Impact of Student's Social Advice Network on their Academic Performance

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The present study examined the impact of structural holes and network closure on the academic performance of female students in an academic advice network. Data was collected from 182 female students of a public sector university in Baluchistan through the network (socio metric) questionnaire of name generators for egocentric network. Techniques of correlation and multiple linear regression analysis were employed to test the hypotheses. After controlling the effect of different variables (age, background education and parental education), the results revealed that network rich in structural holes was more productive then network closure in students' academic advice network. These results have practical implications for students' academic life enabling the students to reap the benefits of the diverse and non-redundant knowledge in their academic advice network structure by the virtue of spanning structural holes and consequently achieve better academic performance.

Keywords. Advice network, structural holes, network closure, academic performance

Informal social interactions are a useful way to gain and convey useful knowledge in organizations (Cross, Parker, Prusak, & Borgatti, 2001). They are equally or more important than formal networks in knowledge intensive work (Chung, Hossain, & Davis, 2008). Informal social interactions (networks) are those relations that actors make with his or her discretionary choice, depending on their judgment of other person expertise or experience that s/he can give better advice or resources (Merton, 1957). Informal relations are self-initiative and self-motivated contracts (Cadima, Ojeda, & Monguet, 2012) that assist harmonization and reduce the chances of conflict among members (Garcia-Perez & Mitra, 2007). Informal network facilitates individuals to knit social structure and to build communities in which they entrust one another, while bringing great benefits to individuals. Knowledge is

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produced and exchanged to a large extent during informal social contacts (Cross et al., 2001).

Informal social interactions in prior studies were found to be related with an individual performance in many different ways (Volker, Keller, Lohaus, Cappenberg, & Chasiotis, 1999) like creativity (Cross & Cummings, 2004), effectiveness (Granovetter, 1973), promotion (Burt, 1992), successes (Sparrow, Liden, Wayne, & Kraimer, 2001) and discovering employment opportunities (Granovetter, 1973).

While taking into account performance related results, network scholars have paid attention to structural characteristics of these informal social networks at numerous levels. Some scholars have recognized the effect of network structure in organizational context, including individuals, and small clusters of individuals (Burt, 1992), while some documented the effect of social network structure on large groups like organizations (Walker, Kogut, & Shan, 1997), societies and nations (Putnam, 1995). Whereas, some scholars have considered particularly, educational contexts and tried to illustrate impact of informal network ties on students' academic performance. For example, Israel, Beaulieu, and Hartless (2001) acknowledged that informal social network ties are a vital factor affecting academic success of teenagers. Similar findings have been documented for MBA students (Baldwin, Bedell, & Johnson, 1997) and performance of undergraduate students (Hwang, Kessler, & Francesco, 2004).

Literature review revealed that although, the field of educational research is promptly enhanced with the detection of the benefits of relational linkages, there is yet much to discover about prospective mechanisms that could explain why these informal social network ties may or may not obtain beneficial outcomes (Moolenaar, Daly, & Sleegers, n.d.). Literature search also discovered that, to date, no such study was undertaken which reveals the impact of social network ties on female students' academic performance. Hence, the focus of this research is to stretch the knowledge of academic advice network by examining the influence of two contradictory theories of network closure and structural holes on academic performance (CGPA) precisely, of female students'.

Academic Performance

Students are critical stakeholders of educational institutes. A country's development depends on the number of its qualified individuals. A large the number of quality graduates opens up endless ways for a country to run on the road of success (Mushtaq & Khan, 2012). The best and easiest way to find the presence of quality graduates

within a country is to analyze the academic performance of students through their academic reports. Academic report showcases the students' progress/ achievement (in terms of CGPA/ GPA) during the course of study in a particular discipline (Allen, 2005).

The foremost purpose for assessing the CGPA/GPA is to generate a performance record of student's academic success that can communicate the level of mastery of a subject a student has demonstrated (Airasian, 1991).

Closure and structural holes

Research on social networks has seen two contradictory theories of network closure (Coleman, 1988) and structural holes (Burt, 2005). The theory of network closure, by Coleman (1988), talks about networks in which everyone is connected with one another in closed networks. Network closure implies that actors in a closed network are able to rely on norms and sanctions against opportunism and thereby freely share information amongst each other.

Li (2011) tried to clarify concept of network closure by a figure of a network which is composed of three actors. All actors have the same number of connections. Node A is connected with nodes D and B; node B is connected with nodes A and D; and node D connected with nodes A and B. This means that they are all connected with one another in a closed network and there are no structural holes.

