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Understanding the Problem You Are Trying to Solve

Causal System Analysis

Objectives

- Recognize importance of taking a systems-view when understanding complex problems

- Develop a fishbone diagram to investigate potential root-causes of a problem

- Understand that Causal System Analysis involves leveraging different perspectives and using various tools flexibly

Faculty Introductions

Jonathan Benjamin
Director,
Post-Baccalaureate Fellowship Program

Edit Khachatryan
Associate,
Networked Improvement Science

Participant Introductions

- Find two other people around you

- Introduce yourself, your organization, your role, and share…
  - *one thing you accomplished before the age of 18.*

Norms

- Be present

- Listen to understand

- Share the air

- Any others to add?
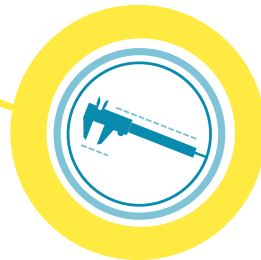
Be problem-focused and user-centered

Attend to variability

Organize as networks

See the system

6 CORE PRINCIPLES OF IMPROVEMENT

Learn through disciplined inquiry

Embrace measurement

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Butterfly Effect Game*

- Observers, what did you notice?

- Participants, how did it feel to be part of the system?

- Who was controlling the system?

- How does this activity speak to your experiences in education?

An interdependent set of **interactions among people**, the **tools and materials** they have at their disposal, and the **processes** through which they all join together to accomplish work.
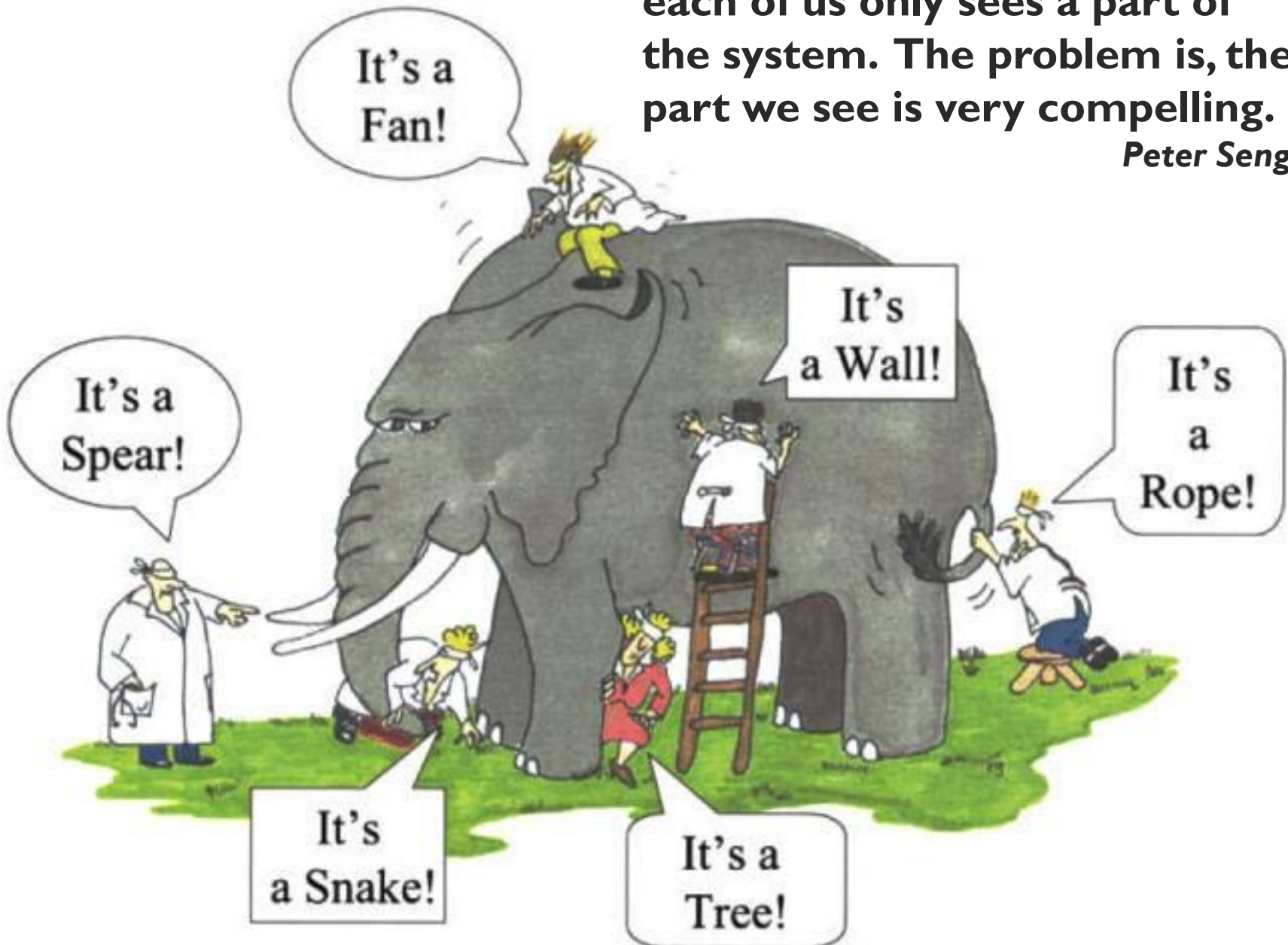
What is a **System?**

"Every system is perfectly designed to achieve exactly the results it gets."

