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A dark blue silhouette of a mountain peak or a stylized roofline.  
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# DESIGNING FOR PRODUCTIVITY

Ben Werner

Usability Engineer



# Introduction

- ▶ My name is Ben Werner!
- ▶ I'm a Usability Engineer.
- ▶ My background is in Human-Computer Interaction (HCI).
- ▶ I'm interested in the scientific study of how people interact with technology.

# Outline

- ▶ Overview
- ▶ Understanding the Problem
- ▶ The Productivity Design Process:
  - Identifying Tasks
  - Task Redesign
  - Implementing Improved Workflows
  - Testing and Refinement
- ▶ Conclusions
- ▶ Question & Answer

# Overview

- ▶ This talk will present a simple *process* for improving the productivity of agents.
- ▶ There are 4 basic steps to this process:
  - Identify the interaction you are improving
  - Redesign the interaction
  - Implement the redesign
  - Test out the implementation and do further refinement

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# UNDERSTANDING THE PROBLEM



# Understanding the Problem

- ▶ What variable has the largest impact on worker throughput for computer systems?

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- ▶ Usability!

# Understanding the Problem

- ▶ What variable has the largest impact on worker throughput for computer systems?
- ▶ Usability!
- ▶ Consider that there are multiple dimensions that make up usability.

# Understanding the Problem: Four Factor Model of Usability

- ▶ Learnability
- ▶ Effectiveness
- ▶ Efficiency
- ▶ Satisfaction

# Understanding the Problem: Four Factor Model of Usability

- ▶ **Learnability** - How fast can a new user get up to speed?

# Understanding the Problem: Four Factor Model of Usability

- ▶ Learnability
- ▶ Effectiveness - How well does the system meet the needs of the user? Does it help them achieve their goal?

# Understanding the Problem: Four Factor Model of Usability

- ▶ Learnability
- ▶ Effectiveness
- ▶ **Efficiency** - What is the maximum level of productivity that can be reached for experienced users?

# Understanding the Problem: Four Factor Model of Usability

- ▶ Learnability
- ▶ Effectiveness
- ▶ Efficiency
- ▶ **Satisfaction** - What emotional response does the system elicit when it is used?

# Understanding the Problem: Four Factor Model of Usability

- ▶ Learnability
- ▶ Effectiveness
- ▶ Efficiency
- ▶ Satisfaction

# Understanding the Problem: Four Factor Model of Usability

- ▶ For certain types of User Interfaces (UIs), a couple of these factors will be more important than others.
- ▶ In other UIs, factors will actually conflict!
- ▶ How can you tell what matters most?
- ▶ *You must have a deep understanding of the users that you are developing for.*

# Understanding the Problem

- ▶ Agent salaries account for the single largest proportion of the budget in most contact centers\*.
- ▶ Contact centers have long been interested in improving the productivity of their workforce.
- ▶ Managers often attempt to measure and improve productivity using various Key Performance Indicators (KPIs).

\*Mean: 55.1% of the operating budget. 2008 US Contact Center Operational Overview

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SUMMIT 09

# Understanding the Problem

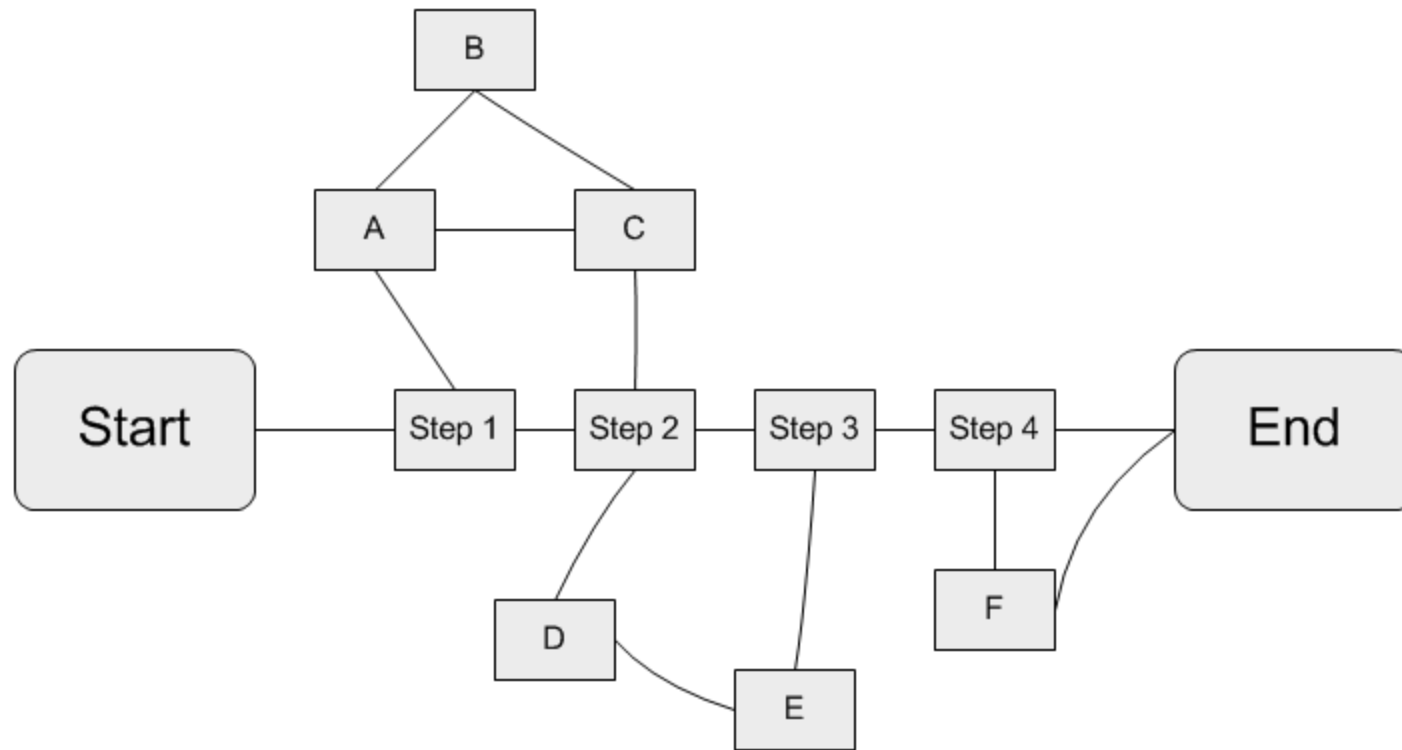
- ▶ Some of the KPIs used are:
  - Incidents handled/hour
  - Data entry speed and accuracy
  - Number or value of sales
  - Call time
  - Wrap-up time
  - First contact resolution (FCR)
  - Utilization
  
