Rather Together? Network Effects among Students

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Introduction

Being faced with global trends that challenge the way tourism is conducted at present (Dwyer, Edwards, Mistilis, Roman and Scott, 2009; Dwyer, Edwards, Mistilis, Scott, Roman and C., 2008), educators worldwide have recognized the need to adapt tourism students' education in order to enable them to recognize changes in the environment and manage the implications (Bramwell, 1996; Sheldon, Fesenmaier, Woeber, Cooper and Antonioli, 2008). Efforts range from the development of educational materials such as collecting international case studies of good practice (Bramwell, 1996; Carlsen, Liburd, Edwards and Forde, 2008) and the design of topic specific teaching modules (Liburd and Edwards, 2010) to the creation of a new framework for teaching (TEFI, 2009). The latter asks for a fundamental change in teaching, away from a mere development of business skills and other tourism-related competences and towards values, which underlie all behavior as professionals and individuals. TEFI (2009) identified five central values related to future tourism education, namely stewardship, knowledge, professionalism, ethics and mutuality. Some of these values relate to individuals' qualities, their human capital, while others like knowledge are closely linked to the social capital of a person.

The importance of, on the one hand, teaching students the skills and values to build social capital (Wilson, 1997), and, on the other hand, supporting effective social capital building among students (Wilcox, Winn and Fyvie-Gauld, 2005; Helliwell and Putnam, 2004) has been stressed in the literature. The latter aspect builds on study findings describing positive effects of social capital building on student performance and subjective wellbeing. Students' sense of belongingness is often stated as one of the main reasons for students to complete their higher education studies successfully (Wilcox, Winn and Fyvie-Gauld, 2005). Social integration and social support are also generally credited as being highly influential for someone's sense of wellbeing (Helliwell and Putnam, 2004). Thus, claims that academic performance and sense of wellbeing are closely tied to social integration come as no surprise. It is this issue that the study turns to. It shows, through application of a structuralist lens, that sense of wellbeing and academic performance are to some degree a result of the social relationships that the individual holds to other individuals around him.

The study findings reported on in this article cover the results of an initial survey round among an international cohort of undergraduate tourism students who just commenced their studies. The

survey was conducted during the first part of the first semester and constitutes the starting point for a longitudinal study on the evolvement of students' networks throughout their studies and thereafter.

The role of social capital

The importance of social capital has long been recognized in the organizational behavior literature, where it has been understood as a quality created between people based on network mechanisms (Burt, 1997; 2000). Research shows that managers with more social capital perform better with respect to solving problems and using opportunities by capitalizing on their networks (Burt, 1997). Similarly, research on student networks confirms that connectedness among students and the structural position taken in networks affects student satisfaction, academic performance, the degree of commitment to the institution and persistence (Thomas, 2000). The studies imply that relationship building boosts the return on an individual's human capital as networks influence knowledge creation and dissemination but also creativity and innovation (Burt, 1997; Burt, 2000; TEFI, 2009). Social capital thereby offers benefits both to the individual and society.

Wilson (1997) recognizes the consequential necessity to actively support social capital building within the educational system summarizing:

> Those professionals who learn the tools, skills and values of social capital building will lead their communities and their professions. Those schools and universities that educate their students with the values and skills to build social capital, both in the work-place and in the community, will help to set the standards, the pace and the vision (1997:756).

Preparing students to become responsible leaders in tourism, therefore, requires that students get the opportunity 1) to learn how to build social capital and use it to their own and society's benefit and 2) to develop and capitalize on a range of relations among each other at present and in the future.

In order for universities to match this expectation, they need to go beyond a revision of classroom teaching and get a thorough understanding of the characteristics of student networks over time and the effects these features have on the network members before being able to actively encourage social capital building. The present research aims to enhance the understanding of student network development in an intercultural student setting and considers the impacts of relationship building on student wellbeing and performance. While such research is context-specific, it can provide insights into the interplay of network features and network development over time.

