

# Problem Solving Training

## Table of Contents

<b>Training Objectives .....</b>	<b>1</b>
<b>Introductions Activity .....</b>	<b>1</b>
<b>What is Continuous Improvement? .....</b>	<b>2</b>
<b>Problem Solving – Why Do It? .....</b>	<b>2</b>
<b>Hiring Process Simulation .....</b>	<b>4</b>
<b>Evaluating the Current State .....</b>	<b>6</b>
<b>Stakeholder Analysis .....</b>	<b>8</b>
<b>Project Objective and Goals .....</b>	<b>9</b>
<b>Determining Root Cause .....</b>	<b>9</b>
<b>Determining Solutions .....</b>	<b>13</b>
<b>Action Plan .....</b>	<b>15</b>
<b>Additional Resources .....</b>	<b>16</b>

## Training Objectives

- Enhance your ability to identify and understand problems
- Learn steps and tools to help identify and solve root causes of problems
- Incorporate problem solving into your daily work
- Build your skills with CI tools

## Course Overview

- Housekeeping and ground rules
- Introductions
- Problem solving overview
- Use a scenario to practice:
  - Defining project objectives and goals
  - Determining root causes of a problem, and
  - Determining solutions
- Apply tools to your work

## Introduction Activity

What are your objectives for attending today's training?

What problems are you asked to solve in your role?

## What is Continuous Improvement?

Continuous Improvement (CI) is an ongoing effort to improve products, services, and processes.

There isn't just one way to solve a problem! **CI draws from many methods and problem solving tools to help us figure out how to work more efficiently and effectively.**

To do this, CI work focuses on customers and data.

**Customer Focus:** Design and improve services based on the customer needs and preferences. Provide what customers need, when they need it, and how they want it. Customers can be internal, external, and end-users.

**Data Driven Decisions:** Base decisions on quantitative analysis as well as qualitative inputs, like anecdote, experience, and intuition. We need data AND, not just data. Validate results with data. To understand if the implemented changes were effective, it is important to understand the current state of a situation.

In the Minnesota Office of Continuous Improvement, we call the work we do “solving problems that change lives!”

## Problem Solving – Why do it?

- Value: As a state agency we want to be operating as ‘lean’ as possible. Problem solving is a way to find opportunities to improve your work processes.
  - Save resources
- Problem solving involves everyone: from process owners to customers. Problem solving brings many forces together that exist separately for a desired outcome.
  - Makes work better for staff
  - Increases customer value and satisfaction
- Problem solving links to customer needs: recipient's needs, tax payer value, process owners, and other stakeholders. If you are involved in a process you have experienced problems inside of it. All these different perspectives are important and will be invaluable to the success of your problem solving efforts.

There are many different tools and methodologies that can be used during a problem solving process. We are going to be focusing on and practicing a select few in today's training.

Question	Scientific Method	Lean	Six Sigma	Human-centered Design	Tools
<i>What is the problem?</i>	Form Question	Plan ↓	Define	Empathize	Project Charter SIPOC Diagram Voice of the Customer Techniques Immersion/shadowing Problem and Goal Statements <b>Stakeholder Analysis</b> Benchmarking Stakeholder Map Team Norms Empathy Map
<i>Why is it happening?</i>	Make Hypothesis	↓	Measure	Define	Swim Lane Map Value Stream Map Spaghetti Map Process Analysis Control Chart Fishbone Diagram Statistics <b>Relations Diagram</b>
			Analyze		
<i>How can we fix it?</i>	Predict Outcome	Do	Improve	Ideate	<b>Brainstorming</b> Idea Box Ranking and Voting 2x2 Table <b>Impact/Difficulty Matrix</b> Cost/Benefit Analysis Prototype "How Might We" Statements
	Conduct Test	Study		Prototype	
<i>Did we achieve our goal? What adjustments still need to be made?</i>	Analyze Results	Act	Control	Test	Control Plan Standard Work Post-Project Review Storyboard Visual Measures

## Hiring Process Simulation

During today's training, you and your team will be working through a problem solving process using different tools and strategies. During this process you will:

- Identify what problem you want to solve
- Identify stakeholders and their needs
- Brainstorm possible causes for the problem and identifying cause categories by using an affinity diagram
- Learn and practice how to identify the root cause of a problem

### Here is the problem:

ABC Agency is a statewide, public sector, union-based organization with 2,000 employees. Offices are open Monday through Friday from 8:00a.m. to 4:30p.m.