- ▶ FCR and sales are the most important KPI's.

# Understanding the Problem

- ▶ If FCR is most important, do the other metrics matter?
  - Yes! Just maybe not to reward individual agents.
  - Forcing other KPI's may reduce FCR. This is bad.
- ▶ On all interactions there is a critical path.
- ▶ If you can enforce and/or shorten the critical path, you improve productivity!

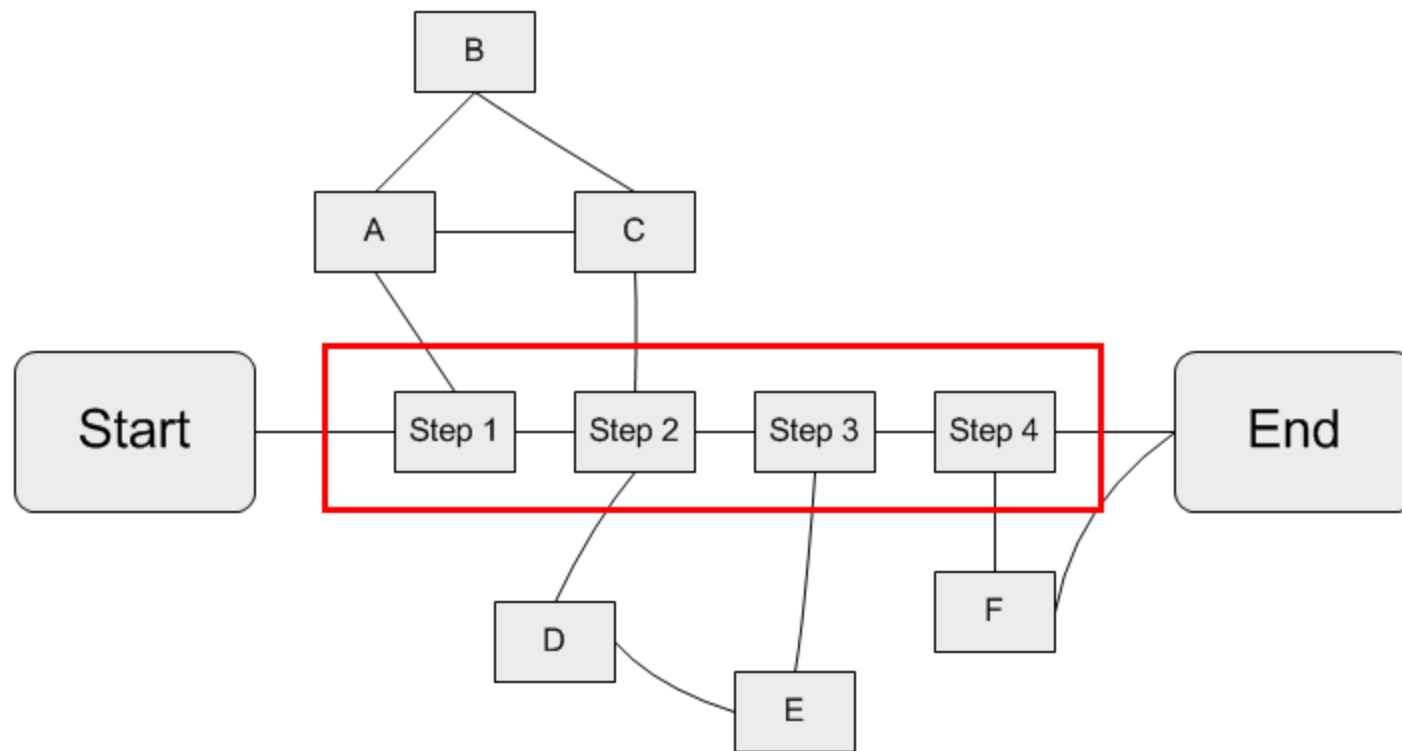
# Understanding the Problem

- ▶ Here's an example of a task flow:



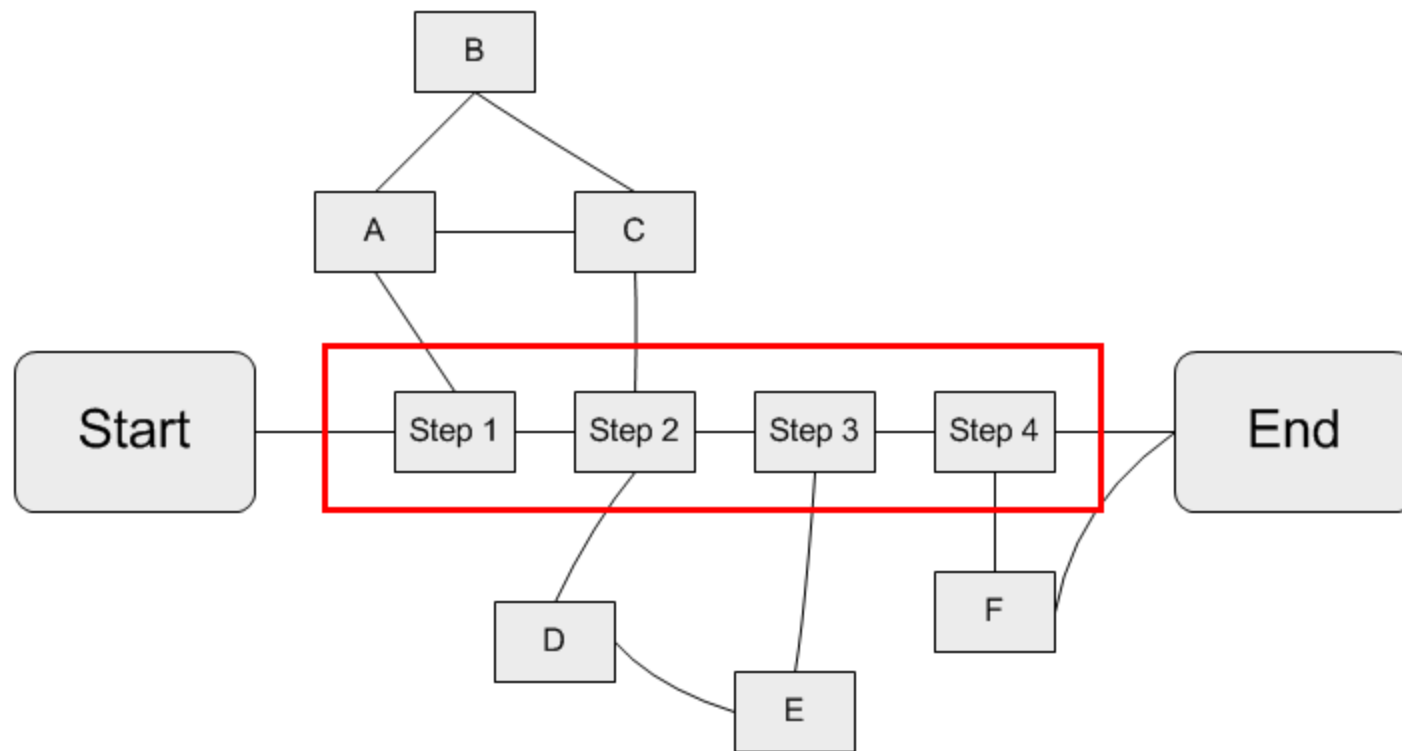
# Understanding the Problem

- ▶ Here's our critical path:



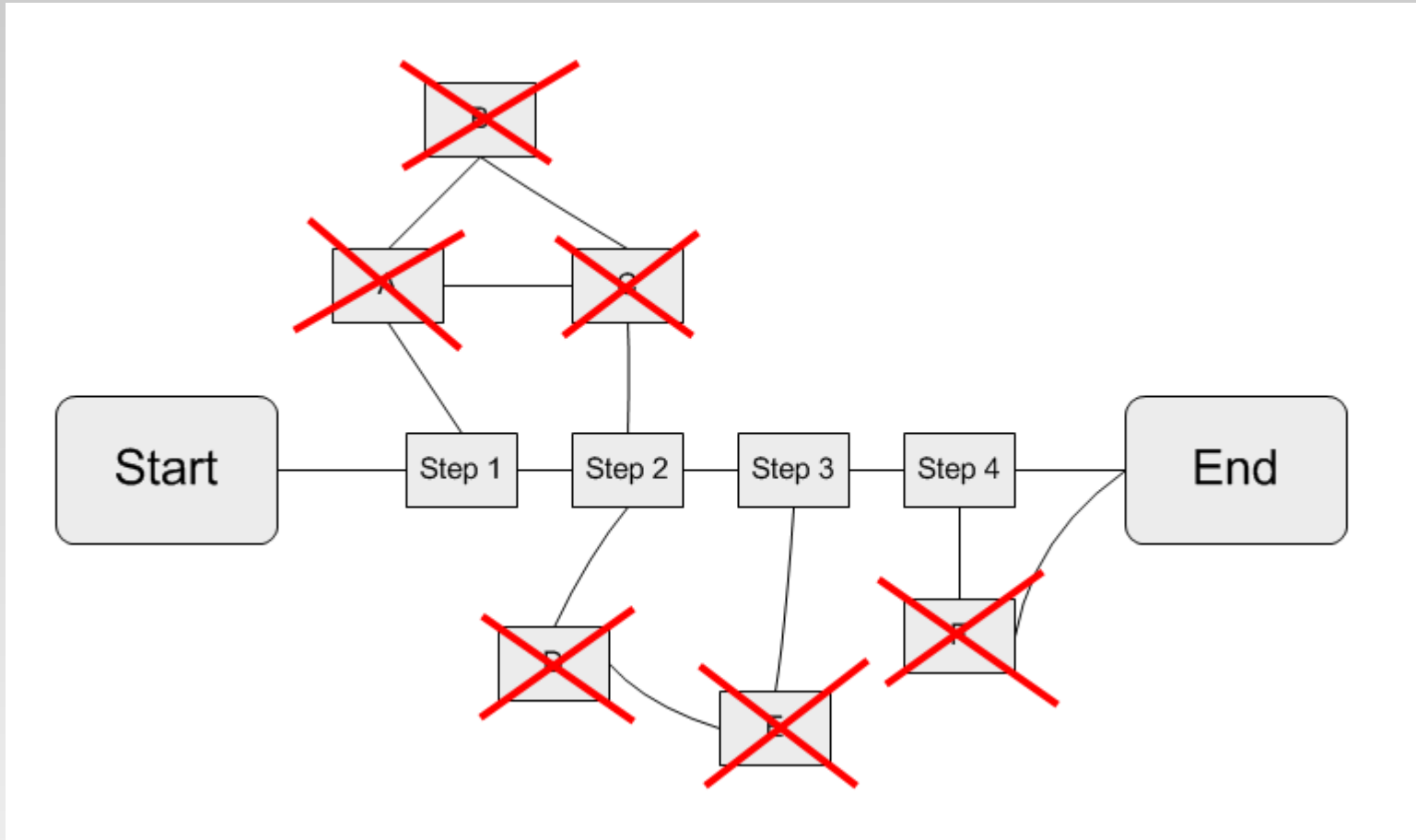
# Understanding the Problem

- ▶ Here's what enforcement looks like:



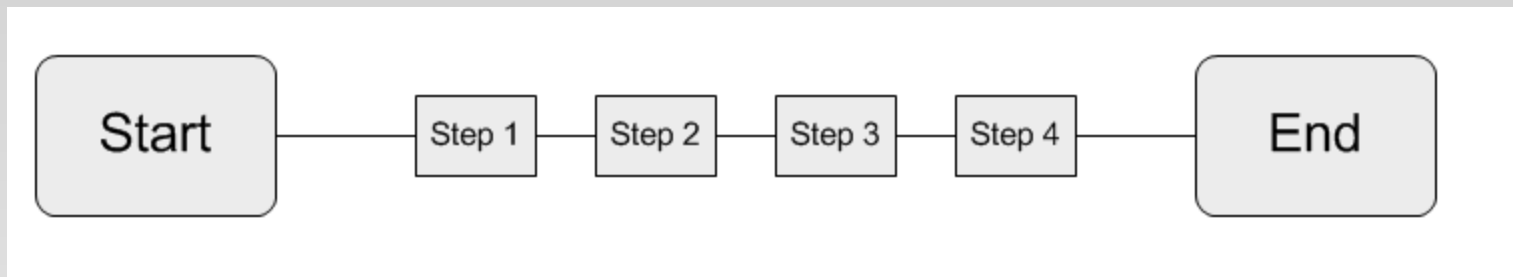
# Understanding the Problem

- ▶ Here's what enforcement looks like:



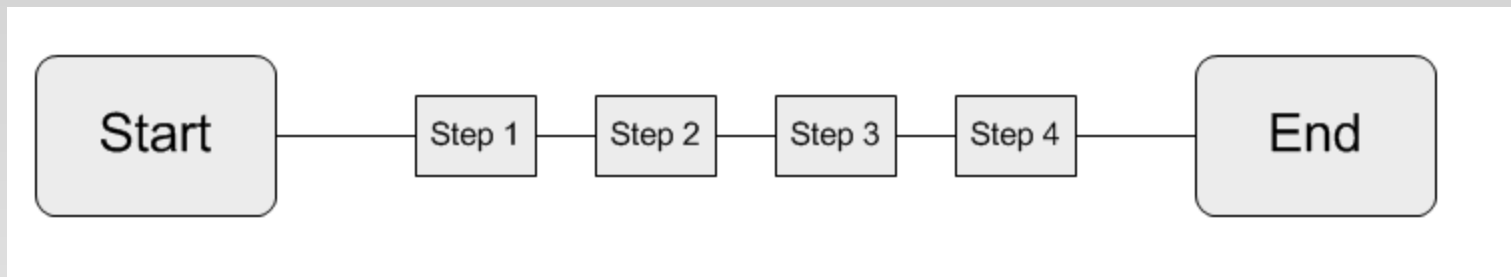
# Understanding the Problem

- ▶ Here's what enforcement looks like:



# Understanding the Problem

- ▶ Here's what shortening looks like:



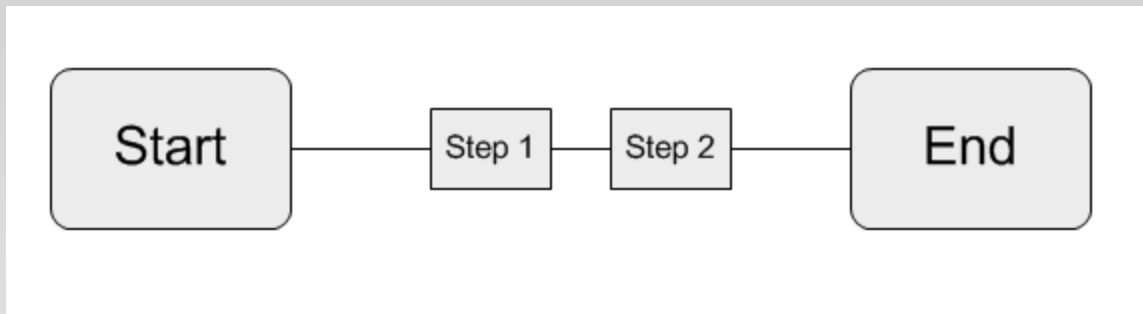
# Understanding the Problem

- ▶ Here's what shortening looks like:



# Understanding the Problem

- ▶ Here's what shortening looks like:



# Understanding the problem: Systems thinking and task analysis

- ▶ The artifacts, people, and process that an agent interacts with affect her productivity.
- ▶ Consider the complex interplay of all of these components:
  - There are a lot of things going on here!
- ▶ To achieve the biggest gains in productivity, this requires systems thinking.

# Understanding the problem: Systems thinking and task analysis

- ▶ Does bright lighting improve worker productivity?

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  - Yes. So does dim lighting!

