?	Design guidelines based on behavioral research methods
4	Derive theoretical implications to better understand human behavior with interactive systems	Why does it work?	General principles, models, and/or theories accounting for various phenomena

Avi Parush " "Toward a Common Ground: Practice and Research in HCI" <interactions>, ACM SIGCHI (Special Interest Group on Computer Human Interaction) Nov/Dec 2006, page 61-62

Examples:

Tier 1 Project: Usability test of a prototype design, working with the expected users of the product.

Question: Can these people use this design to meet the goals of the product?

Tier 2 Project: Usability test in which participants are asked to try the same tasks in two different products.

Question: Which of these products is more efficient and effective to use? Which do users prefer? What features or other characteristics contribute to these results?

Tier 3 Project: Comparing different instructions for how to use a product to see which help users succeed best.

Question: What are good guidelines for writing instructions?

Tier 4 Project: Testing response times to different types of stimulus.

Question: How quickly can people, in general, form an impression of something they are experiencing for the first time?

When you are choosing the usability techniques to use, the most important thing is understanding the question.

- What will we do with the answers we find?

- How broadly do we expect to apply the results?

- What would a useful (or useless) answer look like?

After that, we choose the technique that is the best way to get the answer.

- What data do we need?

- Do we need quantitative or qualitative data (or both)?

- Do we want behavioral or preference data?

Then, we factor in the constraints:

- Timing: where is the product in the lifecycle of design, development and deployment

- Resources: the time, people and facilities we have available

- Participants: who we need and how we will get them

- Politics: what is the environment in which we will do this work and the impact this has on our decisions

Usability testing is often divided into four categories, based on their goals.

Exploratory Research	Benchmark Metrics	Diagnostic Evaluation	Summative Testing
Understand users and context	Establish baseline metrics	Find and fix problems	Measure success of new design
Early in project	Early in project	During design	At end of process
How often: once	How often: Once	Done iteratively	How often: Once :
• 6-12+ users	• 8-24 users	• 4-8 users	• 6-12+ users
• Blend of interview and observation	• Focus on metrics for time, failures, etc.	• Less formal	• More formal
• May use competitive products	• Tests current process or product	• Focus on qualitative data	• Metrics based on usability goals
			• Users unassisted

Source: Ginny Redish

But the toolkit includes more than just usability testing, so perhaps the way to look at this is to consider the different reasons why we conduct usability activities:

- Learning about users
- Learning the business environment
- Task and information analysis
- Evaluating designs in progress
- Evaluating usability results

Learning about users

These techniques focus on listening, observing and understanding the context in which people work and play. They are exploratory and often open-ended, allowing for bottom-up analysis. They include both small-scale qualitative techniques and quantitative data analysis.

To…	Use…
Understand users in their environment	**Field studies**: **site visits**, **ethnography**, or **contextual inquiry** to observe people doing their own tasks in their own setting.
Explore attitudes and expectations	**Exploratory usability testing** and **interviews** to collect information about their reactions to existing products or other conditions.
Know their goals and processes	**Scenarios of use** and other **task analysis** techniques to explore and document their workflow.
Identify quantitative demographics	**Surveys** on user demographics, product usage and other consumer habits.
Identify factors in the environment	**Context of use audit** to document environmental, social and access needs.
Create a portrait of users that captures what you have learned	**Personas** collect and document key aspects of different types of users.

Indirect Methods	
Identify quantitative demographics or behavioral profiles	**Read market research** conducted by other organizations, with similar users or context

Learning the business environment

These techniques focus on what is happening in the business or personal domain. They are a snapshot of the competitive environment, trends surrounding the product and actual use of the product.

To…	Use…
Learn about a new business environment	**Stakeholder interviews** to collect input from different areas of the business domain.
Find trends or gaps in a business process	**Review problem reports** from technical or customer support for usability problems or unmet needs
Understand usage patterns on a web site	**Traffic analysis** of web site logs, looking for patterns in use, navigation, referrals and related sites or pages
Understand the competition	**Competitive audits** or **comparative usability test** with competitive products, or other products and sites that are part of the business domain

Indirect Methods

Get a view of a new field	**Read industry publications** or **market research** on the state of the industry

Task and information analysis

These techniques focus on the information or actions that users will need to meet their goals

To…	Use…
Explore a group process or work flow	**Participatory design, or PANDA (Participatory Analysis and Design Activities)** techniques, such as The Bridge, to develop a consensus view of the overall process.
Learn about relationships between information or tasks	**Card sorting** to create logical groups from the users' point of view
Decide how to organize a task or collection of information	**Affinity diagrams, navigation flow charts** to group and explore the structure of the information
Explore different solutions	**Paper prototyping** to rapidly explore different designs and collect instant feedback.