- Twenty-five percent of ABC's employees are currently eligible to retire and another 25% will reach retirement age in the next five years.
- ABC filled 50 positions this past year and expects the number of new hires to double for the next seven years (100).
- On average it takes ABC four months from the time a manager or supervisor obtains authorization to hire a position to the time an offer letter is sent to the job candidate (80 days or 16 weeks).
- Because of the long time period, current employees appear to be overworked and the best candidates seem to be taking positions with other organizations.
- ABC Agency has also experienced an increase in the attrition rate of new hires in the past three years.

## Evaluating the Current State

### Process

- What process will you be looking at? What is the scope of the problem?

### Customers

- Who are the customers of this process? Who will benefit if this problem gets solved?

### People Who Do The Process

- Who are the people who complete the process steps?

### Process Metrics

- What quantitative and qualitative data would you want gather to better understand this problem?

### Improvement/Project Objectives

- What are you wanting to improve? Efficiency? Quality? Customer satisfaction?

## Evaluating the Current State (Continued)

We want to base decisions on quantitative analysis as well and qualitative inputs. To understand if the implemented changes were effective, it is vital to understand the current state of the situation.

In regards to the Hiring Process Simulation, what data would you want to have to understand why things are happening the way they are?

### Process Data

Data from the hiring process in the past has found that the entire process takes on average four months to fill a vacancy. Here is the high level hiring process and average time to complete each task:

1. Obtain authorization to hire (6 days)
2. Develop qualifications (10 days)
3. Determine posting requirements (4 days)
4. Develop recruiting plan (9 days)
5. Create requisition/position (6 days)
6. Post requisition/position and collect resumes (3 weeks)
7. Review Resumes (10 days)
8. Conduct Interviews (6 days)
9. Complete Pre-hire review (8 days)
10. Obtain salary approval (4 days)
11. Issue job offer (2 days)
12. Onboard employee (i.e., employee's first day) (10 days)

### Customer Feedback

Following are interviews from a few people that are part of the hiring process. This is how they are feeling about their current work environment:

<div data-bbox="253 1260 422 1461" data-label="Image"> </div> <p data-bbox="235 1543 438 1612"><b>Meredith, Unit Manager</b></p>	<p data-bbox="479 1245 1412 1680">I had a critical position that I needed to fill ASAP. I really wanted to hire someone that would overlap with the person who was retiring, so I contacted HR to get the process moving. They didn't give me a clear response for over a week and came back saying it wasn't possible. Even when I finally picked someone after waiting so long, it was hard to just figure out their start date. One of my other positions, I have had to repost it three times because our first choice kept on taking different positions elsewhere. I can tell that my staff are overworked and feeling the pressure to take on more work even though it's not their job. I want to give them answers to when there will be someone new soon, but now I don't think they believe that we are trying to hire someone new at all.</p>
--	--

