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CROSS-DEPARTMENTAL SOCIAL NETWORKS: THE CASE OF UNIVERSIDAD EAFIT

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ABSTRACT

The present paper constitutes a pilot project seeking to measure the degree of insertion of the music department in the whole university (EAFIT) through participation not only in academical but social life. In order to achieve this goal an empirical survey method based upon social network analysis was used. Although the present paper does not analyze if a higher degree of insertion of the music department is desirable or not, the indicator provided could facilitate this decision while exploring the social networks of academic departments.

KEYWORDS

Social Network , Cross departmental integration, Network Theory

INTRODUCTION

As the importance of cross-departmental integration continues to grow in several academic subjects as for instance Strategic Management (Hafsi and Tomas, 2005), the present paper focuses on the students' social networks of EAFIT university in order to establish if the methodology applied can give the needed insight. If the results of the research are satisfactory, then the methodology can be proposed as a basis for a broader study which analyses if academic integration is reflected in the students' social networks.

The methodology draws upon existing literature about social network analysis, however it is not only focused on academic validity and theoretical background, but also on its real-life application in order to remain a useful tool or managerial indicator instead of just theory.

The hypothesis of the present research is the following:

Hypothesis: The survey method applied has a sound foundation and empirical validation in order to be applied in a broad social network openness study across academic departments.

The objective of the present paper is to validate the hypothesis and, if the results are satisfactory, to propose the survey method to be used in further studies about social networks or cross-departmental integration.

Motivation. The main motivation of the present paper is to provide an indicator that can be used either as a managerial indicator in order to analyze cross-departmental integration or as part of an analysis of social networks and social capital in academic departments.

Context of Research. As a particular scenario, the social network of the Universidad EAFIT music department is analyzed in relation with the broader social network of the Universidad EAFIT. The EAFIT music department was chosen because in our opinion cross-departmental integration could be of importance for this academic department.

One of the reasons why cross-departmental integration could be of importance is based on the music department's perceived relative small integration with other departments through courses and physical location of the lessons, among others. Of course it is necessary to validate this first perception, and this validation will be part of the methodology applied.

Another reason could be that music teaching seems to have a long tradition of not adapting in order to respond to changing society needs in the United States (Jones, 2007), and it is possible that the same case has

also happened in several other countries around the world. It is conceivable that small integration with other departments coupled with a traditional approach to music teaching can be interrelated with social network openness.

As stated by Healy (2003), it seems that social network openness contributes to a better knowledge base of students in academic institutions and may improve the students' results. Nevertheless, it may be possible that for certain academic organizations, a closed social network turns out to work well. (Liebowitz, 2005)

Nonetheless, the Universidad EAFIT's music department may also consider a cross-departmental integration strategy in order to remain competitive at international level, leveraging the social capital of its students. In comparison, renowned institutions as the Juilliard School (known in the United States as the "leading school in Art, Music and Design" (Cohen, 1991)) focus on preparing their music students for the "demands of the 21st century" (The Juilliard School, 2008). According to the school's philosophy, their students should grow not only artistically but intellectually in order to be able to respond to the highly changing world they are confronted with. Therefore, isolation of the music students is no longer a viable strategy (Oesterreich, 1999).

LITERATURE REVIEW

As there have been little studies on this subject, the reviewed literature focuses rather on the theory on which the proposed methodology is based.

The analysis of social networks has been employed for different purposes; it can be even used in knowledge mapping. It has been applied in a broad range of disciplines, including organizational behaviour among others. (Liebowitz, 2005)

Social capital can be defined as another resource comparable with human or physical capital; it basically studies trust, social ties, shared norms and relationships. Additional to this definition, one of the underlying concepts of social capital is social network. (Healy, 2003)

According to Robert Putnam (2004), social capital researchers have come to the conclusion that social capital is not a one-dimensional variable. There are different forms of social capital, which could have as much positive as negative consequences. (Putnam, 2004)

When talking about social capital it's important to distinguish between the bonding or the bridging of the social network, as well as taking one of two approaches; qualitative or quantitative. The most common relations between all the approaches are: the qualitative research relates to bonding social capital

while the quantitative research relates to bridging social capital (Patulny and Svendsen, 2007), understanding social capital as the rules and networks of social cooperation (Bourdieu, 1986).