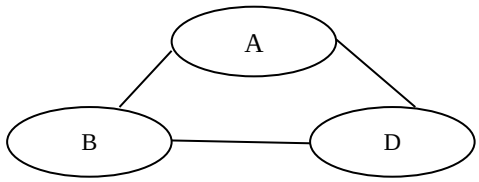

Figure 1. Sociogram Depicting Network Closure

Network closure provides variety of gains to individuals who are embedded in closed/cohesive networks. The gains are in the form of trust, better advice, knowledge sharing, cooperation, support and enforceability of norms (Coleman, 1988). At the workplace it enables colleagues to employ each other's proficiencies and skills in a well-organized way which lead them to improve performance (Cross & Cummings, 2004). Many scholars have tried to empirically prove the relationship between network closure and performance but the results of the studies have been contradictory.

Moran (2005) demonstrates that access to members in a dense network, especially through close ties, positively affects sales manager's performance. In addition, Claro and Neto (2011) conducted a research on sales manager's social network, and concluded that network closure positively affect the performance of sales manager. Reagans and Zuckerman (2001) examined that informal dense network is positively related with team performance. Furthermore, Rotolo, and Petruzzelli (2012) found that network closure is negatively related with performance of scientists. That is because of the flow of redundant information or knowledge in close network.

The theory of structural holes was given by Burt (1992) in which he defined structural holes as detachments between actors/nodes or lack of relationship among two or more actors. The individuals, who span holes and make ties with individuals who are not themselves connected, gain access to non-redundant pools of resources which they can use for their advantage.

Li (2011) again tried to clarify the concept of structural hole by a figure of relation network which is composed of three actors. Node A is connected to certain nodes B and D. Nodes B and D are not themselves connected to each other. Such type of "lack of connection" between nodes is known as a "structural hole". The actors spanning structural holes in networks enjoy distinguished benefits of information and control. For instance, in Figure 2, there are no direct connections between actor B, and D, and only actor A connects them. A act as a spanner of hole and gaining different and non-redundant resources from B and D.

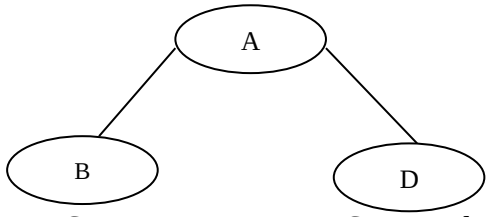

Figure 2. Sociogram Depicting Structural Holes

Burt (1992) claimed that the individual that span holes be likely to do mostly well professionally, and this argument has been supported by empirical studies of managers in large corporations. For example, Mizruchi and Sterns (2001) demonstrated from their study of loan officers in large bank that officers spanning holes are more successful in closing loan transactions. Some researchers like Carolan and Natriello

(2005) believed that exchange of views and disclosure of new ideas are the source of learning new things which is possible by spanning holes.

Control Variables

There are a lot of variables that can affect students' performance. Taking all of those variables is impractical but some of them can be taken as a control variable. We considered only three variables that can impact students' academic performance as a control variable in this current study.

Age is recognized in many studies as a determinant of students' academic performance, like Ukueze (2007) concluded that age has significant influence on educational performance. Similarly, Gullo, and Burton (1992); Trapp (1995) found that greater the age higher would be academic performance.

Parental education is used as a significant factor impacting students' performance in a large set of studies. Experimental judgments advocate a direct and positive relationship of parental education with students' academic success (Durden & Ellis, 1995). Further, Fertig and Schmidt (2002) concluded that performance of those students is high whose parents were highly qualified.

Educational background is known to affect the GPA of students (Betts & Morell, 1999). Students with unrelated educational backgrounds attain low GPA at university. This was due to fact that students, who read the same subjects before have knowledge of those subjects; they know a lot of terms, concepts, methods, and theories related with the subjects but new entrants have no such knowledge regarding the subjects because they have taken that subjects for the first time.

Theoretical Framework

This theoretical framework is showing the relationship between structural characteristics of students social capital and academic performance of female student's in advice network along with control variables.