 <p><b>Jasper, Human Resources Technician</b></p>	<p>Working in human resources, I do not have the time, nor does anyone in my team have the time, to track down other people's paperwork. For all we know, it could be sitting on one person's desk for a week to get authorized. Would we like a better process? Of course! But we don't have the time to create something better when we have other work to do. Especially not with all the positions the agency is trying to fill! Also, there are policies and regulations in place we have to follow that people don't understand. People want to hire someone in a week and that just isn't possible with the processes we have in place and the number of positions we need to fill. We are doing our best to be responsive, but we wish people would utilize resources on our website more before asking us for clarification.</p>
 <p><b>Harvey, Technical Specialist</b></p>	<p>I have put in over 30 years at this agency, and I am starting to get more frustrated by the day because I am having to pick up the slack from vacant positions. I have had to watch as my coworkers retire and take with them a wealth of knowledge. Then when the new person finally does come along we don't have the time or expertise to properly train them, which causes our unit to fall farther behind. I have been in my job for a long time and I feel like I just want to do my part and not have to worry about if other's people work is being done properly or not. Retirement is looking better every day.</p>
 <p><b>Marvin, Hired within the last six months</b></p>	<p>My first five months in this job have been tough. When I started it was clear there was a lot of stress within my work team because they weren't able to get through their tasks fast enough. When I started, I attended an orientation with an HR representative, but didn't receive any "on the job" training. The people I work with are nice but don't have the time or specific expertise to train me in everything I need to know. They say it can take up to a year to get adjusted in a new job, but at this rate I don't see me being comfortable ever. I am not sure how much longer I am willing to keep working in this kind of environment if something doesn't change.</p>

### Stakeholder Analysis for Problem Solving

Stakeholders (also called customers) are defined as anyone who is a part of, effected by, or a recipient of, a process or service. Understanding their needs, experiences, and expectations, as part of understanding the current state, will allow you to solve the problem with them in mind. Use the following steps and grid to identify who the stakeholders are and their needs for Hiring Process Simulation:

1. Identify individuals or groups who stand to “gain” or “lose” as a result of the problem solving process.
2. Why do they want the problem solved?
3. What does “solved” look like to each stakeholder?
4. What do you think their biggest pain points are?
5. What questions would want to ask them?

Stakeholder	Why do they want the problem solved?	What does “solved” look like to them?	What do you think their biggest pain point is?	What questions would you want to ask them?

## Project Objective and Goals

For your **project objective**, make sure it is specific and concise. Review all the information you have put together on page five. Has your original objective changed or stayed the same? With your team, determine what your overall objective is/problem you want to solve moving forward.

- Example: "Reduce the time it takes to fill a vacant position at ABC Agency."

For your **goals**, make sure they are measurable.

- Example: "Reduce the hiring process time from 16 weeks to 10 weeks by X date."

Project Objective:

Project Goals:

- 
- 
- 

## Determining the Root Cause of the Problem

### Brainstorming

Brainstorming is a team-based tool for quickly capturing diverse information, ideas, and perspectives.

For a problem solving project, brainstorming is used to identify possible contributors or causes of a problem, and to identify possible solutions to root causes of the problem.

When brainstorming, use methods that balance contributions from introverts and extroverts, such as silent brainstorming.

Brainstorming Options:

- Silent. Write down first, then share (favors introverts)<sup>1</sup>
- Open/Popcorn. Call out ideas (favors extroverts)
- Structured. Provide themes for brainstormed ideas, like the categories in a fishbone diagram: facilities/equipment/tools, communication, people (training, roles, behaviors), process/procedures/policies, materials, and environment
- Reverse. Brainstorm how to make matters worse!
- Analogy. Relate a story to the issue(s) at hand, draw on parallels

**Brainstorming Rules:**

- Rapid generation is the aim. Strive for quantity.
- Be creative! There is no such thing as “wild” or “bad” idea.
- Defer judgement.
- Clarify, combine, and build on ideas.