The role of networks

Ronald Burt (1982) has outlined a model of individual action in Social Networking Analysis (SNA) terminology in which he claims that the individual is restrained in his actions by the structure of the network surrounding him, and that in turn, the network structure is being accentuated by the repeated actions of the individual. In the Durkheimian sense of network constraints, some speak about the "apparent helplessness of individual actors to resist powerful forces over which they have no more control than molecules over the law of the universe" (Kilduff and Tsai, 2003:112). In consequence, actors unavoidably find themselves operating in a pre-structured context and interest that shape the social struggles in which they are implicated (Reed, 1997:31). By making this pre-structured context the unit of analysis, the researcher leaves behind the methodological individualism inherent in the social sciences and instead takes on a structuralist stance. The urge to instrumentalize social network effects has led to a widespread application of the concept of social capital. Social capital is a common property of the social sciences (see Bourdieu, 1983) and not an asset of the structuralist movement, but in all contexts, social capital is used as a metaphor for advantage (Burt, 2000). The theory of social capital has attracted a number of scholars from diverse backgrounds and has thus evolved into a multi-disciplinary concept. However, multidisciplinarity usually comes at a price, and so numerous definitions, conceptualizations and measurements of social capital coexist. In line with the structuralist paradigm applied in this study, the authors adhere to a network-based theory of social capital. According to Lin (2001), social capital is defined as "resources embedded in one's own social network that can be accessed or mobilized through ties in networks". Social capital conceptualizes production as a process by which surplus value is generated through investment in social relations (Lin, 2001). Through these social relations, individuals (actors) can generate returns for themselves by access to and borrowing or capturing another actor's resources. A theory of social capital, therefore, describes the process by which resources are captured through investments in social relations for returns on that investment.

One has to differentiate, however, between Burt's model of individual action as described above and the social capital concept. Whilst in Burt's model the direction of effect (mainly) is one of Network -> Action, the social capital concept rather observes the direction of effect actor -> (mobilization of) network structure. Keeping this differentiation in mind, the present study examined, in how far the network structure affects actors' (students) subjective wellbeing and the ability to utilize the network structure for achieving positive academic performance. In line with the network-based theory of social capital, the authors argue that social capital is contingent on social networks, meaning networks provide the necessary condition for access to and capture of

embedded resources. In absence of networks, this capturing of resources is almost impossible. At the same time, the mere existence of networks does not constitute a sufficient condition for social capital. Rather, certain network features and variations in networks may increase or decrease the likelihood of a certain quantity and quality of resources embedded (Sparrowe, Liden, Wayne and Kraimer, 2001). Therefore, network features should be seen as important antecedents exogenous to social capital (Lin, 2001).

The question prevails as to which network structures foster or hinder the access to social capital. The closure argument originates in the work of Coleman (1988) and has been extended by Burt (2001); it states that dense networks, i.e. networks of strongly connected individuals provide sources of social capital. Conversely, the 'weak tie' argument (Granovetter, 1983) suggests that networks can profit from individuals, who are more loosely connected (weak ties), since knowledge exchange tends to be more informative. The 'structural hole' argument (Granovetter, 1983), in turn, suggests that social capital emerges when individuals hold a brokerage function between two otherwise unconnected groups (structural holes).

Developing networks

The proverb 'Birds of a feather flock together'[1] is often used to describe the concept of homophily, i.e. the phenomenon is individuals who share similar characteristics are more likely to form social relationships with one another. In network theory, the concept of homophily is a central one. On the one hand, structural sociologists claim that individual behavior is determined by the embeddedness of individuals in networks, rather than individual characteristics (Kilduff and Tsai, 2003). On the other hand, modern social theorists (e.g. Bourdieu, 1990) see structure and agency as complementary, in that structure affects individual behavior but individuals are able to change social structure. Those who have an interest in the development and dynamics of networks are likely to look at a network and identify similarities in characteristics of nodes. In their review of homophily concepts appearing in social networks, McPherson, Smith-Lovin and Cook (2001) outline that, in diverse networks, race and race-like ethnicity is the most prevailing mediator of homophily. Further, sex, age and religion are also apparent to have an influence on one's tendency to form relationships, whereas an effect of occupation, network position, behaviors and intrapersonal values could only be found in certain types of networks.

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[1] Lazarsfeld & Merton attributed the proverb to Robert Burton (1927:622). Like Lazarsfeld & Merton, Burton acknowledged his own conceptual predecessors in classic Western thought (McPherson, Smith-Lovin and Cook, 2001:417).

In most accounts on homophily, it is seen as an antecedent to network development, yet it seems equally interesting to investigate whether homophilic relationships have an effect on other out-of-network behaviors. This instrumentalization of the homophily concept seems particularly appropriate for research in educational settings, where the heterogeneity of the group under investigation is apparent, and where diversity is embedded in the educational concept of the institution.

