Carnegie Mellon University
Software Engineering Institute

Data-Driven Approach to IA Evaluation, Design, and Documentation

BARBORA BATOKOVA
UX STRATEGIST

✉ bbatokova@sei.cmu.edu

WORLD IA DAY
PITTSBURGH, PA • 2/24/2018

🐦 @WIAD_PGH

Hi, I'm Barbora.

... Nonprofit Communications Director

... Information Security Designer

... Information Designer

=> **UX Strategist**

- Worked on cybersecurity and digital forensics solutions for federal law enforcement agencies.
- Current projects include SEI's website redesign and building a knowledge management platform called SEINet.
- Favorite activities include planning design research and facilitating sessions with project teams.
- Current goal is to increase SEI's UX maturity and build a UX design team.

Goals

1 **PROCESS OVERVIEW**
Provide a **very brief overview** of a **5-stage process** for creating usable IAs.

2 **HANDS-ON EXERCISES**
Learn how to write a **tree testing** plan and analyze the data.

✔ Good Example   ↗ Could be Improved   ✘ Bad Example

Why do IA projects?

To institute a logical, consistent user experience for two aspects of the design:

1. underlying structure (less visible)
   (categories and levels, and how those categories relate to each other)
2. navigation controls (visible)

Design Process

How do you evaluate, design, and document an IA?

1 **Understand Current State**
Stakeholder Map • Archetypes • Content Audit

2 **Evaluate Current State**
Tree Testing • Think-Aloud Protocol • Heatmaps/Click Tracking

3 **Fill in the Gaps**
Surveys • Expert Interviews • Search Log Analysis • Competitive Analysis

4 **Create New IA**
Card Sorting • Butcher Paper IA • Task-Flow Diagrams

5 **Test and Refine New IA**
Click Testing • Tree Testing • Think-Aloud Protocol

Design Process

What is the focus of this workshop?

1 **Understand Current State**
Stakeholder Map • Archetypes • Content Audit

2 **Evaluate Current State**
Tree Testing • Think-Aloud Protocol • Heatmaps/Click Tracking

3 **Fill in the Gaps**
Surveys • Expert Interviews • Search Log Analysis • Competitive Analysis

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Card Sorting • Butcher Paper IA • Task-Flow Diagrams
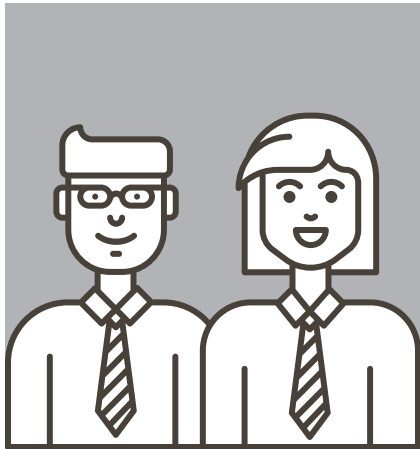
5 **Test and Refine New IA**
Click Testing • Tree Testing • Think-Aloud Protocol
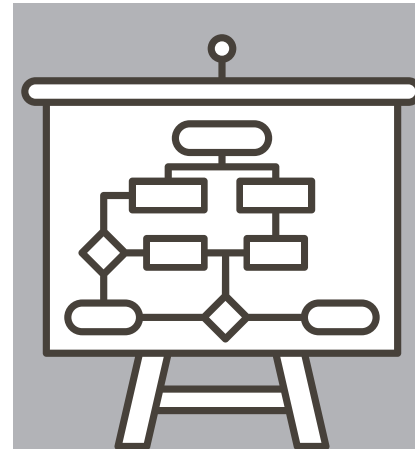
1
Understand Current State

Understand Current State
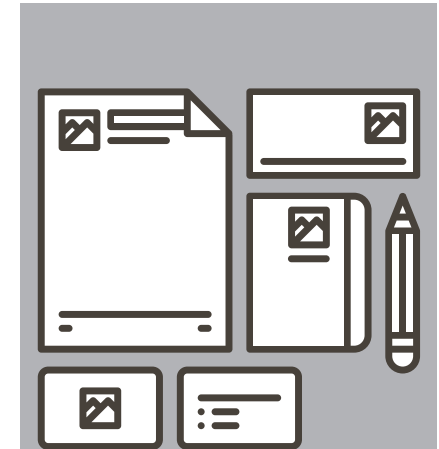
Conduct design research to understand:

Stakeholders

**User Needs
& Goals**

Common Tasks

Content

Stakeholder Map

Archetypes

Content Audit

PAGEUR			DESCRIPTION	Taxonomy	CAT	ROT or Repurpose
sei.cmu.			The SEI provides useful informa	Acquisition Support	15	Redundant, Trivial
sei.cmu.			Technical staff members share	Acquisition Support	15	Trivial
sei.cmu.				Acquisition Support	15	Trivial
sei.cmu.		Acquisition Issues and	SEI staff engage with federal de	Acquisition Support	15	Repurpose
sei.cmu.			An SEI engagement can consis	Acquisition Support	15	Repurpose
sei.cmu.		ning	The SEI helps acquisition progr	Acquisition Support	15	Repurpose
sei.cmu.		Reviews, and Evaluat	For many organizations, the mo	Acquisition Support	15	Repurpose
sei.cmu.edu/acquisition/casestu	05/08/14	Case Studies	The SEI describes several of its	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/risk/people/index.c	05/08/14	Our People	The following is a list of technica	Risk and Opportunity	15	Redundant, Trivial, Out
sei.cmu.edu/risk/start/index.cfn	05/08/14	Getting Started	Whether you are working in a sy	Risk and Opportunity	15	Repurpose
sei.cmu.edu/risk/tools/integrate	05/08/14	Additional Materials	Additional Materials	Risk and Opportunity	15	Trivial
sei.cmu.edu/risk/research/inde:	05/08/14	Research	Research currently in Systemic	Risk and Opportunity	15	Redundant
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Projects	The SEI establishes an acquisit	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project: COTS Management Pla	The SEI's Acquisition Prog	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project: QAW/ATAM/Common L	This pilot project is developing s	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project: Options Analysis for Re	ASP documents its pilot project	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project: Options Analysis for Re	The SEI's Acquisition Prog	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Naval Undersea Warfare Center (NU	The SEI describes a particularly	Acquisition Support	15	Trivial, Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project	Pilot Project	Acquisition Support	15	Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Pilot Project:	Pilot Project:	Acquisition Support	15	Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Strategic Technology Transition: A N	In this case study, the SEI&#39	Acquisition Support	15	Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Army's ASSIP Gains Traction w	ASSIP helps improve the U.S. A	Acquisition Support	15	Outdated, Redundant
sei.cmu.edu/acquisition/casestu	05/08/14	CLIP Program Employs Quality Attrib	The SEI supports CLIP by cond	Acquisition Support	15	Outdated, Redundant
sei.cmu.edu/acquisition/casestu	05/08/14	Global Positioning System Program (	This case study reports the rest	Acquisition Support	15	Outdated
sei.cmu.edu/acquisition/casestu	05/08/14	Acquisition Support Program Helps A	The SEI helps define requireme	Acquisition Support	15	Redundant
sei.cmu.edu/acquisition/researd	05/08/14	Patterns of Failure: System Archetyp	The SEI explores ten systems a	Acquisition Support	15	Outdated

2

Evaluate Current State

Tree Testing

Why do Tree Testing?