# Understanding the problem: Systems thinking and task analysis

- ▶ Does bright lighting improve worker productivity?
  - Yes. So does dim lighting!
- ▶ This is know as the Hawthorne effect, named after a series of productivity experiments with factory work in the 1920's.

# Understanding the problem: Systems thinking and task analysis

- ▶ Does bright lighting improve worker productivity?
  - Yes. So does dim lighting!
- ▶ This is know as the Hawthorne effect, named after a series of productivity experiments with factory work in the 1920's.
- ▶ This has important implications for you...

# Understanding the problem: Systems thinking and task analysis

- Keep in mind that computers are good for certain things and humans are naturally good for others.

Humans	Computers
<ul style="list-style-type: none"><li>- Dealing with conflicting data</li><li>- Problem solving</li><li>- Making inferences</li><li>- Visual processing</li></ul>	<ul style="list-style-type: none"><li>- Processing data quickly</li><li>- Repetitive tasks</li><li>- Being consistent</li><li>- Remembering details</li></ul>

- Use automation where appropriate!

# Understanding the problem: Systems thinking and task analysis

- ▶ The remainder of this talk will focus on a systems thinking approach to productivity.
- ▶ Remember that repetitive tasks are not only bad for productivity but can cause Repetitive Stress Injury (RSI).
- ▶ This methodology draws on research done in Ergonomics, which is the scientific study of human work.

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# THE PRODUCTIVITY DESIGN PROCESS



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# THE PRODUCTIVITY DESIGN PROCESS

## Identifying Tasks



# Identifying Tasks

- ▶ Before you can improve “it” you have to know what “it” is!
- ▶ Many tasks can be identified based on your own knowledge. Other tasks you’ll need to go and talk with the folks who DO the work.
- ▶ These user interviews should be open ended, and focused on understanding what is that people really do (as opposed to “supposed to do”).

# Identifying Tasks

- ▶ Organizational Psychologists are the experts at identifying user goals & tasks in a work environment through interviews.
- ▶ You don't have to hire a Psychologist - just try and think like one.
- ▶ In the next video:
  - What is this employee's goal?
  - What tasks he responsible for

# Identifying Tasks



[Watch Video](#)

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# Identifying Tasks

- ▶ While this is a bit of a silly example, it does present us with a basic task that we can use for the purpose of this presentation:

**Goal:** Do as little as possible

**Task:** Transfer specifications

**Subtask 1:** Receive specifications from the fax machine.

**Subtask 2:** Hold onto specifications.

**Subtask 3:** Bring specs to the engineers.

**Subtask 3a:** Ask secretary to bring specs to the engineers.

**Subtask 3b:** Bring specs personally to engineers.

# Identifying Tasks

- ▶ You will certainly have many agent tasks to indentify and document.
  - This can be a daunting undertaking.
- ▶ I recommend you start small with a set of tasks you already understand well, and then sit down with the current system and a user and have them show you how they do it.
- ▶ This method is called Contextual Inquiry\*.

\*Beyer and Hotzbatt, Contextual Inquiry: A Participatory Technique for System Design, 1993

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# THE PRODUCTIVITY DESIGN PROCESS

## Task Redesign



# Task Redesign

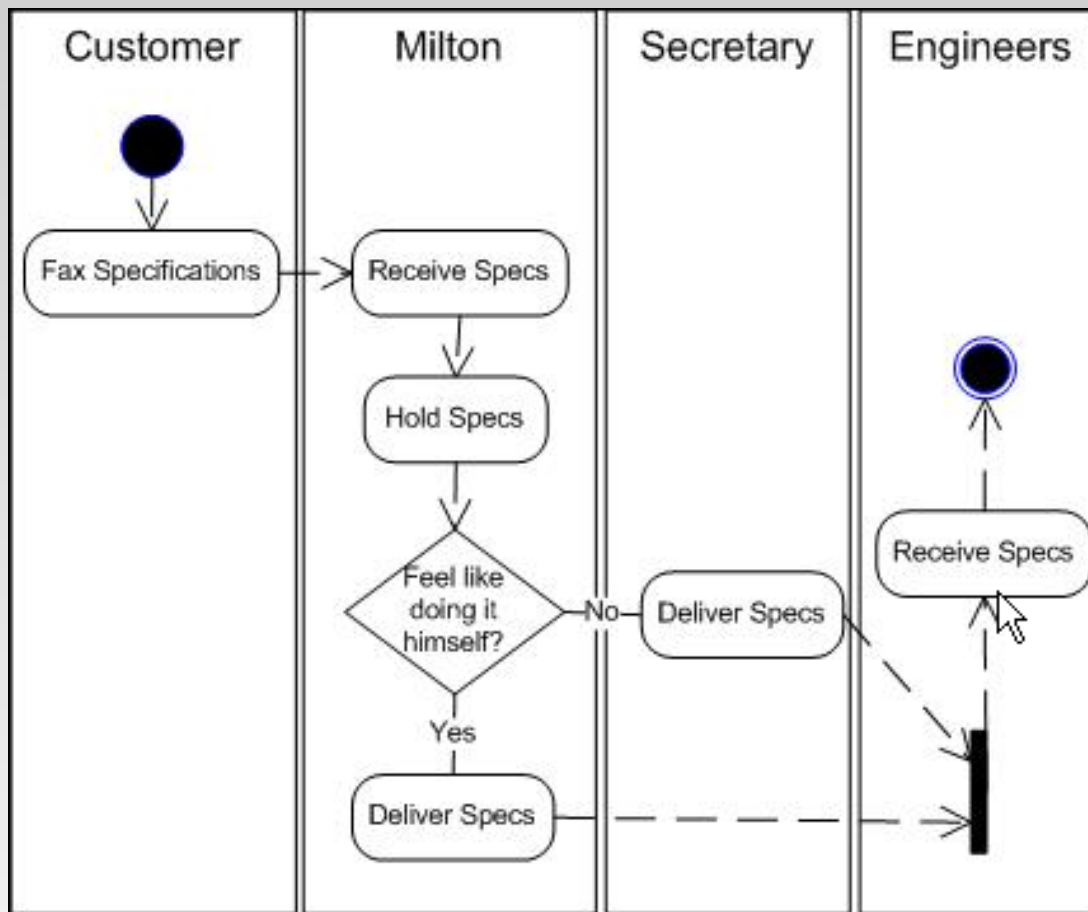
- ▶ After doing your homework to identify the tasks, certain things will be obvious.
- ▶ Other things will be less obvious.
- ▶ To assist in discovering the less obvious, draw out the current and improved tasks.
- ▶ There are many tools available to assist with this.