Indirect Methods

Identify ideal patterns	**Read training manuals** or **policy and procedure documents** for the tasks
Understand a work flow from an ideal perspective	Use requirements and task analysis techniques such as: - Hierarchical task analysis - Workflow diagrams

Evaluating designs in progress

Most usability testing is formative. It's goal is to not only evaluate a product or prototype, but to provide recommendations to improve it. An industry project defines formative testing as:

> "Formative testing: testing with representative users and representative tasks on a representative product where the testing is designed to guide the improvement of future iterations."

To…	Use…
Explore different solutions	**Paper prototyping, and task-based or persona walk-throughs** to explore the structure of the information
Collect informal input	**Informal testing** and **hallway reviews** to collect rapid input for sections of a design
Test a design against scenarios of use	**Usability testing** in formal or informal settings: ▪ Testing in a usability lab ▪ Testing in an informal lab space ▪ Testing in the users' own setting ▪ Remote testing
Understanding what parts of the interface draw the user's visual attention	**Eyetracking** lets you see exactly where a user looks on the screen, and for how long.
Ensuring access for all	**Usability testing** with people with disabilities

Indirect Methods

Check a design against guidelines	**Expert reviews** to check a design against best practice or agreed design or conceptual guidelines
Check a design for accessiblity	**Accessibility reviews (against W3C, national or company standards)**

Evaluating usability results

These techniques include both measuring the success of a design (against usability performance and satisfaction criteria) and establishing benchmarks metrics. They require a more formal test protocol, and realistic tasks. They may not include talk-aloud or allow users to be assisted in their tasks.

To…	Use…
Determine whether a product is meeting its usability goals	**Summative usability testing,** measuring performance against criteria (and possibly benchmark values) ▪ Lab or field setting
Learn how a product compares to its competitors	**Comparative testing** with the same tasks performed using two or more products
Find out whether users like a product	**Satisfaction surveys**, as part of a usability test or with random users. ▪ Before release ▪ After release

4 | Choosing techniques that fit

Even focusing on the methods and techniques, there are still many decisions to be made about what activities are "the best."

We choose a technique by considering:

- Goals: What you hope to learn

- Politics: The environment in which we will do this work and the impact this has on our decisions

And then factoring in the constraints:

- Timing: where is the product in the lifecycle of design, development and deployment

- Participants: how many users you need for the research and how much time the technique requires for you to work with each person.

- Usability requirements: what aspects of usability are important to the success of the product

- Resources: the time, people and facilities we have available

The "right technique" is the one that lets you achieve your goal, and which you can accomplish in your current situation.

Timing in a project

The timing in a project affects the activities that are useful in making decisions about a product. Although some techniques are strongly tied to early or late phases of a project, others can be used for several different goals.