Paul Batalden

By the very nature of systems, each of us only sees a part of the system. The problem is, the part we see is very compelling.
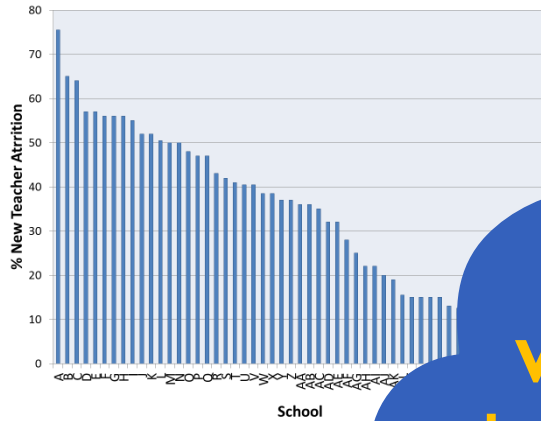
Peter Senge

Causal System Analysis

Aspirations

Current performance

Gap

Why are we getting the outcomes we are currently getting?

Let's go investigate.

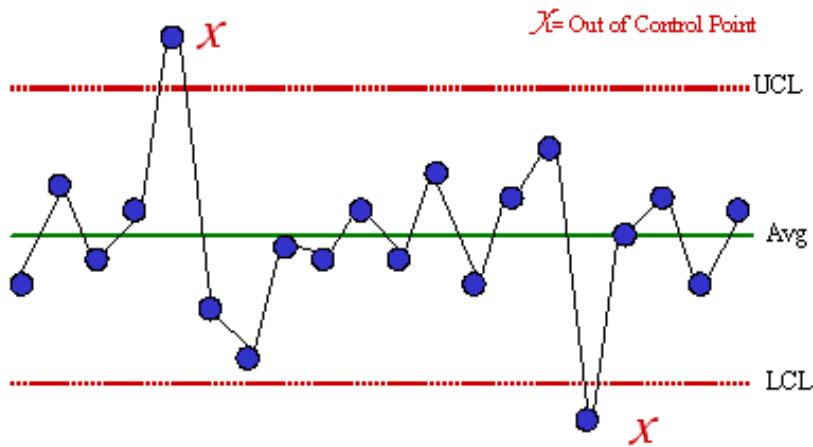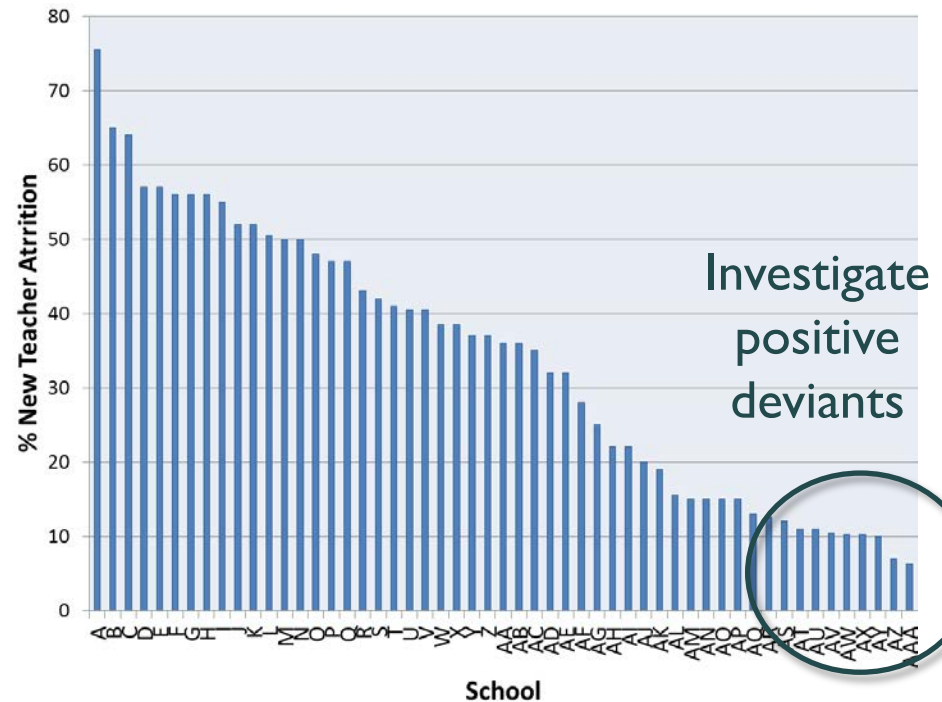# Tools for Undertaking Causal System Analysis

Local Data

Which tool you use and in **what sequence** is determined by the problem, what you learn along the way, and your context.