To figure out which parts of the site tree work well and which don't.

- *Can people find the information they need?*
- *Is the information organized in a way that makes sense?*
- *Do the labels work?*

Benefits

- Mimics how people find content on a site (vs. how they'd organize it).
- Simplified presentation allows participants to solely focus on the IA.
- Quantitative way of measurement.
- Faster than traditional card sorting.

Methodology

Task 1 of 10   Skip this task

Where would you find out how the SEI is shaping the research agenda for managing technical debt?

Home

Products and Services

Research   I'd find it here

Considerations
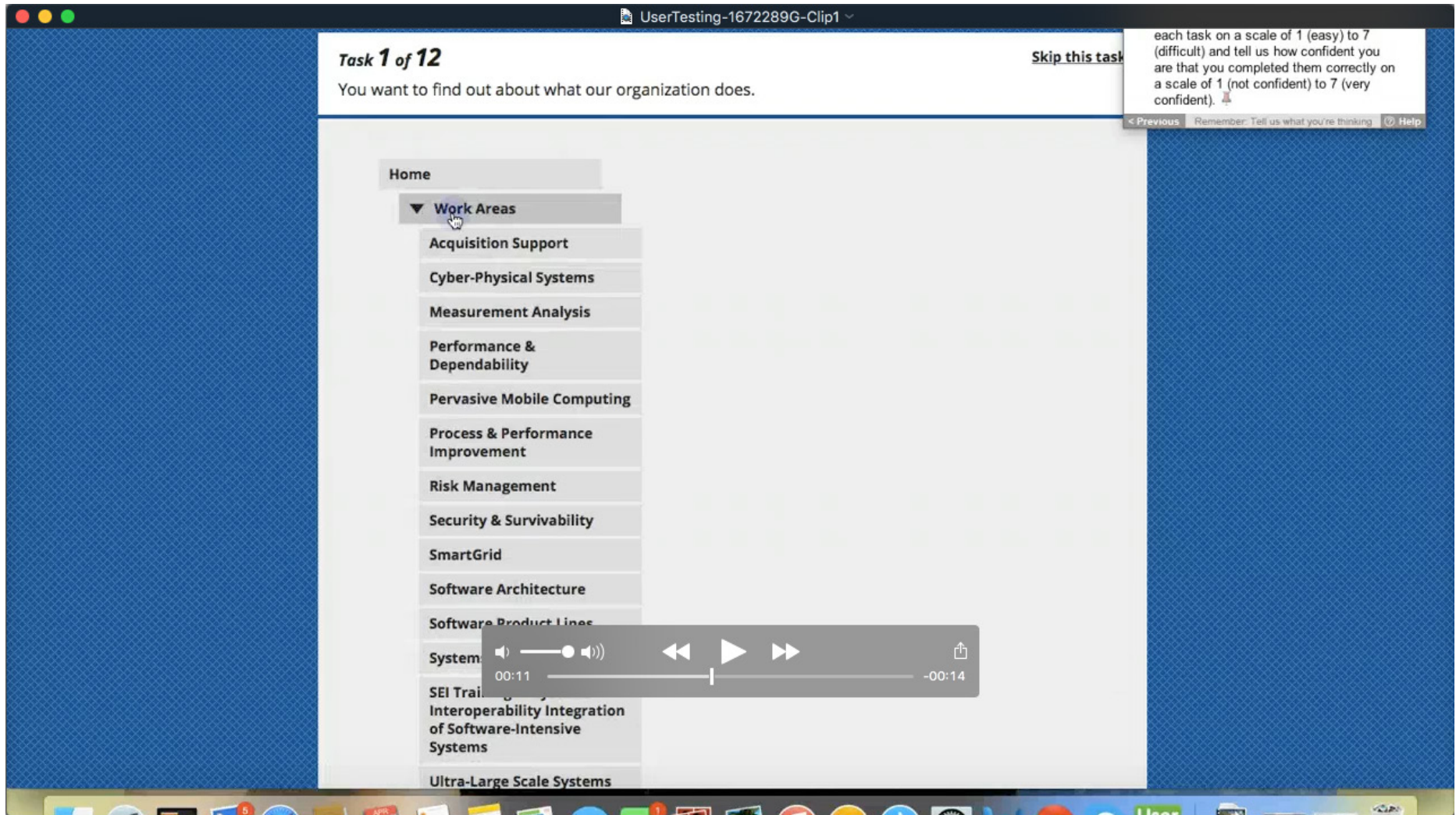
Site Tree Size => No. of Tasks => No. of Tests

