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AALBORG UNIVERSITY
DENMARK

Techno Anthropology

A new move in science and technology studies

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Published in:
STS Encounters - DASTS working paper series

Publication date:
2013

Document Version
Early version, also known as pre-print

Link to publication from Aalborg University

Citation for published version (APA):
Jensen, T. E. (2013). Techno Anthropology: A new move in science and technology studies. *STS Encounters - DASTS working paper series*, *5*(1), 1-22. http://www.dasts.dk/wp-content/uploads/Torben-Elgaard-Jensen-2013-Techno-Anthropology.pdf

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STS Encounters
Research papers from DASTS
Volume 05 · Number 01 · 2013

http://www.dasts.dk/

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ISSN: 1904-4372

Techno Anthropology
– a new move in Science and Technology Studies

Torben Elgaard Jensen

DASTS er en faglig forening for STS i Danmark med det formål at stimulere kvaliteten, bredden og samarbejdet inden for dansk STS-forskning samt at markere dansk STS tydeligere i nationale og internationale sammenhænge.

Techno Anthropology
– a new move in Science and Technology Studies

Torben Elgaard Jensen

I am very honoured to be appointed professor in these two topics: Techno anthropology – a new education - and in STS - a fairly young research field. But this is also a fairly challenging appointment, since both techno anthropology and STS are relatively unknown and rather incomprehensible to the general public. In fact, a consultant from the Danish Federation of Industries recently declared that their member companies would almost certainly not want candidates with new strange combinations such as techno anthropology. The companies, she claimed, would prefer well-established educations such as lawyers, engineers and economists.

My talk today is not for the benefit of those who would reject techno anthropology out of hand – or STS for that matter. I take it as a good sign that you have come here voluntarily, and I will therefore assume some measure of good faith on your part.

As some of you may know, the branch of research, I'm in, is filled with terms such as translation, relation and mediation. For this reason it suits me very well to be a professor not just in one thing, but two, or perhaps more precisely in the mediation between the two. As I see it, my job is to bring the best from the research field of STS to techno anthropology. My job is to establish the best possible dialogue between STS and the other traditions that are a part of techno anthropology: Philosophy of science, philosophy of ethics, various types of social science, and a series of technical disciplines. And finally, I also consider it my job to mediate in the opposite direction, i.e. to turn our joint work at techno anthropology into a contribution to the STS field.

My talk today is an attempt to get on with my job. It is an attempt to start moving back and forth in the mediation space between STS and techno anthropology.

I begin by offering a brief historical account of the STS field that I would like to bring to techno anthropology. There are three questions here. First, what is the unique approach that STS developed in the late 1970's and early 1980's? Second, what is the significance of the enormous growth of STS scholarship that took place in the following two or three decades? And third, what are the challenges today for an STS field that has come of age?

In the second part of the talk, I will describe what I find most promising in the techno-anthropology education, and why it can be considered to be a new move in STS. I will also explain why I'm convinced that the students in techno anthropology will prove the Danish Federation of Industries wrong.

The origin of STS

To begin my brief history of STS, I would like to make the rather banal observation that every society seems to have both enormous benefits from and enormous problems with its sciences and its technologies. To pick a current example, the free movement on the Internet, which is in many ways wonderful, has also raised a host of issues about copyright protection, privacy and surveillance. Or to pick a more historical example, the invention of the automobile, which has worked miracles for individual transportation, has also lead to extremely serious problems with CO2-emisions, pollution and congestion. Every modern invention comes with its controversies and its unexpected consequences. And sometimes these consequences interact and accumulate. The global ecological crisis is the clearest and most symbolic example. In the most terrifying way, this crisis once again brings home the message that our collective existence is caught up in a risky and vastly complicated imbroglio of habits of consumption, modes of knowing and organizing, energy systems, transportations systems, economic markets and countless other things.

STS is about this problematic and productive relationship between science, technology and society. Quite obviously, this is an important problem to think about and to study. But it has do be done with skill and with care. The quality of the whole STS enterprise hinges on the sophistication with which we can conceptualize the relation between science, technology and society.

The worst thing one can probably do is to subscribe to the common sense view that science is simply giving us the facts, technology is simply giving us effective solutions, and society is simply at the receiving end. If we put science, technology and society into separate compartments in this way, then it becomes impossible to get very far into any kind of analysis or discussion. We will endlessly reproduce the idea that science and technology is an expression of a higher form of logic and rationality, that science and technology somehow stand outside of society, and that the products of science and technology – be they facts or devices - will inevitably generate particular outcomes once they reach society.

The great achievement of STS is to circumvent a number of these ideas and to develop an empirical programme that generates a different view of the relation between science, technology and society. Very briefly put, the business of STS is to conduct social studies of scientific practices and of the production and use of technology.