Activities can be classified by their most common use in a user-centered design cycle.
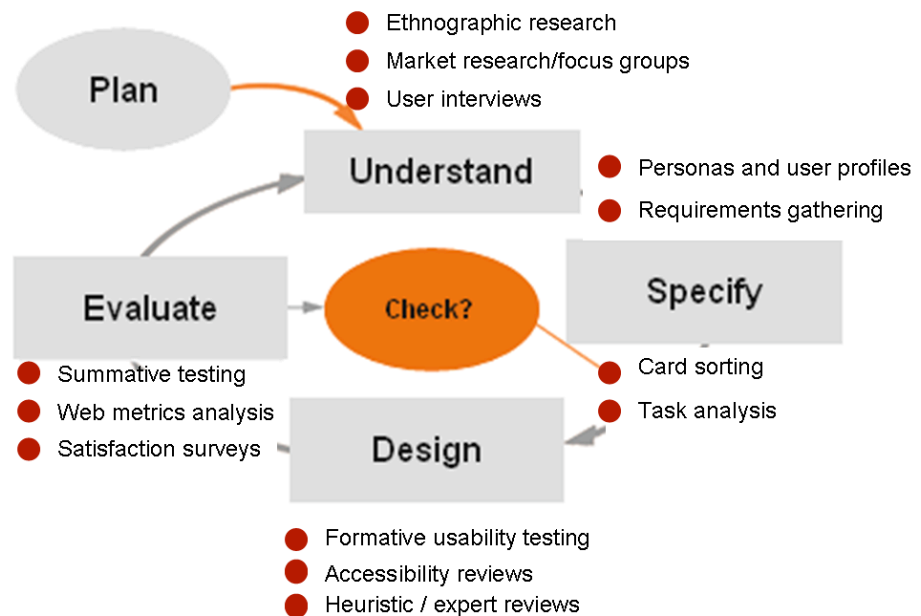
The activities in a user-centered design process

Plan
Your project plan should include all UCD steps

Understand
Start by defining the audience, context of use and other environmental factors

Specify
Describe the features and success factors for the project

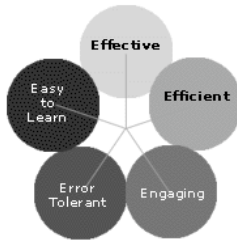**Design**
Create a prototype of the design solution

Evaluate
Test to see if the design met the specs

ISO 13407

Users' goals can drive usability activities

We can also look at goals for usability analysis and evaluation in terms of users' requirements or goals for the products they use.

Effective

The completeness and accuracy with which users achieve their goals.

- ▪ Explore how users define success
- ▪ Evaluate products for how often tasks are completed accurately

Efficient

The speed (with accuracy) with which this work can be done.

- ▪ Explore how long a task "ought to" take, or what makes it feel "too long"
- ▪ Time tasks with realistic tasks and working versions of the software

Engaging

How pleasant, satisfying or interesting an interface is to use.

- ▪ Explore whether the product draws people into the interaction
- ▪ Explore emotions triggered by the domain and product
- ▪ Measure satisfaction
- ▪ Review logs for 'time on site'

Error Tolerant

How well the product prevents errors, and helps the user recover from any that do occur.

- ▪ Investigate how much knowledge user bring to the task
- ▪ Use expert reviews to see if the interface is helpful or creates dead ends and punitive rework?
- ▪ Construct task scenarios to create situations with potential problems

Easy to Learn

How well the product supports both initial orientation and deeper learning.

- ▪ Analyze how often users need to try new tasks or functions
- ▪ Construct task scenarios to explore how easy is it to explore and innovate
- ▪ Control how much instruction is given to test participants, or recruit participants with different levels of knowledge

Quantitative or qualitative?

You have to consider whether you need to answer a question with qualitative or quantitative data.

This affects not just your choice of which technique to use, but how to conduct the work and how to analyse the information you gather.

Quantitative – data that can let you count or measure the effect and how strong that effect is. Quantitative techniques include:

- Surveys, especially surveys with closed questions
- Log analysis (both server activity and search logs)
- Usability tests that focus on task success, counting errors, time on task or other measurable metrics

Qualitative – data that can let you produce insights. Qualitative techniques include:

- Contextual observation (site visits, ethnography)
- User interviews or open-ended survey questions
- Usability tests that focus on how users approach a task or interaction

Of course, you can combine them:

- Comments in surveys or usability tests provide qualitative data to explain, support or amplify quantitative measures
- Qualitative data can be counted and measured, looking for frequency of different events or patterns

If you want to apply the results of the technique beyond the immediate context – moving up to a broader research tier – you have to know whether you can extrapolate from your participants to the broader population:

- Is the data *statistically* significant?
- Are the participants representative of the full population?
- Is the context (or tasks) representative of how the product will be used?

In other words: how well does your usability technique reflect the "real world"?

Resources needed

Resources for a usability test come in two flavors: the resources it takes to conduct an activity and analyze the results, and the number of users it takes to get good results. The two are related, because some techniques scale up to include more people easily, while others require additional people, time or costs for each participant you add.

How "resource intensive" are the techniques?