Participants

- Min 50 for 10 tasks
- Site Visitors / Recruitment Service
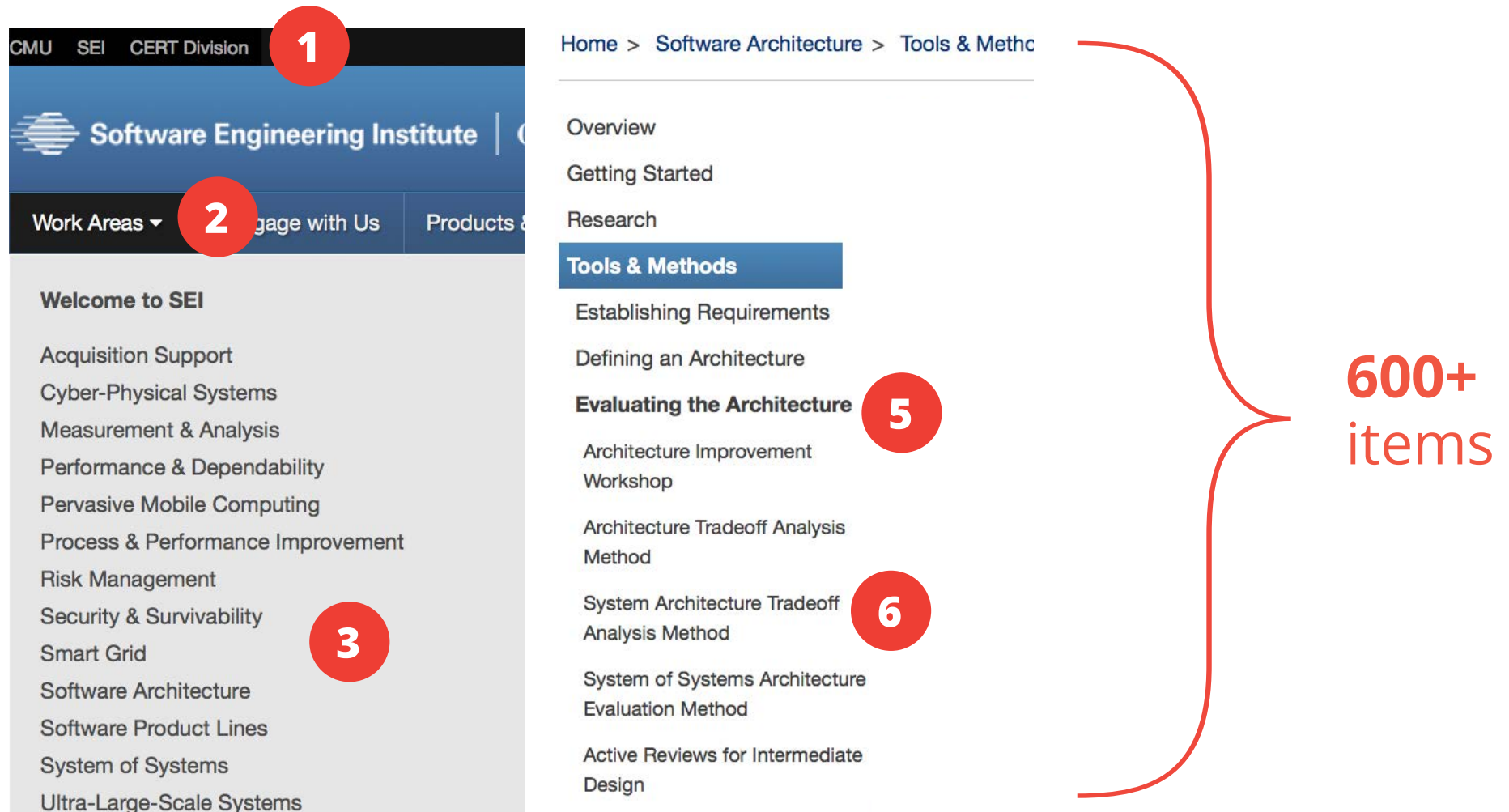
Software

- Treejack
- User Zoom
- C-Inspector

Example

Highlight reel from the evaluation stage of SEI website redesign.

Mini Use Case

Site Tree: **6 Levels of Hierarchy**

600+ items

Organizational Focus

Tasks (15)

Based on website objectives and archetypes.

#	TASK	TASK COMPLETION
9.	Find out about **what our organization does**.	**81%**
4.	**Get involved with us on a research project**.	**50%**
5.	**Fund a research and development (R&D) project**.	**42%**
7.	Find out about our **upcoming conferences**.	**37%**
2.	Find out about our **latest research**.	**35%**
15.	Find out about the **history of the organization**.	**0%**

Good
75% and above

Poor
50–74%

Very Poor
0–49%

37% Overall Success Rate

75% Usable
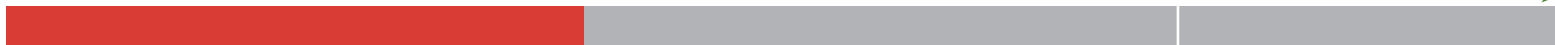
Technical Focus

Tasks (18)

Based on web objectives, archetypes, and technical staff input.

#	TASK	TASK COMPLETION
3.	**Download software packages and tools** the SEI has created.	**76%**
10.	Find out **how the SEI is helping to solve the nation's cybersecurity challenges**.	**36%**
17.	Learn more about **SEI participation at approved targeted academic conferences**.	**26%**
2.	Find out about the **outreach and impact** the SEI has had.	**18%**
1.	Find information on what **high priority problems the DoD faces** and how we help to solve them.	**6%**
4.	Find out how the SEI enables **new or extended capabilities in existing military systems**.	**0%**

■ **Good** 75% and above

■ **Poor** 50–74%

■ **Very Poor** 0–49%

20% Overall Success Rate

75% Usable
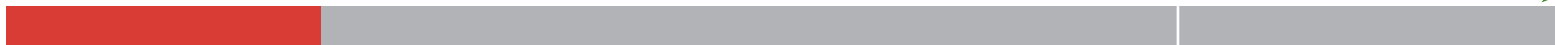
Exercise 1
Tree Testing Plan

| #	Task	Category	Subcategory 1	Subcategory 2
1	Where would you go to find out when the upcoming CTO Townhall takes place?	ABOUT SEI	News & Events	Calenda...
2	Where would you go to read SEI news and announcements?	ABOUT SEI	News & Events	News
3	...atest document specifying SEI's technical strategic direction?	BUSINESS RESOURCES	Governance	Grey Bo...
4		BUSINESS RESOURCES	Governance	Internal ...
5		BUSINESS RESOURCES	Governance	Quarterl...
6		RESEARCH & PROJECTS	/	Researc...
7	...Line-funded work?	RESEARCH & PROJECTS	/	Line & L...
8	...stipend for your phone?	BENEFITS & CAREER	Benefits	Commu...
9	...ommend a friend for an SEI position?	BENEFITS & CAREER	Staffing & Recruiting	Employe...
10	Where would you go to learn about the requirements for advancing from MTS-C to MTS-B?	BENEFITS & CAREER	Career & Performance	Promoti...
11	Where would you go to download SEI letterhead?	BUSINESS RESOURCES	Branding & Templates	Docume...
12	Where would you go to learn about how you can report your effort (as a full-time employee)?	WORKPLACE SERVICES	Pay & Timekeeping	Effort Re...
13	Where would you go to find out about SEI-specific rules regarding Information Technology?	WORKPLACE SERVICES	Information Technology	IT Pract...
14	Where would you go to find out which rooms you can use to hold a large meeting?	WORKPLACE SERVICES	Facilities	Confere...
15	Where would you go to find out about the documented organizational rules that have been vetted and approved by the SEI Executive Leadership Team?	BUSINESS RESOURCES	Legal	Standar...
16	Where would you go to download a form to bring a non-SEI employee to an SEI building?	WORKPLACE SERVICES	Security	Visitor R...
17	Where would you go to find out how to do an expense report for your recent trip?	WORKPLACE SERVICES	Travel & Expenses	Travel R...
18	Where would you go to see the organizational structure of SEI?	PEOPLE & TEAMS	Organizational Charts	Org Stru...
19	Where would you go to find out whether someone has direct reports?	PEOPLE & TEAMS	Organizational Charts	Reportin...
20	Where would you go to find a listing of SEI staff?	PEOPLE & TEAMS	Staff Information	Staff Dir...

Exercise

Write a research plan to evaluate the IA of the Pittsburgh airport website.