A defining moment in the discipline was the in the late 1970's when a small handful of young scholars set out to study the daily practices of laboratory scientists (Latour & Woolgar 1979; Knorr-Cetina 1981; Lynch 1985; Traweek 1992). Taking their inspiration from micro-sociology and anthropology these scholars assumed that scientific culture is like any other culture; It can be studied as a practical set of activities that unfolds over time at specific locations with specific sets of cultural artefacts and guided by specific cultural ideas, assumptions and rituals. Science in this view is not a mysterious entity that stands outside society. It is a cultural and societal practice like any other, although undeniably a very peculiar one, a very powerful one, and one that enjoys a great deal of prestige.

To study science as a situated practice, as these scholars did, may seem like a small move. After all, one could say that it was 'simply' a matter of applying fairly well known anthropological and sociological methods to a new empirical field. But the results were significant and surprising. First of all it was striking that nothing epistemologically special is happening in the laboratories. The anthropologists found no differences in rationality, thought patterns or logic that would distinguish laboratory scientists from other practitioners.

Another interesting finding was that scientific knowledge production entails a surprisingly broad range of negotiations. Scientists do not simply 'put questions to nature'. In fact, whenever they do so, the outcomes of experiments tend to be 'opaque, murky, ambiguous, and generally in need of interpretation and further experimentation' (Knorr-Cetina 1995:152). For this reason scientists must engage in complicated negotiations. What is a real finding and what is an artefact? What counts as an appropriate method? What is proper selection of data? What counts as a replication? Who is a trustworthy scientist? (ibid:151-2). Since these questions cannot be settled by any commonly agreed method, scientists must deal with matters and issues that are inherently contentious. In these negotiations it is crucially important to be persuasive. The art and craft of persuasiveness has therefore become a key focus for anthropologists of science. In a number of studies, they have turned their attention to how scientists produce images, inscriptions, papers and rhetorical styles that persuade a variety of audiences (Gilbert 1977, Callon & Law 1982, Law & Williams 1982, Latour 1986). The manipulation of material worlds and the manipulation of social worlds thus become intimately linked in the practical work of laboratories (ibid:146).

What does it mean to say, as these scholars did, that scientific facts are not discovered, but rather that they are social and material constructions? Does it mean that STS has no respect for the work of scientists? Or that STS believes that facts are merely fictions? Certainly not!

What it means is quite simply that STS is busting the myth that the dramatic powers and effects of science and technology are well explained by reference to mysterious mental notions such as 'rationality' or 'universality'. A sensible, empirical social science account must pay close attention to the practical local circumstances of scientific and technological work. This might step on the toes of a self-conscious scientist here and there who might feel blessed with a higher form of rationality than his fellow human beings. But believe me, STS has caused far more consternation among social scientists. The idea that every kind of knowledge process is through and through entangled with material circumstances and devices amounts to a direct challenge to whole cascade ideas dearly held by social science. In particular all sorts of mentalist notions, such as rationality and logic. All sorts of psychological notions such as subjectivity and intentionality. All sorts of social interactionist notions that take human language and conversation to be a metaphor for social life. And finally, all sorts of sociological ideas of society as a coalition of human subjects.

From its empirical vantage point in laboratory studies, STS has launched a vast number of discussions, provocations and critical reflections on the nature of scientific knowledge. And this has generated a number of debates with our fellow social scientists (e.g. Latour 2005).

As an anecdote, I feel like mentioning that I have also contributed to this joyful type of debate. As a Ph.D. student I once went to conference with a large number of learning researchers and presented a paper with the title 'Let Us get Rid of the Concept of Learning' (Elgaard Jensen 2000). My key argument was that whenever we describe something as learning, we give a human subject all the credit for an achievement, which was really accomplished by a heterogeneous network of human and non-human actors. Now that I'm a bit older and a professor at the Department of Learning and Philosophy, I probably wouldn't phrase it in exactly this way. But the discussion is still worth having. How can we talk about learning and still maintain an acute sense of the materiality of this process?

The creative industrialization of STS

I have talked about the STS in the 1970s and 1980s, and I will now move on to what followed. The early work can be described as some first attempts to analyse science, technology and society in a new constructionist way. In the subsequent decades, STS grew and expanded quite dramatically. It continued its conversations with related movements in other theoretical traditions, such as feminist theory, post-structuralism, anthropology and cultural studies. It also generated a series of fierce internal and external debates (e.g. Elam & Juhlin 1998, Woolgar & Cooper 1999, Latour 1999).

At the same time, a vast expansion of empirical topics saw the light of the day. One can get at good sense of the current multitude of empirical projects in STS simply by browsing through the 40 Ph.D. dissertations that can be downloaded from the homepage of the Danish Association for Science and Technology studies[1].

