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Spread of Community Welfare: A Social Network Analysis of Indian Schools

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Abstract. Schools, though complex, possess unique potential of associating with the 'last', 'lost' and the 'least'. This very distinctive makes it central to the social network that works for community 'welfare'.

A School has dynamic stakeholders viz: administrators (as owners); young adults (as produces); Government (as funders); teachers (as co-creators); Industry (as customers) and society (as victims). Perhaps, their premise itself consist of a small social network encompassing the essentials for community welfare'.

This research tries to explain the importance of schools in this network which serves as the potential path for community welfare, by means of Social Network analysis.

Keywords: Community, Schools, Social Network

I. INTRODUCTION

Social Network refers to a structure depicting the connections among members (actors) (Knoke and Yang, 2008) or theory of understanding relationships in any social situation (**Durland and Fredericks, 2005**; Wasserman & Faust, 1994). Researchers like Patricia et al., (2018) believes that it is an approach to understand the exchange of various elements among the actors in a society. Here, actors consist of organsations and individuals who are interconnected and continuously influence each other. These social actors, typically forming a network, highly influences the perceptions and believes of their likes. SNA "allows representing and measuring the ties between people and among sets of people as well as explaining the causes and implications of these relationships" (Knoke and Yang, 2007).

This theory is different from other methodological theories as it helps understand the social behavior of actors (**Durland and Fredericks, 2005**). Although, various scholars associate this method with concept mapping. In fact, concept mapping is structurally similar to Social network Analysis but are conceptually different. Both the approaches are about connections between various elements but SNA studies social connection and concept mapping works on connecting or graphically depictinginformation and ideas.Research evidences that SNA is a powerful tool for understanding relationships in situations where one or more social elements are involved (Scott, 2012; Kilduff & Tsai, 2003; Cross, Parker, & Sasson, 2003).

Indeed, SNA has been widely used in areas like learning network theory (Melo & Beck, 2015),career development in women's networks (Bierema, 2005), career advancement via informal social networks (Combs, 2003),leadership (Baltodano, Carlson, Jackson, & Mitchell, 2012),knowledge management (Parise, 2007), interorganizational networking (Hawley & Taylor, 2006), keyword networks (Jo, Jeung, Park, & Yoon,

2009), social-networked learning (White, 2014), virtual working community and job performance (Wu & Zhang, 2014).

II. Social Network Theory:

An early SNA framework used a mathematical approach of graph theory with basic two elements: actors (or nodes) and relational ties (or edges)—the lines between pairs of actors (Wasserman & Faust, 1994, p. 19). Actors are commonly depicted using circlesand edges are straight lines, connecting two nodes or circles (shapes subjected to change, depending on the context). Connected nodes are considered to be adjacent to each other. If the relation between two nodes is reciprocal or undirected then such nodes are referred to as 'Undirected node' (refer figure 1-Relation AB) (Borgatti et al., 2013, p. 12). Such edges does not explains the direction of the flow of information. Various researchersalthough,use these undirected nodes to show bi-directional relation (refer figure 1-Relation 'CD') (Borgatti et al., 2013, p. 12). Some scholars considers Facebook friendship networks, movie actor network as Undirected networks.

However, the ties or edges which have a sense of direction or flow of information are referred to as 'Directed Networks'. The 'directed edges' always contains an arrow (refer figure 1- Relation 'BD'). Wasserman and Faust (1994) calls such ties as 'Arc' and explains it with an example of a tweet and retweet network. On the other hand, some calls it as 'Digraph'. Additionally, few scholars consider bi-directional edges as directed edges (Cross et al., 2003), contradicting Borgatti et al. (2013) ideas of bi-directional edges.

These edges and nodes carries various attributes of network such as strength, frequency and proximity among the actors.

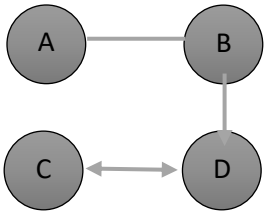

Figure I: Nodes and Edges

*Source: Author

There are oftennodes which are central to a network. These centralized networks are termed as ego and such networks are known as egocentric networks. Actors, other than the 'ego', are termed as alters. These networks are used where one or more nodes-depicting an individual or an organization,play central role in networking or controlling the flow of information within the network (refer figure II) (Knoke & Yang, 2008). Although, these networks have limited data depicting capabilities as they are confined to show network from ego to its alters and visa versa without much explaining the inter relation between network alters. "Egocentric networks have a limited capacity to assess network connectivity because they include no observations of network ties beyond each ego" (Yang et al., 2016).