Dig into Local Data

Examine trends over time

Examine variation across contests

Investigate positive deviants

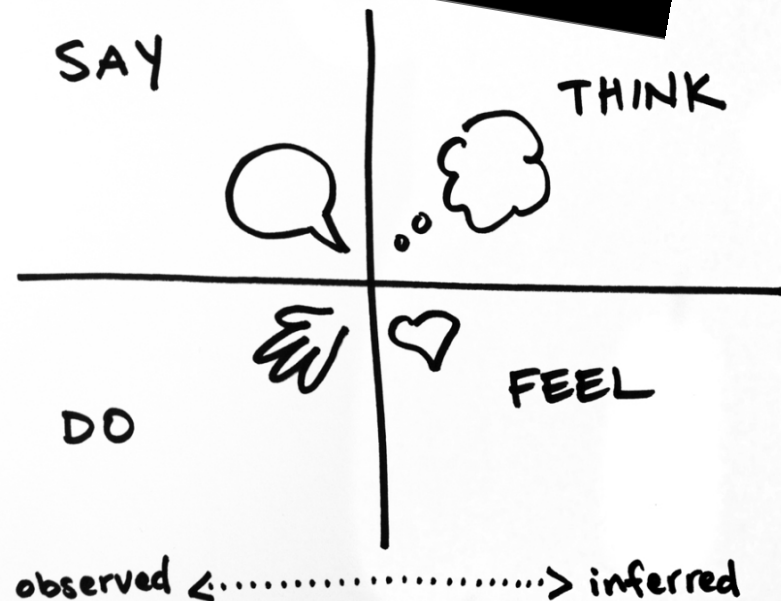# Tools for Undertaking Causal System Analysis
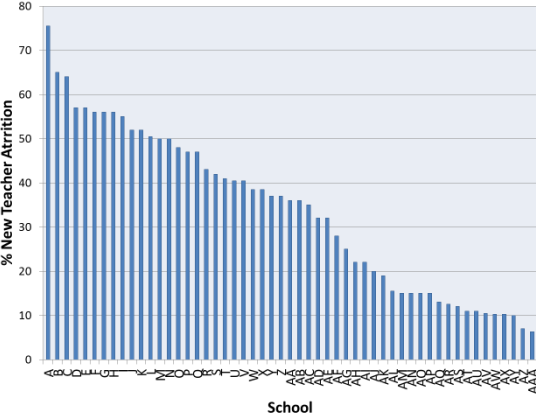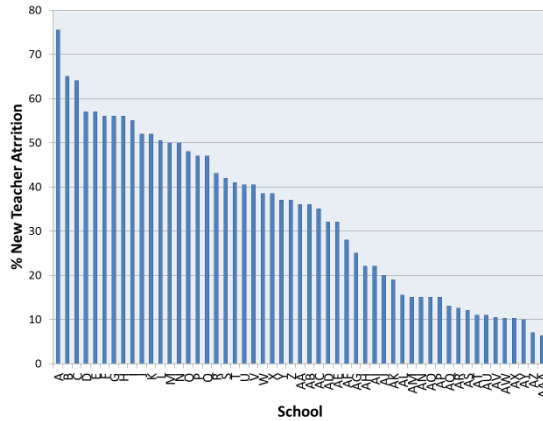

Local Data

Empathy Exercises

Seeing the World as Users See it

- "Empathy" interviews

- In-context observations
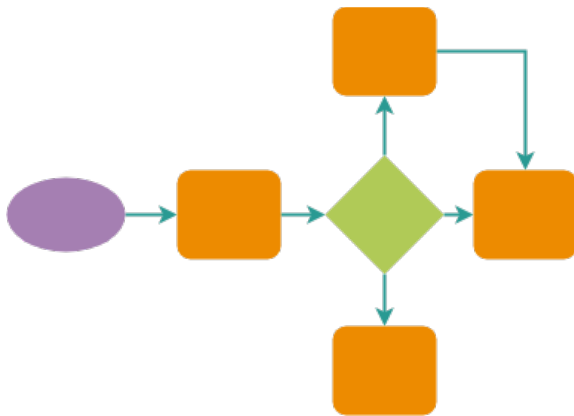
- Journey maps

Tools for Undertaking Causal System Analysis

Local Data

Empathy Exercises

How the Work Gets Done

Zooming In on How Work Gets Done

Process Map: A graphical representation of the steps that come together to produce a particular outcome.

