

THE POSITIONS OF THE SOCIAL SCIENTIST: SOCIAL AND TECHNICAL ACTS OF INTERVENTION

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Introduction

A new space for social science is opening within large-scale technical projects such as cyberinfrastructure and information infrastructure building more generally. These endeavors are framed as complex and ambitious combinations of information technology enactment, science research goals, and the bringing together of diverse communities. This framing has opened an opportunity for the participation of science and technology studies (STS) not only as researchers, but also as participants in the creation of collaboratories, standards, metadata languages, ontologies, ‘best practices,’ &c. But within STS intervention – the contribution of the analyst to the field of action – itself remains a controversial and under-explored subject. In this position paper I describe three empirical sites of investigation which also double as sites of intervention. I use these cases to first elaborate on the understanding of intervention within STS – not as a problem of objectivity, but of political action – and then outline three experiences I have had with interventions in these projects. I conclude that interventions, while complex, are opportunities to refine empirical understandings of fields sites, for developing grounded theory and for enriching methodologies of action.

Three Cases - Three Positions

I am currently involved in three information infrastructure development projects, each of which stand as independent research sites, but which are also tied together through a comparative study of their *interoperability strategies* (Ribes, Baker et al. 2005). In each of these three projects a different position emerges for social science research, thus producing three kinds of interventionist politics.

GEON, the geo-sciences network: GEON is a five year cyberinfrastructure development project for the broader geo-sciences. It is a collaborative project between information technologists and earth scientists to build and deploy high-end IT tools: computing, visualization and knowledge mediation. The project is nationally distributed, with its technical core at the San Diego Supercomputer Center, and includes PI’s from multiple institutions and disciplines. I was brought on to this collaboration as a ‘social informatics researcher’ at project inception (2002), with the explicit goal of facilitating relations between domain and IT

practitioners. This research is primarily ethnographic and via document collection. All GEON participants are aware of the nature of the social research project, and have discussed its development with me throughout the years through formal and informal conversations. I have also conducted more official feedback presentations to the GEON group, and to the National Science Foundation’s project review team.

LTET, Long Term Ecological Research: LTET is a collaboration of American ecologists with the goal of creating interoperable datasets which match the length of environmental timespans. This research network includes 26 sites, distributed across the nation, and drawing together many disciplines related to ecological research (including biologists, geologists, information managers, and human geographers, to name a few). The project was initiated in 1981, and has gone through several iterations of funding renewal, identity shifts, and growth. Data collection for the social research project is primarily through document analysis, ethnographic investigation at a single site of the research collaboratory and of larger planning meetings; primary access is granted through an information manager. The scope of LTET quite large, and the vast majority participants are unaware of our research project. Interventions have been substantially limited to the primary investigation site at the Scripps Institute for Oceanography, and has included such activities as organizing ‘information studies’ reading groups, publications in the LTET newsletter and informal discussions with participants.

OI, Ocean Informatics: OI does not yet exist as a formal organization. It is a loose collection of information managers and ocean scientists at Scripps. As a nascent endeavor participation is relatively informal and goals continue to shift: broadly stated OI is organizational formation with the intention of strengthening the information infrastructure for scientific research. This is a study in ‘collaboration readiness’ (Olson and Olson 2000) -- the preparatory work of forming working relations between participants. My participation in this project comes close to transcending the ‘investigator’ role as I am a collaborator at multiple levels of engagement, including planning events, reading groups, continuous developmental feedback – research involves documenting the unfolding and maturing of the

participant relations, technical decision-making and organizational ties.

Inherent Intervention and the Act of Intervention

In this section I would like to quickly distinguish between naïve objectivism and interventionism as it is understood in the pragmatist traditions of social research. Within the sociological adoptions of pragmatist philosophy (e.g. symbolic interactionism and actor-network theory – ANT) scientific investigation, or inquiry of any kind, is always already understood as an intervention. Investigation is the deployment of tools – ideational, technical or practical – in relation to the object(s) of inquiry (Hacking 1983). Emergent elaborations of meaning and *knowledge* is the result of this placing-in-relation (Hickman 1990). For the sociologist this notion of intervention always places the investigator within the field of action, thus rendering moot critiques of maintaining objective separation: intervention is inherent.