# Task Redesign

- ▶ In my opinion, the modeling notation you use is not that important.
  - UML (Unified Modeling Language)
  - BPMN (Business Process Modeling Notation)
  - Basic flow charts or diagrams
- ▶ The point of modeling is to visually communicate a complicated process so that appears simple.

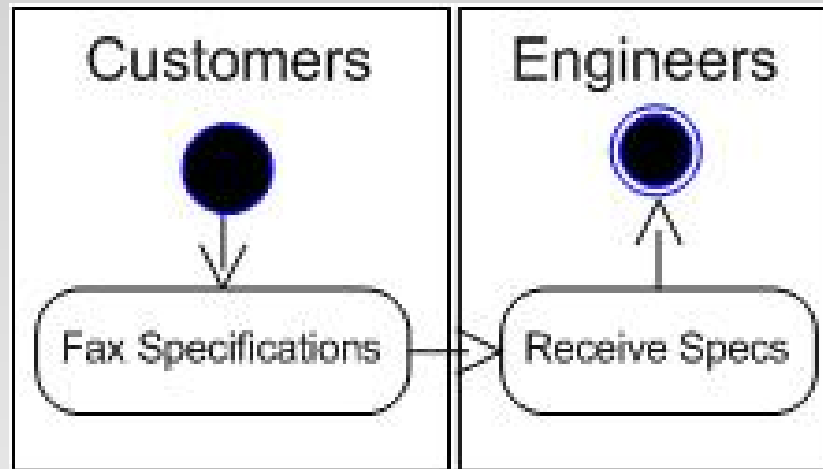
# Task Redesign

- Unified Modeling Language (UML) Activity Diagram



# Task Redesign

- Unified Modeling Language (UML) Activity Diagram

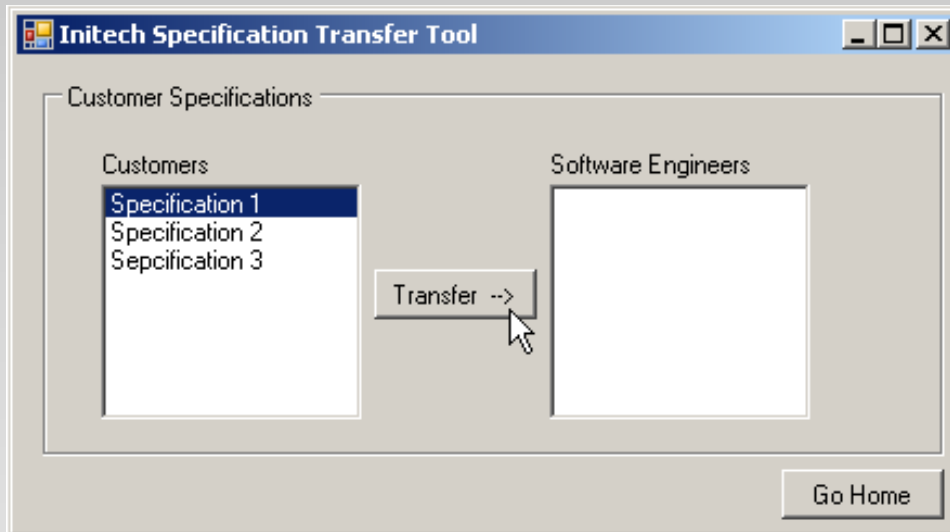


# Task Redesign

- ▶ What happens if you fail to redesign the entire work system and instead redesign only the UI?

# Task Redesign

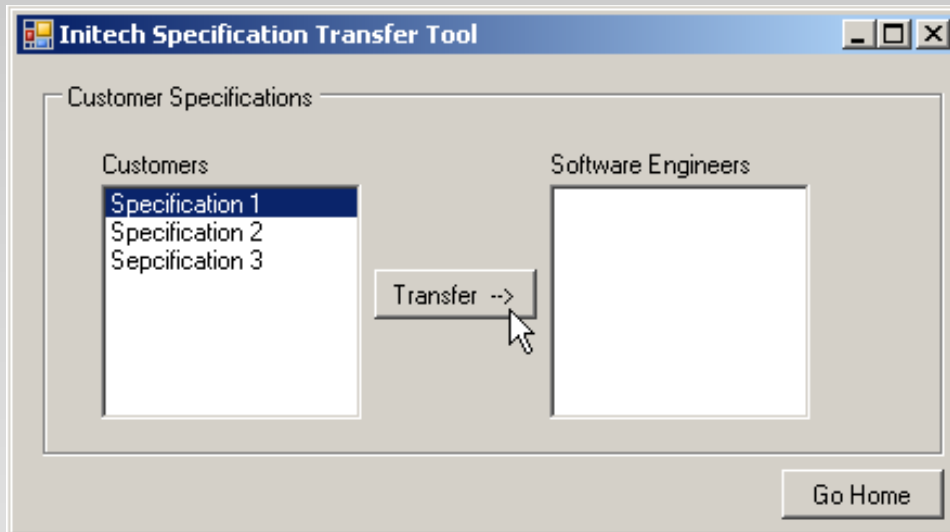
- ▶ What happens if you fail to redesign the entire work system and instead redesign only the UI?