How do you make one? Go and see the process in action OR talk to people that are involved in enacting the process.

Why is it useful? Processes are a basic building block of systems. Creates a shared understanding of "what is."

Ovals show the start/end of process

Rectangles are for tasks performed in the process

Arrows show the direction or flow of a process.

Decision Points (Y/N)   NO

YES

There is usually one arrow out of a rectangle box. If not, you need a decision point.

Close all loops, i.e. make sure every path takes you back to or ahead to another step in the process.

Ovals show the start/end of process

"You cannot improve a process if you don't understand it."   *-W. Edwards Deming*

Tools for Undertaking Causal System Analysis
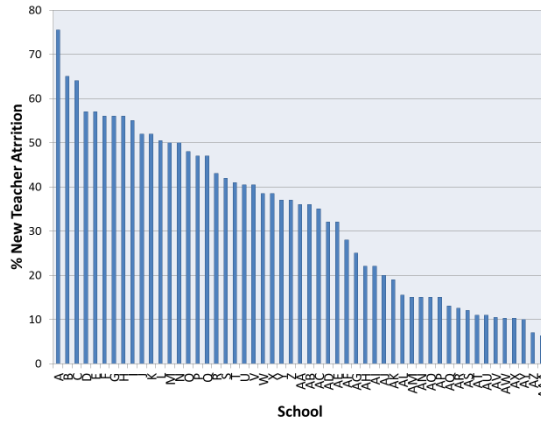
Local Data
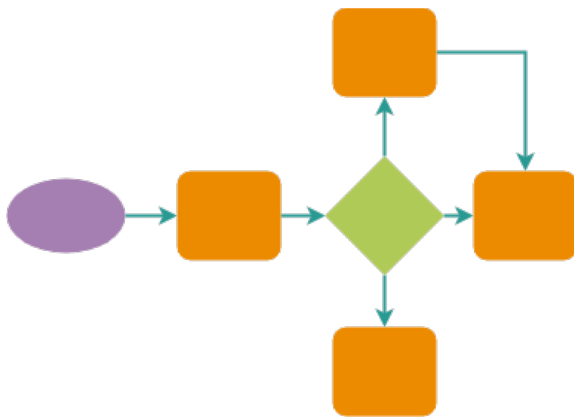
Empathy Exercises

How the Work Gets Done

Research Scans

Scan Existing Knowledge on the Problem

Examine research and relevant literature to find information about the problem and how it may be addressed.

Tools for Undertaking Causal System Analysis
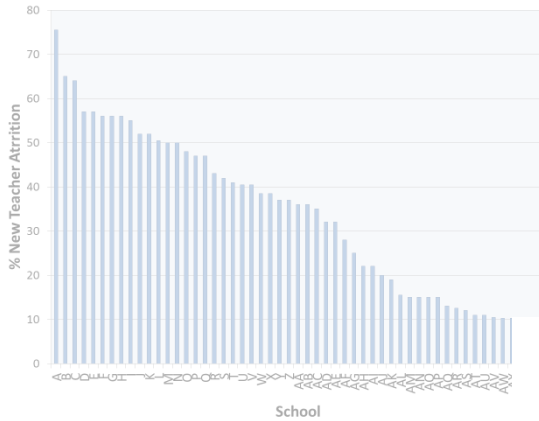
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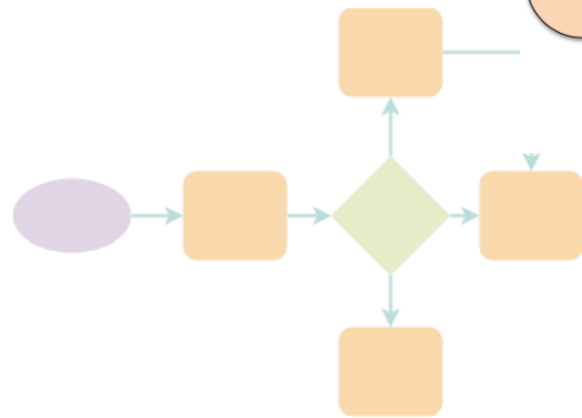
Fishbone Diagrams