But within the field of Science and Technology Studies (STS), interventionism has come to take on an additional meaning: what in the social sciences is usually called participant observation, a social researcher who partakes in the development of the research object. From this perspective intervention becomes problematic not as ‘a question of objectivity’ but as a kind of political act: what is it to contribute to, assist even, the site of investigation? STS often takes on questions such as the relationship of science to the state (Shapin and Schaffer 1985); the work that categories do (Bowker and Star 1999); and the epistemic and moral consequences of information organization (Vaughan 1999). Investigations of large-scale information infrastructure building, such as cyberinfrastructure, inevitably raise these questions for the STS oriented researcher. Far too large to chew in this paper, I include them as ‘contexts’ for understanding the broader concern that informs a more detailed analysis of interventions in this position paper.

More practically then, leaving aside the question of objectivity and instead focusing on consequences means carefully considering the participation of a social scientist as *acts of intervention*. In what follows I describe three occasions in which I contributed back to the communities in which I partake, and which I investigate. These narratives of intervention are the ‘stuff’ of politicized STS questions, writ small.

Three Odd Tales of Intervention

Acts of intervention are local. While at times they can be planned, or at least outlined, often they are ad hoc opportunities emerging in the moment. Furthermore, interventions are experimentalist actions, resulting in further elaborations of meaning but also unintended

outcomes. In the first two narratives the particular circumstances of intervention were relatively unplanned, in the third a more conscious action is described – conversely, the first two cases are tales of effects on my objects, whereas the third is of how an intervention re-shaped my understanding of the research field.

In GEON my formal feedback to the group has been in my capacity as a social researcher, focusing on IT-domain relations. These interventions have served as theoretical elaborations, providing conceptual frameworks for informants’ experiences. A more surprising intervention occurred approximately thirty six months into the project during an internal re-organization. As a formal organization GEON has built itself up from the ground up, there are no professional managers or an independent administrative body. The re-organization involved the creation of topically oriented sub-groups and regularized weekly meetings for the development of particular aspects of the information infrastructure: a systems group for hardware and grid development, a geographic information systems team &c. In response to what I saw as significant organizational formalization, I suggested that “*organizations* require coordinating and communication mechanisms to ensure that the work and progress of sub-groups is available to the larger body.” The response that followed was quite unexpected. The suggestion of co-ordination and communications mechanisms was received quite well; meanwhile the term ‘organization’ received heavy resistance. It was the earth-scientists present at this meeting who reacted most strongly: to them ‘organization’ was a term from business, open to management and financial concerns, whereas they understood GEON as science, as research. Meanwhile the information technologists were relatively comfortable with the term, holding closer ties with IT businesses, but also understanding ‘organization’ as a general term not necessarily tied to the private sphere. What resulted was a small debate between domain earth scientists and information technologists: my intervention became a resource for a discussion of GEON’s identity and its future as a planned entity. This intervention had the unexpected result of inciting discussion about ‘what is GEON’ and the role of considered organization and management in building cyberinfrastructure for the geo-sciences.

One LTER intervention has been the formation of a reading group which brings together information managers, scientists and social scientists; readings are selected to broaden participants’ understanding of methods for producing interoperable datasets, they includes articles drawn both from computer science and social science. One of the early readings was my own article, co-written with Geoffrey Bowker, on the

process of developing ontologies within GEON (Ribes and Bowker forthcoming). Ontologies are software technologies to enable ‘smart searches’ or integration of multiple databases. These technologies are well established within the business sphere as part of ‘knowledge management,’ but have only recently been introduced within scientifically oriented circles; in recent years ontologies have become particularly ‘hot,’ gaining substantial cachet as an approach to data integration. In contrast, LTER has been through a long-term process of developing and adopting the Ecological Metadata Language (EML); metadata standards are another approach to interoperability (see Millerand forthcoming). For various reasons, this long-term effort to standardize data has recently come under question within LTER and the technically savvy have been eyeing the currently favored ontologic approach. At the reading group it became apparent that our article was interpreted as endorsing ontologies, but in writing the article our purpose was not to promote ontologies but to outline the methodological details of this particular approach. I proceeded to dedicate substantial effort to framing ontologies as one approach amongst many, each with particular practical and organizational commitments. While initially we had understood the intervention – sharing this social science article – as an introduction to processual understandings of interoperability development the more significant and unplanned intervention was to reframe ontologies as a particular approach, rather than simply in terms of technological progress. Thus the particular intervention was a sort of categorical leveling, contrary to the bubbling hype surrounding ontologies I attempted to encourage an agnosticism to the available strategies of interoperability: ontologies become one amongst a range of possible approaches.

