

Informal organizational structure of an online university: The UOC e-mail social network

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ABSTRACT

Informal social networks play an important role in the internal dynamics of organizations and its study provides interesting insights for organization scientists [3,8,9]. However, the description of real social networks is not an easy task due to the difficulties associated to data gathering. Traditional methodologies rely on information facilitated directly by actors in the network through surveys and interviews. In spite of its proven utility, this procedure presents important drawbacks. One is an important degree of subjectivity in the information acquired and, therefore, the difficulty in its interpretation. Another important disadvantage is that this is a considerably costly process, specially in terms of time.

Nowadays, electronic communication systems like cellular phone, e-mail or instant messaging may provide us with a humongous quantity of objective information on social interaction in the form of data stored in log files. This information presents a high degree of accuracy and exhaustivity and is ready to be used and analyzed by computerized means. Through the use of this information it is quite feasible to identify and study social networks in diverse settings while being respectful with privacy issues.

Of course, not all social interactions take place by electronic means and the analysis of the so-build networks gives only a partial vision of reality. In some modern organizations where this systems are generalized, though, this partial vision may provide quite accurate insights on the structure of the social fabric [1]. For instance, information gathered from e-mail systems at organizations where it is extensively used and becomes one of the main communication channels is particularly well suited for this purpose. Only with data gathered by the e-mail server about the sender and receiver of each message—which are present at any log file—it is possible to build the e-mail social network. Instances of this kind of networks have been used in the study of different aspects of social networks, namely network topology [5], search strategies [2], information diffusion [12], spread of

computer viruses [10], temporal dynamics [6], strength of connections [4], and community structure [7,11].

In this paper we will analyze the e-mail network of our home academic institution, the Universitat Oberta de Catalunya (“Open University of Catalonia”). UOC is an online university located in Barcelona founded in 1994 by the Catalan government. Nowadays UOC has more than 35,000 students (between undergraduate and graduate), more than 2,000 members of the faculty (from them, about 200 are full-time academics and the rest are academic collaborators on a part-time basis) and around 400 people in the administration services. Faculty is distributed among a number of estudis (“colleges” or “schools”) representing different academic fields and which take care of the related academic programs.

All of UOC’s courses are imparted online making use of an in-house developed Learning Management System, the Campus Virtual, which includes an e-mail system. This system is meant also for internal communication among the members of the organization faculty or administration personnel and is extensively used due to the virtual character of the organization.

For the representation of the e-mail social network of UOC we make use of the log data recorded during a period of one month. In that time, 854,522 messages were recorded, from which 462,033 can be considered within the university (that is, from one UOC address to another UOC address). As in this study we focus in the internal organizational structure, we discard those messages sent from or to students, part-time academic collaborators or other people with a UOC e-mail account. This leaves us with a number of 119,578 messages exclusively among full-time faculty and administration personnel.

After the refinement of the data, we end up with a directed network of 696 vertices and 19,927 weighted links. If we use a threshold in the number of exchanged messages for an interaction between two members of the organization to be taken into account (at least 10 messages, from which at least 2 in each direction) and

consider the established relationships to be bi-directional, we obtain an undirected network of 696 vertices and 2,371 edges.

The analysis of different features of the network like density, degree distribution or community structure results in a characterization of the informal structure of social relationships in the organization. When this is contrasted with the formal organizational chart of the university, it sheds light on different aspects of the organizational functioning and the strengths and weaknesses of the university in questions like leadership, intraorganizational collaboration, and influence and power.

The study reflects the singularity of the organizational model of the university, in which administrative personnel plays a key role. The results obtained suggest also a lot of possibilities of internal collaboration between departments and the establishment of different types of informal structure.

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