

## Chapter XLIV

# Assessing the Social Network Health of Virtual Communities

**David Hinds**

*Hinds & Associates, USA*

**Ronald M. Lee**

*Florida International University, USA*

### ABSTRACT

*In this chapter, the authors suggest how measures of “social network health” can be used to evaluate the status and progress of a virtual community. Using social capital theory as a foundation, the authors describe community health as the general condition of a community leading toward its advancement or decline, and show how social network analytical measures can be applied to existing virtual community archives to measure social network health. They describe the metric development and validation process and use their empirical study of 143 open source software project communities to illustrate how this process can be applied. Their hope is social network health metrics will be devised and integrated into host platforms for various types of virtual communities, thus providing socio-technical system designers and community managers with a valuable new diagnostic tool for tracking the status and progress of their communities.*

*Social network analysis can provide an X-ray of the way in which work is or is not occurring in these informal networks.*

—Cross, Parker, Prusak, and Borgatti

## INTRODUCTION

Virtual communities have become a subject of considerable interest in both research and practice. These communities encompass a broad spectrum of initiatives ranging from social networking sites such as MySpace to online auction sites such as eBay to open source software initiatives such as Linux. While it is easy to cite many prominent examples of large and successful virtual communities, there are a great many other examples of such communities which have not been so successful. For example, only a small fraction of the 20,000 or more open source software projects launched each year actually produce useful computer software.

Because the number and variety of virtual communities continues to expand rapidly, there has been insufficient experience from which to recognize and validate a well-developed list of best practices for design or management. In such a challenging design environment, it is especially important to have evaluation metrics which can be used by socio-technical system designers to assess the impact of various design configurations. Such metrics are also quite important for community leaders wishing to monitor the progress of their communities and to assess the impact of changes in management approach or policy.

In the following section, we define what we mean by “virtual community” and “community health”. We then use social capital theory to define one specific kind of community health—“social network health”—and we show how social network analysis offers a set of tools and measurements for quantifying this construct. To assist in creating useful metrics, we refer to a typology of virtual communities and then describe the process for developing and validating the metrics. We use our empirical study of open source software communities as a case study to demonstrate how this process can be implemented. In our conclusions, we discuss the implications for socio-technical systems design and virtual community management.

## THE HEALTH OF VIRTUAL COMMUNITIES

### Virtual Communities

While various definitions have been offered in the literature, a simple definition is adopted for the purposes of this chapter:

*A virtual community is a population of individuals with shared or complementary interests who interact across a host platform.*

Viewed from a socio-technical system perspective, our definition makes explicit the social aspect and the technical aspect. The social aspect is the population of individuals and their interests and needs. In some cases, the members of the population may have a single shared interest as in a socializing community where the members are generally seeking friendship and a social experience. In other cases, the population may consist of individuals with two different but complementary interests or needs, as with a knowledge sharing community where some members have an interest in providing knowledge while other members have a need to seek knowledge.<sup>1</sup>

The technical aspect of the virtual community is the web-based host platform which is provided by a hosting organization. We view this host platform as including not only the enabling technologies, such as wikis, blogs or databases, but also the rules and policies which govern the behavior of community members. The host organization will typically provide some general policies while individual community managers will often provide more specific policies geared to the needs of their particular community.

Combining a population and a platform, a set of interactions will emerge and in some respects the community itself is defined by this set of interactions. In this context, the notions of “community” and “interaction” are broadly interpreted and can involve either direct interactions among individuals (e.g. as in threaded conversations) or indirect

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