Social relations should be, of course, not only relevant for students' performances but also for their happiness. As subjective well-being research emphasizes, having social contacts seems to be one of the key drivers of a positive psychological state (see e.g. Diener and Seligman, 2004), whereby social contacts are not only to be considered as the consequence of a pleasant psychological condition but also as a cause or a pre-condition. So, one of the aims of the study was to assess whether social networks are related to mental states of the students. Moreover, recent scientific work by Fowler and Christakis (2008) has pointed at the influence of the happiness of our companions on our own. In their study they found clusters of happy or unhappy people; moreover, they believe that subjective well-being spreads along the network ties and positively affects people in the network neighborhood, i.e. those will probably be happier in the future. This collective feature of happiness is a characteristic of friends and relatives but not of co-workers. Therefore, it might be expected that homophily effects around happiness scores are a property of friendship networks but not of working group networks. However, effect may also not be observed at all because the early stage at which the networks were surveyed did not allow enough time for the development of these effects.

Methodology

Freeman (1979) argues that social network analysis is –despite its criticism – a useful tool to formally describe social properties. All 62 students of the "Tourism and Hospitality Management" BBA course who belong to the cohort 2009/10 were contacted shortly after the commencement of their first semester and asked to respond on a voluntary basis to an online survey as part of a panel study. The names were immediately deleted from the file, but an identification number was added for being able to connect the network nodes properly.

The items of this questionnaire related to demographics (age, gender and ethnic background) as well as measurements of happiness (Ahrendt, 2003, European Quality of Life Survey). Network information was collected regarding five different types of social interaction contexts: friendship, advice, lunch, leisure time and student work groups. The reason for measuring different networks

simultaneously lies in the fuzziness of some of the underlying constructs, and the fact that perceived networks are measured (as opposed to actual, objective exchanges)[2]. Friendship, for example, is perceived differently across the respondent group for cultural but also personal reasons. A lunch-network or leisure-network on the contrary are more 'objective' measures and, thus, can function as validations of the initial friendship-network. Network data comprise the reported relationships (incoming and outgoing ties) in each of the aforementioned contexts. Finally, the average grade from the first semester was used as a measurement of academic performance.

Statistical evaluations of happiness variables and demographics were based on standard procedures such as correlations and linear regression, χ^2-tests and Mann & Whitney-tests as long as no networks have been involved. To calculate correlations and to assess the significance of the correlations between the networks surveyed, the Quadratic Analytic Procedure (QAP) was used (Hubert and Schulz, 1976). Network data requires particular attention in statistical analysis. Traditionally, attribute-based data are collected independently from a wider population. This is not the case with network data, where the dyads comprise a census of all actors sampled, the data is inherently interdependent. Therefore, standard statistical packages do not work in this case (Krackhardt, 1988), since interdependent matrices are correlated. Instead, specialized software for network analysis, UciNet (Borgatti, Everett and Freeman, 2002), was applied. It allows for the calculation of QAP correlations and computes the *p*-values by applying a bootstrap algorithm, thus circumventing the problem of dependencies.

Dropout. A total of 40 students out of 62 took part in the survey, corresponding to a completion rate of 64.5 %. Three students opted out and were completely removed from the study population. The remaining students were treated as non-respondents, meaning they remained active nodes in the network (and could thus be related to), but they did not report on connections to other nodes. Certainly, this missing data can cause concerns for further statistical analyses. As Kossinet (2006) outlined, studies on e.g. affiliation networks are much more vulnerable to missing data (one missing respondent is equivalent to 100% of affiliations missing for that node) than communication or acquaintance networks are. For network data, missing responses is an exponential problem (Stork and Richards, 1992). In case of a 100% response rate, each relationship is reported by 2 persons. In general, if the response rate is R%, there will be complete information only for R% x R% of the relationships in the network (Stork and Richards, 1992). Unfortunately, "no failsafe

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[2] See Marsden (1990) for a discussion the quality of sociometric data and suggestions for survey design to increase validity and reliability.

solution to the missing data problem exists" (Knoke and Kuklinski, 1982:35), yet one needs to be aware that some statistical procedures are more vulnerable to working with incomplete data matrices than others. In simple affiliation networks (e.g. who knows whom), one can reasonably argue for a reciprocity-effect that helps alleviating some of the non-response issues. In more complex affiliation networks (e.g. friendship), the matter is complicated by different interpretations of 'friendship' resulting in possibly non-reciprocal data despite a 100% response rate.