- ▶ This interface might achieve small productivity gains for Milton...

# Task Redesign

- ▶ What happens if you fail to redesign the entire work system and instead redesign only the UI?



- ▶ This interface might achieve small productivity gains for Milton...
- ▶ What's really needed here is to eliminate Milton from the system completely!

# Task Redesign


- ▶ There are other situations where the process is already efficient, but the UI gets in the way.
- ▶ Consider Address Entry in the RightNow system.
- ▶ With the out of the box design, this requires lots of clicking and extra keystrokes to input a street address.

# Task Redesign

## ► Address entry in RightNow:

Address   [Edit](#)



Address US  [Edit](#)


Street

City

Country

State/Prov

Postal Code

Address US  [Edit](#)


Street

City

Country

State/Prov

Postal Code

Address US  [Edit](#)


Street


City

Country

State/Prov

Postal Code



Address US  [Edit](#)

Street

City


Country


State/Prov

Postal Code

opportunities (0)

Name	Assigned	Status
MT		
NC		
ND		
NE		



Address 136 Enterprise Blvd  
Bozeman US  [Edit](#)

Street

City


Country


State/Prov

Postal Code

opportunities (0)

Name	Assigned	Status
MT		
NC		
ND		
NE		



Address US  [Edit](#)

Street

City

Country

State/Prov

Postal Code

Address 136 Enterprise Blvd.  
Bozeman MT 59718 US

[Edit](#) 

# Task Redesign

- ▶ Using KLM-GOMS\* , we can benchmark interaction time: 17.12 seconds

**Point the mouse to the “Edit” link.**

**Click on the link.**

+ 1.1 seconds

+ 0.2 seconds

**Move the mouse hand back to keyboard.**

**Type in a street “136 Enterprise Blvd.”**

+ 0.4 seconds

+ 5.6 seconds

**Press -Tab- to change focus to the city field.**

**Type in the city “Bozeman”.**

+ 0.28 seconds

+ 1.96 seconds

**Move the mouse hand back to the mouse.**

**Point the mouse to the State down.**

**Click on the State drop down.**

+ 0.4 seconds

+ 1.1 seconds

+ 0.2 seconds

**Point the mouse to the scroll bar.**

**Click and hold on the scroll bar.**

**Drag the scrollbar so that the correct state shows up.**

**Release the button.**

+ 1.1 seconds

+ 0.1 seconds

+ 1.1 seconds

+ 0.1 seconds

**Point the mouse to the correct state “MT”.**

**Click on “MT”.**

+ 1.1 seconds

+ 0.1 seconds

**Move mouse hand back to keyboard.**

**Press -Tab-.**

**Type in the postal code “59718”.**

+ 0.4 seconds

+ 0.28 seconds

+ 1.4 seconds

**Press -Enter-.**

+ 0.28 seconds

\* (Keystroke-Level Model of Goals Operators Methods Selection analysis).

# Task Redesign

- ▶ KLM-GOMS is the simplest variant in the GOMS family of modeling techniques.
- ▶ It is one of the most highly researched areas in all of Ergonomics.
- ▶ GOMS was invented by directly observing 72,450 agent-customer interactions, and then breaking these interactions down into atomic pieces.

# Task Redesign


- ▶ Using this framework we can predict how long it will take to work through an interface\*:

Move hand from keyboard to mouse	<b>0.4 seconds</b>
Point the mouse to something	<b>1.1 seconds</b>
Click the mouse	<b>0.2 seconds</b>
Move hand back to keyboard	<b>0.4 seconds</b>
Type a character on the keyboard	<b>0.28 seconds</b>

\* On average, KLM-GOMS is accurate to about +/-3% for a random sample of computer operators.

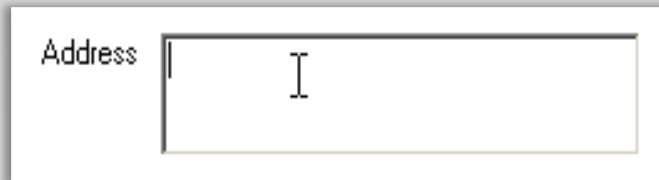
# Task Redesign

- ▶ What if we used Google Maps to automate city/state lookup?
- ▶ TOTAL TIME: 10.86 seconds



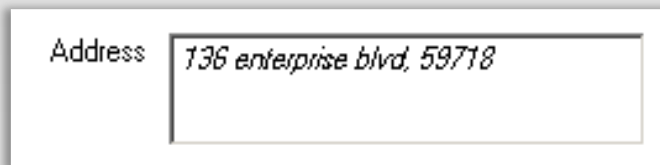
Address

**Move mouse to field.**  
+ 1.1 seconds



Address

**Click inside the field.**  
+ 0.2 seconds



Address

**Type in the Street and Zip code**  
**“136 enterprise blvd, 59718”.**  
+ 7.28 seconds



Address

**Press –Enter–.**  
**Wait for server to validate results.**  
+ 0.28 seconds  
~ 2 seconds  
+ ~2 seconds

# Task Redesign

- ▶ Pushing down automation to the computer and allowing the human to have a shortened critical path makes this task more efficient.
- ▶ Just by eliminating keystrokes and mouse clicks, 6.26 seconds have been saved for a 37% increase in efficiency.
- ▶ Do these 6 seconds matter? What are they worth?
- ▶ We can do a cost/benefits analysis to find out...

