



Carnegie Mellon University

# Structuring Unstructured Problems

# Agenda

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- Questions
- Consulting lifecycle
- Unstructured problems
- Differentiating  
Problems/Opportunities from  
Solutions

# Structuring Unstructured Problems

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An overview,  
Done graphically  
on whiteboard.



(You will do this step by  
step over the next couple  
weeks.)

# The initial request

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- Your starting place is a *wishlist* that is provided by the community partner.
- The vagueness of the term *wishlist* is intentional, allowing for the very general to very specific.

# Community Partner Application

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- The actual wishlist question:
  - What are the issues, problems, ideas, or projects that your organization would like to explore with the student consultant? You may be as specific or general as you would like.

# Example Request

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- To learn how our network works
- To update our Microsoft Access database
- To learn more about our software
- To learn how to update our website

# Example Request

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- We'd love to be able to tweak our website that would ask people for their email addresses so that we could begin to send out email blasts with newsletters, calls to action, and event updates.
- We would also want to learn how to best manage and maintain the database that would contain those email addresses.

# Example Request

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- We face the challenge of keeping our data management system on pace with our growth. One particular challenge is integrating our referral process automatically into our database, which would allow us
  1. more streamlined data management,
  2. more efficient management of our services,
  3. more structure for our volunteers,
  4. better tracking of our growth,
  5. and to offer more individualized services and real-time information to people based on their needs and preferences.
- In addition to the on-site services, we would like to better serve individuals through its web site.
  - Technological vision is needed to enhance our web site in order to reach more people and provide more timely information on our site.
  - We seek to become more self-sufficient in updating our site.

# Example Request

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- Help!

# Structuring Unstructured Problems

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- Request == unstructured
- Scope of Work == structured

# Scope of Work

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- A clear articulation of the work that will be done
- Scope of Works are used in:
  - Proposals
  - Contracts
  - Memoranda of Understanding
  - Terms of Reference

# Scope of Work Contents

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- A clear articulation of the problem being solved, or opportunity being sought.
- A persuasive case for why that problem or opportunity is important
- A description of the proposed solution
- A persuasive case for why that is the most appropriate solution.

# Eg: Dress for Success Pittsburgh

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- Request
  - We have a bunch of Excel spreadsheets in a lot of places and want to compile this into one database.

# DFSP - Scope of Work

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With the increased emphasis on fundraising to sustain the organization's growth, DFSP had been reaching to larger contributors to provide funding. Here, they were running into difficulty with the process of compiling key statistics, such as volunteer hours or client job history, required by these larger contributors.

While DFSP was able to produce these statistics, their decentralized method of data management made the process difficult, slow, and more subject to human error.

# DFSP - Scope of Work (cont.)

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Different information, like contact lists for donors or referral partners were often kept in separate Excel spreadsheets on separate computers, where linking them to determine key statistics would be impossible.

Often, simple tasks like compiling the data and creating reports took up a substantial amount of time. This then took time away from tasks that were more central to the mission, like finding new sources of funding or working with referral partners.

# DFSP - Scope of Work (cont.)

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This not only made staff time less efficient, but also led to frustration.

Wendy, as part time contractor, is only paid for a set number of hours. She found that some of these data management tasks take away her time and often forced her to work on her own time so that crucial deadlines could be met.

DFS Worldwide had been working on the issue of data management and was looking to implement a Worldwide database solution free for all affiliates.

# DFSP - Scope of Work (cont.)

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This software will be custom designed by ETapestry, who is known for donor database management products and would be free for DFS affiliates. It is intended to first address the problem of donor management, and then later address some of the other problems like matching up clients and referral agencies.

While the Pittsburgh affiliate was included in group of affiliates that will receive the database first, the client-referral agency piece would not be available for approximately a year.

# DFSP - Scope of Work (cont.)

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Because of this delay, Wendy had decided that a data management solution that could help fix the client-referral agency problem was amongst the highest priority problems that the organization faced.

This data is crucial to their fundraising and there is no guarantee that the Worldwide database will sufficiently solve the problem. The data management solution should be flexible enough to take on the short-term donor management challenge as well.