To assist with brainstorming potential causes, here are some examples of problems that might be happening in your process:

<b>Problem/Cause</b>	<b>Effect</b>
<b>Time</b>	<ul style="list-style-type: none"> <li>• Waiting: hand-off delays</li> <li>• Inefficient or illogical work flow</li> <li>• Unreliable equipment or limited equipment capacity</li> <li>• Process complexity</li> <li>• Motion</li> </ul>
<b>Cost</b>	<ul style="list-style-type: none"> <li>• Numerous sign-offs</li> <li>• Over-processing</li> <li>• Overproductions</li> <li>• Too much inventory or documentation</li> <li>• Bottlenecks/backlog</li> <li>• Transportation</li> </ul>
<b>Quality</b>	<ul style="list-style-type: none"> <li>• Errors</li> <li>• Rework</li> <li>• Defects</li> <li>• Unclear roles and responsibilities</li> <li>• Vague customer requirements</li> </ul>

**Exercise Task:**

Take five minutes to silently brainstorm all possible causes and contributors to the hiring process problem. Record one idea per Post-It®.

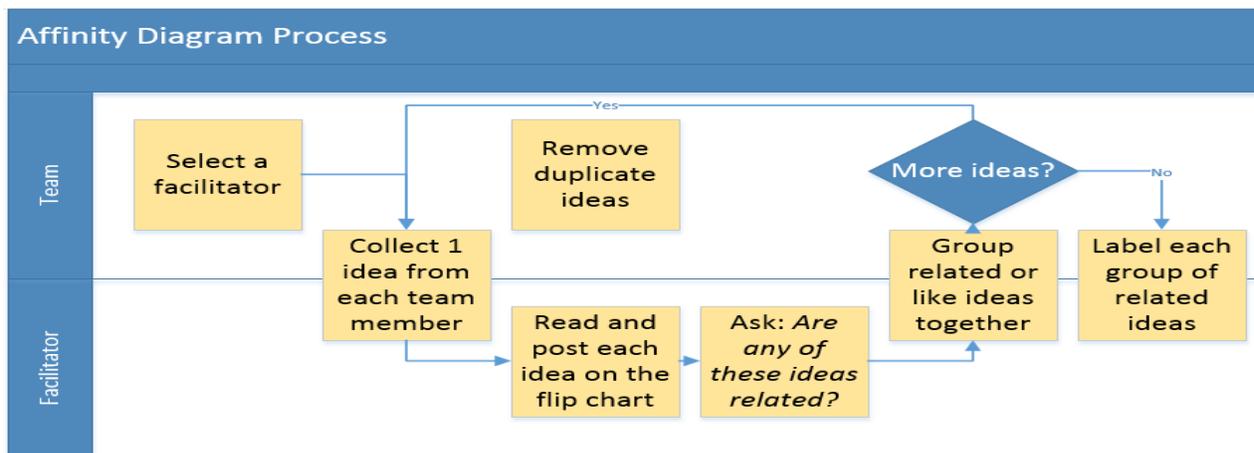
## Affinity Diagram

An affinity diagram is a tool for simplifying and communicating a large number of ideas and feedback by grouping similar or related ideas into themes.

For a problem solving project, the affinity diagram is used in combination with the relations diagram. The relations diagram helps a team rank which theme (or root cause) has the strongest influence over other causes. When you solve the cause with the greatest influence on other causes, you typically resolve or minimize the impact of related causes. The relations diagram also helps a team see the problem from a systems perspective, which enhances the team's understanding of the subject area and ability to make future improvements.

You have flexibility and discretion in how you group related ideas. Below is one approach you may use:

1. Facilitator instructs team members to record one idea per **Post-It®** note during the brainstorming exercise.
2. Using a round-robin approach, the facilitator collects tow idea (e.g., causes and contributions) from each person.
3. Facilitator instructs team members to remove ideas from their list that are the same as ideas posted.
4. Facilitator reads aloud each idea and places it on a flip chart or white board.
5. Facilitator asks the team, "Do you see any ideas that relate to each other?" Facilitator places related ideas next to each other.
6. Facilitator follows the round-robin approach until all unique ideas are posted and works with the team to group related ideas.
7. Once all ideas are posted, the facilitator records the team's identified theme at the top of each group of ideas.