Here you can find constructionist case studies not just on laboratory practices[2], but also on health technologies[3], IT-systems[4], various forms of organizational development and control[5], design and innovation processes[6], educational practices[7], international envi-

[1] www.dasts.dk.
[2] Sommerlund 2003
[3] Adrian 2006; Langstrup 2005; Danholt 2008; Jespersen 2008; Johannsen 2009; Nielsen 2010; Søndergaard 2009; Ballegaard 2011.
[4] Lauritsen 1998; Sveningsen 2003; Jensen 2004; Jensen 2010; Winthereik 2004.
[5] Elgaard Jensen 2001; Bendixen 2007; Hatting 2007; Gad 2009; Kousgaard 2008; Boll 2011; Ratner 2012.
[6] Henriksen 2003; Nickelsen 2003; Pedersen 2007; Halse 2008; Lotz 2008; Valderrama 2010; Brodersen 2010.
[7] Sørensen 2005 Sørensen 2009; Benjaminsen 2009; Hansbøl 2009.

ronmental issues[8], public knowledge controversies and engagement of science[9], markets[10], cityscapes[11], art and culture[12].

To give a further sense of the expansion of the STS enterprise it is also worth mentioning that the field have generated a number academic superstars that are very widely read. We are even at the point where it is not entirely absurd that younger scholars occasionally write books about the established figures in the field (Blok & Elgaard Jensen 2009; 2011). There has also been a very significant growth in educational programmes, in journals, and in conference attendance. The largest international STS conference ever, with more than 1700 participants, was actually held just four weeks ago at Copenhagen Business School.

I am mentioning all this not just to boast on behalf of Danish STS, but also because it is deceptively easy to give too much credit to the first movers in a field and to overlook the importance of everything that followed. Let me give you a curious example. In 2006, a group of people including me, decided to try to establish Danish association for STS. When we announced the first meeting for our new association, we were met with the following blog-comment from a senior colleague.

> "I (..) believe that the STS field is characterized by a few bright theoreticians and a huge crowd of imitators, and that no real independent theoretical development is taking place in the field as a whole"[13]

[8] Blok 2010; Degnbol 2012.
[9] Horst 2005; Plesner 2009; Munk 2010.
[10] Madsen 2007, Reijonen 2008.
[11] Sandberg 2009
[12] Strandvad 2009; Suenson & Byrlov 2012.
[13] The entire blog debate (in Danish) can be found here: http://www.museion.ku.dk/2006/09/danish-association-of-science-and-technology-studies/

One can of course smile at the exquisite insult that this fellow-academic so beautifully voiced in public. Or one could feel compelled to educate our esteemed colleague on a number of recent theoretical developments, as I actually attempted to do in a reply-blog post. But more interestingly, the entire line of argument, that a field is in some sort of crisis if it includes 'a huge crown of imitators', runs counter to a lesson that we should all have learned from science studies a long time ago.

If a field is not able to reproduce itself, if a field is not able to recruit people who are willing and able to carry old ideas one step further, then the field will quickly seize being a field at all.

The strength and importance of a field owes as much to its ability to generate new theories as to its ability to reproduce these theories consistently. From a pragmatic viewpoint, the creative and conscientious 'industrialization' of STS in the last couple of decades is therefore every bit as valuable as the crazy first attempts to do something entirely new.

The challenges of a mature field

But of course we must also realise that the challenges are different, now that we are operating in a field that has expanded and matured for more than three decades. I will now talk about the final bit of my brief history of STS: our current challenges. I would suggest that as a mature field we should focus on three types of effort.

First of all, we should make some effort to *reclaim* the field. It is worth reading the classics, and it is worth spending a bit of time reminding ourselves and others of some of the core discussions and approaches in of STS (Edge 1995). I also believe that it is very useful to continue doing ethnographic case studies, especially of new techno-scientific projects. The point is not to conclude, once again, that this or that thing is constructed or multiple. It is rather to describe *how* it is constructed and *how* it is multiple - and perhaps to do some sort of comparison with other projects.

The second effort, I think we should make, is to *reflect* on our own practices. STS has had long discussions about reflexivity (Woolgar 1988, Lynch 2000), and some scholars, not least John Law, has done an amazing job of analysing how STS writings perform particular realities (Law 2002; 2004). At this moment, however, I think the most interesting way to deal with reflexivity is to turn our attention to the 'uptake' of STS.

In this mode, Alan Irwin (2006), has analysed how ideas from the critical studies of PUS have been taken up by policy makers in their effort to restore public trust in science. It is a highly ambivalent story, and one that articulates the unruly and unintended performativity of STS. Similar discussions about the uptake of STS are underway in other subfields.[14]

The third effort, it almost goes without saying, is to engage in *experimentation*. If the relationship between science, technology and society is an unruly imbroglio then we need to keep on our toes to constantly invent new way to engage with the field. We should be able to speak not only about specific technologies but also about elusive and vastly distributed issues such as public knowledge controversies or the sustainable transition of cities. We should experiment with digital methods as a topic and as resource. And we should constantly look out for interesting collaborators in other fields.