Empathy Exercises

How the Work Gets Done
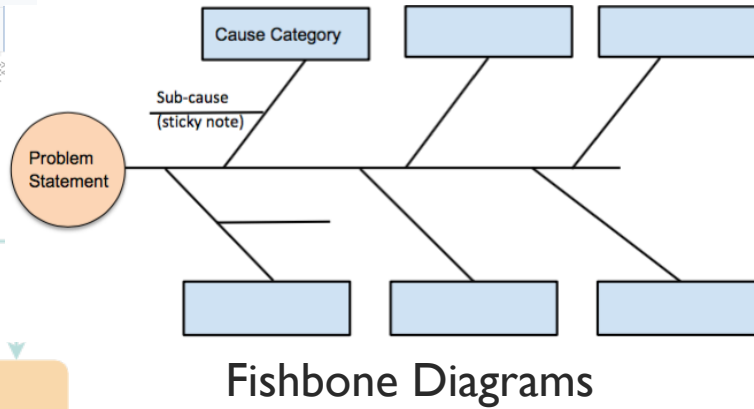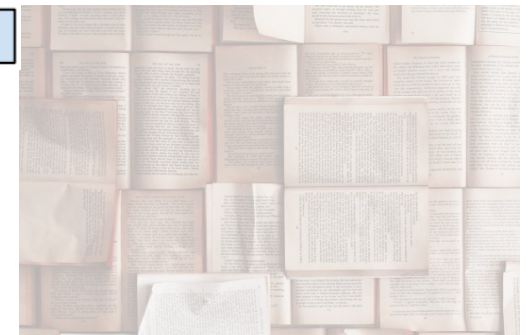
Research Scans

Brainstorming Root Causes: Fishbone Diagram

What is it? A summary of a group's understanding about the causes of the current problem

Why is it useful?

- Visualizes the causes of a problem at a high level.

- Helps with scoping and identifying areas to dig in deeper

- Builds consensus in the group

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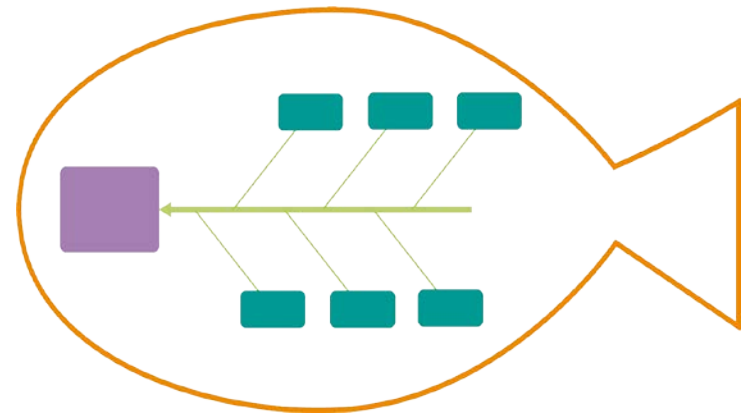
How to Build a Fishbone Diagram

2) Brainstorm potential causes

1) Clear PROBLEM STATEMENT

5 – WHY'S

The outcomes we want
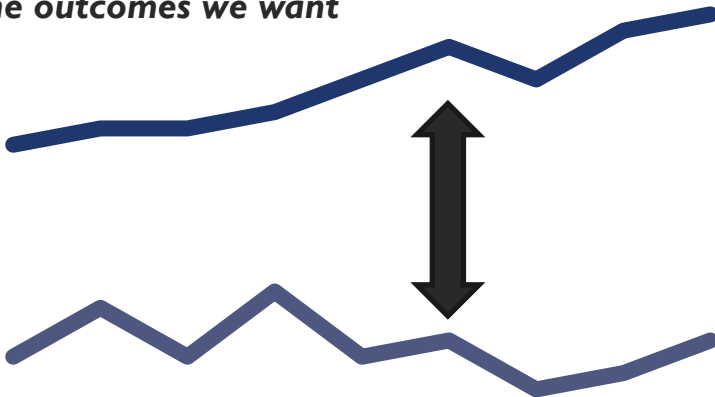
The outcomes we actually see

2) Brainstorm potential causes

How to Build a Fishbone Diagram

2) Brainstorm potential causes

5 – WHY'S

3) Categorize

Category 1

Category 2

I had this idea too

Could this be the best?

This idea has legs

This is an idea

This idea could be it

An idea here too

Lets not forget this one

Another idea here

Idea – my favorite

And an idea here

1) Clear **PROBLEM STATEMENT**

4) Build Fishbone

Cause Category

Sub-cause (sticky note)

Problem Statement

5) TEST!!

Tips in Building a Fishbone Diagram

- Avoid SOLUTIONITIS

- Identify multiple potential causes

- Keep an open mind

- Consider a variety of perspectives

- Stay user-centered

- Use available data

Remember: Definitely incomplete and possibly wrong

The Blood Drive Problem: The Data
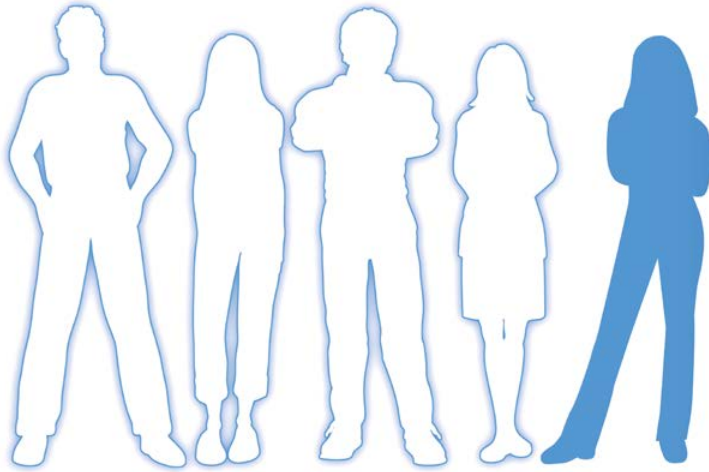
1 in 5 people admitted to hospital need blood