30 mins

ARCHETYPE
Frequent Flyer
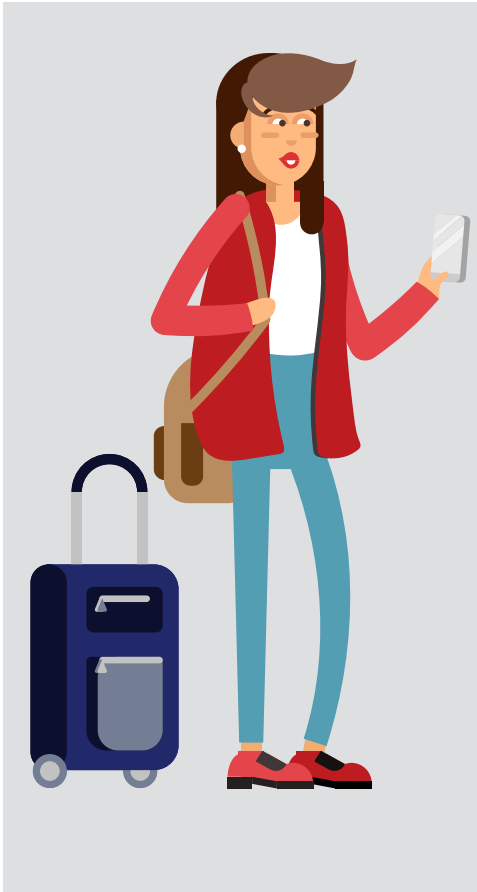
Description
Flies frequently for business or personal travel. Comfortable with being at the airport. Likes to get stuff done at the airport in between flights.

Behavior Anecdote
While flying home for Christmas vacation, they plan on spending the time before boarding to do some last-minute shopping for their mom. They use the website on their phone to see what stores are available.

Behaviors
- Checks the website if flight is delayed.
- Checks the website to see TSA line status.
- Explores the shopping section to see what stores are available.
- Uses the website to see where a particular restaurant is located.

TREE TESTING

Testing Plan

Purpose

_____

_____

_____

Methodology

_____

_____

_____

Participants

_____

_____

_____

Recruitment

_____

_____

_____

Tasks

#	TASK	CORRECT DESTINATION
1		
2		
3		
4		
5		

Data-Driven Approach to IA Evaluation, Design, and Documentation
Created by Barbora Batokova · UX Strategist, CMU Software Engineering Institute · bbatokova@sei.cmu.edu

Testing Plan – Basics

Purpose*

- Establish a baseline? Evaluate new IA?
- What IA are you testing?

Methodology*

- Scope: Site Tree Size + Archetype(s) => No. of Tasks => No. of Tests
- Software

Participants*

- Min 50 for 10 tasks
- Stakeholder groups?
- Specific archetypes?

Recruitment*

- Site intercept?
- Recruitment service?
- Social media?
- Email?
- Rewards?

Risks

- Access to software
- Team availability
- Access to participants
- IRB approval
- Budget

*Absolute Minimum

Testing Plan – Tasks

Where would you go to … ?

Base them on:

- Site objectives
- Archetypes
- Common tasks and user goals

Watch out for:

- Using the name of the correct destination in the question.
- Leading phrases (e.g., using "services" to guide through Services).

Instructions

1. Work with a partner.
2. Discuss the *Frequent Flyer* archetype.
3. Explore screenshots of www.flypittsburgh.com.
4. Fill out the basics: purpose, methodology, participants, recruitement.
5. Come up with 5 tasks for the *Frequent Flyer* archetype.