Time-intensive, but take little equipment (usually few users)
- Contextual inquiry / ethnography
- Requirements gathering
- Task analysis
- User interviews
- Personas & user profiles

Require time and some expertise (number of users can scale)
- Heuristic / expert reviews
- Accessibility reviews
- Card sorting
- Informal usability testing

Typically rely on automated tools (usually large number of users)
- Remote usability testing
- Surveys
- Web metrics analysis
- Card sorting (online or large numbers of users)

Need specialized facilities (usually few users, but can scale)
- Usability lab for formal testing or focus groups
- Eye tracking
- Accessibility testing (assistive technology)

Your mileage may vary – these are just rules of thumb. You need to consider the scope and complexity of your project, the number of possible users, and what resources you already have available.

How many people will you need to work with

The question of "how many users" is one of the hot topics in usability.

Sometimes the questions is really "how few users" can find enough usability problems to make the test worth while.

> "The "Magic Number 5"—five participants will yield 80% of the findings from a usability test—comes from research conducted in the 1990's by Nielsen, Virzi, Lewis, and other human factors engineers. Nielsen's model showing the number of users required for the maximum cost-benefit ratio in a usability test provides the evidence needed to convince our managers that a cost-effective usability test can be added to the development timeline without slipping the schedule and without costing much money."
>
> > "What's in a Number?" by Carol M. Barnum. Usability Interface, January 2003
> > www.stcsig.org/usability/newsletter/0301-number.html

Sometimes the question is "how many participants do you need to provide valid results?" To answer this question you need to think about:

- ▪ How many different kinds of users do you have (and how different they are in their use of the product you are testing).
- ▪ How many different ways user can interact with the product, and how you will be sure you see all of them.

One rule of thumb is that you should continue gathering data until you start to see the same patterns of behavior repeatedly.
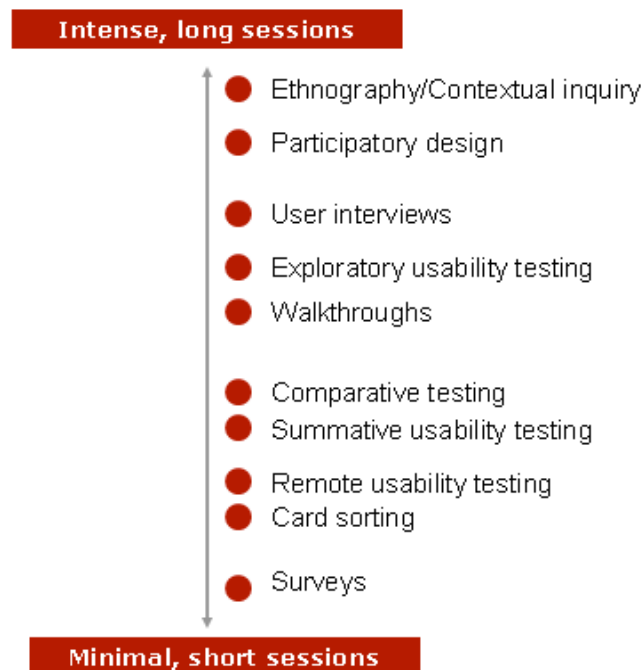
The last important consideration in the "how many users" question is how sure you must be that your results and recommendations are right. It's OK to use just a few users each time if you will do several rounds of iterative testing during the design process. But, if you are making a big decision about the design direction for a product, or setting baselines for usability, you might want a few more data points.

How much time will you need with each participant?

Some techniques require very little time per participant, while others are more intensive interactions. You need to consider:

- How much time is needed from each participant

- How much time you will need per participant, and for all the participants you are planning to work with

This is also affected by the goals for the work, and the nature of the product. Some have long, complex tasks and require more time and effort to test; others are short interactions, requiring little time per participant.

Intense, long sessions
- Ethnography/Contextual inquiry
- Participatory design
- User interviews
- Exploratory usability testing
- Walkthroughs
- Comparative testing
- Summative usability testing
- Remote usability testing
- Card sorting
- Surveys

Minimal, short sessions

Some techniques also require more time to analyze the sessions and report on the results. The more open-ended the method, the more time it usually takes to analyze the information you gather.