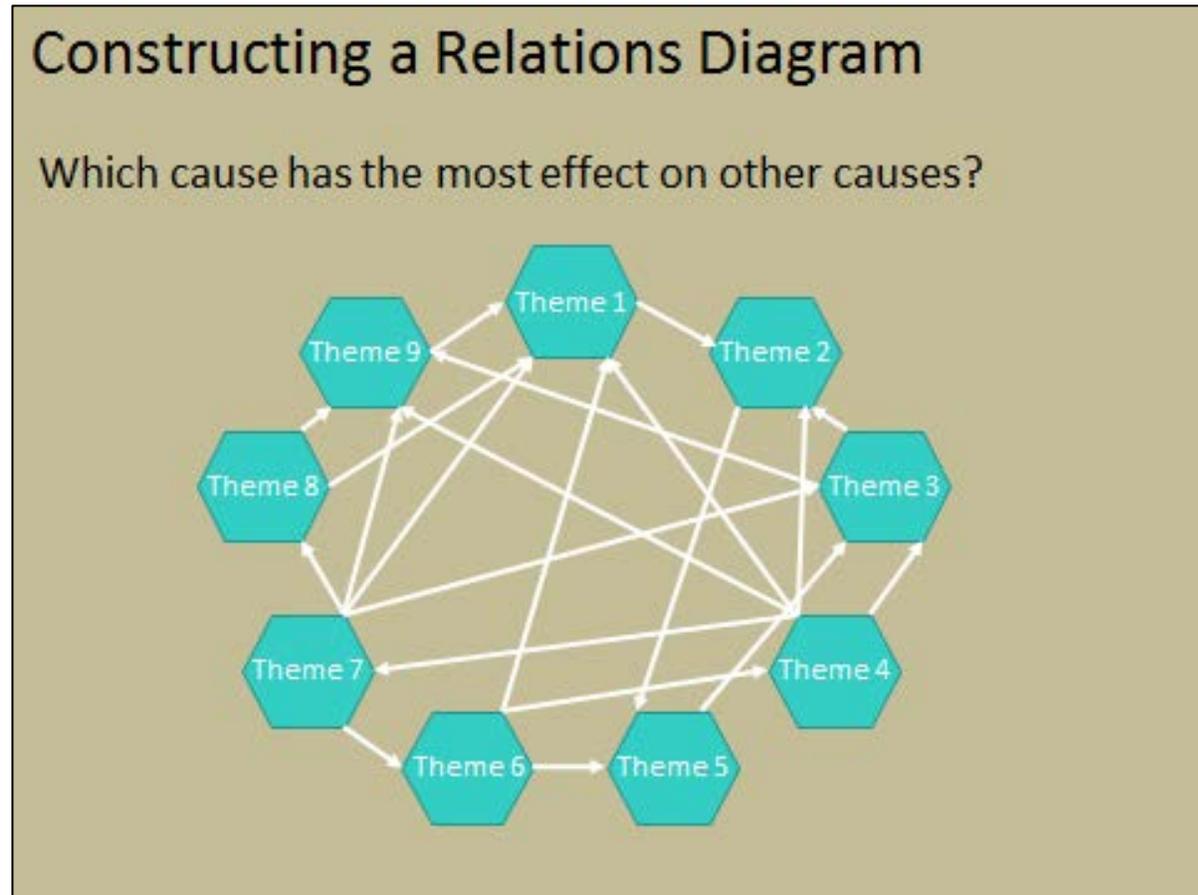


### Exercise Task:

With your team, create an affinity diagram with the all the causes you brainstormed as individuals. You will have 15 minutes to create your affinity diagram and establish what you think are the main causes/themes of this problem.

## Relations Diagram

The purpose of the relations diagram is to identify which themes and root causes have the strongest influence or other causes. It also helps to see the interrelationships among causes.



Start with a list of brainstormed problems/causes. If the list is long (more than 10 causes), use the affinity diagram to identify themes or groups of related causes.

