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On visualizing knowledge flows at a university department

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Abstract

The analysis of dynamic network data has become an increasingly relevant research issue, showing a high potential for applied use in organizations. To unlock its potential also for the target user group of non-domain experts, we introduce a software prototype, which provides different views on network dynamics, intertwining network analytical measures with options of visual exploration. To demonstrate, how this approach can provide new access to questions of knowledge management and accessibility, a case study of a university department will be discussed. By combining multi-relational data of communication networks with attribute data of individual knowledge domains, we show how essential knowledge and change management issues can be reframed from a social network perspective and further developed towards integrated applications in organizations.

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1. Introduction

Division of labor, which is a necessary precondition for organizational performance, means from the management perspective: the challenge to constantly control and coordinate actors with specific skills and specific knowledge. At least, this is how the classical (i.e. the heroic) management perspective is used to tell the story (Handy, 1991). From a cognitive science perspective, knowledge originates from an actor's expectation, addressed to environmental objects, issues, structures or processes (Johnson-Laird, 1980). Interaction with such entities can lead to the development of mental models or representations, which help to manipulate and cope with relevant parts of an actor's environment. Expectations or conjectures which continually prove themselves in practice can attain the state of "knowledge" - in terms of appropriate expectations and representations - but still have to undergo a constant process of collective evaluation and adaptation (Harms, 2004).

Due to naturally restricted task and information processing capacities of individual actors, social collectives show a general tendency to differentiate or distribute their various aims on different (groups of) actors –hence developing ever refining subgroups of specialized knowledge and expertise (Boyd & Richerson, 2009). Given the ability to share specific knowledge via inter-actor-communication, social collectives can cultivate high standards of collaborative problem solving by developing highly differentiated trees and bodies of expert knowledge (see Figure 1).

Organizations, as socio-technical units which bundle specialized actors and tools to pursue common organizational aims (e.g. producing microprocessors, providing heart surgery, attacking or granting national security, transporting people, or mediating knowledge), hence have to solve the problem of (re-) integration and coordination of heterogeneous expertise by functions of communication and management (Hatch, 2006).

The classical "heroic" approach to such challenges of high diversity always has been – in a figurative sense – to counteract the tree of evolution by turning it upside down (i.e. transforming it into an organizational chart) and putting a manager on the top. This is the background, against which the network perspective makes those patterns visible, which build the factual infrastructure of collaboration by informally and pragmatically connecting the hierarchical branches of vertical hierarchies wherever need is given (Brass, Galaskiewicz, Greve, & Tsai, 2004). The associated "postheroic" approach to management is thus fostering notions of flat hierarchies and self-organizing networks of coequal actors for a long time (Handy, 1991; Etcher, 1997; Pearce & Barkus, 2004; Balkundi & Kilduff, 2005) (see Figure 2).

While this – in the meanwhile – is commonly accepted and widely practiced, we want to put the focus of the following considerations on challenges which arise from scenarios where such transitions have already taken place or are currently happening. When the structures of informal communication networks are crucial for collaborative performance, then their patterns and dynamics should be accessible also for non-experts in network analysis (Zenk, Windhager, Ettl-Huber & Smuc, 2011). When governing hierarchies or strict rules of communication are reduced, skills and technologies are gaining importance, which help the actors to operate and optimize their connectivity by themselves (Tenkasi & Boland, 1996).

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