These are not absolutes for each technique:

- Usability tests can vary from as short as 30 minutes to several hours, depending on the complexity of the tasks.

- Usability tests, including summative tests, may have very little qualitative data, especially if you are focused on task success and time-on-task.

- Surveys that include open-ended responses take longer to tabulate and analyze.

And, there are some user experience techniques that don't include any users at all:

- Expert reviews

- Persona-based walkthroughs

- Web metrics analysis

- Accessibility checks
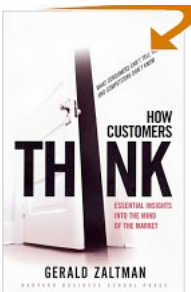
Gerald Zaltman - How Customers Think. Harvard Business Press

Why not focus groups?

If you want 'numbers', why not use focus groups, and get more users per hour? A book on customer research points out that focus groups are good for exploring what users or customers *want* or gaining consensus on a concept, but…

- They provide little depth from any participants

- They capture opinion, not behavior

- Strong group members can skew results

- They provide weak qualitative data

It concludes that you can get better data for the same cost with in-depth interviews.

Putting it together

When we combine the number of participants that you can work with, and the stage in the project, we get the following chart.
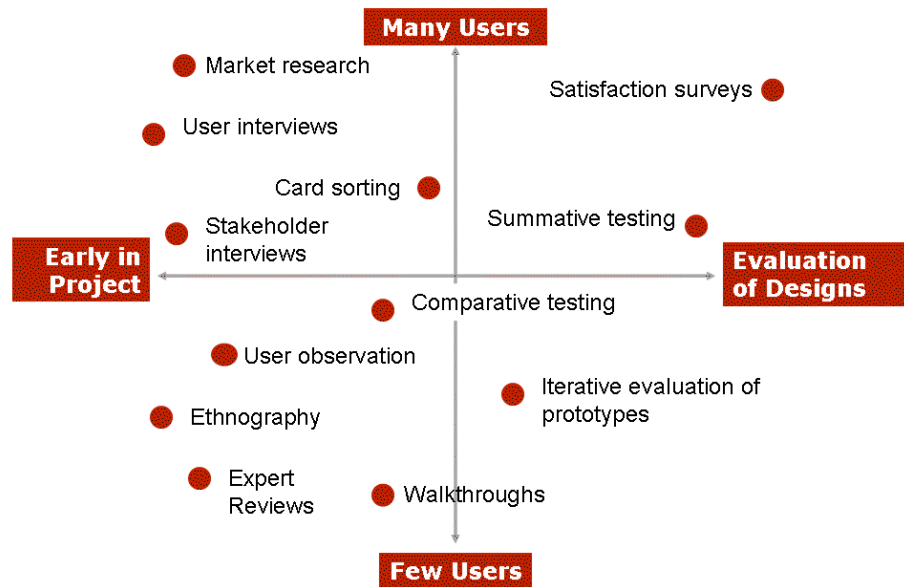
5 | Getting creative: adjusting to reality

You will often need to be flexible to find the right technique to get the answers you need…in your real situation. Some of the challenges we hear about often are:

- Reaching users

- Making tasks realistic

- Getting resources for usability work

Reaching users

You may be in a situation where it's difficult to get to "real" users, and you have to consider testing with surrogates – they can be better than no one at all!

Best

- **People who really use the product**
- People like those who use the product
- People who used to use the product or were recently in the users' role
- People who work with people who really use the product
- People with specialized knowledge that is not typical of users
- Other internal staff used to represent real users
- Experts, analysts and other designers
- **No one at all**

Worst

What creative solutions have you used to find participants for usability activities?

Making tasks realistic

Whether you are running a usability test or a task analysis session, choosing realistic tasks is important to help participants engage in the activity effectively.

- If you are exploring one function in a product, consider whether it is something that users see as a stand-alone activity. If not, you may need to enlarge the scope of the task.

  Example: Would anyone use a shopping cart without also choosing items to buy? How would you construct an activity to test the flow of a checkout process?

- If the task depends on personal knowledge and the users' goals, consider whether everyone needs to do the exact same task.

  Example: The usability of medical information partially depends on what prior knowledge a user brings to the task. How would you construct an activity to see whether information is effective and provides accurate answers to medical consumers?