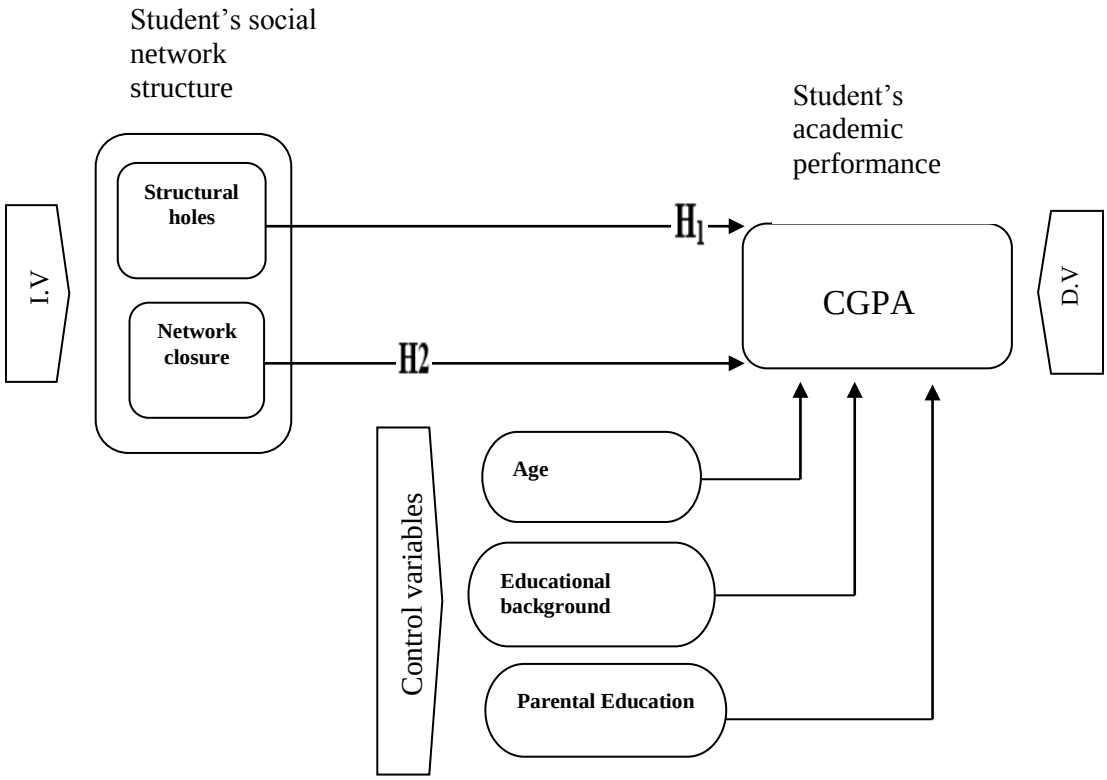

Figure 3. Theoretical Framework

Structural holes, network closure and academic performance

Students who span structural holes in their current advice network and take academic advice from those students who are themselves not connected in an academic advice ties can gain diverse and non-redundant academic advice. Therefore, by spanning holes, students get access to diverse and non-redundant knowledge which is required by them for enhancing academic performance. Consequently spanning holes help students in identifying good ideas through disclosure to varied and diverse pools of academic advice (Burt, 2004) which the students may use for improvement of their academic performance.

On the other hand, performance depends on right advice related to problem especially in knowledge intensive work. Network closure encourages norms, trust, and cooperation and these things inspire the students to take advice from a closely connected circle of classmates. Network closure discourage opportunistic behavior (Guler & Nerkar, 2011); while it provides facility of relaxed and comfortable association and communication (Cross & Cumming, 2004). Consequently, students

find it easier to seek out advice from a closed network of contacts rather than an expert in the area who is unknown to them or with whom they are loosely connected (McCain, O'Reilly, & Pfeffer, 1983). Therefore, students are more ensured to obtain better academic advice and other resources form network closure and may use the obtained advice to enhance their academic performance.

Hypotheses

- Students spanning structural holes in the academic advice network achieve better academic performance.
- Students having dense network ties (network closure) in the academic advice network achieve better academic performance.

Method

Research Design

It was correlational research.

Sample

One hundred eighty two (182) female students enrolled in undergraduate and graduate degree program (in business studies) served as sample of this study. Convenience sampling technique was used to collect data. The participant were ranged in age from 18 to 30 (M = 22.08, SD = 1.81) and they all participated in the study voluntarily. 103 (56.6%) participants were studying at undergraduate level and 79 (43.4%) participants were studying at graduate level. According to semesters 10.4% of the participants were in their second semester, 30.2% were in third semester, 11% were in fourth semester, 20.3% were in fifth semester and 28.0% were in seventh semester of their study at university.