Only 5% of eligible donors
(50% of US Population)
donate blood

25 | 25
25 | 25
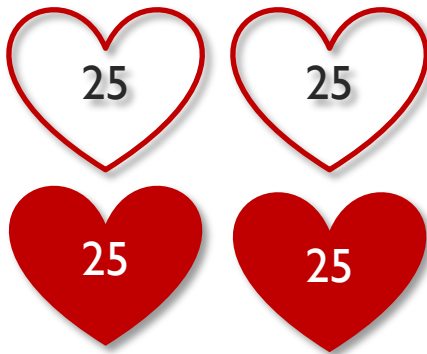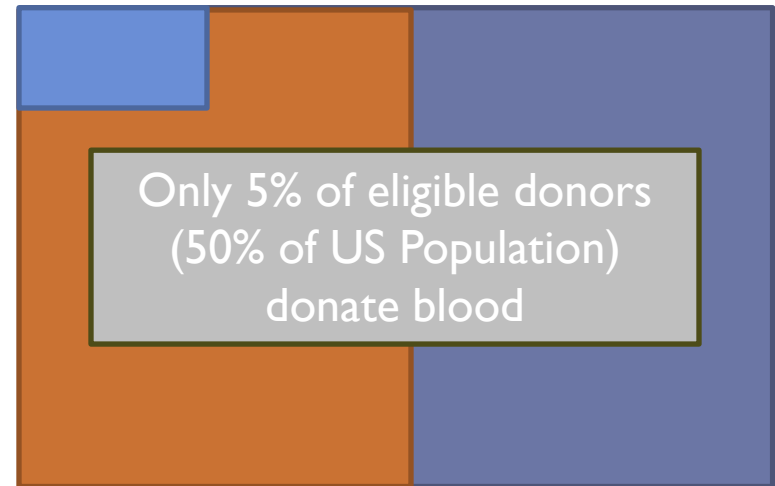
100 units/day requested,
only half demand met

Who are we?
3 providers for 8 regional hospitals:
1. **A non-profit**
2. **A clinic**
3. **A university blood center**

*Scenario adapted and improvised from local data and information

The Blood Drive Problem: The Issue

5% of eligible population donate

WHY NOT MORE PEOPLE?

Activity: Build a Fishbone Diagram

In groups of five, follow steps to identify causes of blood drive problem:

1) Draft problem statement (5 min)
2) Brainstorm causes individually (5 min)
3) Share causes & Cluster (15 min)
4) Label the clusters (5 min)
5) Arrange the Fishbone Diagram (5 min)
6) Identify next steps (5 min)

The Blood Drive Problem: The Data

- About one in five people admitted to a hospital will need blood.

- 50% of the U.S. population is eligible to donate blood, but only 5% does so.

- The University Blood Center (UBC), a local hospital, and a non-profit community center are in a NIC and are the only three providers for 8 regional hospitals.*

- All of the area hospitals request about 100 units of blood each day, but the blood centers can only meet half of this demand.

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*Scenario adapted and improvised from local data and information

Giving blood is not convenient

- People are too busy to give blood
- Giving blood often requires someone to go out of their way to the hospital
- Blood drives are not held in convenient locations, such as the workplace
- Wait times are often too long

People are not informed

- People think their blood isn't the right type
- People think they are ineligible when they are not
- People think they will be exposed to disease by giving blood
- People do not know the frequency that they can give blood
- People do not know where the blood is going to

Not enough people give blood to meet the demand for blood from patients

People are not aware of the need to give blood

- Blood drives are not well publicized
- People do not see firsthand the demand for blood
- People do not understand how much blood is needed
- People think hospitals have enough blood
- People don't have others to encourage them to give blood

People feel uncomfortable giving blood

- People are afraid of needles or blood
- People do not like the side effects of giving blood, such as a weak feeling afterwards
- People do not give blood for religious reasons
- People had one bad experience
- People are afraid of finding out about a disease, such as HIV

Some people are not eligible to give blood

- People have an illness that prevents them from giving blood
- People have possibly been exposed to diseases such as malaria or mad cow
- Discriminatory barriers exist in the blood-drive process

Debrief

- Find 2 other people not in your fishbone group, discuss the following:

  1. What did you select as your problem statement?
  2. What were two of your cause categories?
  3. What are some examples of root causes your team identified for those categories?
  4. **What does your team want to learn next?**