Social capital is a productive resource facilitating action that ranges from an individual occupational attainment (e.g. Lin and Dumin, 1986, Lin, Ensel and Vaughn, 1981, Marsden and Hulbert, 1988) to a firms business operation (e.g. Baker, 1990, Burt, 1992, Coleman 1990). Social capital generates value and innovation for a company through social interaction, thrust worthiness and shared vision, these dimension explain the degree of solidity in the social network that would later be the outcome (Improvement or decline) for the organization. (Tsai and Ghoshal, 1998).

According to John Scott (2000) in his book Social Network Analysis: A Handbook, a social network is the interaction between individuals that constitutes a social structure based on relationships; these relationships are measured in several degrees of cohesion in order to define the actual status of the network, this analysis is used in a vast variety of fields, but the ones relevant for this paper would be: sociology, organizations studies and communication studies. It is important to mention that social networks do not only apply for people but also for computers, websites and any information processing entity. The main components of the social networks are "nodes" which would be in our case the persons and the links or ties which would be the subjects in common that relate one node to another (Scott, 2000).

After defining the components, an analysis is made by choosing an appropriate method of relating the data; these methods vary from very mathematical model to more descriptive analytic methods, the book "Social Networks Analysis" tends to be analytic rather than mathematical. "Although there are distinct types of data each with their own appropriate methods of analysis, there is nothing specific about the methods of data collection which can be used to produce them" (Scott, 2000).

This is particularly important for this research, because this way it would be possible to identify what kind of bonds exists in within the students and other students different than the ones of their own department.

Tom Healy (2003) states that the term social capital refers to the unseen but relevant relationships built between the people of a specific group, "It refers to trust, social ties, shared norms and relationships among people and communities" (Healy, 2003). This social capital is usually related to training and education, also the capacity of a person or a whole group to create an environment glued together for the best communication outcome possible, that's why an organization that wants to have a cohesive social network, has to enhance the

ties between the nodes in order to achieve it, this can be done by linking individuals, making the proper accommodations to obtain a bond.

The organizations today have changed quite a lot, but some of them are passing through a conversion state, this transition has to be made, making a less bureaucratic and stiff system to a more integrated, horizontal organization in which one person reports to multiple superiors its own work, this functional structure allows a worker to negotiate with peer others what kind of jobs one can do best, so its each one responsibility to accept a jobs and do it at the best possible way believing he or she is the proper person to do it; this is what is called social capital (Burt, 2004), the ability of one person to do some activity in a more efficient way than another person with similar capabilities, but with less social affiliations to achieve the goal (Burt, 2004).

Considering the impact of Social Capital on education, Helliwell and Putnam (2007) state that the level of education has an impact on the social capital structure of a society, also the two variable used for measuring this impact are effects of education on trust and social engagement. A more educated society can increase the accumulation of social capital due to the increase in knowledge and skills developed by people (Helliwell and Putnam, 2007).

According to Mizruchi (1994), Social Network Analysis tries to deal with cultural and human agency issues that are difficult to deal with through structural sociology in general, mainly because it uses a more dynamic understanding of social action than the traditional normative and structural models (Mizruchi, 1994).

According to Wasserman and Faust (1994), Social Network Analysis is based on the assumption that the relationships between people or interacting units are important, defining those relations as linkages among the interacting units. The approach assumes that actors or units and their actions are interdependent and that the relations are used to transfer resources between the actors. The models derived from this approach assume that these networks can either create opportunities or constraints on an individual's actions, and that the relation's structures derived from the model are almost permanent patterns (Wasserman and Faust, 1994).

In a study conducted by Aboelela, Merrill, Carley and Larson (2007), there was evaluated an interdisciplinary research center through social network analysis, they found the method useful for quantifying and describing some of the characteristics of an interdisciplinary research center. According to them, these data can be useful for evaluating the center's progress, identifying leadership indicators, areas of strength and of weakness, and for taking strategic decisions (Sally, Merrill, Carley and Larson, 2007). Therefore it can be considered that a

Social Network Analysis could be useful for evaluating characteristics of different departments or units of an organization.

METHODOLOGY

The methodology applied consisted essentially of two steps. In the first place, it was important to obtain real data support on the small cross-departmental integration of the EAFIT music department, and in the second place a survey was analyzed which could measure social network openness across academic departments.

Step 1 was proposed in order to offer an indicator of the current situation in terms of academic cross-departmental integration. Although, in this case, a tradeoff between simplicity and accuracy of the indicator certainly existed, the indicator used was rather simple.

