

Chapter X

On Web Structure and Digital Knowledge Bases: Online and Offline Connections in Science

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Abstract

This chapter analyses the web as a complex system of interactions bridging online and offline communities in open science in order to discuss the transformation of communication and practices within scientific communities. It addresses the problem of mapping the structural linkages of research networks on the internet for purposes of identifying digital knowledge bases on electronic networks. Traditional (nonelectronic) research networks are likely to have a digital representation (web presence), whose boundaries and characteristics require a closer investigation. It is of special concern here to identify particular subsets of these digital networks whose properties are related to non-digital collaboration

structures. Empirical evidence for electronic connectivity on the internet is discussed from a European Language and Speech Network, constituted by 141 research groups—the ELSnet network. We explore the possibility of identifying particularly intensive “Digital Knowledge Bases” on these electronic networks.

Introduction

Traditional (nonelectronic) research networks and scientific communities more generally are likely to have a digital representation (web presence), whose boundaries and characteristics require a closer investigation. Extensive research has now been conducted on collaboratories (see Vann and Bowker in this volume for an introduction) which provide a good indication of the potentiality of ICT and e-infrastructures for research collaboration. In-depth studies have also been conducted on the use of the internet within the European research arena (see, for example, Barjak in this volume). It is our special concern here to identify particular subsets of these digital networks whose properties are related to non-digital and offline collaboration structures.

In the first place, we will be interested in testing the hypothesis that the patterns of connectivity of these electronic networks are structurally similar to the collaboration patterns identified previously by bibliometric and network analyses. Those analyses were based on research project collaboration structures that have evolved after a decade of European Commission funding of this research field and the interpersonal collaboration structures as revealed by the survey of researchers in ELSnet (a European Language and Speech Network, constituted by 141 research groups). We find that those electronic connectivity patterns allow one to identify a restricted set of “best-connected” research institutions, and the linkages to important external entities and electronic resources.

Secondly, when analyzing more deeply the inner structure of these “web communities,” we can identify different degrees of centrality and prestige even among the “core” of electronically very-well-connected research institutions. At this point, we need to obtain a better understanding of how many other institutions are directly linking to each institution as well as “who is” directly connected to each of the 141 ELSnet research groups. As a complementary measure of the centrality of each institution in the whole network, we also mapped the electronic “ego-networks” (direct and indirect links starting in a specific institution and spreading into the wider internet space) for some central research institutions. Again, these centrality results corroborate the collaboration patterns of the actual nonelectronic network.

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