- If you are working with an early prototype, information the participant enters is not remembered, and shown on later screens.

  Example: You are testing a search user interface, looking for the best way to present the results. How would you simulate the interaction, when you don't know what the user will enter in the search box?

What other difficult situations have you encountered, and how did you solve them?

Getting resources for usability work

Resources are always a problem. Thinking about your goals will help you come up with a creative solution.

This example is from Bob Hurst at Southwest Airlines, and is published in an article in the UPA Voice The situation:

- No lab, special equipment, or special facilities

- Internal application used by employees

- The goal was to test the flow of a new process

- And to have a way to show results to management

The solution:
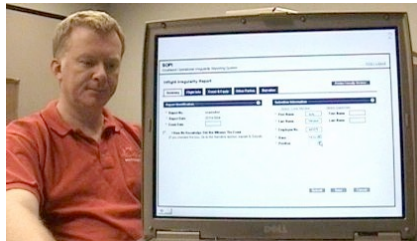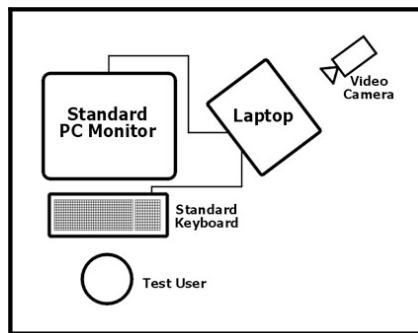
- The test was conducted in a conference room

- The prototype ran on a laptop computer with an external monitor and keyboard/mouse

- A borrowed video camera was positioned so the image included the laptop screen and the participant's face.

- The report included video clips that were clear enough to show specific problems and real user reactions.

Picture-in-picture at almost no cost!

Bob Hurst, Low Cost Usability. UPA Voice, February 2005

http://www.usabilityprofessionals.org/upa_publications/upa_voice/volumes/2005/february/low_cost_usability.html
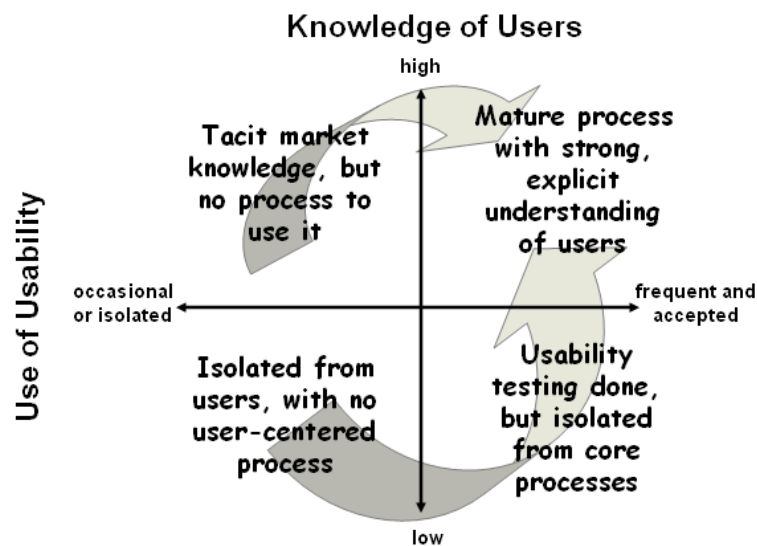
6 | The political landscape

The politics of usability can be complicated by factors outside of your work, your department or your project. The "usability maturity" of your company, personalities or control issues, and who needs to be convinced by the work you do all affect decisions about choosing usability techniques.

To evaluate the level of usability maturity you need to consider:

- The depth of knowledge about your users and how they use your products

- Expectations from other fields such as market research or quality testing for procedures or numbers of participants

