Project Name : Social Network Analysis

Project Planning and Hypothesis Document

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Social Network Analysis

Purpose

Social Network Analysis (SNA) is a powerful tool that helps us understand how individuals are connected as a community. It also informs us about the structure of knowledge mobilization across individuals and organizations. By providing a means of expressing the diversity of networks and a set of tools for visually representing and quantifying their properties, SNA plays an essential role in gauging community engagement and evaluating communities. Collaboratory datasets can be used to interpret and inform better decision-making for improving community engagement. Information retrieval through data analysis is a crucial component of community-engaged scholarship, which is a promising strategy for problem-solving research, civic education, and revitalizing the democratic aspirations of higher education.

SNA is the application of network science to social networks, which examines the linkages between an individual's behavior and the macro-level pattern of relationships. The research endeavors to graph the foundation as a simple and useful representation by incorporating data visualization techniques. The research has established numerous metrics to describe and contrast network structures and positions, such as centrality, density clusters, structurally equivalent networks, and unique locations. By analyzing their effectiveness for engagement, the comparison of network topologies as a whole is possible.

Theoretical Framework

Community engagement involves building relationships between communities, researchers, and research institutions. Evaluating community-university activities allows for the improvement of collaborative partnerships. Social Network Analysis can be used to evaluate

community-engaged initiatives, measure their results, and identify areas for improvement. The Framework of Social Network Analysis involves analyzing relationships with community members who benefit from or have influence over community public health actions. There are four practice elements

Knowing a community, its constituents, and capabilities

The practice of knowing a community, its constituents, and capabilities involves collecting intelligence through various types of data, safe reporting and collection mechanisms, and staff with the skills to analyze and interpret data. It also requires organizational procedures that encourage the use of community-engaged information in decision-making and a culture that prioritizes community engagement. To act collaboratively, a collaborative platform is used, allowing individuals and groups from communities or organizations participating in community engagement to assimilate data through their respective filters. SNA projects have enough capacity to allow for collaborative data collection through a collaborative platform.

Establishing positions and strategies that guide interactions with constituents

Structural capacity is important in establishing positions and strategies that guide interactions with constituents. Organizations must identify their priorities regarding community-related activities and the constraints on their mission or financing that will limit their ability to address challenges.

Building and sustaining formal networks

Building and sustaining formal networks can maintain relationships, communicate messages, and leverage resources. Effective networking requires active communication channels, fluid exchange of resources, and energetic coordination of collaborative activities among network partners.

Mobilizing communities and constituencies for decision-making and social action

Mobilizing communities and constituencies for decision-making and social action requires leading them through a process of discussion, deliberation, and decision-making to secure their commitment to a cooperative objective.

To identify the structural capacity needs of organizations and other collaborative entities undertaking community engagement, the frameworks above are synthesized. The main goals of project evaluation are to support continuous program management by evaluating the procedures and results of the efforts taken. Multiple measurements are typically used to evaluate a program, and these measures are frequently influenced by the perspectives and contributions of many stakeholders gathered through frequent meetings and discussions. The collaborative platform and SNA projects play a vital role in collecting data, establishing positions and strategies, building and sustaining formal networks, and mobilizing communities for decision-making and social action.

Research Questions/ Hypothesis

1. The instrumental value of the relationships under study raises questions such as:
2. "Which network structures and positions generate great opportunities?"
3. "Which network positions impose strong constraints?"
4. “Are the right community members involved?” (This is a question that needs to be reassessed throughout the program or intervention because the “right community members” might change over time.-identifying powerful and influential participants)
5. “Under what bases are community members involved in developing the program or intervention?”

6. “Did community members help to conceptualize the project, establish project goals, and develop or plan the project?”
7. “How did community members help assure that the program or intervention is culturally sensitive?”
8. “How are community members involved in implementing the program or intervention?”
9. “Did community members assist with the development of study materials or promotion of community engagement scholarships or the implementation of project activities or provide space?”
10. “How are community members involved in the evaluation of data analysis?”
11. “Did community members help interpret or synthesize conclusions?“
12. “Did community members help to develop or disseminate materials?"
13. “What kind of learning has occurred, for both the community and the academics?”
14. “Have community members learned about the evaluation or research methods?”
15. “How does a particular activity support the organization?”
16. “Should each team network be tested individually or club them to get organizational correlations?”
17. “What should be my main considerations when working with the visualization of small networks?”
18. “Is analysis of weighted longitudinal networks possible?” - How does the network change over time?
19. “Which stakeholders on and off campus are isolated?”