Discussion

1. What did you fill out for purpose?
2. How did you specify the methodology?
3. Who are the participants?
4. How are you recruiting them?
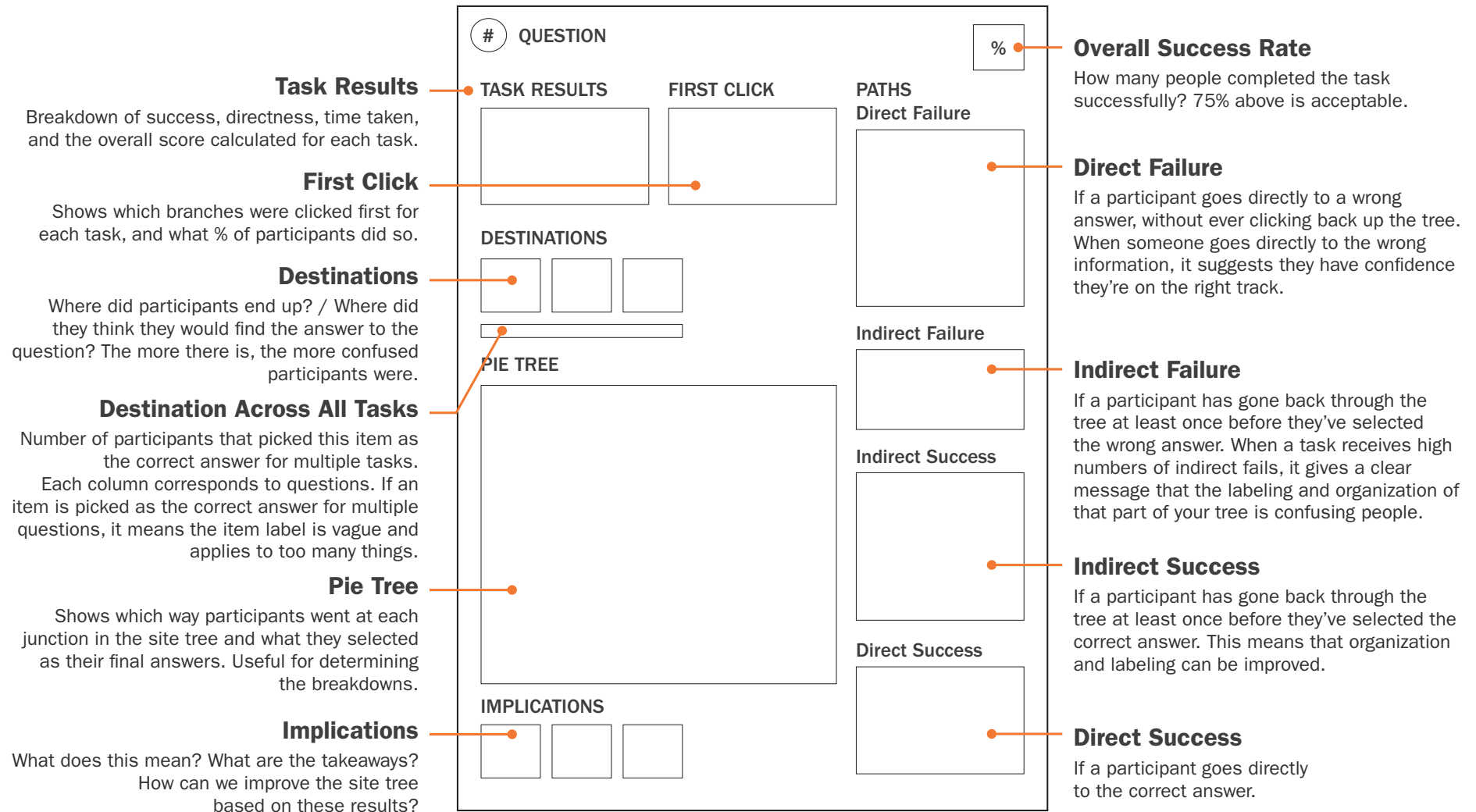5. What are some of the tasks you came up with?
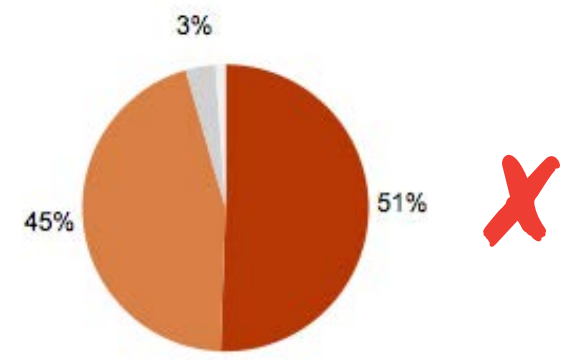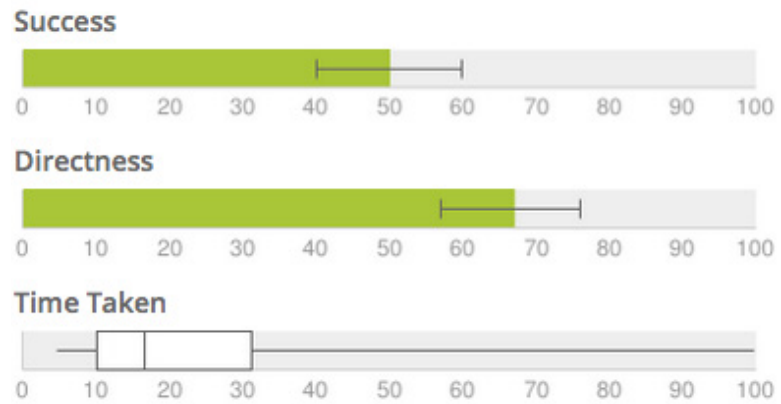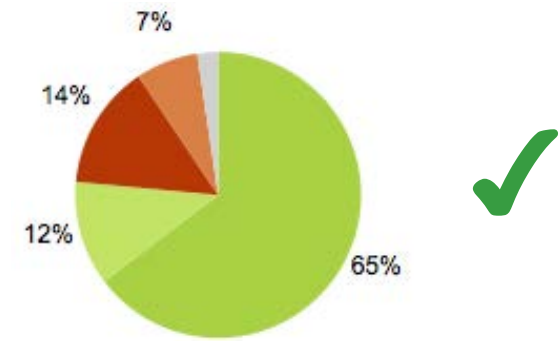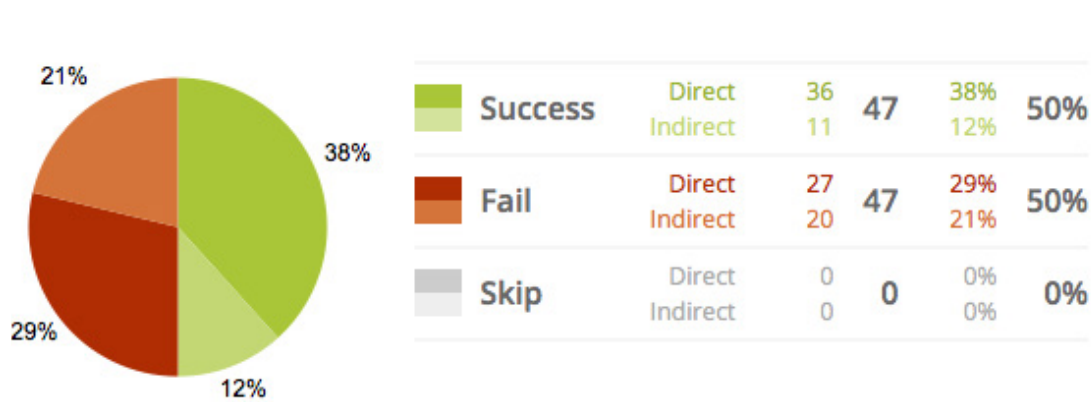
What questions do you have?
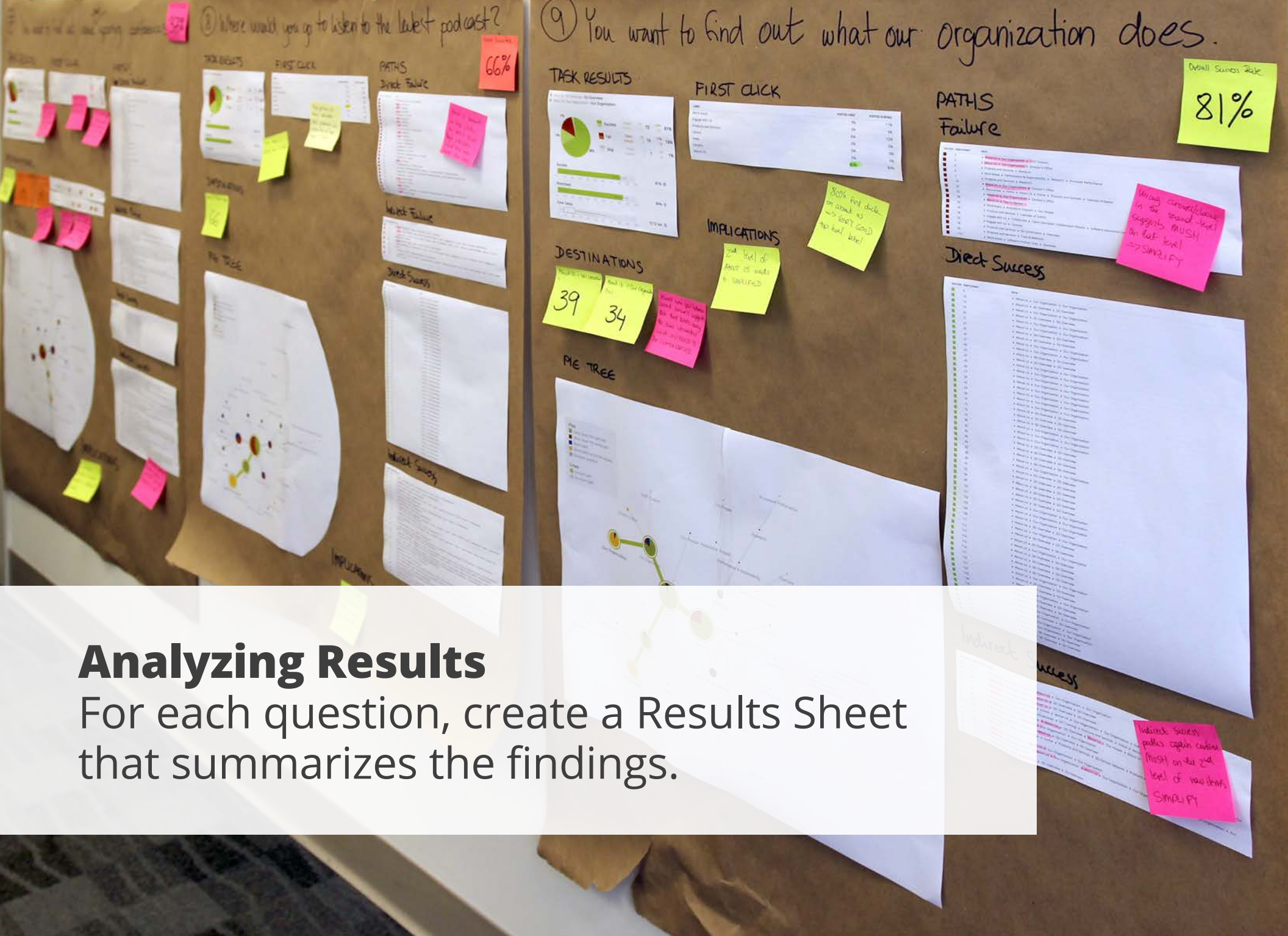
Analyzing Results