Tools for Undertaking Causal System Analysis
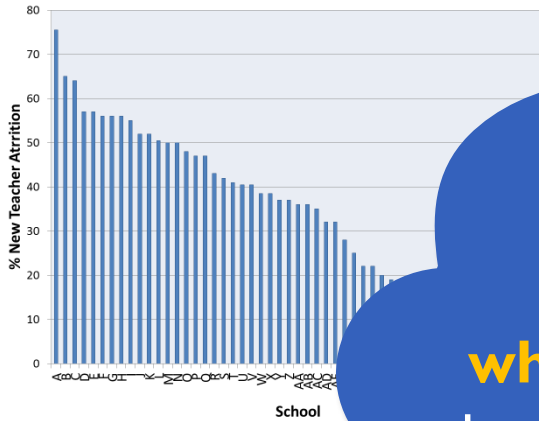
Local Data

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Exercises
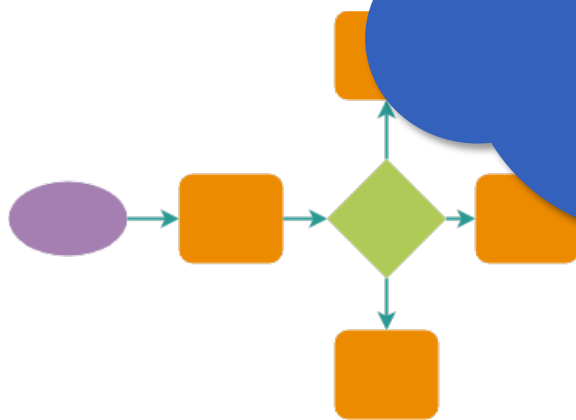
How the Work Gets Done

Research Scans

Reflection & Take it Home

- Private write:

    1. What is the problem of practice that you're tackling in your work and what do you already know about it?

    2. What one step can you commit to taking in order to understand the causes to this problem?

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Aspirations

Current performance

Gap

Why are we getting the outcomes we are currently getting?

Fishbone Diagram

Cause Category

Sub-cause (sticky note)

Problem Statement

Driver Diagram

AIM

Primary Driver — Secondary Drivers
- Change
- Change
- Change

Primary Driver — Secondary Drivers
- Change
- Change
- Change

Primary Driver — Secondary Drivers
- Change
- Change
- Change

Primary Driver — Secondary Drivers
- Change
- Change
- Change

System Map

Problem: Low graduation rates of community college students

System Improvement Map
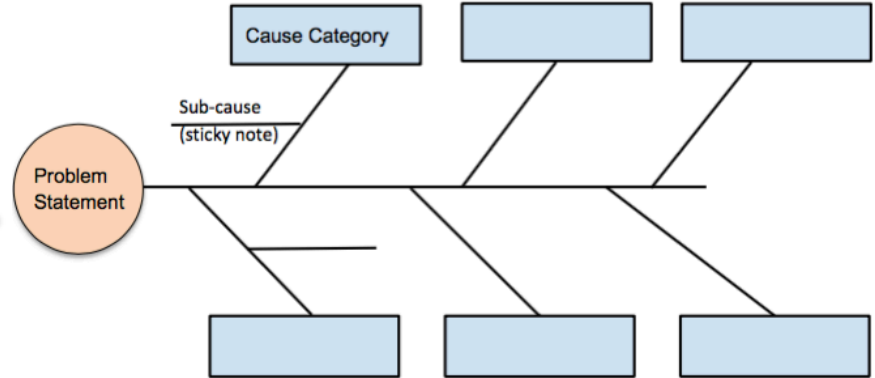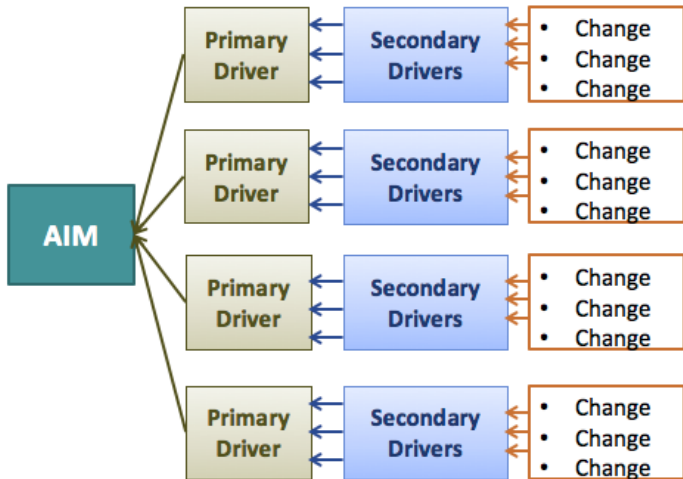
Instructional System
- Processes for student course placement are ineffective
- Students & faculty maintain negative beliefs about learning mathematics
- Articulation of learning goals lack relevance & value
- Students face course registration hurdles
- Inadequate outside of classroom student learning
- Student engagement suffers from social organization of classrooms
- Unclear path I: HH-CC alignment
- Insufficient evidence-anchored instructional design
- Unclear path II: transfer requirements