- Prior experience with usability within the company

Knowledge of Users

high

Tacit market knowledge, but no process to use it

Mature process with strong, explicit understanding of users

occasional or isolated ← → frequent and accepted

Use of Usability

Isolated from users, with no user-centered process

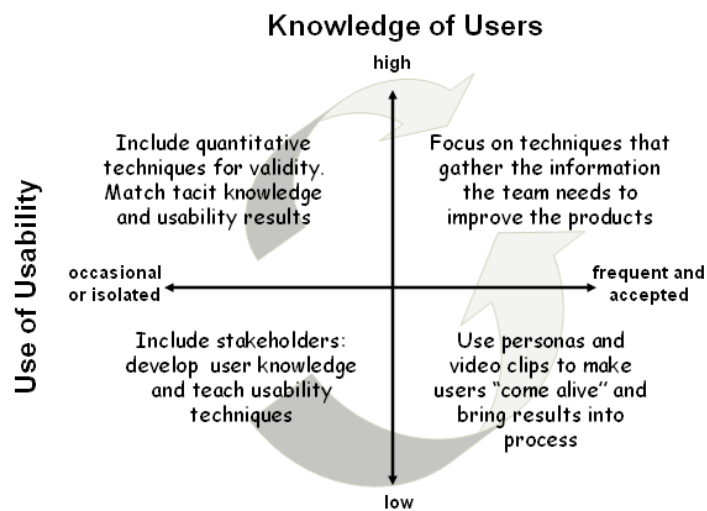Usability testing done, but isolated from core processes

Choose techniques that match your audience

You should also consider who you may need to convince, and what evidence or reporting style will be helpful.

- ▪ Every usability report should include positives. Report what is working, not just what is not.

- ▪ Tailor your approach to recommendations to the team and your relationship to them, with the right level of detail and specificity.

Here are some ideas for how to adjust your work to different levels of usability maturity.

Knowledge of Users

high

Include quantitative techniques for validity. Match tacit knowledge and usability results

Focus on techniques that gather the information the team needs to improve the products

Use of Usability

occasional or isolated

frequent and accepted

Include stakeholders: develop user knowledge and teach usability techniques

Use personas and video clips to make users "come alive" and bring results into process

7 | Making decisions – scenarios to explore

Scenario 1 – Solve an unexpected design problem

During a design review, a problem has come up because the development system does not support one of the interactions. Several alternative designs have been proposed, but you are not sure which one will be the best. Deadlines are looming!

Discuss:

1. What usability resources do you have easily available?

2. How do you find participants for usability testing?

3. How will you create prototypes for the alternatives to test with?

4. Who needs this decision, and how formal will your report be?

What techniques would you choose?

Scenario 2 – Provide input to a new product

Your company is planning to launch a new product. Marketing wants you to run a focus group to understand how users are using the current service to see how it can be improved.

Discuss

1. How similar is this product to other existing products?

2. What do you already know about your users: when, where, why and how is the current service used?

3. How much time to you have before work begins on development?

What techniques would you choose?

Scenario 3 – Add usability at the last minute

Your new product is about to launch, but there has been no usability input. Management is concerned that the product may not succeed because some critical features are hard to use.

Discuss

1. What are the most important questions you need to answer?

2. Is there any opportunity to make changes to the product?

3. Why hasn't any usability work been done?

What techniques would you choose?

8 | About Whitney Quesenbery

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Whitney Quesenbery is a user researcher, user experience practitioner, and usability expert with a passion for clear communication.

As the principal consultant for Whitney Interactive Design (WQusability.com), she works with companies around the world to develop usable web sites and applications. Her recent projects include work for The Open University, IEEE, National Cancer Institute and Sage Software.

As an advocate for usability, Whitney has been president of UPA, is a Fellow of the STC, and worked on projects to establish guidelines for usability requirements and test reports. She is on two US Federal Advisory Committees, working to improve the usability and accessibility of voting systems and on an updates of "Section 508", the US accessibility laws.

Whitney is a frequent contributor to industry publications, including UPA's UX magazine, uiGarden, UXmatters, <interactions> and STC's Intercom
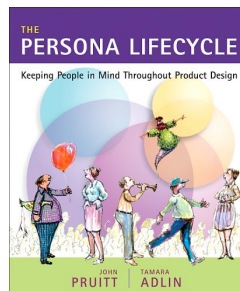
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Chapter 9: "Storytelling and Narrative"
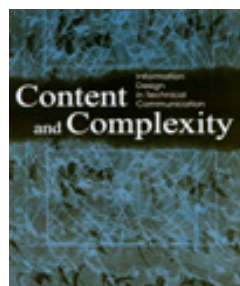
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