Within OI my role is closer to a participant, than observer. Much of the work has been assisting in familiarizing ocean scientists at Scripps with their human and technical infrastructure, such as the information managers, the technologies of interoperability and organizational commitments necessary for planned projects. The domain sciences have often considered information technology as a ‘mere tool’ to accomplish scientific ends. With the growth of large-scale projects such cyberinfrastructure it is becoming progressively more difficult to consider IT as ‘means’ – information managers are becoming experts in their own right, shifting from completing the ‘to lists’ of scientists, to organizing for technology adoption and long term data curation. Information managers are a substantial repository of knowledge about scientific datasets, and this knowledge is crucial for the integration goals of cyberinfrastructure. I am most familiar with the GEON case, which is an explicit collaboration between domain and information technologists – information managers are far less

prominent in GEON than in OI. For months I had simply equated the information managers of OI with the information technologists and computer scientists of GEON. It was only after close collaborations with the information managers that I began to shape the categories of my analysis and understand information managers as an independent group of practitioners. The result of my interventions with OI, has been a new reflexive understanding of the particular structure of GEON which is understood as domain-IT collaboration, leaving information managers significantly on the periphery.

Conclusion

In this paper I have argued for an understanding of intervention as a considered act, rather than as a challenge to objectivity. The act of intervention is not, however, de-problematized. Rather it must be considered a form of political action. It is significant to conclude with some generalizations about these cases of intervention:

First, is the emergent quality of activity: in each case, it has been a somewhat surprising set of circumstances which have constituted the intervention, and in turn a surprising outcome. Aside from contribution back to informants, interventions are opportunities for testing understandings of the field site, and to refine grounded theorizing. To pose outcomes of interventions as surprising is not an excuse to recklessness, but rather a call to careful reflection, before and after the fact.

Second, interventions are not simply acts upon the subjects of research, but are in turn sources for the development of new knowledge. My work in OI has significantly enriched my analysis of GEON and future projects by adding an important group category: information managers. In introducing the term ‘organization’ to GEON I developed a more nuanced understanding of what GEON was to the geo-science participants. From the LTER reading group I received a new reading of my own article and how it may play into technical choices made by readers.

Thirdly, the astute reader will note an agnosticism towards the consequences of intervention by a social scientist on the social or technical dimensions of a project. While in the first narrative the consequences are traditionally ‘social: a shift in GEON’s understanding of itself as an organization; the second example approaches a ‘technical’ intervention: the problematization of hierarchies of one particular technological approach over another. The agnosticism towards divisions of the social and technical espoused by ANT (Latour 1993[1991]) is more than a fancy theoretical perspective but a noteworthy methodological resource for action.

References

- Bowker, G. C. and S. L. Star (1999). Sorting things out: classification and its consequences. Cambridge, Mass., MIT Press.
- Hacking, I. (1983). Representing and intervening: introductory topics in the philosophy of natural science. Cambridge Cambridgeshire; New York, Cambridge University Press.
- Hickman, L. A. (1990). John Dewey's Pragmatic Technology. Bloomington and Indianapolis, Indiana University Press.
- Latour, B. (1993[1991]). We Have Never Been Modern. Cambridge, Ma., Harvard University Press.
- Olson, G. M. and J. S. Olson (2000). "Distance Matters." Human-Computer Interaction **15**(2-3): 139-179.
- Ribes, D., K. S. Baker, et al. (2005). "Comparative Interoperability Project: Configurations of Community, Technology, Organization." Proceedings of the Second ACM/IEEE-CS Joint Conference on Digital Libraries.
- Ribes, D. and G. C. Bowker (forthcoming). "A Learning Trajectory for Ontology Development." Journal for the Association of Information Systems.
- Shapin, S. and S. Schaffer (1985). Leviathan and the air-pump: Hobbes, Boyle and the Experimental Life. Princeton, N.J., Princeton University Press.
- Vaughan, D. (1999). "The Role of the Organization in the Production of Techno-Scientific Knowledge." Social Studies of Science **29**(6): 913-943.