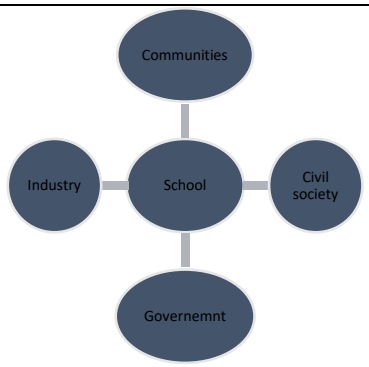

Figure II: Egocentric network
*Source: Author

Researchers of SNA often discuss the concept of'social capital' as well. It refers to "the aggregate of resources embedded within, available through, and derived from the social network of relationships possessed by an individual or organization" (Inkpen & Tsang, 2005, p. 151). On one hand, Coleman (1988) calls it as an invisible asset that helps building a social structure. Additionally, Nahapiet and Ghoshal (1998) argues that these so called social capital helps creating intellectual capital through the knowledge-sharing process. They help create mutual benefits to all the nodes especially in ego centric network by initiating the process of mutual profit between ego and it's alters. Tsai and Ghoshal (1998) opinions that the social capitals strengthens 'social channels for knowledge flows'. They assist interactions between different nodes of the network. In fact, Yli-Renko, Autio, & Sapienza, (2001) suggest that these social capitals, having extensive social interactions, can"perceive greater social responsibility for knowledge sharing".

Researchers further argue that a strong network is characterized by "cooperative knowledge sharing" (Tsai & Ghoshal, 1998), trust among actors for efficient and effective knowledge sharing (Reinholt, Pedersen, & Foss, 2011; Inkpen & Tsang, 2005), "shared expectations and goals of behaviors in a network" (Kilduff & Tsai, 2003), "cognitive awareness of expertise" (Chow & Chan, 2008; Chae et al., 2017). All these characteristics can be strengthen through social capital of the network.

Following the previous arguments, there have been an evolution of Social network theories. From graph diagrams to applying descriptive statistics, researchers have shown high variance in adopting SNA in their researches.
An important attribute of networks is its density. Density is defined as 'the degree of cohesiveness in a network' (Han et al., 2019). Density, mathematically, ranges from 0 to 1 wherein, 0 refers to 'No connection' and 1 refers to "every actor is connected to every other actor in the network" (Han et al., 2019). Density identifies 'Network centralization'. Network centralization identifies the dominated nodes of a network.Scott(2012) believes that one of the earliest measures of SNA is centrality. In fact, Wasserman& Faust(1994) considersidentification of important node (Central node) as primary use of SNA.
In order to identify a node's centrality, researchers use three most common centrality components, viz-degree, betweenness, and closeness centrality. Different nodes may have different centrality measure. "Each centrality measure…… more efficient access to network resources" (Han et al., 2019).

Wasserman & Faust, (1994) considers degree centrality as how much popular a node is in a network. In an undirected network, degree centrality is the number of ties the ego possess. On the other hand, direction consist of an 'in-degree centrality' and an 'out-degree centrality'. The more a node has in-degree ties (receiving ties), the more prominent it is considered in a network. A node having high out-degree centrality, is considered to be an influential actor/node. A team member…….tasks of many others (Han et al., 2019).Although, degree centrality limits its applicability to the immediate ties of an actor (Hanneman & Riddle, 2011).
Covering the limitation of degree centrality is 'closeness centrality' that considers "the concept of distance and indirect ties to all others" (Hanneman & Riddle, 2011). Node that is closest to majority nodes in a network have highest closeness centrality.

Another centrality is the 'betweenness centrality' that refers to "interactions between two nonadjacent actors might depend on the other actors in the set of actors, especially the actors who lie on the paths between the two" (Wasserman & Faust, 1994; Hanneman & Riddle, 2011). A node/ actor has a high betweenness centrality when it works to be an information broker. It represents the shortest path in a network to go to every node.

As a centrality fact, all the three components of centrality are required to be fulfilled by the ego of a network.

III. SCHOOL SOCIAL NETWORK:

The concept of networking has been widely discussed in terms of education by various researchers.
In fact, (Lima, 2008, p. 13) considers networks to be essential for generating powerful professional learning. "Networks generate…… learning" (Lima, 2008, p. 13).
Pataraia et al. (2013) "describe networks as a key source of teachers' professional development and highlight their vital role in equipping teachers with a sense of empowerment, providing emotional support, enhancing engagement in teaching, and enabling teachers to take ownership of curricula" (Lieberman and Miller, 1999; Baker-Doyle, 2011; Lieberman and Wood, 2003).

Researchers indeed, predominantly try to prove the important role networkplaysin professional development of teachers (Baker-Doyle and Yoon, 2011). Kerr et al. (2003) focuses on identifying the role of participants in the network instead of coordinator(s) of the network.

This studyaims to understand the relationship between schools and its stakeholders for initiating community welfare activities. We use the social network theory to describe the world of interactions of academics and its allies and calls it as **'School Social Network' (**SSN).

We identify schools as potential locus of community welfare. In fact, authors such as Schulz and Geithner (2010), Scardamalia and Bereiter (2003), Eraut (2007), "have emphasised the importance of dialogue and social interaction for sharing ideas, experiences and concepts during learning" and schools have the potential to foster them. Network as a medium provide access to resources, guidance and information (Kadushin, 2011). Schools serves as an efficient store house for it and can potentially help disseminate these resources to its stakeholders by forming an efficient stakeholder network. This way schools can direct and control the flow of RIGHT information to POTENTIAL stakeholders as the "characteristics of the networks in which individuals are embedded have a significant influence on what individuals know or what type of information they have." (Cross and Parker, 2004).

