Ten questions to ask a network map

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A map itself has no immediate purpose. It will have been drawn to illustrate a general framework such as the structure of roads or the relative heights of land or the location of points of interest. It's the canvas on which any number of individual purposes may be plotted. Take a road map for instance. There are many different ways to travel through the map. The routes you take depend on the purpose of your journey - a meandering scenic route when sightseeing, the motorway when you have to get to a business meeting and so on.

Network maps are useful in charting a social landscape and in plotting the ways that people and organisations travel through it and gather together. The following questions can help you understand and use such maps.

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1 Who connects to whom?

This is the most basic information that you can get from a network map. It will show organisations or key individuals as nodes and collaborative activity between them (conversations, working together, giving advice, funding etc) as lines. Any situation that can be expressed in this way is a network. So, at its most basic, the map is a **visual representation** of how people and organisations work together. The pattern of nodes and connections can be further analysed using specialist software. This approach is known as Social Network Analysis (SNA) and has a long pedigree of use in research, business and security.

WHY IS THIS USEFUL?

- Just knowing the collaborations between the organisations and people that you are dealing with can be really helpful in deciding who to involve in a project or programme. There may be key collaborations that you wish to be a part of or you may wish to bring together organisations that don't collaborate at the moment. The network map can help you identify these and assess the possible effects of new connections.

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2 What are your closest connections?

A network map will show your immediate connections - the people and organisations that you collaborate with directly. It will also show the nodes that are connected to your immediately connected nodes. You can **step out** from your initial node to see the possible pathways to others.

WHY IS THIS USEFUL?

- Identifying your own connections and the exchanges you have with them is itself a useful process. You can add to this an estimate of how strong you feel a connection to be and what stories you share. This can become more powerful when you also identify what further connections **they** have. Of course you can also map other people's close connections and step out from them.

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3 Who is most central?

In any real life network, some nodes will be more **central** than others because of their **position** on the map. These nodes will be able to influence the network more than others and are best placed to distribute information to other nodes on the map. In small, simple maps, it is usually easy to identify these nodes. In maps with large numbers of nodes and connections, specialist software is needed to pinpoint the key nodes. The concept of **centrality** is key to network analysis. Although there are a number of metrics of centrality the most commonly used are:

- **Closeness** centrality measures the distance each element is from all other elements. In general, elements with high closeness can spread information to the rest of the network most easily and usually have high visibility into what is happening across the network. - Discover the sensers / spreaders
- **Betweenness** centrality measures how many times an element lies on the shortest path between two other elements. In general, elements with high betweenness have more control over the flow of information and act as key bridges within the network. They can also be potential single points of failure - Discover the brokers / bottlenecks
- **Eigenvector** centrality measures how well connected nodes are with other well connected nodes - Discover the leaders

WHY IS THIS USEFUL?

- You can use centrality to identify who is most likely to influence the network - these are the organisations or individuals that you should involve in your campaign or programme. You can also identify the nodes that would have the greatest impact on the network if they were removed.

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4 How do nodes cluster?

Most maps will show areas that are more dense than others - where the nodes hang together because of how they are connected. We can highlight these clusters using software. Although the clusters have been entirely created from the geometry of the map, there will often be a remarkable fit to functional clusters - nodes that share some activity interest or asset. Finding these congruities gives you some confidence that the map is reasonably accurate representation of the real life networks it seeks to portray.

WHY IS THIS USEFUL?

- Identifying such communities of interest or action is useful in deciding who to include in events or campaigns. Some nodes may act as vital bridges between otherwise disconnected clusters.

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5 What's the shortest route?

You may want to know how near to another person or organisation you are - how many connections lie between you and them. In a small network this is easily seen. In a large network this is much more difficult and software can help. You may also want to know the shortest pathway between nodes that you think **should** be collaborating.

WHY IS THIS USEFUL?

- Many campaigns, ranging from the medical to the military have found it more effective to target the network of nodes surrounding their actual target. It is therefore useful to know the most immediate connection pathways to the node you want to influence.

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6 What assets and attributes do nodes have?

So far we have concentrated on the **form** of the network rather than on the individual character of its component nodes and connections, but we can also record information in nodes and connections. This might typically relate to the skills and resources held by that organisation or individual. It is also possible to determine a list of attributes across nodes and connections and to add tags. This allows us to carry out complex searches. The map becomes a database.

WHY IS THIS USEFUL?

- Knowing what you **have** makes it easier to decide what to **do**. The spread of assets within a network may be sparse or plentiful. Knowing which will help you set a strategy. Knowing where these assets are located and how willing organisations are to share, is a useful guide to action.

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7 What is the strength of connection?

Some connections are stronger than others. The strength of connection will affect how information and influence spread throughout the network. This can also change how nodes cluster and how central various nodes are. Again software can help by incorporating the strength of connection in calculations of centrality and clustering. Further detail can give different strengths of connection based on different factors such as money, information, power and so on. Software can show how the map changes according to which factor is being considered.

WHY IS THIS USEFUL?

- Knowing how strong connections are can refine the calculation of centrality. It can also help identify the nodes that will have a strong influence on a target node.

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8 What is the density of the network and how does it change over time?

Some networks are more connected than others - the density of connections is greater. It is often useful to measure the degree of connectedness of a network and to show how this measure changes over time - to illustrate the effect of a strategy or programme where connectedness is an important factor. A common way of assessing density is to compare the maximum number of links possible within a network with the actual number of links. The problem with that is that the number of possible links rises dramatically with the number of nodes according to the formula: **nx(n-1)/2.** Most organisations tend to have an upper limit for real interactive collaborations of around 15 and most individuals are half that. We must distinguish between membership organisations where most links are one way and tenuous, and collaborative organisations that interact on projects.

WHY IS THIS USEFUL?

- Many complex delivery issues are concerned with connectivity. We talk of being more joined up, of collaborating and sharing. Yet we have few means of measuring what that means. Social capital is defined as the degree to which people and organisations are linked. Social network analysis provides a way of evaluating the changes in connectivity that occur as a programme develops.

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9 How do assets compare with network position?

It is possible to measure how central nodes are and then compare that with the skills and resources that they control. Often you will find that the most central nodes are not the best equipped. In some cases they may not be able to exercise the role

that the network has assigned them because they lack the assets to do so. On the other hand a node may have plenty of resources but be so poorly connected that they can't use them to benefit the network. Comparing the balance of assets and network position gives an insight into network performance and specialist software can demonstrate this in a “mic-mac” chart displays quadrants that show:

- High centrality/high assets
- Low centrality low assets
- High centrality / low assets
- Low centrality / high assets

WHY IS THIS USEFUL?

- Comparing assets held with how central organisations are gives some idea of how they contribute to the network and how they might contribute in the future.

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10 How reliable / credible is network analysis?

In the last 20 years or so, there has been an upsurge in thinking about how networks of all sorts shape our lives and our surroundings. Although the approach is called **social network analysis**, it's principles and methods have been applied in many diverse fields from public health to cell biology, military strategy, family dynamics and farming. The NHS NICE website cites over 16,000 references to social network analysis in its Evidence section.

WHY IS THIS IMPORTANT?

- The spread of network ideas and their adoption across many fields gives some confidence in their use. Although the UK has been slow in adopting such methods, we are coming to recognise their usefulness and accept their results.

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