# DFSP - Scope of Work (cont.)

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To implement this solution, the following approach was taken:

- Work with Wendy and Stacey to create a list of requirements for the data management solution. These requirements included performance features such as what information it should be able to keep track of or the reports that it should be able to generate.
- Decide on a commercial or open source database software package that fits the immediate needs of DFSP.
- Obtain or create the data management solution decided upon and set up the solution using the data DFSP has stored in Excel spreadsheets.
- Work with the staff to add contacts and generate reports so that they are able to use the solution effectively and comfortably.



# Problem, opportunity, solution

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- A **solution** is an approach to solving a problem or realizing an opportunity.

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- A **problem** is something that is hindering the full attainment of the organization's mission.
  - An **opportunity** is a new alternative for attaining the organization's mission.

# Problem, opportunity, solution

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- **Problems** and **opportunities** are two sides of the same coin..
- E.g.
  - Problem: We lose donors because of poor communication.
  - Opportunity: We could keep more donors with better communication.
- A **solution**, however, is different.
  - It is often one of a set of alternatives to:
    - Solve a problem
    - Realize an opportunity
  - E.g. An email newsletter could address our communication problem with our donors.

# Problems, opportunities, solutions

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- So how do you transform that *wishlist* to a scope of work
- Your most persuasive scope of work is one that proposes a **solution** to a **problem** or **opportunity** in order to better meet the organizations **mission**.
- Your community partner most often articulated their needs in terms of a **solution**.

# Your job is to:

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- Articulate the CP's view of the problem
- Articulate the CP's idea for a solution
- Understand for yourself the problem and how it impacts the organization's mission.
- Consider alternative solutions
- Validate for yourself the choice of solution
- Come to a common agreement with the CP on the choice of solution
  - That may likely be what the CP was thinking
  - You might suggest a better alternative

# Example

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1. Articulate the CP's view of the problem
  - I understand you don't have a database
2. Articulate the CP's idea for a solution
  - And you would like to create one in Access
3. Understand for yourself the problem and how it impacts the organization's mission.
  - Errors in managing donor information leading to lower donations and wasted staff time makes for fewer resources to <do mission>
4. Consider alternative solutions
  - Request a Salesforce.com license to handle CRM
5. Validate for yourself the choice of solution
  - Lower TCO, more functions
6. Come to a common agreement with the CP on the choice of solution.

# And as you are figuring this out:

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- Be helpful!

# Problem/Opportunity or Solution?

- Database for our records
- Make donating to us simpler
- Help our organization develop a website
- Assist us to develop more efficient front desk applications.

# Problem/Opportunity or Solution?

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- We are unable to generate good reports from existing database.
- We have problems updating our website and editing existing information on the website.
- Need assistance and minor training for staff in using different software correctly.

# Group exercise

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- In groups of 3-4, assume you are assigned a “wish list” item:
  - A technology plan
  - Internet access to all of our lab computers
  - An Access database to consolidate spreadsheets holding membership information
  - A web site
  - A computer class for our after-school program
  - A better way to keep our members involved.
- Answer:
  - Is this a problem/opportunity, or a solution
  - If solution, surmise an underlying problem/opportunity
  - How would you deliver a pump?
  - How would you deliver a sustainable water source?
    - I.e. Meet the 3 consulting goals of this course.

# Whole-class discussion of exercise

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- Comments?

# Mentally ill prison inmates & Y2K

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How did the problem of data field size representing 'year' (I.e. the Y2K problem) contribute to the doubling of inmates of the psychiatric ward of the county jail?

