FLOW SYSTEM

PARTICIPANT WORKBOOK

Complexity Thinking

Workbook: Network Analysis

getflowtrained.com/playbook/network-analysis/

Network Analysis

Definition

Open systems, such as complex adaptive systems, can be viewed and analyzed as a network. Network analysis techniques allow you to view the interactions or linkages between components, such as the interactions between teams or between organizations. Network analysis can inform how the flow of information between systems and agents will impact the strategy or practice of change.

Explanation

Network analysis has been used to analyze many different types of networks, such as culture, nature, brains, organisms, economies, and ecologies (Borgatti et al., 2018).

Network analysis has also been used to identify key people in organizational units that hold essential information to the success of the organization. Understanding how these various networks communicate, share, store information, and collaborate is necessary for effective organizational design.

This is where the power of our networked connections comes in.

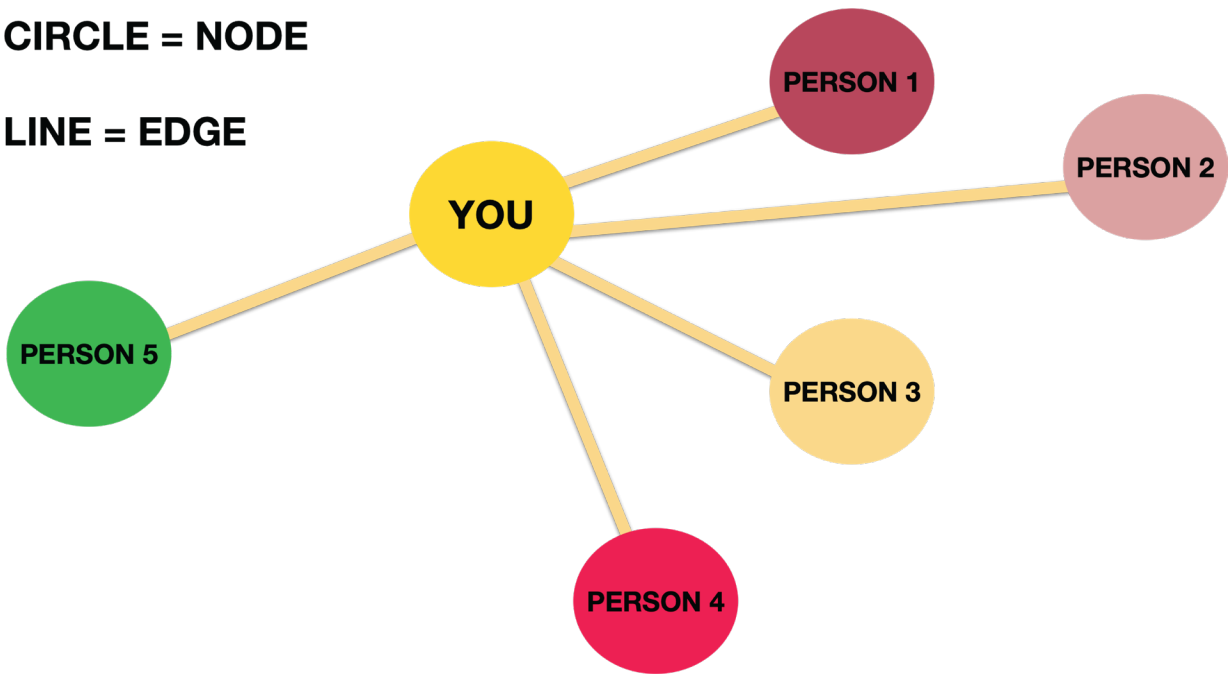
In network analysis there are many different types of connections as well as linkages between those connections. Each plays a role in how information flows to and through the system.

Networked Connections

In the following exercise, you will be asked to identify five connections, five people who you are connected to through some visual means (e.g., LinkedIn, Facebook). The reason it needs to be visible for this exercise is because you will then identify five people who are connected to each of these five people. You will develop a short table and draw a network diagram from these five people and five of their connections.