We adopt an ego-centric approach to grasp the attributes of relationships between Schools and its stakeholders-identifying schools as its 'ego' and its stakeholders as 'alters', as explained above.
There have been various reasons of identifying schools as an ego of the network. Schools scores high in all the three components of centrality. Having high reservoir of resources- it is the most popular, the most connected actor among all other nodes in SSN. Thus, it scores highest degree centrality.
Also, schools are majorly located in areas-closest to society therefore, having high closeness centrality. Additionally, schools possess direct connection with majority of actors which might not connect directly with one another but connects through schools. In fact, schools possess the shortest distance (the 'geodesic') to every stakeholder. For instance, civil societies and Industries rarely work together for social welfare but schools regularly works with both of them, binded under institutional policies. Therefore, schools acts as a broker or bridge for connecting various unconnected social welfare actors.

This ego-centric network initiates learning, considering schools as its broker/director/leader- creating a 'Personal Learning Network' (PLN). A PLN is "a group of people who can guide your learning, point you to learning opportunities, answer your questions, and give you the benefit of their own knowledge and experience" (Tobin, 1998). Although, academic networks are usually complex (Haines et al., 1996), having

dynamic co-workers (stakeholders) including "former colleagues, cross- disciplinary collaborators, family members and friends" (Pifer, 2010).

Hinds et al. (2000) believes that academics attract towards other academics. In fact, any human being or organization is considered to be networking with their alike. This phenomenon is commonly termed as 'Homophily' [William Turner, 1545] and refers to a phenomenon where individuals associating with others who are similar. This phenomenon equally works onschool networks as well where all the stakeholders of schools, directly or indirectly, operates for common purpose- Community welfare. This very purpose makes them follow the phenomenon of 'Homophily'. In fact, Institutional norms also consider their stakeholders (here, alters) equally important decision maker as they are both victims and partners in producing outputs (refer figure 3).

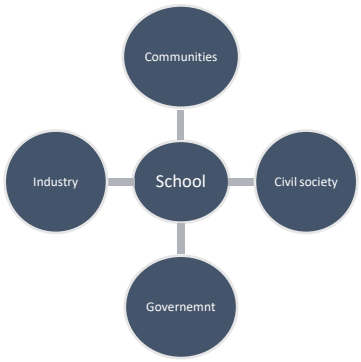

Figure III: School Social Network
School (Ego) and its stakeholders (Alters)
*Source: Author

School have potential of fostering every step towards attaining maximum social welfare. But a schools or a group of few schools are insufficient in attaining it. Schools are required to engage other schools in their SSN.

To do so, Each school is required to network or collaborate with the most direct or closest of its stakeholders- including nearest civil society; nearest community (local community); powering Government and its immediate collaborating industries (May be, one, that hires its products or students). Along with it, every school shall collaborate with each other thus, forming a network-including every possible Government; industry; local communities and civil societies and creating Dynamic SSN (refer figure 4). This way SSN will develop high Eigenvector centrality in its social network. Eigenvector centrality measures the number of connections of every node's connection. In other words, it measures the number of friends of an actor's friends. The higher the Eigenvector centrality, the more connected the egos and alters are to each other.

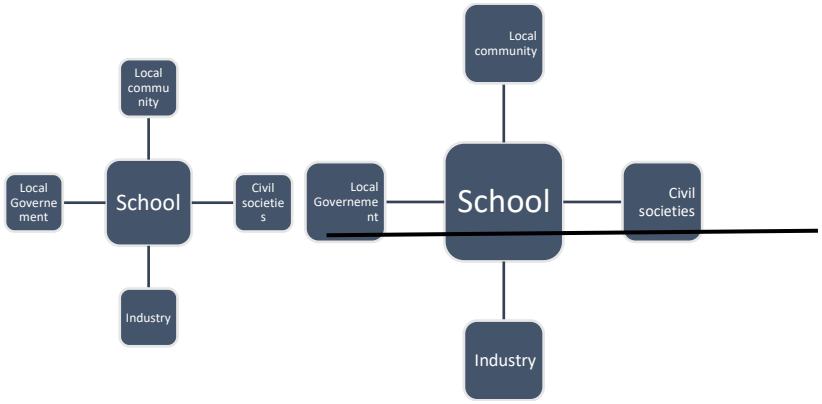

Figure IV: Dynamic School Social Network
*Source: Author

It has to be considered that the edges are undirected-depicting bi-directional flow of resources, information and authority (Borgatti et al., 2013). School acts as a controller of information flow but is not, in any possible way, the authority of this network. Although, it's egoistic (here) nature here, is well justified above, in the study. There exist equal in-degree and out-degree for school and each of its alters.

IV. Limitation and Suggestions

The study discusses the relevance and working of School Social Network (SSN) theoretically. There can be further studies that study the issue so discussed here practically. Additionally, there can be studies that identify the role and importance of individual stakeholders (alter) of school social network in much detail.

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