Networking to Meet the Demands of Youth: An Analysis of Communication Networks Among Nueces County Youth Services Organizations

Daniel J. Jorgensen, Ph.D.
Assistant Professor of Public Administration
Texas A&M University, Corpus Christi
Corpus Christi, TX
dan.jorgensen@mail.tamu.edu
(361) 825-3269

A paper presented at the
Southwestern Social Science Conference
Corpus Christi, Texas
March 18, 2004
INTRODUCTION

Public sector organizations have found it increasingly useful to establish inter-organizational networks as a means to implement and assess broad-based community policies such as economic development, education, homeland security, and social services (Hagen, Killenger & Streeter, 1997). Treading between dimensions of market and hierarchy, these “network” organizations encourage cooperative behavior between public, non-profit and private sectors and are believed to improve the efficiency and effectiveness of service delivery. Key to understanding the development of these organizations is being able to assess communication, relations, cooperation and inter-organizational environments of the network. Traditional organizational analysis typically falls short in this task. The purpose of this paper is to demonstrate the use of social network analysis as a means to define and assess structural features of network organizations. For the purposes of this demonstration, the communication network of the youth services agencies in Nueces County, Texas, is utilized.

The organization, Youth Opportunities United (YOU), sought a study to assess the dozens of youth service organizations in Nueces County, Texas, each with their own missions, strategies, planning and information resources. Social network analysis was selected for its strength in assessing communication. Supported by a grant from Texas A&M – Corpus Christi (TAMUCC), and the Social Science Research Center, in the College of Arts &
Humanities, the researcher undertook an applied social network analysis study. As a network study of inter-organizational communication, the study presents a snapshot of the network of public organizations contributing to the critical work of youth social services.

**BACKGROUND INFORMATION**

In 1998-1999, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) funded the development of a comprehensive strategy to address risk and resource assessment, prevention services, youth development, institutional care and aftercare services in Nueces County, Texas. The planning process brought together, city, county and non-profit organizations to focus on effective programming and revealed the existence of approximately $8 million dollars in private and public funds being spent on youth services in the county. An organization named Youth Opportunities United (YOU) was created to leverage the current inflow of dollars and establish systems and linkages between youth service organizations in Nueces County to assure effective use of service delivery and funding.

Since its inception, it YOU has been able to document that its efforts have been the proximate cause for an additional $4 million in funding for youth services in Nueces County. It has been much more difficult, however, to assess the role the organization has played in creating relations, and cooperation, in the inter-organizational environment in the county.

As YOU continued to integrate national and local resources to be directed toward youth services, YOU needed to assess the status of the youth services environment. YOU decided that a quantitative and current study should be performed to help determine an appropriate role for it and other networking organizations, and that social network analysis would be an appropriate method for the study.
RESEARCH GOALS

The explicit goals of this study would be:

- To identify levels of communication;
- To assess overall levels of inter-agency coordination;
- To identify key youth services agencies;
- To better visualize the entire youth services network in Nueces County, Texas.

RESEARCH DESIGN

The sampling frame for this research consisted of 85 organizations with significant youth service missions as identified through the 2001 Resource Guide to Services for Nueces County Youth (Rhoades, 2001). In order to assess levels of communication and coordination among youth service organizations in Nueces County, Texas a questionnaire was designed and distributed under the auspices of the Social Science Research Center at Texas A&M – Corpus Christi, the data gathering arm of YOU. The questionnaire was administered to the survey population in August 2002, with a follow-up mailing October 2002.

The questionnaire was addressed generally to the organization and a cover letter requested that the survey instrument be given to a director or otherwise qualified individual to complete. The two-page questionnaire asked the respondents to indicate if there was formal communication at the organizational level with any other organization on the list daily, weekly, monthly, yearly, or never. It also asked organizations to attach their mission statement and self identify their market sector as government, private, or non-profit. After two mailings, 73% of the questionnaires were returned.

Designed to elicit information from all 85 actors, the loss of information from 27% of the organizations surveyed may have been too severe to continue. The questions in the
instrument, however, were asked so that the relations between organizations would be reciprocal (either have received or sent information). Instead of abandoning the research, therefore, the data was symmetrized with the help of the received questionnaires. Additionally, this would resolve the concern if an unqualified respondent who reported links inaccurately completed the instrument. Thus, the loss of information mainly concerns relations between those organizations that did not answer.

Responses to the survey were compiled in a weighted case by case matrix of all 85 organizations in which each organization was listed twice, once in the rows and once in the columns. After constructing the matrix data were processed by the UCINET program (Borgatti, Everett, and L.C. Freeman, 1999). The data analysis was aimed at identifying important characteristics at both the network and organizational level. Four network parameters were focused upon to assess the communication among youth services organizations in Nueces County; density, centralization, closeness centrality, and betweenness centrality.