Five Visible Contacts	
Identify 5 plus 1 (you) people	Identify the first contacts for each of these six people. First contacts can be identified in a number of social network sites (e.g., LinkedIn, Facebook)
Names	**List of first connections…**

Plot the six people in your initial network on a graph, concept map, or a whiteboard like the example below.



The circles that represent the main people (you and the five first contacts) are called nodes. The lines that connect you with these five contacts are called an edge. These edges are the same color as the circle that represents you, they are first contacts to you. These edges could have an arrow from *You* to each of the five contacts if you were interested in identifying directional relationships (directed network). For this example, however, we are only looking at contacts or associations (undirected network).

Linking Associations

Next, you will list the associations with each of the contacts that you identified in the earlier table. Link these associations as *From*, *To*, and *Type*. *From* is from whom the contact originated.

You are listed in the first five entries as *You* are connected to each of these five contacts. These are also listed as first contacts as they are connected directly to you.

Next, identify five contacts for each of the five members (Person 1 through Person 5). If these contacts are not connected to you, they will be listed as being a secondary type of contact.

If you have the same contact, you can list it as a first contact and will need to add a new row with *You* in the *From* column and the duplicate contact person in the *To* column with *First* in the type of contact.

Continue until you have completed the list for all five associations.

Linking Associations

From	To	Type
YOU	Person 1	First
YOU	Person 1	First
YOU	Person 1	First
YOU	Person 1	First
YOU	Person 1	First
PERSON 1	Contact 1.1	Second
PERSON 1	Contact 1.2	Second
PERSON 1	Contact 1.3	Second
PERSON 1	Contact 1.4	Second
PERSON 1	Contact 1.5	Second
PERSON 2	Contact 2.1	Second...

Once you complete the connection table (linking associations), graph the relationships for each of the five members. Use different colors to indicate who is connected to whom. See what transpires and look to see how many connections are similar to yours, and how many connections are similar to the other associations. While this is a small sample, with only five contacts and five connections for each, you can begin to see the power that network analysis can have in identifying patterns that would not otherwise be able to be seen without these tools. You will also begin to realize the power that technology and software programs have when performing network analysis on large datasets.

Additional Sources

Some of the technologies include:

- Kumu (https://kumu.io/)
- Gephi (https://gephi.org/)
- Cytoscape (https://cytoscape.org/)
- R (https://www.jessesadler.com/post/network-analysis-with-r/)

Additional sources related to network analysis are listed below:

- Stanford Large Network Dataset Collection (SNAP; https://snap.stanford.edu/data/)
- Navigate relationships from Harry Potter (http://dpmartin42.github.io/projects/Harry_Potter/Harry_Potter_Network.html)
- Medium article (https://medium.com/graph-commons/analyzing-data-networks-f4480a28fb4b)
- Social Network Analysis wiki (https://en.wikipedia.org/wiki/Social_network_analysis)

Connect the Three Helixes:

Flow can only be achieved when the three helixes are interconnected. To identify how this could occur, the next exercise requires the reader to identify examples of different methods from each of the other two helixes (distributed leadership, team science) that might work well with, or support, weak signal detection. Knowledge of all three helixes will be required to make these connections..

Connect the Helixes	
Select a scenario or problem that would benefit from network analysis techniques.	
Identify three methods from distributed leadership that could work with network analysis and give a brief description about how they complement one another.	
DL Method 1:	
DL Method 2:	

Connect the Helixes	
DL Method 3:	
Identify three methods from the team science helix that could work with network analysis and give a brief description about how they complement one another.	
TS Method 1:	
TS Method 2:	
TS Method 3:	
Three Helixes. **Provide a description explaining which methods from each of the three helixes (with network analysis being the CT method) work best for the scenario/problem identified earlier.**	