Sample characteristics. The share of females is 65.0 %, whereas it is 61.3 % in the population which is a non-significant deviation (p = 0.750). Similarly, the share of Austrians in the sample (55.0 %) does not deviate markedly from the one in the population (61.3 %, p = 0.42). Half the sample was born between 1989 and 1991. In the sample, 33 students reported not to have a regular employment besides their studies, the rest work part-time between 5 and 30 hours. 6 of the students are only children, 11 are eldest siblings, 7 in-between, and 16 youngest. Median student performance by the time of the assessment was 74 % whereby female students performed significantly better than male (Medians 80 % vs. 64 %, one-tailed p = 0.006); the latter are more heterogeneous in their performance (standard deviations 23 instead of 14, one-tailed p = 0.03). No other significant relationships between demographic variables and happiness, social contact or performance variables have been found other than the one between gender and average grade.

Results

Describing the Networks

There is no such thing as the network. In fact, every person constantly acts in multiple networks, so the network to be measured is defined by the purpose of the study. Networks commonly under investigation are affiliation, communication, friendship, trust, and advice networks (Jansen, 2006). Given that students generally did not know each other before the beginning of the semester, the friendship network was the main focus with respect to building sustainable social capital.

Table 1: Overview of tie distribution in networks

Type of Network	No. of Ties[1]	Network Density[2]	Reciprocity[3]
Advice *Who do you turn to for advice regarding student life in general (e.g. semester ticket, taxes, …)*	117	0,0354	N/A
Friendship *Who would you consider to be your friend?*	443	0,1340	0,2340
Leisure *Who do you regularly meet outside university for leisurely activities?*	176	0,0532	0,2308
Lunch *With whom do you regularly spend your lunch break when you are at university?*	272	0,0823	0,2252
Workgroup *With whom would you prefer to work on a group project?*	333	0,1007	0,1978

1) Total number of ties found in respective network.
2) The density of a binary network is the total number of ties divided by the total number of possible ties
3) Percentage of ties that are reciprocated in a network (Note: In advice network, ties are directed)

As depicted in Table 1, the friendship network is the largest in total number of ties. Given the binary nature of the networks, this does not provide any indication of tie strengths, yet it means that the friendship network has the highest density (13%) of all networks observed (i.e. the highest percentage of all possible ties that exist). At the same time, the advice network shows the lowest density, with just below 4% of all possible ties. This may be explained by the fact that students who have just commenced their studies may not have had the opportunity or, in fact, see the need to build such an advice network. This may be different with friendship networks, and one has to acknowledge that differing conceptions of what constitutes 'friendship' coexist. This becomes obvious by the fact that only 23% of all the reported ties in the friendship network are reciprocated, suggesting that most respondents hold a more supple view of friendship.

Do networks develop on homophilic grounds? To answer this question, attribute data (gender, ethnicity, language spoken at home, and employment besides studies) were first transformed into matrices. The logic behind this is simple: Rather than looking at monadic attributes (e.g. gender), in network analysis one is interested in dyadic attributes. Thus, two male actors have the same gender in common, thus there is a tie between the two. Table 2 shows all significant results of the Quadratic Analytic Procedure (QAP) in which associations between networks are measured. The

significant correlations suggest similarities in the structure of the networks, e.g. actors who form ties in gender networks are also more likely to form ties in friendship networks.

Table 2: Associations demographic matrices and networks (Jaccard Coefficient and p-values)

	Network									
	Leisure		Friendship		Workgroup		Lunch		Advice	
Matrices	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*
What is your nationality? (transformed to Nationality Network)	0.07	0.003	0.15	0.001	0.12	0.003	0.10	0.002	0.04	0.015
Which language is spoken at home? (transformed to Language Network)	0.07	0.018	0.14	0.005	0.13	0.001	0.10	0.001	0.05	0.008
Do you hold a regular job besides your studies? (transformed to Employment Network)	0.08	0.001	0.16	0.001	0.11	0.014	0.10	0.002	0.05	0.017
What is your gender? (transformed to Gender Network)	0.07	0.009	0.12	0.005	0.11	0.005	0.10	0.002	0.04	0.015