Density is a basic means of measuring levels of the overall level of network integration between organizations. Turk (1977) points out that public service organizations can coordinate their activities without external direction. This describes a form of coordination that does not involve leadership or centralized direction, but that is instead based upon decentralized cooperation. The density measurement is the total number of ties divided by the total possible number of ties, in other words, the more actors that have relationships with one another, the denser the network (Scott 1991).

A second measure of the overall structure of the network is centralization. Centralization describes the extent to which the network is organized around a particular focal
point. This measurement helps us to understand if the structure center of the network is a single point or group of points upon which the network pivots or if there is a general rolling and tumbling around a much larger group of organizations. Hagen, Killinger and Streeter (1997) point out that centralization has particular relevance for an inter-organizational study of coordination and leadership. Turk (1977) claims that interagency network centralization can be equated with coordination. Similarly, Tichy (1980) defines global network centrality as the degree "to which relations are guided by the formal hierarchy," and Irwin and Hughes (1992) refer to network centralization as the degree to which an inter-organizational network is "dominated by a few places."

Following Scott (1991, p 92) “the concepts of density and centralization refer to differing aspects of the overall ‘compactness’ of a graph. Density describes the general level of cohesion in a graph; centralization describes the extent to which this cohesion is organized around particular focal points. Centralization and density, therefore, are important complementary measures.”

The final two measures used in analysis of the data focus on the position and roles particular organizations in the network might occupy. Centrality is one of the most common means to measure the extent to which an organization may be integrated into a network of relationships. Scott (1991, p85) likens the concept of centrality to the sociometric concept of the “star.” A star is that person who is the most popular in his or her group or who stands at the center of attention. Hagen, Killinger and Streeter (1997) assert that centrality can be used to identify network leaders. High network centralities are associated with reputations of power and influence over community affairs or economic sectors (Mizruchi and Galaskiewicz 1994). There is a number of varying ways to construct the concept of centrality. Krackhardt (1990)
discusses two ways to construct centrality that are useful in analysis of these data; closeness, and betweenness.

Closeness centrality measures the access an organization may have with regard to global network resources and information (Scott, 1991). Focusing on the measurement of the “geodesic” distance\(^1\) between organizations in a network, closeness centrality measures an organization’s position in the network-wide web of interaction. Hagen, Killinger and Streeter (1997) argue that closeness is a good measure of the overall network activity of individual organizations.

Betweenness centrality measures the extent to which a particular organization lies “between” the other organizations in the network. Once again utilizing geodesic distance, betweenness centrality focuses on how often a particular point falls of the geodesic(s) linking any two points in a network. Organizations with high levels of betweenness centrality are in control of a significant amount of information flowing from one side of the network to the other. Additionally, since organizations with a high degree of betweenness centrality typically have few redundant contacts, they have higher levels of independence than other organizations in the network (Jorgensen, 1999).

Finally the Pajek software program (Batagelj and Mrvar, 1996) was utilized to diagram the network utilizing multidimensional scaling in the attempt to actually visualize the network at hand.

RESULTS AND ANALYSIS

Utilizing the UCINET 6 program and a symmetric and dichotomized adjacency matrix of the youth services network the density and centralization scores were computed. Data is reported in table 1 on the next page.
Table 1. Density and Centralization of Youth Service Network

<table>
<thead>
<tr>
<th>Number of Connections</th>
<th>0-14</th>
<th>15-29</th>
<th>30-45</th>
<th>45+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Organizations</td>
<td>31</td>
<td>21</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>Density</td>
<td>28%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centralization</td>
<td>42%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In this study the network has 85 nodes and a density of .277. The density measure suggests that the overall communication network is at least moderately integrated or cohesive with 28% of all possible connections being completed. The centralization score for the network is computed at 42.34% using Freeman’s degree centralization calculation (Scott, 1991). There is one isolate in the group, Operation Paintbrush.

These data suggest that a large portion of the network was generally well integrated and centralized around a group of organizations. The best guess thus far would be those organizations listed above in the 45+-connection column. These eight organizations include The Council on Alcohol and drug Abuse – Coastal Bend (CADA), Texas Department of Protective and Regulatory Services (TDPRS), Lutheran Social Services (LSS), Coastal Bend School for the Arts (CBSA), Neuces County-Mental Health/Mental Retardation Center (MHMR), Corpus Christi Independent School District (CCISD), Communities in Schools (CIS), and the Salvation Army. Organizations demonstrating both high closeness and betweenness centrality are often called the “stars” of the network (Scott, 1991).

To further analyze the position and roles particular organizations in the network might occupy Freeman’s closeness and betweenness centrality scores were calculated for each organization in the network. Table 2 presents the organization code, closeness and

---

1 The length of the shortest path between two points in a sociometric diagram.
betweeness centrality of the 20 organizations that scored the highest with each measure. (See appendix A for cross listing of organization name and code.)

