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Chapter V

Embedding Digital Infrastructure in Epistemic Culture

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Abstract

This chapter introduces the notion of a "disunity of e-science:" It posits that different epistemic cultures privilege different forms of digital infrastructure, integrate them into their practice in historically and culturally specific ways and assign to them distinct functions, meanings and interpretations. Based on an ethnographic case study of theoretical particle physics, the chapter demonstrates how digital infrastructures are firmly embedded and deeply entwined with epistemic practice and culture. The case is made, firstly, by investigating the practice of distributed collaboration and how it is sustained by e-mail-based interaction and, secondly, by analyzing the practice of preprinting and how an electronic preprint archive has turned into a central element of the scientists' culture. In its conclusion, the chapter cautions against techno-deterministic views of how digital infrastructure might align sciences and turn them into a homogenized "e-science."

Introduction: E-Science in Discourse

E-science is about global collaboration in key areas of science and the next generation of infrastructure that will enable it. (John Taylor, n.d.)[1]

In the future, e-Science will refer to the large scale science that will increasingly be carried out through distributed global collaborations enabled by the Internet. Typically, a feature of such collaborative scientific enterprises is that they will require access to very large data collections, very large scale computing resources and high performance visualisation back to the individual user scientists. (Research Councils UK, n.d.)[2]

"E-science" carries different connotations and incorporates different visions of the future development of science, as is exemplified by the above definitions. In particular, programmatic texts seem to suggest that sciences will follow a common trend toward a new form of scientific research and become aligned or homogenized due to the influence and thrust of new information and communication technology infrastructure. This chapter argues that the image of e-science as a coherent endeavor that encompasses and subsumes a wide range of scientific fields is a rhetorical construction that, while it might serve various purposes, does not adequately mirror the complex and multifaceted nature of scientific practice and culture in an era of widespread computerization. Instead, the view will be advocated that different "epistemic cultures" (Knorr-Cetina, 1999) incorporate, configure and co-evolve with a plethora of (existent, novel and imagined) information and communication technologies in a variety of ways.

Different epistemic cultures are situated very differently in the e-science field, be it with respect to the kind of digital infrastructure they privilege, the timeframes in which they promote, adopt or resist to new ICT applications or the epistemic status that they assign to computer-based practices and products (databases, numerical models, etc.). In this article, the notion of a *disunity of e-science* is introduced and promoted to denote a double logic of differentiation. It makes allusion to the concept "disunity of science" (Galison & Stump, 1996) which indicates the growing awareness of STS-researchers that epistemic cultures differ with respect to important dimensions (see also Knorr-Cetina, 1999). "Disunity of e-science," then, refers to the uneven and unequal development of different scientific fields as concerns their adoption and usage of digital infrastructures (for a related argument see Kling & McKim, 2000). Furthermore,