For each question, create a Results Sheet that summarizes the findings.

Results Sheets

Task Results

Breakdown of success, directness, time taken, and the overall score calculated for each task.

First Click

Shows which branches were clicked first for each task, and what % of participants did so.

Destinations

Where did participants end up? / Where did they think they would find the answer to the question? The more there is, the more confused participants were.

Destination Across All Tasks

Number of participants that picked this item as the correct answer for multiple tasks.
Each column corresponds to questions. If an item is picked as the correct answer for multiple questions, it means the item label is vague and applies to too many things.

Pie Tree

Shows which way participants went at each junction in the site tree and what they selected as their final answers. Useful for determining the breakdowns.

Implications

What does this mean? What are the takeaways? How can we improve the site tree based on these results?

QUESTION

TASK RESULTS   **FIRST CLICK**

DESTINATIONS

PIE TREE

IMPLICATIONS

PATHS
Direct Failure

Indirect Failure

Indirect Success

Direct Success

%

Overall Success Rate

How many people completed the task successfully? 75% above is acceptable.

Direct Failure

If a participant goes directly to a wrong answer, without ever clicking back up the tree. When someone goes directly to the wrong information, it suggests they have confidence they're on the right track.

Indirect Failure

If a participant has gone back through the tree at least once before they've selected the wrong answer. When a task receives high numbers of indirect fails, it gives a clear message that the labeling and organization of that part of your tree is confusing people.

Indirect Success

If a participant has gone back through the tree at least once before they've selected the correct answer. This means that organization and labeling can be improved.

Direct Success

If a participant goes directly to the correct answer.

Task Results

Breakdown of success, directness, time taken, and the overall score calculated for each task.

Success	Direct	36	47	38%	50%
	Indirect	11		12%	
Fail	Direct	27	47	29%	50%
	Indirect	20		21%	
Skip	Direct	0	0	0%	0%
	Indirect	0		0%	

Success — 50% ⊕

Directness — 67% ⊕

Time Taken — 16.56 sec ⊕

First Click

Shows which branches were clicked first for each task, and what percentage of participants did so.

✔️

LABEL	VISITED FIRST	VISITED DURING
Work Areas	9%	11%
Engage with Us	3%	3%
Products and Services	8%	12%
Library	0%	0%
News	0%	0%
Careers	0%	0%
About Us	80%	89%

❌

LABEL	VISITED FIRST	VISITED DURING
Work Areas	20%	32%
Engage with Us	13%	28%
Products and Services	14%	28%
Library	25%	41%
News	21%	33%
Careers	1%	3%
About Us	4%	15%