**Table 2. Normalized Closeness and Betweeness Centrality**

<table>
<thead>
<tr>
<th>Organization Code</th>
<th>nCloseness</th>
<th>Organization Code</th>
<th>nBetweenness</th>
</tr>
</thead>
<tbody>
<tr>
<td>CADA</td>
<td>43.52</td>
<td>CBSA</td>
<td>6.85</td>
</tr>
<tr>
<td>TDPRS</td>
<td>43.08</td>
<td>CADA</td>
<td>5.53</td>
</tr>
<tr>
<td>CBSA</td>
<td>42.42</td>
<td>TDPRS</td>
<td>4.55</td>
</tr>
<tr>
<td>LSS</td>
<td>42.42</td>
<td>CIS</td>
<td>4.10</td>
</tr>
<tr>
<td>CIS</td>
<td>41.38</td>
<td>LSS</td>
<td>3.80</td>
</tr>
<tr>
<td>CCISD</td>
<td>41.38</td>
<td>FO</td>
<td>3.02</td>
</tr>
<tr>
<td>MHMR</td>
<td>41.38</td>
<td>CCISD</td>
<td>2.84</td>
</tr>
<tr>
<td>SALA</td>
<td>41.18</td>
<td>SALA</td>
<td>2.83</td>
</tr>
<tr>
<td>FCS</td>
<td>40.38</td>
<td>SHERIFF</td>
<td>2.80</td>
</tr>
<tr>
<td>FO</td>
<td>40.38</td>
<td>YWCA</td>
<td>2.77</td>
</tr>
<tr>
<td>NCHD</td>
<td>40.19</td>
<td>MHMR</td>
<td>2.45</td>
</tr>
<tr>
<td>SHERIFF</td>
<td>40.19</td>
<td>CCP&amp;R</td>
<td>2.10</td>
</tr>
<tr>
<td>CASA</td>
<td>39.81</td>
<td>TYC</td>
<td>1.95</td>
</tr>
<tr>
<td>CCP&amp;R</td>
<td>39.81</td>
<td>NCHD</td>
<td>1.92</td>
</tr>
<tr>
<td>UWAY</td>
<td>39.81</td>
<td>B&amp;GC</td>
<td>1.78</td>
</tr>
<tr>
<td>YWCA</td>
<td>39.44</td>
<td>CASA</td>
<td>1.74</td>
</tr>
<tr>
<td>VCCB</td>
<td>39.07</td>
<td>BOKE</td>
<td>1.48</td>
</tr>
<tr>
<td>DELM</td>
<td>38.89</td>
<td>UWAY</td>
<td>1.44</td>
</tr>
<tr>
<td>TYC</td>
<td>38.71</td>
<td>FCS</td>
<td>1.42</td>
</tr>
<tr>
<td>CCPD</td>
<td>38.53</td>
<td>STFP</td>
<td>1.32</td>
</tr>
</tbody>
</table>

The data in table 2 is consistent with what has been learned about the youth services network in Nueces County. These data confirm the eight organization mass at the center of the network. Rating high in both closeness and betweeness centrality means that these eight organizations each have extensive reach across the network and control significant amounts of information. Some interesting observations about organizational roles brought out by the differences in closeness and betweeness centrality in organizations near the network core are that while Nueces County MHMR has a greater reach across the network, it controls less information and has less autonomy. Family Counseling Service (FCS) finds itself in a similar position. Conversely, the Nueces County Sheriff’s (Sheriff) and Family Outreach (FO) find
themselves having a shorter reach across the entire network but in key positions to control information. It is also interesting that it is an elected position, the Sheriff’s office that appears at the center of the network as opposed to the Corpus Christi Police department, which is at the margin.

There are 17 organizations that rate in the top twenty scores of both closeness and betweenness. Three organizations, the Volunteer Center of the Coastal Bend (VCCB), Del Mar Community College (DELM) and Corpus Christi Police Department (CCPD) enter the top 20 organizations when it comes to reach over the entire network. The Boys and Girls Club of Corpus Christi (B&GC), Bokenkamp Children’s Center (BOKE), South Texas Family Planning (STFP) show more control over information than they do reach in the network to enter the top 20 betweenness scores. Such data may lend credence to theory that suggests non-governmental organizations have more freedom to operate in public service arenas.

