INFORMATION SCIENCE PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com
ITB12126

This chapter appears in the book, *New Infrastructures for Knowledge Production: Understanding E-Science* edited by Christine M. Hine © 2006, Idea Group Inc.

Chapter I

Virtual Witnessing in a Virtual Age: A Prospectus for Social Studies of E-Science

Steve Woolgar
University of Oxford, UK

Catelijne Coopmans
Imperial College London, UK

Abstract

Despite a substantial unfolding investment in Grid technologies (for the development of cyberinfrastructures or e-science), little is known about how, why and by whom these new technologies are being adopted or will be taken up. This chapter argues for the importance of addressing these questions from an STS (science and technology studies) perspective, which develops and maintains a working scepticism with respect to the claims and attributions of scientific and technical capacity. We identify three interconnected topics with particular salience for Grid technologies: data, networks, and accountability. The chapter provides an illustration of how

these topics might be approached from an STS perspective, by revisiting the idea of "virtual witnessing"—a key idea in understanding the early emergence of criteria of adequacy in experiments and demonstrations at the birth of modern science—and by drawing upon preliminary interviews with prospective scientist users of Grid technologies. The chapter concludes that, against the temptation to represent the effects of new technologies on the growth of scientific knowledge as straightforward and determinate, e-scientists are immersed in structures of interlocking accountabilities which leave the effects uncertain.

Introduction

Despite a substantial unfolding investment in Grid technologies (for the development of cyberinfrastructures or e-science[1]), little is known about how, why and by whom these new technologies are being adopted or will be taken up. These questions are pressing, for at least three main reasons. Firstly, major current decisions about long-term investment in these technologies are effectively establishing modes of operation and use for many years to come. We need to understand now the ways in which we are fashioning the legacy for future outcomes and directions (Woolgar, 2003; cf. Wouters & Beaulieu, this volume). Secondly, it is widely agreed (even if sometimes only with the benefit of hindsight) that the inherent potential of new technologies does not itself guarantee their most appropriate uptake and use. Although much is said about the likely effects of Grid technologies, we need to understand what kinds of social circumstances facilitate and/or inhibit their use. Thirdly, we need to know about the uptake and use of the new technologies in order to discover the extent and the ways in which they are making a significant difference to the nature and practice of academic research, and to ensuing knowledge.

To elaborate this third point: It is almost a commonplace that significant changes in scientific direction and knowledge are associated with the development and use of new instruments and technologies. However, it is also well known that the nature and direction of change is unpredictable. For example, most would agree that many advances in knowledge of molecular structure are contingent on the development of electron microscopy (e.g., Barad, 1996). But, equally, it was in virtue of *not* possessing equipment for routinizing the analysis of observations of quasars that Cambridge radio astronomers were able to discover the wholly unexpected new astrophysical phenomenon of pulsars (Woolgar, 1978). These examples suggest we need to keep an open mind about whether and how Grid technologies might assist or inhibit the advance of scientific knowledge. The fact