Happiness

Well-being of students was assessed by a set of 8 items, starting with a general happiness question (Q1): "Taking all things together, how happy would you say you are?", which is a standard general happiness single question as used in the European Quality of Life Questionnaire (EQLS, see Ahrendt, 2003) but to be responded to on a 10-points scale ranging from "very unhappy" to "very happy". **Error! Reference source not found.** shows the distribution of happiness responses in the sample. The mean 7.4 is within the usual population range of this item for Austria (Keck, 2004, according to Veenhoven, 2010). Most students rate themselves as somewhat happy, but only a few respond with "very happy" which is a very typical behavior as observed in many happiness studies.
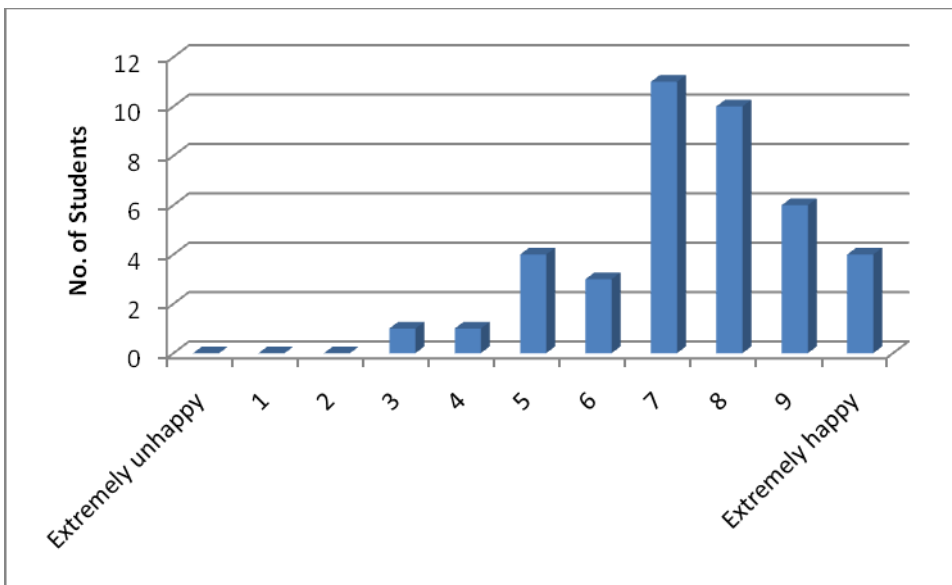
Figure 1: Happiness of MODUL Students

Regarding social contacts, 34 students meet with friends, relatives or colleagues at least on a weekly basis (Q2); 10 of them report daily contact. Most students respond affirmative to the question whether there are people who really care about them (Q3), among them are 24 students who agree strongly, but 13 who only checked "agree". Similarly, only 2 students negated to have persons to discuss intimate matters with (Q4). However, many students feel lonely at least sometimes (Q5) as Table 3 shows. As one would expect, there are strong connections between social contacts and being happy, Spearman's ρ = 0.66, *p* < 0.001; none of the students reporting to have daily social contacts shows less than 8 points on the happiness scale. The relation between loneliness and happiness is weaker (ρ = -0.28, *p* = 0.04 one-tailed) but still significant, being lonely "*some of the time*" corresponds to a loss of half a point on the happiness scale, compared to *"almost none of the time"*. It is not surprising that the correlation between loneliness and social contact is marked as well (ρ = -0.36, *p* = 0.012 one-tailed), even though this relation is not as significant as between happiness and social contacts.

Table 2: How much of the time during the past week have you felt lonely?

	Number of Students
Almost none of the time	21
Some of the time	12
Most of the time	4
All or almost all of the time	1

In a multivariate context, happiness can be quite well predicted by the variables about social contacts (Q2 to Q5) and studying conditions (Q7 and Q8) applying linear regression (adjusted r^2 = 0.42, p = 0.001), whereby the output shows (*Table 3*) that the relevant links to happiness are observed for social contact variables. Average grade, which could be a potential predictor of happiness as well, is not included in the final model: there is no visible relationship between average grade and happiness (ρ = 0.18, p = 0.13 one-tailed) or any other of the variables Q1 to Q7.

Table 3: Linear regression for overall happiness: Q1: Taking all things together, how happy would you say you are?

