Chapter 23
CSE as Epistemic Technologies:
Computer Modeling and Disciplinary Difference in the Humanities

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ABSTRACT

Computational science and engineering (CSE) technologies and methods are increasingly considered important tools for the humanities and are being incorporated into scholarly practice. This chapter uses a single case of the use of simulation in the humanities in order to better understand the value and the issues with cross-disciplinary exchanges. We focus on the epistemic practices of this case – by which we mean the practices in which knowledge and truth are manifested, defended, and critiqued. We see these practices and their connections to CSE as requiring increased attention and in this chapter provide some guidance as to potential resources and important themes.

INTRODUCTION

Computational science and engineering (CSE) technologies and methods are increasingly considered important tools for the humanities and are being incorporated into scholarly practice. As noted by many digital humanists (McCarty, 2005), these tools foster novel modes of engagement with older questions as well as the development of new lines of research. This makes them attractive objects for innovative scholarship and examples of such research are multiplying (Schreibman et al, 2004).

However, this is not to say that such adoptions and, increasingly, adaptations of simulation and modelling technologies are without challenges. One challenge is the fear by scholars that some of the means for exploring and communicating knowledge that are particular to specific humanities fields may be lost. Others worry that the capabilities of new technologies may not be fully exploited. Experiments and explorations in this area are therefore ongoing and are seen by members of relevant academic disciplines as having great potential but also as sites for concern.

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Formost among the issues is a desire to conserve and maintain the diversity of knowledge practices that is the hallmark of humanistic scholarship.

Computing has been called an 'epistemic technology' (Hooker, 1987), and it is certainly the case that simulation and modelling technologies fall into this category. By epistemic technology Hooker means that computational technologies amplify the knowledge-making capacities of humans, supporting and facilitating the creation, legitimation, and critique of truth claims. Specifically, along with great possibilities for revealing and visualizing insight, simulation and modelling also often embed specific practices of inquiry, evaluation, verification, and testing. These epistemic technologies make visible already existing fractures between and within humanities disciplines and also work to introduce new dividing lines. More importantly, these technologies may be used by members of particular disciplinary groups to buttress their own position within the wider scholarly context, create new divisions, or bring disparate groups together. Such processes have previously been explored within traditional scientific fields (Galison & Stump, 1996; Galison, 1997; Knorr-Cetina, 1999). In this chapter we address the interconnectness between epistemics and computational technologies within cross-disciplinary research in the humanities.

In order to call attention to the epistemic problems and possibilities, this chapter traces a particular adoption of computer modelling in archaeology, seeing the progression of this case as illustrative of the dynamics and challenges humanities scholars face in adopting CSE practices. Using stakeholder interviews carried out between 2005-2007, this chapter explores why a computer model reconstruction of a pre-Roman temple was created by a classical archaeologist and – more importantly – how it was received by other archaeologists, cultural heritage professionals, and computer scientists working in archaeology.

It is important here at the outset of this chapter to be clear about its intention. Rather than evaluate the role of simulation and modelling in archaeology generally – or the specific 'good' or 'bad' science of the specific case – this research is situated in and supported by insights from the Sociology of Scientific Knowledge (SSK) and Science and Technology Studies (STS) more generally. Using a single case as a 'controversy' study is a practice common in SSK and STS (Bloor, 1991; Collins, 1981; Dascal, 1998) as a means of exploring how critical decisions are made within research disciplines that involve either the maintainence or rejection of existing conventions of acceptability.

The starting point is thus the principle of 'symmetry' from which much sociological research on science emerges. This concept, originally described by Bloor (1981) states that theories about scientific projects must not rely on normative assumptions that assume that 'good' science is good because it is true but 'bad' science is bad because of politics, social reasons, or some other external factors. Most research in the STS tradition has taken this as a core insight and thus most STS research projects start from a position of epistemic neutrality, taking controversy over truth claims as the 'topic rather than the starting point' (Collins & Yearly, 1992, p. 302).

In particular this case is revealing of important contradictions in the overall goals of members of the archaeological community as well as important differences in how subgroups in this community make – and make legitimate – the results of their intellectual labour. In order to draw a link between the aesthetic and representational choices made by individual researchers, and the maintenance and recreation of disciplinary difference, this chapter extends the concept of 'double-bind', developed initially by Bateson (1987) and extended to the area of knowledge work by others (Bowker & Star, 2000; Star & Griesemer, 1989). In the end, addressing the development and use of CSE technologies in the humanities requires more than just increasing the technical skill and understanding of humanities scholars or, conversely, providing humanities knowledge to computer scientists and