Figure 1, on the next page, presents a multi-dimensional scaling of the network adjacency matrix. In general, organizations (identified by codes from Table 2) near the center of the graph have higher centralities (and consequently higher levels of information access and leadership potential) Furthermore, the relative proximity of an organization to another organization on the graph is roughly indicative to shared communication levels. Formal interaction between any two organizations with a frequency of monthly or greater is indicated by a connecting line between those organizations. Finally, in the upper left hand corner, note the isolate of the group, Operation Paintbrush (OP).
Figure 1. MDS diagram of the Youth Services Network of Nueces County (stress = .395)

This pictorial graph of the network further demonstrates the density of the network as seen by the lines representing communication between organizations and the centralization of the network as seen by the circular structure of the graph as opposed to a linear structure.

Figure 2 is an MDS diagram of the 23 organizations that lie at the core of the youth services network in Nueces County and its margin. The Coastal Bend Youth City was also removed due to the fact that they have lost their license.
Figure 2 shows that of the eight “stars” of the network (CADA, TDPRS, CBSA, LSS, CIS, CCISD, MHMR, SALA) five of them are at the core of the smaller graph. The Salvation Army, Nueces County Mental Health and Costal Bend School of the Arts are more toward the margins of the core, suggesting that these organizations may not be as involved in the coordination of the network as the Council on Alcohol and Drug Abuse, Texas Department of Protective and Regulatory Services, Lutheran Social Services, Communities in Schools and the Corpus Christi Independent School District. The data suggest that drug and alcohol abuse, and education play keys roles in planning issues along with faith based services and intervention at the state level from protective and abuse issues.
Additionally, Figure 2 shows how different types of agencies align themselves in the network. The right side of the network shows how organizations with healthcare, education and recreational mission organizations have formed closer relationships, while they have more distant relationships from those organizations focusing on law enforcement and regulatory issues. Additionally, as would be expected, the two organizations with a foster care mission are closely aligned with the law enforcement and regulatory agencies.

Finally, following the lines and arrows that depict the direction of communication, Figure 2 demonstrates that while CBSA has high levels of centrality, it is primarily due to communication emanating from the organization, not towards it. This explains the high level of betweenness centrality for CBSA. It also may be cause for concern as the outgoing communication is self-reported and the role the organization plays may not be as central as it appears when influence is a consideration.

CONCLUSIONS AND IMPLICATIONS

The primary concerns for this research were to identify levels of communication; assess overall levels of inter-agency coordination; identify key youth services agencies; and to better visualize the entire youth services network in Nueces County, Texas.

The data in this research show that the levels of communication among the youth services network organizations are dense and centralized around an inner core of agencies. The centralization and density results suggest that organizations in the youth services network in Nueces County is cohesive and exhibits cooperation in projects of shared interest. While this cooperation is neither comprehensively planned nor directed, agencies with particularly high centralities may serve as leaders in identifying critical issue areas or sources of information concerning the state of the county’s youth services needs.
The leaders that play a key role in the identification, funding and delivery of services come with a diverse set of goals. The five agencies that appear to have the greatest reach and control of information in the network are also most likely to control the planning and coordination of it around their mission based issues. While not directly adjacent to each other in terms of network position, these core organizations collaborate regularly to achieve their goals. For this network the focal points are prevention of drug and alcohol abuse, education, faith-based services and protective and abuse issues. Each of these issues can be linked to a risk or protective factors that have been determined to be significant in other YOU research.

Through graphic depiction of multidimensional scaling the reader can actually visualize the youth services network. While it may be cliché to say that a picture is worth a thousand words, the data that can be gleaned from the graph is invaluable to one who seeks to better understand the entire network and the position that organizations within it occupy. This can be helpful in terms of determining cohesion, focus, service delivery and seeking funding.

The social network analysis methodology provides a unique perspective and assessment of the network organization that traditional organizational analysis may not. While the specific findings of this research are extremely valuable to the leaders and members of the youth services network in Nueces County, Texas the demonstration of the power of the methodology and technique has much broader application to all who seek to analyze similar network organizations.

There are, however, some limitations. First it should be noted that a common limitation to all social network analysis is boundary specification. Social network analysis requires that line be drawn to delimit the network boundary. This lines may be arbitrary and affect the results of the study. In this study the YOU Resource Guide was utilized to establish
the network. There may be other important communication network linkages which influence youth service in Nueces County that may have been left out of the network due to the arbitrary boundary drawn.

A second limitation is that this research did not look at the content of the communication. Future research may look at this network again utilizing a multiplex approach to network communication that addresses content issues. Along with content, communication quality could be considered a limiting factor.

A third limitation is that of self-reporting methods. In the development of this instrument used in this research, careful attention was paid to being as precise and specific as possible when defining how the instrument should be answered. Nonetheless, respondents rely on their own perceptions and recollection of communication and this can differ depending on the individual who completed the instrument.

Finally, implicit within this research was the purpose of introducing the concepts and methods of social network analysis to a broad audience concerned with public sector performance and network organizations. It is important to have tools which combine deductive theory that is attractive to academics, yet tackle the real world problems faced by organizational and network leaders.
REFERENCES