Assessment Measures

Data was collected through questionnaire called sociometric questionnaire based on standard method of name generators for egocentric network as developed by Burt (1984). Questionnaire asked respondents to write the names of only ten students with whom s/he (respondent) most frequently discuss their study related problems and take academic advice.

Academic performance. CGPA of each student was used to measure academic performance. Which was taken from university examination record but CGAP can be calculated with the help of grades, grade weights (A = *4*, B = *3*, C = *2*, D = *1*), credit hours attempted, and

number of semesters/ classes / subjects attended. CGPA was calculated as follows:
GPA = [∑ (Credit hours *grades weights earned) / total number of credit hours] in one semester.
CGPA = [summation of GPA of all semesters / total number of passed semesters]

Structural holes and network closure. Network constraint defines the degree, to which a network is focused in redundant and recycled interactions. Burt's index of constraints (1992) was used as a measure of independent variables (structural holes and network closure), which suggest that structural holes would reduce proportionately with the accumulation of direct and indirect ties. Constraint is low in networks of disconnected contacts (structural holes). Constraint is high in networks of contacts who themselves connected (Network closure).

Greater the constraint, higher would be network closure and vice versa. Precisely, network constraint allows us to measure how open or closed advice networks actually are. The network constraint was calculated as follows (Burt, 1992):

$$C_{ij}= (p_{ij} + \sum_{q} p_{iq}\, p_{qj})^{2} \quad , i\neq q\neq j$$

Where C_{ij} is constraint on student i, in advice network and p_{ij} (directly) is the amount time spent by student i (ego) with student j (alter), where student j is directly connected to student i (ego). Student q (alters) is directly and indirectly connected links with student i. They are all those students who have strong direct relationship with student i (ego) and is symbolized by p_{iq}. They also have strong direct relationship with student j (alter) and again they are indirectly (through student j) connected with student i and is symbolized by $p_{qj.}$ $\sum_{q}$ is total number of connection student i and student j are connected with and $\sum_{q} p_{iq}\, p_{qj}$ (indirectly) is the proportion of student i's time devoted to student q, who are in turn invested time in student j.

The value of constraint fluctuates within 0 and 1. Constraint scores equal zero (0) signals a low degree of closure and high degree of structural holes. Whereas constraint scores equal one (1) signals a high degree of closure and low degree of structural holes. UCINET VI (Borgatti, Everett, & Freeman, 2002) was used to calculate this measure.

Control variables. Age, parental education and study background of students were used as controlled variables.

Age was calculated as number of years spends from birth till date of data collection.

Parental education mean higher level of educational accomplishment by parents, we measured parental education as number of years of schooling. This variable was introduced in the model as a continuous variable.

Study background reflects last degree attained by students before getting admission in the current discipline or course. It was divided into 3 categories and two dummy variables- graduation and intermediate were created.

Procedure

The data collection instrument (sociometric questionnaire) was free to use for all researchers so no permission was required. After taking formal permission from institutions the data was collected. The participants were given questionnaire along with informed consent form. Participants were appealed to read inform consent form and if they are agree to take part in this study then sign on form. It was announced that participant can terminate contribution at any time. It was made sure to participants that data would be used for research purpose only and their names were kept anonymous. Participants were given the right to ask question if they want. After that participants were requested to read the guidelines cautiously and sensibly to fill out demographic and name generator sections of the network questionnaire. The questionnaire took 15 minutes for completion, almost all questionnaire distributed were returned and no incomplete questionnaire was returned back, as researcher remained present in the class at the time students were filling questionnaire and provide guidance to those find any difficulty in filling or understanding questionnaire therefore, response rate was 100%.

Results

The study was carried out using the statistical techniques of correlation and multiple linear regression analyses. Analyses were performed in the IBM Statistical Package for the Social Sciences (SPSS) 20.0 to determine potential relationships among the variables. Performance of students was measured by CGPA. Data using network questionnaire resulted in a 182 X 182 matrix which was imported in UCINET-VI (Borgatti, Everett, & Freeman, 2002) and was used to calculate measure of independent variables (structural holes and network closure): i.e. constraint. Data was coded, entered and analyzed through IBM SPSS 20.0 to determine potential relationships among the variables.