Pie Tree

Shows which way participants went at each junction in the site tree and what they selected as their final answers.
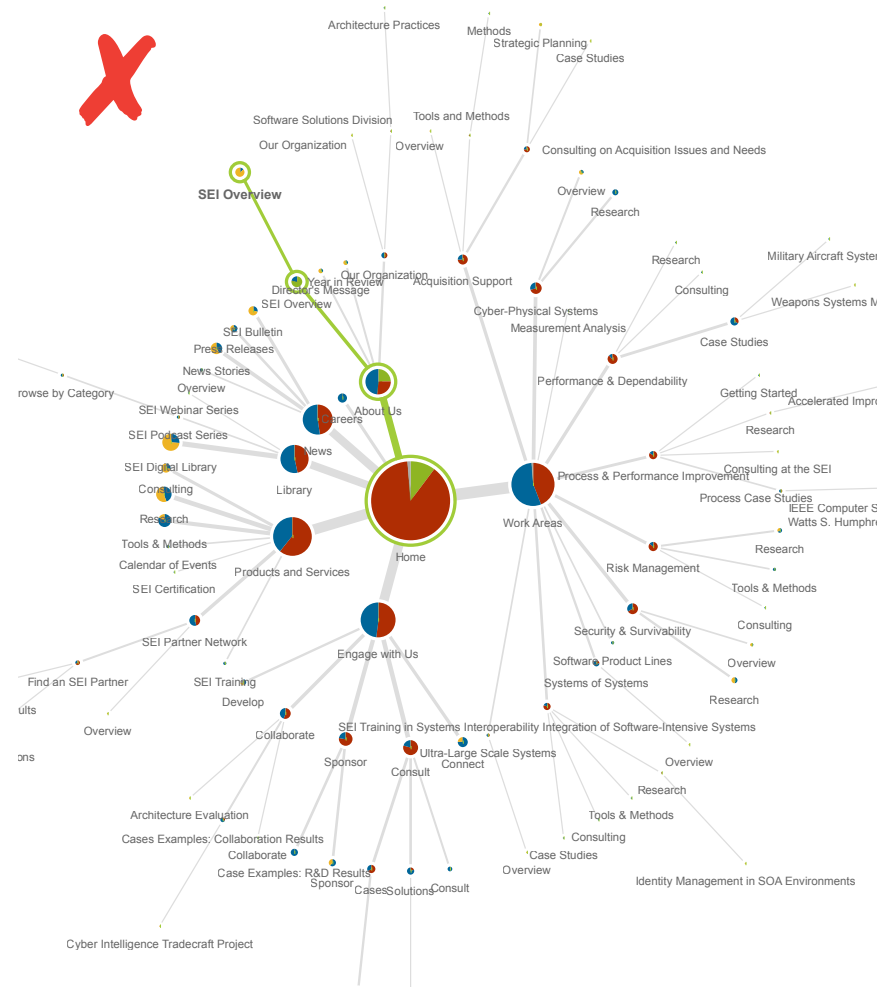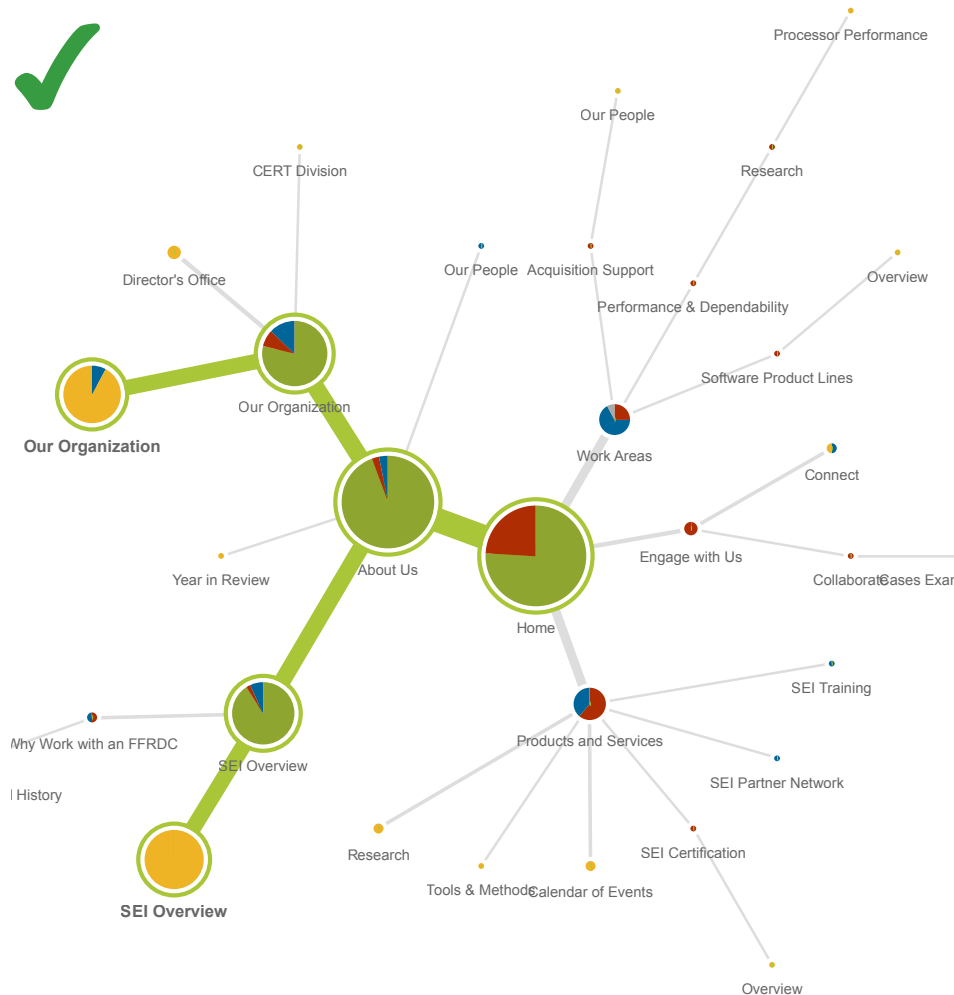
Paths

Direct Failure

| | 10 | ⟩ News ⟩ Overview ⟩ SEI Article | ✗ |

Indirect Skip

| | 174 | ⟩ Products and Services ⟩ Consulting ⟨ Home ⟩ Library ⟨ Home ⟩ Work Areas ⟨ Home ⟩ Engage with Us ⟨ Home ⟩ About Us ⟨ Home and Services ⟨ Home ⟩ Engage with Us ⟨ Home ⟩ Work Areas ⟩ Acquisition Support ⟨ Work Areas ⟨ Home ⟩ News ⟨ Home ⟩ Engage Home ⟩ Library ⟩ SEI Digital Library ⟨ Home ⟩ About Us ⟨ Home ⟩ Careers ⟨ Home ⟩ News ⟨ Home ⟩ Library ⟨ Home ⟩ Products and Tools & Methods ⟨ Home ⟩ Work Areas ⟩ *Skipped* | ✗ |

Indirect Failure

| | 122 | ⟩ Work Areas ⟩ Risk Management ⟩ Consulting ⟨ Risk Management ⟩ Our People ⟨ Risk Management ⟨ Work Are ⟩ Consult ⟩ Consult ⟨ Engage with Us ⟨ Home ⟩ Work Areas ⟩ Risk Management ⟩ Consulting ⟨ Risk Manageme ⟨ Home ⟩ Engage with Us ⟩ Consult ⟩ Consult ⟩ Consult ⟨ Engage with Us ⟨ Home ⟩ Products and Services ⟩ R Products and Services ⟨ Home ⟩ Work Areas ⟨ Home ⟩ Work Areas ⟨ Home ⟩ Work Areas ⟩ Risk Management ⟩ Risk Management ⟩ Consulting ⟨ Risk Management ⟩ Consulting | ✗ |

Indirect Success

| | 63 | ⟩ Engage with Us ⟩ Connect ⟨ Engage with Us ⟩ Consult ⟩ Solutions ⟨ Engage with Us ⟩ Develop ⟨ Engage with Us ⟨ Home ⟩ Products and Services ⟩ Consulting ⟨ Products and Services ⟩ SEI Partner Network ⟨ Products and Services ⟩ Tools & Methods ⟨ Products and Services ⟨ Home ⟩ Engage with Us ⟨ Home ⟩ Work Areas ⟨ Home ⟩ Engage with Us ⟩ Consult ⟩ Solutions ⟨ Engage with Us ⟩ Connect ⟨ Engage with Us ⟨ Home ⟩ Careers ⟨ Home ⟩ Products and Services ⟩ Tools & Methods ⟨ Home ⟩ Engage with Us ⟩ Consult ⟩ Consult | ↗ |

Direct Success

| | 90 | ⟩ Library ⟩ SEI Digital Library | ✓ |

Destinations

Where did participants end up?

	TASK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Testing Centers			1			2									
✔ Calendar of Events					1	1	36	2	2			1	5		
Tools & Methods	1	1	6	2		1		2	1		6		4	10	
✘ Research	8	33	7	14	19	3	1		2	10	13		1	1	
Consulting	2			1	2	1				3	2		1	27	
Library															
SEI Digital Library	23	4	39	1	3			2			51		2	1	6
SEI Podcast Series			5					66							
SEI Webinar Series	1		5		1	1	1				1		4		

Implications

What does this mean? What are the takeaways? How do we fix it?

Exercise 2

Tree Testing Analysis

Exercise

Analyze tree testing results. What are the **implications**? Do you have any **recommendations** for improving Pittsburgh airport's website?

🕐 **30 mins**

Instructions

1. Find your partner: match question numbers printed on the cover of your handout folder.

2. Create results sheets for the questions you have in your folder.

3. Discuss results together, annotating the sheets with implications on post-its and highlighting problematic or successful areas.