Information Infrastructure
- Limited analytic support for continuous improvement efforts
- Research on instructional improvement is not an institutional priority
- Lack of student-centric data system
- Limited data on student engagement & learning

Student Support System
- Disjointed advising guidance
- Missing on-ramps to effectively transition students into college

Human Resource System
- Limited time, resources, processes to support improving teaching
- Inappropriate allocation of faculty resources for student success
- Effective teaching absent from the hiring criteria
- Inappropriate faculty evaluation for improving instruction

Governance
(affects all systems)
- Lack of incentives for improving teaching and learning
- Poor alignment of resources for student success

Key:
- (Yellow) Challenges at the Classroom Level
- (Pink) Challenges at the Organizational Level
- (Green) Challenges at the Governmental/Field Level

Some Habits of a Systems Thinker

- Seeks to understand the "big picture"

- Examines different perspectives

- Resists the urge for quick fixes

- Plans to adapt and learn

- Looks for high-leverage points

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Some Takeaways

- Diagnose a problem and the system in which it occurs carefully before attempting solutions

- A variety of problem investigation tools exist; the tool you use depends on what you want to learn

- Be mindful of "analysis paralysis;" sometimes trying a change idea can yield significant understanding
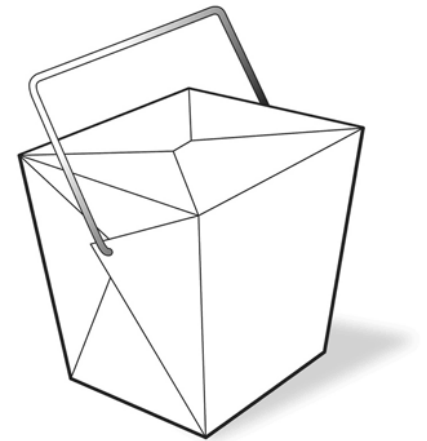
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Objectives

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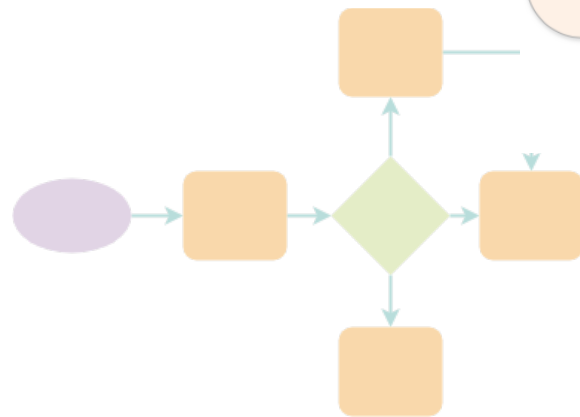
Tools for Undertaking Causal System Analysis
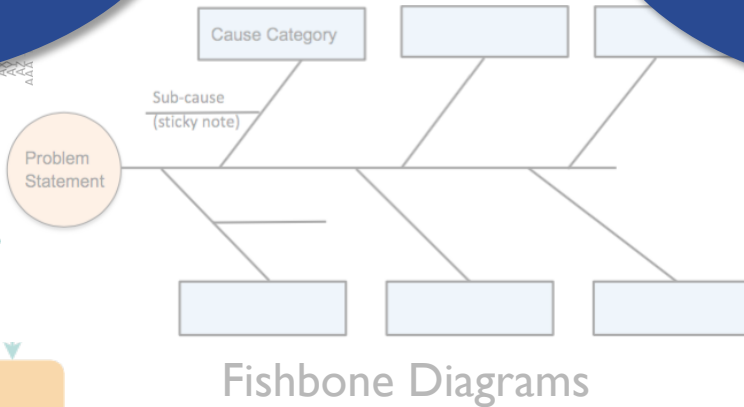

Sessions:
Data-Driven Improvement
Today @1:30
Data Workshop
Thurs @10:15

Session: *Understanding the User Experience*
Today @1:30: Salons 10-11

Local Data

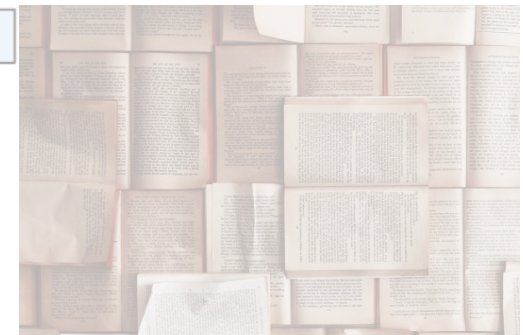Fishbone Diagrams

Empathy Exercises

How the Work Gets Done

Research Scans