Table 1

Relationship Between Academic Performance, Network Constraints and Control Variables among Students (N=182)

	M	*SD*	1	2	3	4	5	6
1. Academic Per.	2.74	.74						
2. Constraint	.80	.43	-.42**					
3. Age	22.08	1.81	-.05	.11				
4. Graduation	.46	.50	-.29	.96	.55**			
5. Intermediate	.05	.07	-.07	.10	-.10	-.07		
6. Parental edu.	13.01	4.26	.04	.36	.07	.13	.02	

**$p < .01$

Table 1 revealed significant negative relationship between constraint and academic performance in students and all control variables showed non-significant relationship with the study variables.

Table 2

Summary of Regression Analysis for Variables Predicting Academic Performance of Female Students (N = 182)

Predictors	*B*	*SE*	*β*	*VIF*
Constant	2.97	.80		
Age	.03	.04	.07	1.40
Parental education	-.12	.13	-.06	1.01
Others	-.48	.75	-.04	1.09
Graduation	.07	.13	.05	1.41
Constraint	-.02*	.39	-.49*	1.06
R^2	.19			
F	3.41*			

*$p < .05$. ** $p < .01$

Table 2 showed no problem of multi collinearity as all values of VIF were lower than 5. The Durbin-Watson statistic was near 2(1.82) indicating independence of residuals. The regression model incorporated the independent and control variables, R^2 = .19. The coefficient for structural holes and network closure i.e. constraint was negative and significant, β_5 = -.49, t = -.64, p<.05. Negative sign shows direction of relationship among predictor and outcome variable. Inverse relationship was found between constraint (structural holes) and academic performance, which means low constraint and high opportunities for bridging structural holes in the academic advice network for female students. So, results support H_1. The same value of standardized

coefficient beta of constraint (network closure) reveals that H_2, however, is not reinforced for female student's academic performance. Surprisingly, all control variables: age, others dummy, graduation, and parental education have non-significant effect on student's academic performance.

Discussion

This research wanted to study that whether structural holes, and network closures indicative of high academic performance. The statistical results support Burt's structural hole approach that spanning structural holes in students' academic advice network is a significant predictor of academic performance. Researchers find significant support for hypothesis 1 that in advice network performance of student would be more fruitful, if they span more structural holes. Thus, large number of non-redundant advice ties can be accumulated by students that assist them in achievement of better academic performance. This finding endorses former investigations (Burt, Hogarth, & Michaud, 2000; Llopisa & Esteb, 2014). While the statistical results for network closure contradict with Coleman's cohesive network approach evident from the fact that no support was found for hypothesis 2. This outcome challenges the preceding studies (Claro & Neto, 2011; Moran, 2005; Reagans & Zuckerman, 2001) and lead the researcher to suppose that although network closure would allow members for higher and more effective levels of cooperation, trust, assistance, support, collaboration and faith on each other but due to information redundancy in network closure, performance may not be enhanced. Overall results shows that higher the constraint (network closure) lowers would be academic performance and lower the constraint (structural holes) higher would be academic performance.

All control variables have non-significant effect on student's academic performance. Which may be due to general observation like performance depends on hard work and whoever (elderly, younger students) worked hard would achieve better performance. Beside these, opportunities also effect on performance, if more learning opportunities and direction are given to students without considering their age gap, they will perform better. Most of the parents are illiterate in Balochistan so they are unable to guide students. Alongside educated parents also does not significantly impact performance. There can be many reasons like parents have no time to give academic advice to students or students have chosen study discipline that is different from parents field of education so they are unable to give advice.

Conclusion. This study inspected the academic advice network of Pakistani female students, studying at graduate and undergraduate level and effect of structural holes and network closure on academic performance (CGPA) of female students was tried to be predicted. The study finds that network rich in structural holes is more productive then network closure in students' academic advice network. It can also be said that spanning structural holes have positive impact on students' academic performance and consequently achieve better academic performance. While female students having network closure may not achieve better academic performance (get lower CGPA).

Limitations. This study does not escape from certain limitations, like many other empirical studies. First limitation is, we have collected data within single university and from female students of business studies, and it limits the generalizability of our inferences. Future studies should explore the impact of structural hole and network closure on student's academic performance in academic advice network across different universities, while including both genders (male and female).Second, data was collected at one point in time. It would be exciting to realize how a longitudinal study would offer more clarity and insight into above describe relationship and changes in relationships over time.

Implications. The result of the study has practical implications for students' academic life: It will enable students to reap the benefits of the diverse and non-redundant knowledge in their academic advice network structure by the virtue of spanning structural holes and consequently achieve better academic performance.

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