Discussion

Each group presents results for one question.

1. What do the results mean?
2. What are the takeaways?
3. How do we fix the identified problems?

What questions do you have?

2

Evaluate Current State *(Continued)*

Think-Aloud Protocol

Heatmaps & Click Tracking
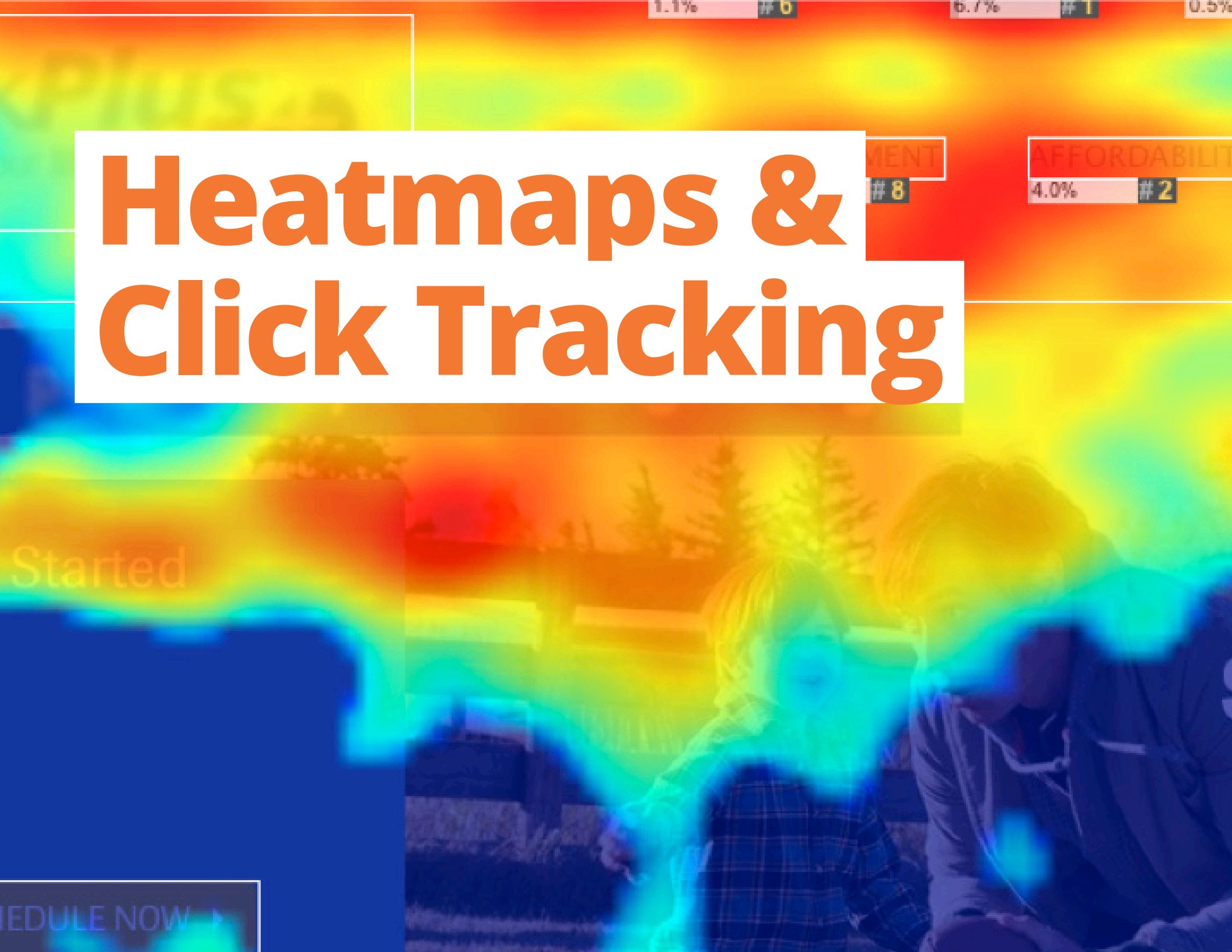
3
Fill in the Gaps

Survey

Expert Interviews

Search Log Analysis

Competitive Analysis

4

Create New IA

Card Sorting

Butcher Paper IA

Task Flow Diagrams

5
Test & Refine New IA

Click Testing

Example

Proposed IA

| About | Research | Capabilities | Education | Publications | News |
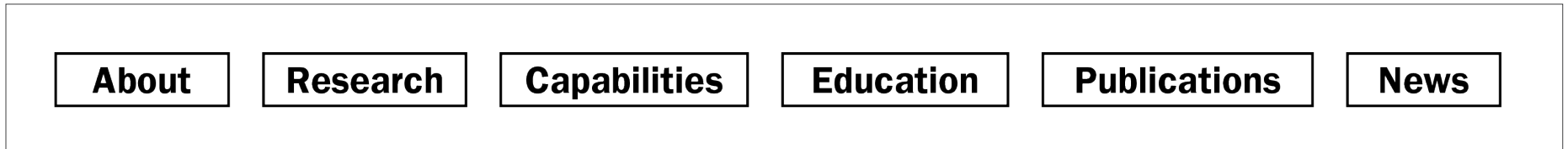
Example

Proposed IA + Heatmap

72%

Compare: Original First Click

Work Areas	3%
Engage with Us	36%
Products and Services	16%
Library	1%
News	**33%**
Careers	1%
About Us	9%

118%
Improvement

Tree Testing

Our Organization

Director's Office

Our Organization

Our People   Acquisition Support

Performanc

Work Areas

About Us

Year in Review

Home

Enga

Why Work with an FFRDC

SEI Overview

SEI Statistics and History

SEI Overview

Products and Services

Research

Tools & Methods   Calendar of Events

SEI

SEI UX Tools

- Crazy Egg
- Optimal Workshop
- Piwik
- Qualtrics
- UsabilityHub
- UserTesting.com

Other UX Tools

- ClickHeat
- ClickTale
- Loop11
- Optimizely
- SurveyMonkey
- UsabilityTools
- UserZoom

Books, Reports & Online Resources

- **Boxes and Arrows**: http://boxesandarrows.com/tree-testing/
- **Communicating Design**, Dan M. Brown
- **Information Architecture**, Louis Rosenfeld, Peter Morville & Jorge Arango
- **Nielsen Norman Group**: Intranet Information Architecture Design Methods and Case Studies 2nd Edition
- **Optimal Workshop Blog**: http://www.optimalworkshop.com/blog
- **TED Archetypes**: https://hello.ted.com/2014/02/13/how-user-archetypes-lead-to-design-decisions/
- **Universal Methods of Design**, Bella Martin and Bruce Hanington
- **Web Usability**: http://webusability.com/firstclick-usability-testing/

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Keep in touch!

BARBORA BATOKOVA

✉ bbatokova@sei.cmu.edu