The indicator was essentially based upon a comparative analysis of the curriculum of an undergraduate student of the EAFIT music department compared with the curriculum of an undergraduate student of a second department in terms of courses held by the same department. In this case, the international business department constituted the control group. Based upon information provided by both academic departments, the relative amount of courses held by the same department was calculated.

The comparative analysis did not take into account the possibility of choosing a major of a different department, although this would certainly have had an impact on the outcome of the analysis: not only because of the relative amount of courses held by the same department changed, but also because even just the possibility of choosing a major of a different department should be quantified and included in the outcome. Neither the possibility of choice was quantified nor were the changes on the outcome based upon majors of different departments included, although the differences in this aspect between the music department and the international business department were briefly mentioned.

It is important to note that the comparative analysis used in this approach should provide an indicator of possible cross-departmental integration, instead of quantifying the cross-departmental integration itself. In order to have a deeper insight into cross-departmental integration, there are infinite additional variables which should be taken into account.

Continuing with Step 2, the main component of the survey method consisted in using two different indicators in order to measure relational data, which provided insight into the degree of openness of a determined social network, in this specific case the music department.

Based upon Scott (2000), it was important to define which kind of data is analyzed. The data used in social network analysis should be "relational data", which is referred to as connections, but not properties of the surveyed students themselves. (Scott, 2000) Although the survey included properties of the students, it is important to highlight that the two main indicators reflected relational data.

The Survey was divided into three types of questions:

- Contextual Questions:
    - Do you study a second career/specialization?
    - In which semester are you?
- Facebook Contacts:
    - How many Facebook contacts do you have?
    - How many of these belong to EAFIT?
    - How many belong to EAFIT music department?
- Cell phone contacts:
    - How many cell phone contacts do you have?
    - How many of these belong to EAFIT?
    - How many belong to EAFIT music department?

The survey was conducted using a laptop, in order to facilitate access to the number of Facebook contacts, and with the approval of all participants. It was supposed that the students who takes the survey studies music in EAFIT, had cell phone and a Facebook account.

Based upon the empirical data collected trough the survey, three basic percentages were calculated: EAFIT contacts/total contacts; music department contacts/total contacts and music department contacts/EAFIT contacts. A basic descriptive analysis was applied to each type of percentage. Finally a linear regression was calculated between Facebook music department contact/total contact percentages and cell phone music department contact/total contact percentages in order to calculate the coefficient of multiple correlations. Both the descriptive analysis and the linear regression provided basic data in order to analyze the results and to conclude if the survey method applied is validated or not.

RESULTS

Step 1. After calculating the percentage, it seems to be clear that there is small integration with other departments, at least based upon a comparison with the control group, in this case the international business department. 88 percent of

all classes are held by the music department itself, in comparison with 25 percent of all classes in international business. (Of course it is important for the music department to determine if a cross-departmental integration is desirable or not; in this case the discussion could be based upon the Context of Research section included in this paper.). In table 1 below contains the results.

Table 1: Indicator of Cross-Departmental Integration

Cross-Departmental Integration		
Undergraduate Curriculum 2006/2 and before		
	Music	International Business
Total classes	75	60
Departmental classes	66	15
Percentage (Dept. Cl.)	88 %	25 %

Data Source: Official Information on EAFIT university undergraduate curriculum (EAFIT Undergraduate Curriculum Music and EAFIT Undergraduate Curriculum International Business)

Step 2. The survey was conducted with fifteen students of the music department. Related to the first question, it was established that only one music student was studying another career or specialization. So first, the percentage of cell phone and Facebook contacts from the university in relation with the total number of contacts was calculated. In the same manner the percentage of contacts from the music department out of university contacts and out of total contacts were calculated as described in table 2 below.

Table 2: Sample Data in Percentage Term

Facebook Contacts			Cellphone Numbers		
%EAFIT/Total	%Mus/EAFIT	%Mus/Total	%EAFIT/Total	%Mus/EAFIT	%Mus/Total
29 %	70 %	21 %	73 %	75 %	55 %
n/a	n/a	n/a	50 %	67 %	33 %
n/a	n/a	n/a	59 %	50 %	29 %
71 %	23 %	16 %	63 %	47 %	30 %
n/a	n/a	n/a	50 %	67 %	33 %
60 %	50 %	30 %	47 %	71 %	33 %
67 %	40 %	27 %	50 %	70 %	35 %
n/a	n/a	n/a	56 %	100 %	56 %
33 %	100 %	33 %	27 %	100 %	27 %
75 %	100 %	75 %	63 %	100 %	63 %