	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	Standard Error	Beta	
Intercept	-2.24	3.63		(0.54)
Q2: How often do you meet socially with friends, relatives or colleagues?	0.89	0.35	0.51	0.02
Q3: There are people in my life you really care about me.	-0.76	0.42	-0.36	0.08
Q4: Do you have anyone with whom you can discuss intimate and personal matters?	4.90	1.95	0.65	0.02
Q5: How much of the time during the past week have you felt lonely?	-0.44	0.38	-0.21	0.25
Q6: How satisfied are you with the balance between the time you spend on your studies and the time you spend on other aspects of your life?	-0.02	0.02	-0.20	0.38
Q7: How much of the time do you find your studies interesting?	0.28	0.20	0.20	0.17
Q8: How much of the time do you find your studies stressful?	-0.04	0.21	-0.03	0.85

In regards to links between happiness and social contact items and network-related properties such as centrality index values, no significant relationships could be detected. This is surprising because especially for social contact items it was expected that network contacts and consequences such as "having somebody to talk to about intimate matters" would be correlated. But maybe the chosen point in time was too early to allow the network structure to show measurable effects on these happiness and social contact items.

Social Ties and Concordance of Happiness

Similarly to analyzing whether people with certain demographic characteristics link to each other, it may be analyzed whether people with similar levels of happiness or social contacts tend to choose each other as friendship network partners as suggested by the literature. *Table 4* gives an overview regarding the Jaccard coefficients between similar survey characteristics and network ties together with the corresponding *p*-values (significant results highlighted; due to Type I error inflation, only the bold values can be considered as reliably significant). Statistical units are pairs of nodes evaluated regarding concurrent survey responses on the one hand, and the presence of a network connection (a tie) on the other. It is seen that coefficients are rather small in general; strong significance was only observed regarding the availability of persons to discuss intimate matters with (Q4). So in fact, all networks show clusters of people with similar responses on question Q4. The expectation that people with similar happiness levels would come together in the networks could not be supported, at least not in this initial phase. Future surveys will show whether similarities in happiness levels will become manifest in the networks in the longer term.

Table 4: Relationships between happiness matrices and networks (Jaccard coefficients and p-values)

	Network									
	Leisure		Friendship		Workgroup		Lunch		Advice	
Matrices	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*	*Jac*	*p*
Q1: Taking all things together, how happy would you say you are?	0.02	1.00	0.06	0.99	0.05	0.92	0.04	0.96	0.03	0.78
Q2: How often do you meet socially with friends, relatives or colleagues?	0.05	0.29	0.10	0.46	0.09	0.17	0.07	0.28	0.03	0.43
Q3: There are people in my life you really care about me.	0.05	0.22	0.11	0.16	0.10	0.06	0.08	0.20	0.04	0.05
Q4: Do you have anyone with whom you can discuss intimate and personal matters?	0.07	0.01	0.16	0.001	0.13	0.001	0.10	0.001	0.04	0.02
Q5: How much of the time during the past week have you felt lonely?	0.06	0.03	0.11	0.21	0.09	0.26	0.08	0.05	0.03	0.65
Q6: How satisfied are you with the balance between the time you spend on your studies and the time you spend on other aspects of your life?	0.03	0.93	0.05	0.99	0.05	0.92	0.04	0.96	0.02	0.82
Q7: How much of the time do you find your studies interesting?	0.06	0.08	0.10	0.36	0.11	0.01	0.09	0.03	0.04	0.07
Q8: How much of the time do you find your studies stressful?	0.02	1.00	0.05	1.00	0.05	0.97	0.05	0.97	0.03	0.60

Academic performance and networks

One of the key questions addressed by the survey was whether student performance can be linked to students' network properties. Out of the 15 network indices extracted (Bonachic power as well as Freeman centrality for incoming and outgoing ties) a few Freeman centrality indices showed significant Spearman correlations (applying Bonferroni correction) with the average grade. The most marked but not too surprising ones are obtained for incoming workgroup connections, ρ = 0.54, and incoming advice, ρ = 0.53 ($p < 0.001$) which might solely show that students seem to know rather quickly who could be a competent helper. Most interestingly, outgoing centralities are not significant for either of these network types (workgroup and advice); so being listed is obviously a more valid predictor for the grade than to list other people. However, there are strong connections to the friendship and the leisure time network as well: For incoming friendship and grade ρ = 0.47 was observed (p = 0.002), for incoming leisure activities ρ = 0.46 (p = 0.003). Formulated as linear regressions, the average grade could be predicted with adjusted r^2 = 0.25 (p = 0.007) by the 4 centralities incoming workgroup, incoming advice, incoming friendship and incoming leisure activities, and still with r^2 = 0.21 (p = 0.005) by only the two centralities incoming friendship and leisure activities.