# Diagrams & prose

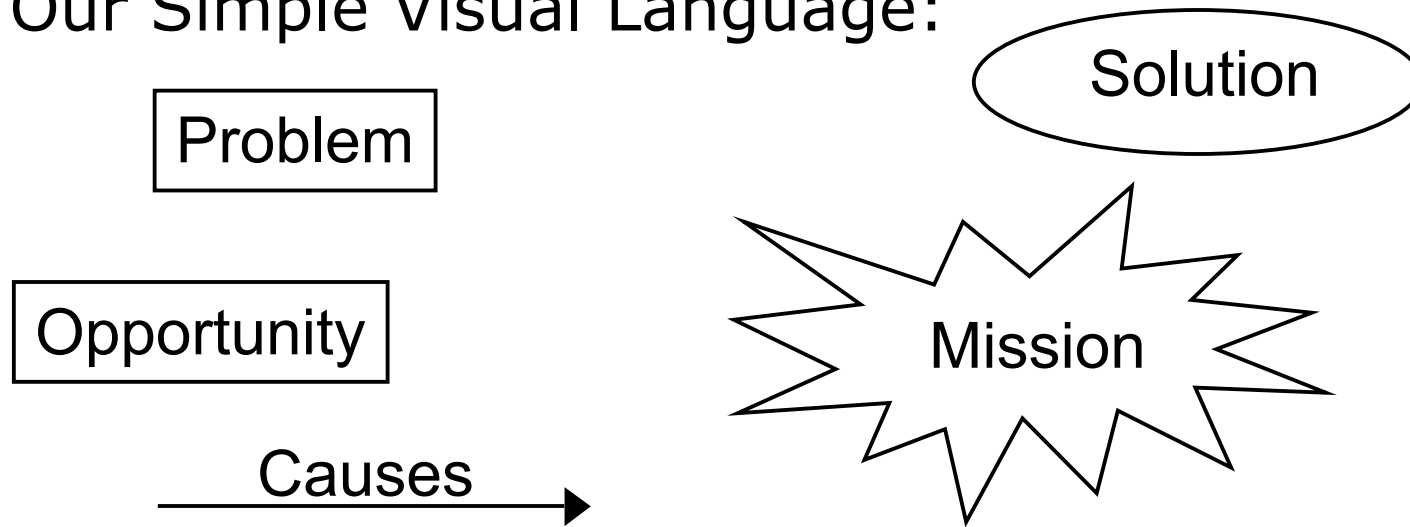
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- Which works better?
- How do they complement each other?
- If you were writing a proposal to develop information systems for the county, how could you use Horn's mess map?

# Causal flow diagrams

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- Purpose: to gather information & analyze the relationship among
  - Mission
  - Problems / Opportunities
  - Solutions
  - Complex environment the technology exists in.
- Our Simple Visual Language:

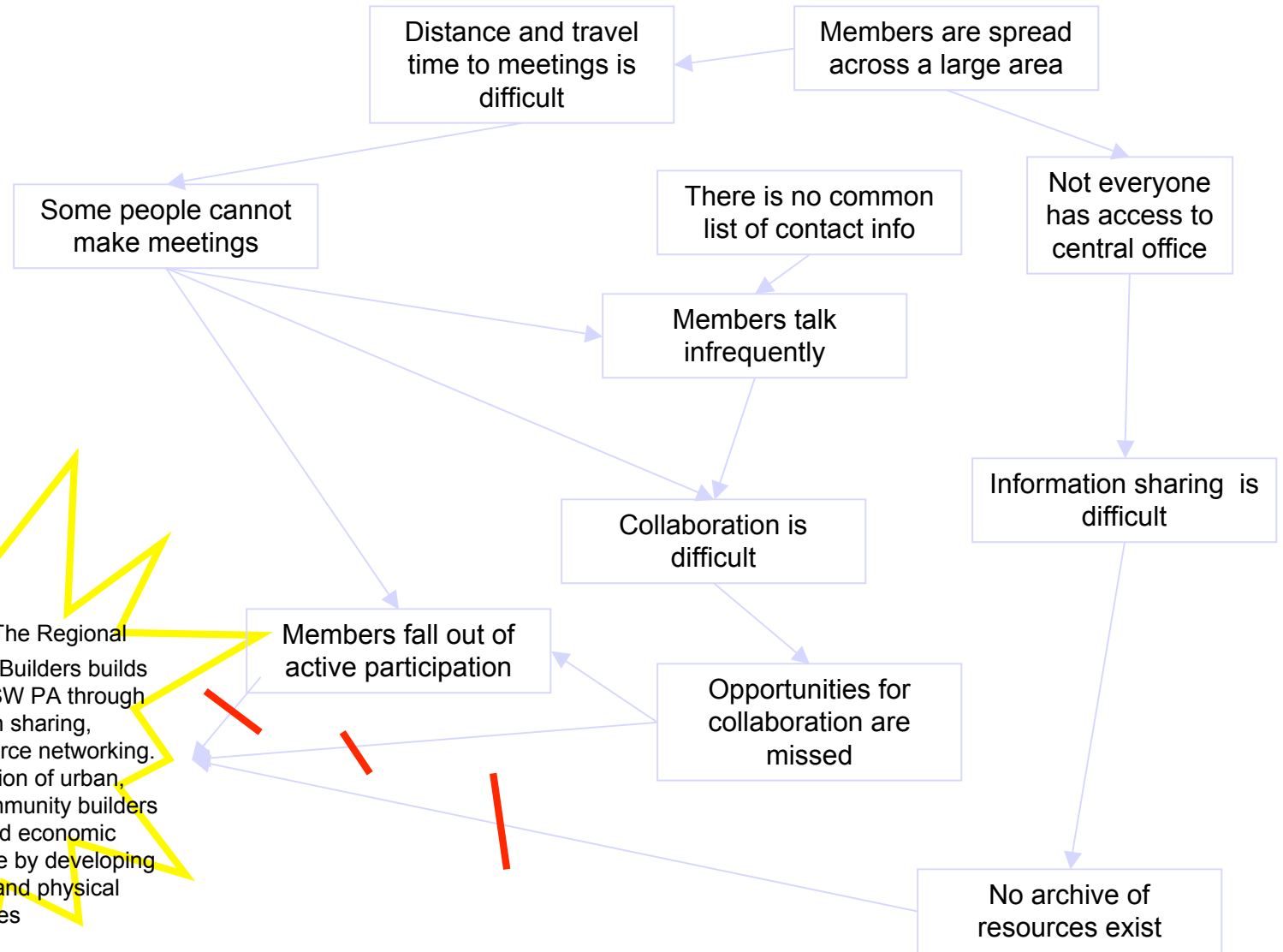


# E.g. Mission

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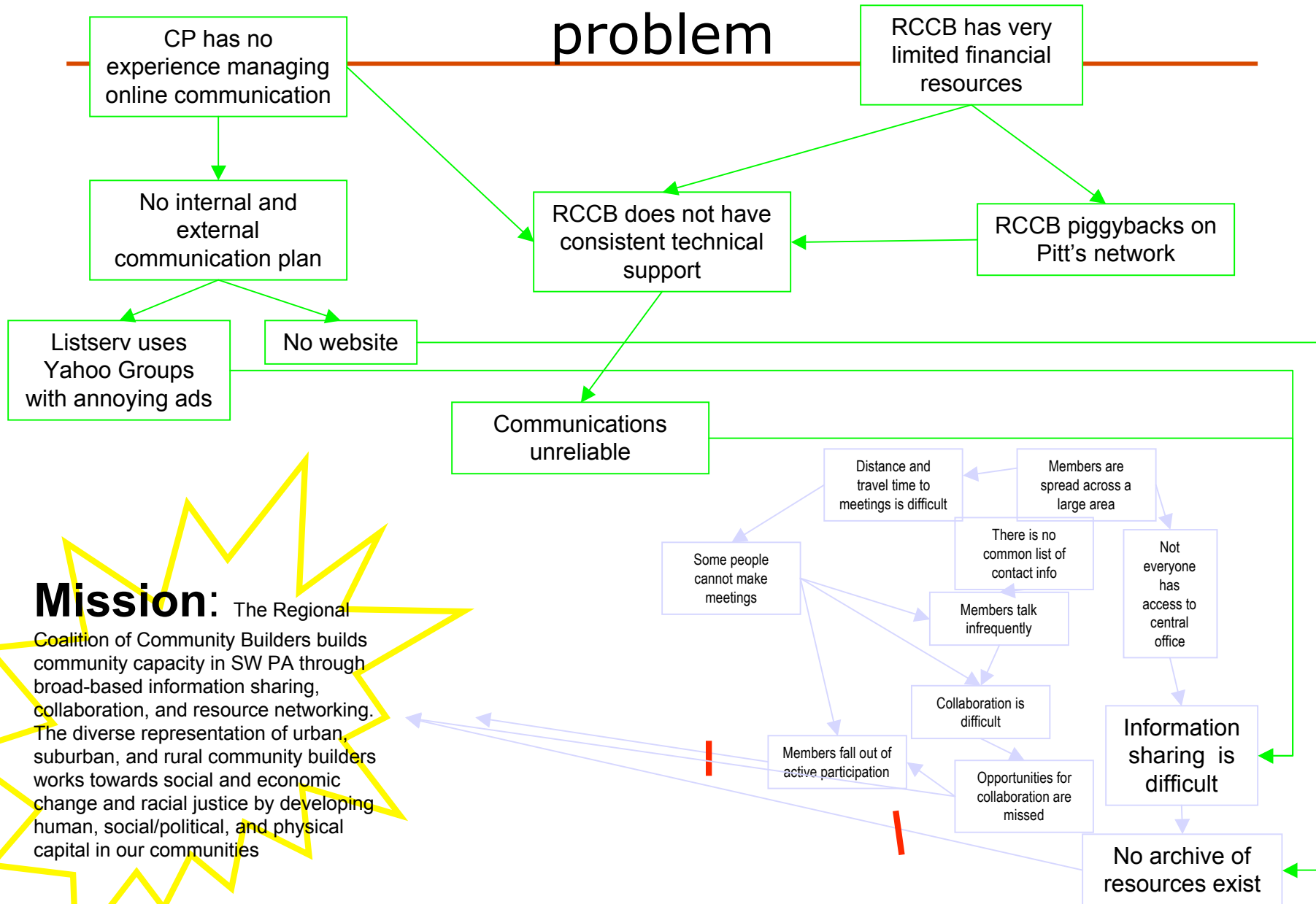
**Mission:** The Regional Coalition of Community Builders builds community capacity in SW PA through broad-based information sharing, collaboration, and resource networking. The diverse representation of urban, suburban, and rural community builders works towards social and economic change and racial justice by developing human, social/political, and physical capital in our communities

# External Communication problem



**Mission:** The Regional Coalition of Community Builders builds community capacity in SW PA through broad-based information sharing, collaboration, and resource networking. The diverse representation of urban, suburban, and rural community builders works towards social and economic change and racial justice by developing human, social/political, and physical capital in our communities

# Technical environment & management problem



# Crafting a causal flow diagram

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- What is a common student complaint about CMU?

# Crafting a causal flow diagram

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- What is a common student complaint about CMU?
- As a class, lets generate a causal flow diagram for the issue

# What is the value?

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- What value is there in creating a causal flow diagram?

# Analyzing work processes

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- Modeling your community partner's work processes is another way to analyze and understand their underlying problems and opportunities.
- There are are many perspectives by which work can be analyzed
  - E.g. Perspective of the clients
  - E.g. Perspective of the data

For more info, see: Contextual Design: Defining Customer-Centered Systems  
By Hugh Beyer, Karen Holtzblatt, Morgan Kaufmann Publishers, 1997

# Work models - artifacts

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- How artifacts are created, modified, and used
  - E.g. from the intention of applying for a scholarship through receiving a check

# Work models - people

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- Diagram the flow of people
  - E.g. how clients arrive and are helped

# Work models - step sequence

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- Detailed steps to perform the work
  - E.g. person entering application information into a database

# Work models - communication

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- How people communicate and coordinate
  - E.g. that application is ready for evaluation

# Work models - policy

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- How culture and policy directs work
  - E.g. Foundation policy requires collecting extensive parent work history data to identify truly needy applicants.
  - E.g. Scholarship applicant finds application requires too much personal information and decides to quite the process

# Work models - physical space

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- How the physical environment is used
  - E.g. how an afterschool computer lab is configured and how children and instructors interact in the space