50 %	50 %	25 %	30 %	67 %	20 %
41 %	96 %	39 %	67 %	100 %	67 %
30 %	50 %	15 %	40 %	60 %	24 %
10 %	100 %	10 %	30 %	83 %	25 %
28 %	54 %	15 %	30 %	83 %	25 %

As described in the methodology, a basic descriptive analysis was applied to both the Facebook contact percentages and cell phone contact percentages. The analysis of the Facebook contact percentages drew the following results: First of all, one of the survey's assumptions was not validated, as 27 percent of the students surveyed did not have a Facebook account. Nevertheless, considering the data of the persons who did have a Facebook account, it was possible to say that in average 45 percent of the students' contacts where from EAFIT university, which implied that the students do have an important number of relations outside the university. This percentage showed a low variance (4 percent), implying that the data varied in average 4 percent from the average. The range between the highest and lowest percentage is 65 percent, which implied that some of the data were widely spread in comparison with the average the average.

Considering the percentage of music department contacts out of total university contacts, the average of 67 percent means that, out of all the contacts from the university, 67 percent were from the music department. Therefore it is to conclude that in average the students have predominantly contact with other music students. The variance of this indicator is low as well (8 percent). Finally, the range of the data of 77 percent revealed as well widely dispersed data, but with the most repeated percentage being 100 percent, meaning that there were several students who only have contact with other music department students and non with students from other academic departments.

The average of the percentage of music students out of total contacts was in comparison to the other indicators very low (28 percent), and showed a low variance of 3 percent. The dispersion of the data was similar to the one of the percentage of university contacts out of total contacts (65 percent).

Table 3 below displays the basic descriptive analysis of the Facebook-contact percentages derived from the survey.

Table 3: Descriptive Analysis of Facebook Contacts Data

%Eafit/Total		%Mus/Eafit		%Mus/Total	
Mean	45 %	Mean	67%	Mean	28 %
Standard Error	6 %	Standard Error	8 %	Standard Error	5 %

Median	41 %	Median	54 %	Median	25 %
Mode	#N/A	Mode	50 %	Mode	#N/A
Standard Deviation	21 %	Standard Deviation	28 %	Standard Deviation	18 %
Sample Variance	4 %	Sample Variance	8 %	Sample Variance	3 %
Kurtosis	-112 %	Kurtosis	-151 %	Kurtosis	485 %
Skewness	3 %	Skewness	10 %	Skewness	199 %
Range	65 %	Range	77 %	Range	65 %
Minimum	10 %	Minimum	23 %	Minimum	10 %
Maximum	75 %	Maximum	100 %	Maximum	75 %
Sum	495 %	Sum	732 %	Sum	307 %
Count	11	Count	11	Count	11

The same percentages (Percentage of EAFIT contacts out of total contacts, etc.) were established for the data about cell phone contacts. The assumption about cell phones seemed to be accurate, as all persons surveyed had a cell phone.

Considering the percentages of the EAFIT university out of total contacts, the average established was 49 percent, revealing that the students did have an important percentage of contacts outside the university. This percentage had a very low variance, 2 percent, showing that this data varied less than the data derived from Facebook contacts. As well the range was quite smaller, 46 percent, meaning that the data were not as dispersed as the data from the Facebook contacts.

Considering the percentage of contacts from the music department out of total university contacts, the average was higher than for the Facebook data, meaning that, according to this variable, 76 percent of the students' contacts belonged to the music department. As well as for the foregoing indicator, the variance was very low, 3 percent, giving greater credibility to the sample, although the number of people surveyed was quite low. The range of 53 percent showed that the data were dispersed, but not as widely as the Facebook data, giving as well more credibility to the sample.

Finally, considering the percentages of contacts from the music department relative to the total number of contacts, the mean of 37 percent was rather low compared to the other indicators. The low variance of 2 percent shows that the data did not vary too much from the average, and the range of 47 percent indicated that the data was not as dispersed as in the case of the Facebook contacts.

The basic descriptive analysis for the cell phone contact percentages data can be found in table 4 below.