As mentioned earlier, another important predictor of the grades is gender (used as single predictor of performance, r^2 = 0.19, p = 0.01). Further analyses showed that it is not a confounder regarding the relationship between the centrality parameters and the grade but rather independent of them. Accordingly, adding gender to the list of predictors, an adjusted r^2 = 0.38 can even be obtained (p = 0.001).

Grades could not be linked to the survey items on well-being and social contacts but only to study-related questions: Spearman correlation was ρ = 0.33 (p = 0.02) for the question on whether the studies are interesting (Q7) and ρ = -0.35 (p = 0.01) for Q8 on whether the studies are stressful.

Discussion of the results

Do social contacts make students happier? Do social contacts make students perform better in their studies? The results of this initial study do not fully support any of these claims that have been voiced in the literature. Whilst these results are somewhat surprising, they are not discouraging and in fact can be supported by reasonable arguments. One needs to not forget that the network data was collected at an initial stage of the studies, a stage in which social relationships between students have only started to form. It seems just to argue that the

happiness of students was still very much affected by factors outside the university; thus, it remains interesting to see whether relationships among the students will have a larger influence on student happiness in the future. The same holds true for the social network effect on academic performance. One would argue again, that the social networks measured are still too fresh to have a sustained effect on individual behavior. The findings from the network characteristics support this outlook. Clear tendencies for homophilic clustering were detected; should such clustering remain in future measurements it seems likely to see cluster influences on individual nodes.

Two questions arise from this study. First, what is it that makes actors engage in a network, i.e. form relationships (antecedents to networks)? And second, when do networks start to have an observable effect (consequences of networks)? On the basis of the results, we are able to clearly define some antecedents to networks, yet it may still be too early to talk about network consequences. Both issues will be dealt with in turn.

Network antecedents describe the factors that can be defined as fostering the development of a specific network (or defines the development of a specific network structure). Homophily, as previously described, is just one aspect in the wide field of antecedents-research (Borgatti and Foster, 2003) Here, homophily effects are obvious and are playing a role in the development of the networks, in the common form of gender and ethnic background. Whilst this in itself may not be surprising, it remains to be seen how stable these networks are over time. Only with repeated observations, one will be able to see whether homophily effects have a sustained influence on networks or whether the importance decreases over time.

An international institution, such as the one studied, faces a particular dilemma. On the one hand, it strives for internationalization and supports diversity, on the other hand, efforts are made to integrate students from different ethnic backgrounds. The results now raise the question whether the development of social networks among students is fostered in such a way that the student community and the university as a societal entity can profit overall. Whilst it may be too early to speculate on the effects of network development in this particular community, obvious parallels can be drawn to the Granovetter's (1983) long established weak-ties theory. In this theory, Granovetter claims that networks with fewer (or weaker) ties can profit from novel information entering and flowing through the network, whereas dense networks (i.e. made up of actors who have close ties) may suffer from a deadlock since no new information can enter the network. In our sample, we have observed rather weak networks, whose structure mainly relates to ethnic backgrounds. Further, no dense clusters (i.e. sub-networks) could be detected, which opens the grounds for substantial growth and evolution of the networks. It seems likely that in future network evaluations,

individual actors play a much stronger role, be it in brokerage or bridging roles, or as major contributors or opinion leaders in the networks.

Future directions of the study

This paper reports on the first iteration of a longitudinal study. At this initial stage, at the beginning of the semester, social networks were obviously mainly driven by demographic factors such as language, nationality and gender. From experience on elder cohorts, we may expect that this segregating behavior will change; the panel study will enable a systematic view in which direction this starting structure will develop. The relations to students' performance, which were found, will be analyzed more deeply, as well, to shed some more light on the underlying cause-effect structure which still lies in the dark.

Generally, for coming iterations, the focus will be on network consequences, i.e. students' subjective well-being, academic progress and performance. The major tasks comprise tracking social contacts among students to investigate the dynamics of network structure and possible effects of social capital. From then on, recommendations on how a university can influence these dynamics positively should be a visible result of this research project.

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