

Chapter 48

The Analysis and Balancing of Scientific Social Networks in Cancer Control

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ABSTRACT

Considering the importance of cancer control in contemporary society, the INCT (National Institute of Science and Technology) for Cancer Control was established in 2008 as a national body under the Ministry of Health of Brazil. However, given its importance and considering a possible dispersion and the peculiar behavior of the academic environment, a series of analyses, as well as balancing, was conducted in the social networks that represent this INCT in particular. We will see not only a history of Social Networks, but also their application, importance, and peculiarities in the medical context. Further details will be shown in the project proposal BRINCA, its architecture, and the current state of our research.

INTRODUCTION

Trying to minimize the division and separation amongst research groups and to develop, in a unified way, research in key areas of Science, the Brazilian Government created the Brazilian Science and Technology Institute. The proposal

is to have one Institute per area of Science which should be a national and international reference, gathering different researchers, universities, and research centres of excellence in Brazil and abroad. The main focus is a national mobilization and aggregation, in a coordinated way, of the best research groups from strategic scientific areas for the sustainable development of the country, innovation promotion, and that is internation-

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ally competitive. The National Institutes should also establish programmes that contribute to the improvement of scientific education and the dissemination of Science to ordinary people. One of these institutes is the National Institute of Science and Technology on Cancer Control (Cancer INCT), which is led by INCA, the main institution in Oncology research and treatment in Latin America.

In this scenario, the BRINCA (Analysis and Balancing of Scientific Social Networks in Cancer Control) project was created. BRINCA's goals are to analyze how members of the Cancer INCT collaborate and how the scientific knowledge flows amongst the different researchers and institutions (members of this National Institute). For this, a computational environment was built which helps historical interaction analysis and identifies possible problems in knowledge flows. In it, we have nodes that are highlighted because they deserve special attention as they have features like: centralization of relationships, isolation from the network (either by being in the periphery or being too distant or disconnected from other nodes), serving as a bridge between two clusters of the network, etc. We needed to identify these kind of nodes as they are the ones that have the highest probability to affect the flow of knowledge within our social network (i.e. a bridge node, if removed from the social network, generates two disconnected graphs, apart from the fact that it holds great power in the flow of knowledge between the two clusters it connects). With these special nodes in hand, a number of suggestions for relationships were held.

These suggestions were based on areas of related scientific interest, equivalent competence skills (knowledge declared by the user), even the psychological profile of the users, using the MBTI indicators (Myers, 1980) as a base, and the Keirsey personality test (Keirsey, 1984). Considering the degree of importance related to cancer research in the national and international scenario, it is fundamental that the synergy be-

tween the researchers and their research became as significant as possible. That is, the greater the flow of knowledge through this social network, the richer the works of research would be, thus further integrating its researchers.

To analyse the scientific interaction we use a nation curricular database (Curriculum Lattes), the PubMed co-authorship (PubMed is a compendium of international scientific articles in the medical field) and, therefore, we conducted a survey with 122 Cancer INCT researchers. There are several ways to identify a relationship between two researchers. In general, these relationships may be: Project Participation; Co-authored publications; Advisory work; Examination board participation; Judgment commissions; Awards; and other types of scientific production (e.g., patents). In addition to relationships, each of the researchers has an individual profile, built with one's personal attributes, such as: Academic Level (PhD, MSc. or BSc.); Research and activity area; Number of Journal Publications; Number of Proceeding Publications; Number of Technical Report publications; Number of Project participations; Number of Thesis Advising participations; and Number of Participations in Examination Boards. Research and activity areas indicate what areas a researcher is connected with. Examples of research and activity areas are HPV and thyroid cancer.

Researchers are linked to each other either directly or indirectly. This association may be stronger or weaker according to the degree of relationship between them. Researchers who have publications in common, working in similar areas, and who took part in treatment and thesis presentations before, or in Examination Boards, for example, can be considered as having a strong relationship. On the other hand, if two researchers have participated of only one examination board, the relationship between them is considered weak. Also, there are cases where researchers are not directly connected, where the relationship will be carried out by other researchers.

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