Table 4: Descriptive Analysis of Cell Phone Contact Data

%Eafit/Total		%Mus/Eafit		%Mus/Total	
Mean	49 %	Mean	76 %	Mean	37 %
Standard Error	4 %	Standard Error	5 %	Standard Error	4 %
Median	50 %	Median	71 %	Median	33 %
Mode	50 %	Mode	100 %	Mode	33 %
Standard Deviation	15 %	Standard Deviation	18 %	Standard Deviation	15 %
Sample Variance	2 %	Sample Variance	3 %	Sample Variance	2 %
Kurtosis	-117 %	Kurtosis	-101 %	Kurtosis	-42 %
Skewness	-15 %	Skewness	9 %	Skewness	101 %
Range	46 %	Range	53 %	Range	47 %
Minimum	27 %	Minimum	47 %	Minimum	20 %
Maximum	73 %	Maximum	100 %	Maximum	67 %
Sum	733 %	Sum	1140 %	Sum	554 %
Count	15	Count	15	Count	15

It is important to note that the most appropriate indicator for this studies purpose is the one that measures the percentage of contacts from the music department out of total university contacts, because it only counts contacts from the university and the music department. The other indicators consider contacts not related to the university and therefore their results would have to be analyzed considering social network outsides the university and its academic departments. As the purpose of this study is the study of social networks between academic departments, the data considering non-university-related contacts, though analyzed, will not be considered for drawing conclusions.

Finally, in order to establish an indicator of the importance of the non-validation of the assumption about Facebook accounts, a linear regression was applied between the data of the cell phones and Facebook of the percentages of contacts of the music department out of university contacts, of students who had as much a cell phone as a Facebook contact. The determined coefficient of multiple regression (multiple R) was 0.89719513, revealing that there is a very high correlation between the cell phone and the Facebook data. Therefore a student will have very similar data for both variables. It is possible to conclude that both variables can be valued independently and both will draw very similar results, and that the not validated assumption can be of little importance for the purpose of the study.

Table 5 below includes the result of the linear regression.

Table 5: Linear Regression Results

Regression Statistics	
Multiple R	0,89719513
R Square	0,80495911
Adjusted R Square	0,78545502
Standard Error	0,07728331
Observations	12

CONCLUSIONS

In the first place, the high correlation (0.89719513) between Facebook and cell phone percentages in terms of music department contacts/total contacts seems to validate the results obtained by both variables. This evidence underlines the possible relevance of the variables in terms of actual social network openness by highlighting that the percentages obtained by both variables are revealing similar results.

In the second place, even with the small sample the variances were surprisingly low, never higher as 8 percent. This evidence suggests that the results of the study could have relevance if applied in a broader study, but even with the small sample it could be possible to analyze the actual results (although they are only preliminary and should be validated).

In terms of actual results, the means of both variables in terms of music department contacts/total contacts percentages (67 percent in cell phones contacts and 76 percent in Facebook contacts) can be interpreted as a signal of small social network openness. It is important to remember, though, that these results should be compared to results obtained from other departments in order to have a basis for interpretations. The size of the sample is not representative in order to rely on the results obtained, and a broad social network openness study across academic departments should validate the results obtained.

Another interesting fact obtained by the survey is the relatively high percentage of students without Facebook account (27 percent). Although this result should again be compared with other department's percentage in order to be interpreted, it seems to validate the preliminary results obtained regarding social network openness.

The hypothesis of the present paper seems to be true; the survey method applied has a sound foundation based on social network theory and empirical validation. Additionally, the empirical validation suggests that music department students

mostly interact with people belonging to the same department, a possible indicator of small social network openness.

RECOMMENDATIONS

A more complete validation of the present paper, which only constitutes a pilot project, should give more insight into the foundations and validation of the survey method proposed. It seems, at least based upon the information provided in the present paper, that the survey method could be proposed in order to be used in a broad study.

A broad study across academic departments should provide relevant data in order to be taken into account by management or to draw sound conclusions. As stated before, the sample size should be relevant and data should be collected across different departments, in order to be able to make comparisons and to draw conclusions based upon these comparisons.

As a last recommendation, according to suggestions made by the students surveyed, it seems that a broader study should focus especially on the Escuela de Humanidades. Although the present paper studies the EAFIT music department only, which is part of the Escuela de Humanidades, during the development of the present paper it turned out that there exists a perceived small integration not just between the music department and the other departments of the university, but also between the other departments of Escuela de Humanidades and the other departments of EAFIT university. It is noticeable that this supposed small integration is perceived by students of the Escuela de Humanidades themselves.

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