1. Record each theme or idea on a large **Post-It®** note and place notes in a large circle on a flip chart or marker board.
2. Start at the top of the circle with “Theme 1” and work your way clockwise through the remaining themes as they relate to Theme 1. Ask: Does Theme 1 have a stronger influence on Theme 2 or does Theme 2 have a stronger influence on Theme 1?”
3. Draw arrows from the cause or theme that has the greater influence to the theme influenced. When themes influence each other, choose the stronger influence (no two-way arrows!). If there is no relationship among two themes (i.e. no influence) do not draw an arrow.

4. Then ask, “Does Theme 1 have a stronger influence on Theme 3 or does Theme 3 have a stronger influence on Theme 1?” Proceed until you have recorded the relationship of all remaining themes to Theme 1.
5. Follow steps 2 through 4 with “Theme 2” until all relationships among remaining themes have been recorded for “Theme 2”.
6. Continue in a clockwise fashion until you have recorded all relationships with each subsequent theme.
7. Count the arrows going out and the arrows going in for each theme. Record as (<# of arrows out>, <# of arrows in>).
8. The themes with the most arrows out and fewest arrows in will be root causes or drivers. The ones with the most arrows in will be key outcomes, results, or symptoms of the root causes.

### **Exercise Task:**

Using the instructions above to guide you, create a Relations Diagram using the themes that you established in the affinity diagram. Use the data you have seen and different causes you brainstormed when discussing which theme has a greater influence over the other.

## **Determining Solutions**

### **Brainstorm Solutions to Root Causes**

- Individually brainstorm possible solutions to the root causes for your project objective.
- Record one idea per post-it.
- Look back at your original goals/measures, how can you achieve the gap?

### **Difficulty/Impact Matrix**

The Impact/Difficulty (Impact/Cost) Matrix is a simple 2x2 tool for prioritizing and selecting solutions. Solution ideas are sorted based on their impact or ability to achieve the Problem Statement (i.e., project goal) and on their level of difficulty or cost to implement. The four matrix categories are:

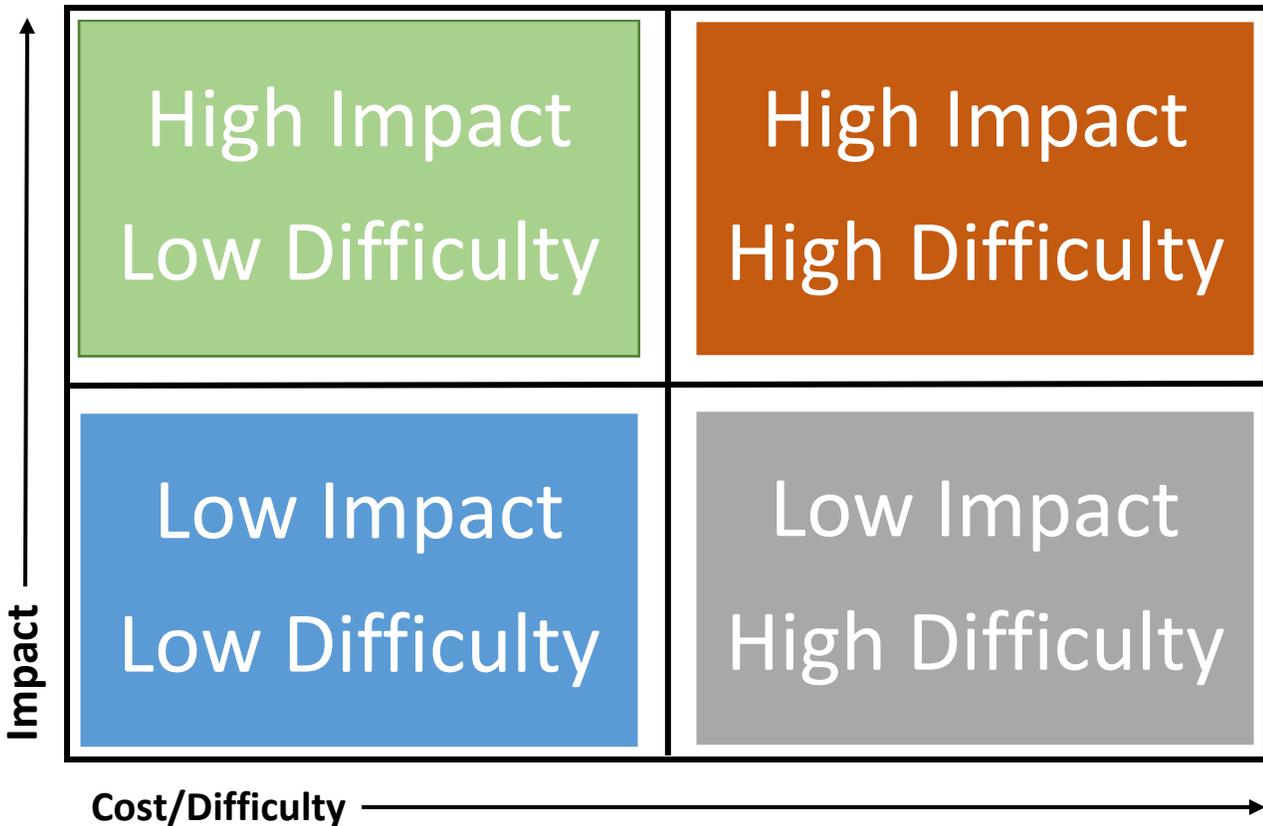
**A**: High Impact and Low Difficulty — these are great ideas to implement;