Datasets

Questions	Attributes Required
1. Which network structures and positions generate great opportunities? 2. How are community members involved in the evaluation of data analysis? 3. What kind of learning has occurred, for both the community and the academics? 4. How does a particular activity support the organization?	Activities , projects, collaborations, strength of network density ,beneficial outcomes and achievements, community name,positions , contributions to society, no of students benefited
1. Which network positions impose strong constraints?	strength of network density ,Activities ,confidential projects, level of confidentiality,positions ,rules and regulations,projects
1. Are the right community members involved? 2. Did community members help to conceptualize the project, establish project goals, and develop or plan the project? 3. Under what bases are community members involved in developing the program or intervention? 4. What should be my main considerations when working with the visualization of small networks?	Level of education,title,experience,project,delivery analysis,rating,no of problems per day ,resolved issues, raised tickets,feedback, speed of problem correction ,Behavior, interest or passion towards the project,level of experience,feedback,type of community,type of change ,number of groups involved,social support, social recognition, and reinforcement,

1. How did community members help assure that the program or intervention is culturally sensitive? 2. Did community members help interpret or synthesize conclusions? 3. Did community members help to develop or disseminate materials? 4. Should each team network be tested individually or club them to get organizational correlations? 5. Is analysis of weighted longitudinal networks possible?”	Feedback, survey results, pre and post analysis results,location knowledge,discussions,impact analysis, awareness ,budget, revenue,positive percentage evaluation, regression percentage,Start date of project,time period , intermediate outcomes, no of interventions
1. How are community members involved in implementing the program or intervention?	No of discussions ,surveys,meeting conducted, browsing history,reference materials,consultation with veterans
1. Did community members assist with the development of study materials or promotion of community engagement scholarships or the implementation of project activities or provide space?	No of Promotions made, no of persons contacted/communicated through connections(calls and emails) ,type of programs, eligibility for scholarship, no of views, no of applications
1. Have community members learned about the evaluation or research methods?	Test scores, discussions,certification check, no of sessions conducted, no of methods proposed,papers published
1. Which stakeholders on and off campus are isolated?	Title, working organization, employee id , contract list,agreement/signed SOW (statement of Work) information, activities alloted,

CRISP-DM Steps Involved

CRISP-DM (Cross-Industry Standard Process for Data Mining) model is a very popular methodology that offers a structured approach for any data science project. The advantage of using a CRISP-DM approach is easy maintainability and tracking of the project. The six steps involved in CRISP-DM are

1. Business Understanding
2. Data Understanding
3. Data preparation
4. Modeling
5. Evaluation
6. Deployment

Methodology

The methodology used for the SNA project involves tracking the depth of relationships, frequency of communication, and history of collaboration. SNA helps to track and measure the connections that exist between participants, weave connections between individuals, and increase collaboration across departments or organizations. Networks are used to illustrate social network analysis, with arrows or lines known as edges representing the connections between the actors known as nodes. Following the acquisition of the data, various methods are used to evaluate it to emphasize the relationships.

SNA is a helpful method for assessing community partnerships, their sustainability, and the partnership's effects on civic involvement. Understanding social networks, and developing and executing organizational structures to support community engagement projects are also helpful for formative work. The methodology followed for implementing the SNA project involves planning, implementation, completion, dissemination, and reporting.

Planning

During the planning stage, potential solutions will be investigated for figuring out project feasibility, identifying stakeholders, and establishing short and long-term objectives. Defining and identifying stakeholders is an important part of the planning step. During project implementation, numerous factors such as engagement and retention of project stakeholders, usage of accurate and understandable training materials, adherence to the schedule, coordination with other programs and activities, and compilation with applicable laws are considered.

Implementation

In project implementation, various factors such as stakeholder engagement and retention, use of clear training materials, adherence to schedule, coordination with other programs, and compliance with laws are taken into account.

Social network analysis (SNA) examines the structural patterns of interactions within the entire network, known as the socio-centric network. Data is gathered at the individual level but analyzed at the structural level using actor-by-actor matrices, similarity/distance matrices, and graph representations. Sociograms can reveal the inner workings of relationships in a group, uncovering communication patterns, alliances, and social rank.

The index of network density measures the ratio of observed edges to total potential edges. Cohesion is a measure of the interconnectedness of network actors, with distance and density as the most common measures. Components and cliques measure properties of network subgroups, while centrality measures identify the most prominent actors within a network. Local centrality refers to direct ties, and global centrality refers to direct and indirect ties.

Completion, Dissemination, and Reporting

A network can be represented graphically by graphs. Sociograms are a visual model graph database that illustrates the relationships among individuals in a group and explains how people in a group interact with one another. The inner workings of relationships in teams, classes, or a group of friends or coworkers are revealed and evaluated using sociograms, which can uncover alliances, secret goals, social rank, and communication patterns between group members. This enhances collaboration, productivity, efficiency, and teamwork.

The index of network density used in social network analysis is the ratio of observed edges to the total number of potential edges for a given network. The key to social network analysis is in the calculation of descriptive measures that reveal crucial characteristics regarding the position of network actors, the characteristics of network subgroups, and the characteristics of whole networks. Visualizing the data is done by data visualization tools and descriptive measures is by estimating cohesion. Characteristics of complete networks are defined in terms of centrality, and centrality measures identify the most prominent actors within a network.

Subject	Questions
Understanding structure of the network	• Which individuals are linked together in the network? How are they linked? • Who is peripheral to the network and who is central? • Who turns up in some networks and not others? Why is this?
Tracking of community engagement	• Can any hierarchy be seen in the Clusters (e.g. Administrator)? • Are there any opportunities to fragment the networks ? • Are some networks more / less densely packed (and therefore potentially more / less difficult to disrupt)?

Beneficial outcomes	● What are all the benefits attained by the community through the activities across the network? ● Which sector of people get benefited from whom and how can that be implemented across all the communities?
Analytical solutions	● What role do individuals play in the networks? ● Who is uniquely connected to lots of others? ● If an intervention was delivered to individuals, what impact would it have on the network?