# Work models - Summary

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- Artifacts
- People
- Step sequences
- Communication
- Policy
- Physical space

# Work models - Summary

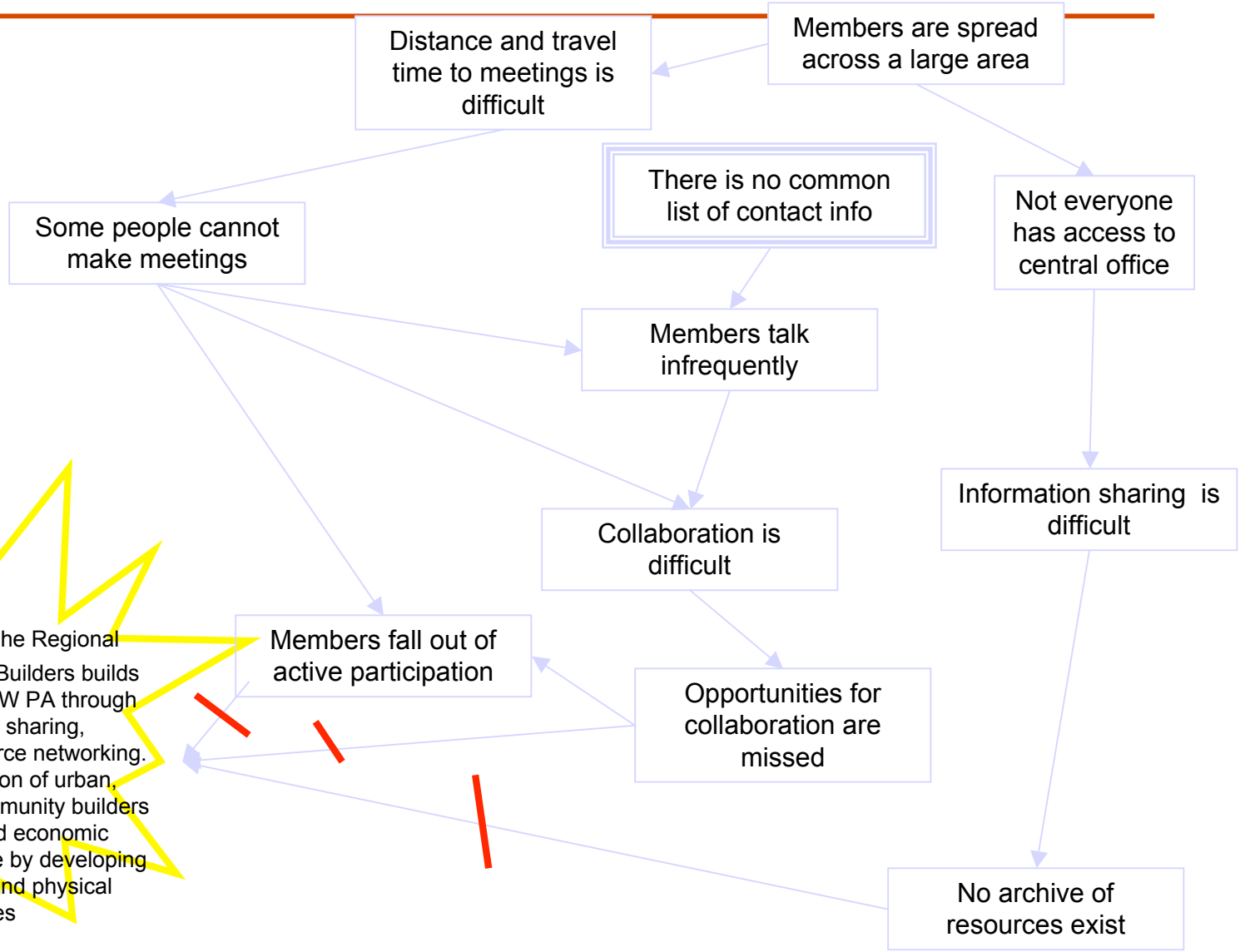
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- Artifacts
- People
- Step sequences
- Communication
- Policy
- Physical space

Try it!