# Task Redesign

- ▶ The mean salary in the US for a tier 1 agent is \$27,946\*.
- ▶ Just divide Salary by  
(Workweeks [52]\*Hours[40]\*Mins[60]\*Seconds[60])  
to get salary per second.
- ▶ What is 1 second worth?
  - About .0037 cents.
- ▶ This doesn't seem like much does it?

# Task Redesign

- ▶ Consider these system factors:
  - Interactions handled per day per agent
  - Days in a year
  - # of agents working in a contact center
  - # of total contact centers
- ▶ These factors often quickly compound when you consider the sheer volume of repetitiveness.
- ▶ For address entry, the improved address control (if used on 1/3<sup>rd</sup> of interactions) results in cost savings of \$176,373 for 1,000 seat contact center per year.

# Task Redesign

- ▶ If you are interested in diving deeper into KLM-GOMS and cost-benefits analysis, I recommend you read our technical publication:

*Agent Efficiency, Productivity, and the User Interface*

- ▶ Available in the Community Library at:

<http://community.rightnow.com/customer/library/>

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# THE PRODUCTIVITY DESIGN PROCESS

Implementing Changes in RightNow



# Implementing Changes in RightNow

- ▶ Now you are ready to explore different methods to implement the task redesign.
- ▶ If you do a cost/benefits analysis, you know exactly the value of implementation!
- ▶ Until you actually implement the changes, your cost benefit figure is just an idea on a piece of paper...

# Implementing Changes in RightNow

- ▶ RightNow offers a number of tools that can help with different aspects of productivity:
  - Contextual Workspaces
  - Guided Assistance
  - Agent Scripting
  - Workflow
  - Add-Ins
  
- ▶ How do you know which tool to use?

# Implementing Changes in RightNow

► Here is a brief overview of each tool:

<b>Tool:</b>	<b>What it does best:</b>
<b>Contextual Workspaces</b>	Dynamically fill out/hide other fields given value of a single field.
<b>Guided Assistance</b>	Enforce best practices for a troubleshooting flow.
<b>Agent Scripting</b>	Enforce a particular style of agent-customer interaction.
<b>Workflow</b>	Construct custom task flows.
<b>Add-Ins</b>	Automate a task or portion of a task.

# Implementing Changes in RightNow

- ▶ Recall there are two ways to improve productivity:

<b>Tool:</b>	<b>Enforces Critical Path?</b>	<b>Shortens Critical Path?</b>
<b>Contextual Workspaces</b>	No	Yes
<b>Guided Assistance</b>	Yes	No
<b>Agent Scripting</b>	Yes	No
<b>Workflow</b>	Yes	Yes
<b>Add-Ins</b>	No	Yes

# Implementing Changes in RightNow

- And four factors of usability:

	Improves Learnability	Improves Efficiency	Improves Effectiveness	Improves Satisfaction
<b>Contextual Workspaces</b>	May	Yes	Yes	<u>Yes</u>
<b>Guided Assistance</b>	Yes	No	Yes	May
<b>Agent Scripting</b>	<u>Yes</u>	No	Yes	No
<b>Workflow</b>	Yes	Yes	<u>Yes</u>	Yes
<b>Add-Ins</b>	May	<u>Yes</u>	Yes	Yes

# Implementing Changes in RightNow

- ▶ There is a considerable learning curve required to administer several of these tools.
  - Add-ins (Need Development experience)
  - Workflow (Need expert knowledge of RightNow)
  - Scripting
- ▶ Other tools have a faster admin learnability.
  - Guided Assistance
  - Contextual Workspaces

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# THE PRODUCTIVITY DESIGN PROCESS

Testing and Refinement



# Testing and Refinement

- ▶ In order to be successful, you need a feedback mechanism.
- ▶ This provides you with information on whether or not the project will be successful, and if you need a course correction.
- ▶ An extremely powerful feedback mechanism is Usability Testing.

# Testing and Refinement

- ▶ This basically just involves having a user sit down in front of your implementation and let them work through the redesign task.
- ▶ For more on how to conduct a basic Usability Test, I recommend you either:
  - Involve your company's User Experience group.
  - Read up on it and do it yourself.
- ▶ Google "Usability Testing on 10 cents a day" for an excerpt from Steve Krug's awesome book on do-it-yourself usability testing.

# Testing and Refinement

## Usability Testing

# Testing and Refinement

- ▶ Employees in general are resistant to change, because it bumps them out of their daily groove.
- ▶ A little squawking is normal - but this can get ugly if the task redesign and implementation is done poorly.
- ▶ If you do Usability Testing, you'll know what steps you need to do to mitigate and prevent squawking.

# Testing and Refinement

- ▶ This many involve:
  - Creating a training or certification program.
  - Rolling out changes one at a time or all at once.
  - Incorporating user feedback to make tweaks.
  - Doing additional iterations of Usability Testing and task redesign.
- ▶ In general, if employees feel a sense of ownership or “being listened to”, they’ll be excited about the change.

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**CONCLUSIONS**



# Conclusions

- ▶ The least you can do:
  - Have the courage to involve agents in the design and testing process.
  - Think outside the “UI box” and consider the entire work system.
  - Use more than one iteration of the process.

# Additional Reading:

- ▶ 2008 Contact Center Operational Overview, Contact Babel, <http://www.contactbabel.com/reports.cfm>
- ▶ Agent Efficiency, Productivity, and the User Interface, RightNow Technical Publication, 2009, <http://community.rightnow.com/customer/library/>
- ▶ Don't Make Me Think, Steve Krug, 2005
- ▶ Project Ernestine (GOMS), <http://www.rpi.edu/~grayw/grayres/ernestine.html>

# Question and Answer