**B**: High Impact and High Difficulty — these ideas require sponsor approval;

**C**: Low Impact and Low Difficulty — these ideas should be implemented after having implemented ideas in category A; and

**D**: Low Impact and High Difficulty — it is not feasible to implement these ideas.

To sort solutions into the appropriate category, record the solution number in the appropriate area of the Impact/Difficulty table on a flip chart, white board, or sticky wall.



If you wish to increase team participation, you can have team members read each of their ideas aloud and work with the team to place each idea in the appropriate matrix quadrant. Be aware that people have a tendency to view their ideas as having high impact, so you may need to verify idea impact with the team. Another tendency of teams is to view ideas that require a change in staff behavior as difficult. In these instances, remind team members that solving problems necessitates changes in behavior and encourage them to think more in terms of costs to implement the idea.

**Exercise Task:**

With your team, take the solutions you individually brainstormed and place each idea in the most appropriate area of the impact/difficulty matrix.

What solutions would you recommend to implement and why?

## Personal Action Plan

Write down goals that you would like to work on in the next three to six months.  
Choose goals based on:

1. What you want to apply from this class
2. What you would like to learn more about
3. What impact do you feel like this could have on the work you do/organization you work for

Goal 1:

- Action steps:
  
  
- Other people or resources needed:
  
  
- Due date:

Goal 2:

- Action steps:
  
  
- Other people or resources needed:
  
  
- Due date:

Goal 3:

- Action steps:
  
  
- Other people or resources needed:
  
  
- Due date:

## For More Continuous Improvement Training, Resources, and our Newsletter:

- CI Homepage:  
<http://mn.gov/admin/government/continuous-improvement/>
- Additional Resources:  
<http://mn.gov/admin/continuous-improvement/resources/>
- Additional Training Available:  
<http://mn.gov/admin/continuous-improvement/skills-development/>
- Sign-up for our CI Newsletter:  
<http://mn.gov/admin/continuous-improvement/resources/newsletter/>

We offer four standard courses: Introduction to CI, Problem Solving, Process Improvement Measurement, and Human-centered Design in CI. Our training programs equip Minnesota's state government workforce with the tools of continuous improvement. Courses are offered for public sector employees only and are **free** of charge. Register through the Employee Self-Service website.

For state agencies, we also offer direct CI training to your project teams and work units. Contact us at [ci@state.mn.us](mailto:ci@state.mn.us) for details!