In pairs, build one  
(very simple)  
work model for  
Starbucks.

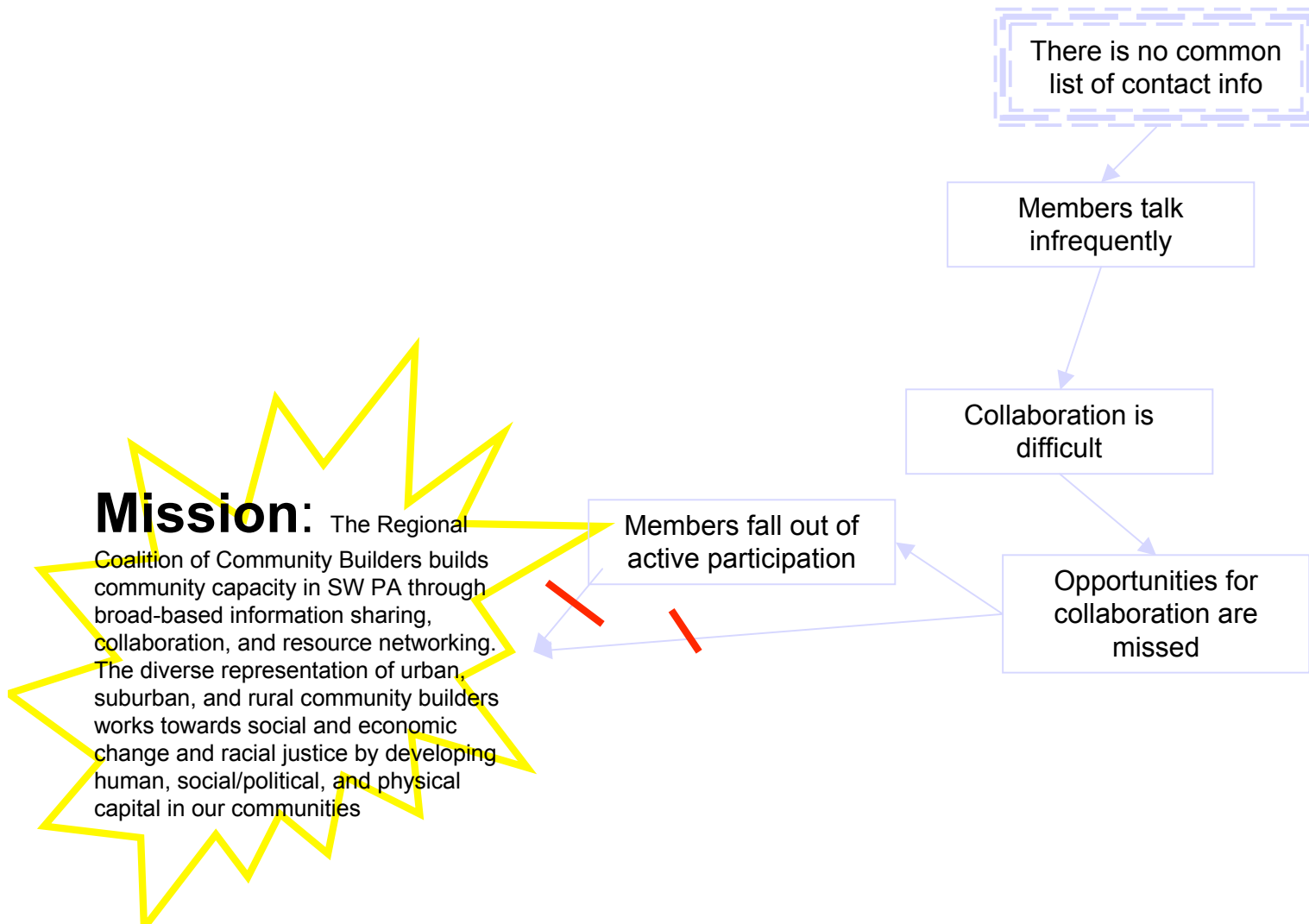
# Models help raise & answer questions



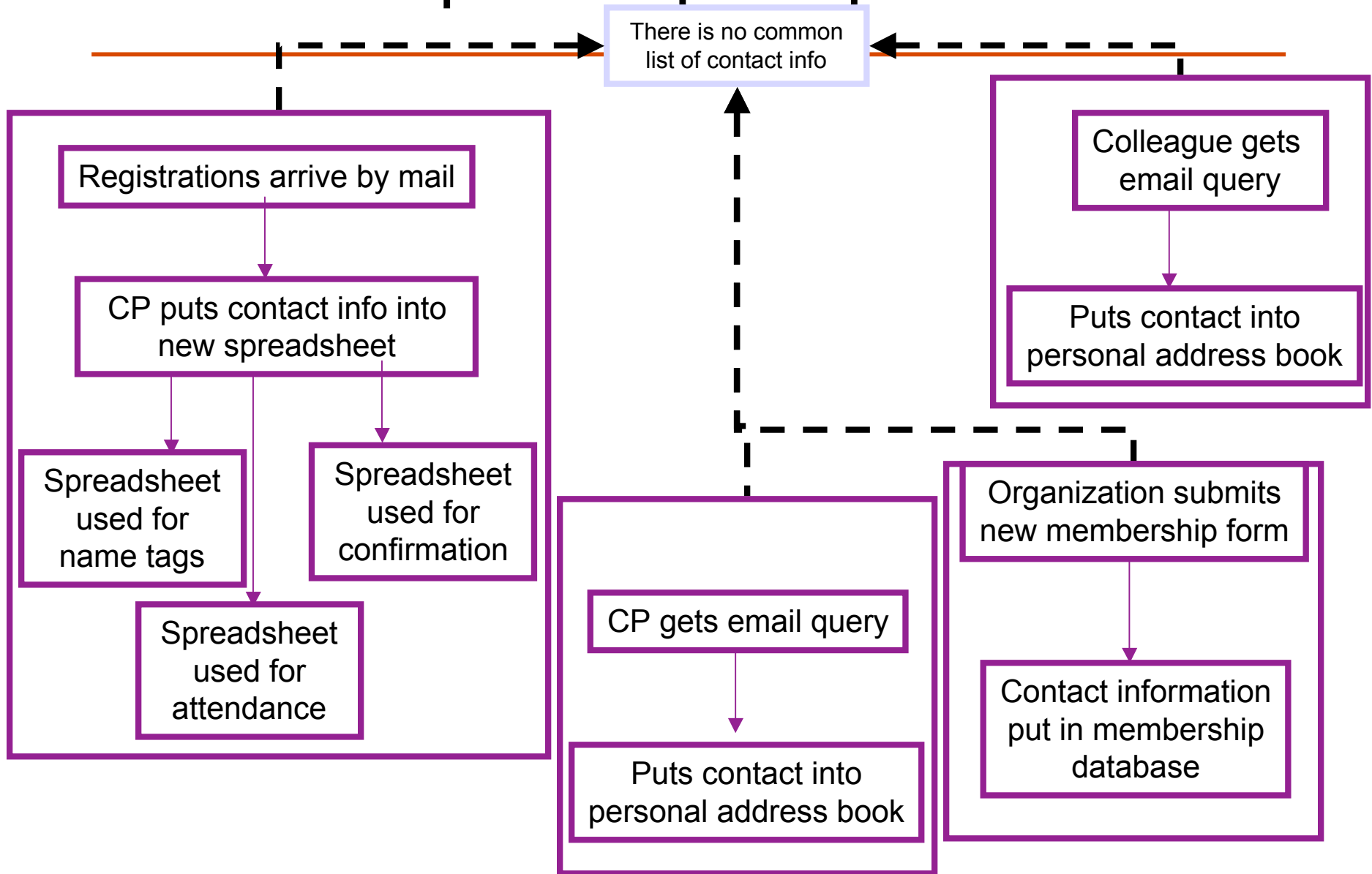
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# Why is there no common list...?

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# Multiple step sequences



# Review Calendar / Homework

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