Obviously, there is plenty of interesting work to do for everybody, who wants to be in STS. Let me take this occasion to mention three projects that I will be doing the near future.

Two weeks from now, I will join a group of psychologists at the University of Copenhagen. They are carrying out a series of very interesting research projects related to standards and subjectivity[15]. And they have invited me to follow their work. This will be an occasion to do a 'classic' ethnographic study of their scientific practices. It will also be an occasion to reflect on the performativity of social science – or more precisely to engage with the reflexive discussion that these psychologists are already pursuing (Nissen 2012).

A second project is about user-driven innovation. I am part of a research alliance between the Danish School of Design, University of Copenhagen and Aalborg University. Many interesting themes are examined in this project. But the one that I will specifically mention is how ideas from user studies in STS twist and turn, when they become parts of innovation projects. We have already discussed this theme in a special issue of *Science Studies* (Jespersen et al 2012; Elgaard Jensen 2012; Winthereik & Verran 2012; Munk & Abrahamson 2012), and we will pursue it further in a book project with Finnish and Dutch colleagues.

A third project of mine is perhaps more ambiguously defined. With my colleague Anders Munk, I am involved in a network of 22 Universities that teach courses in the mapping of controversies[16]. The idea of these courses is to use web crawlers, bibliometric analyses and other digital methods to trace and depict how public knowledge controversies unfold across homepages, blogs, news media and scientific literatures (Venturini 2010a; 2010b). The Mapping Controversies network is a great site of experimentation with research methods, with communication, with teaching methods and with the role that STS researchers should play in relation to their fields of study.

[14] See the journal special issues on the uptake of STS in business schools (Woolgar et al. 2009), and on the uptake of STS in innovation projects (Jespersen et al). See also Ratner (2012) on the use of reflexivity in school management, or Elgaard Jensen & Munk (2012) for at discussion of how the current turn to cartography in STS might be taken up.

[15] See the project homepage www.substance.ku.dk.

[16] See the homepage for the Danish node in the network: www.mappingcontroversies.dk.

Techno anthropology

Now that I have given you view my brief account of STS, from the early beginnings to its present challenges, it is time to move on the second part of this lecture: What is techno anthropology? What kind of work will our candidates be able to do? And why is techno anthropology a new move in STS?

One of the renowned figures in STS, Annemarie Mol, once described the strange combinations that occurred with she studied philosophy and medicine at the university: "In the mornings I had a philosophy class about the body and in the afternoons an anatomy class where we dissected corpses. Barthes gave way to a large, white room that stank of formalin. Merleau-Ponty was followed by corpses wrapped in orange towels and green plastic" (Mol 2002: x). This is not exactly what we are doing at TANT, but it's not far off either.

Techno Anthropology was created collaboratively by researchers from the humanities and researchers from the faculty of engineering and science. The education draws on teaching resources from both faculties.

Every semester, our students will have a substantial amount of either STS or philosophy of science. At the same time, the students will get in close contact with different techno-scientific domains. Our goal is to make these contacts as hands-on as possible. In one semester, they work in a biochemical lab and conduct an experiment. In another semester, they use graphical software to design an artefact. When the students have passed their bachelor, they will have some kind of hands-on experience from at least four different techno-scientific fields. At the same time, they will learn a number of qualitative social science methods.

It should be obvious that techno anthropology students will not become technical experts. Nor will they feel at home in every technical field. But we expect that our students will learn not to shy away from technical content. And we believe that their hands-on encounters will give them a basic practical sense of different technical fields. This type of sensibility is crucial if one wants to do STS research. But more importantly, we consider it to be a valuable asset on the labour market. The world is filled with messy and wicked problems, and the search is on for solutions that are both technically well crafted and socially robust; solutions that combine different kinds of expertise.

This is easier said that done. Most companies are conglomerates of different expert cultures and most companies have 'communication problems' between their dedicated technical experts and other groups such as the marketing department (Akrich 1995). Similar communication problems between different knowledge cultures and organizational units can be found everywhere in the public organizations. The standard response, which is entirely sensible, but again easier said than done, is to define projects that attempt to cross boundaries and to combine different types of knowledge from different groups within or beyond the organization. In such messy situations, a project assistant or a project leader with a background in techno-anthropology may be very valuable. And sometimes even more valuable than people solidly trained within one particular professional culture such as lawyers, engineers or economists.

I also believe that techno anthropologists have important work to do as mediators between techno-scientific projects and the public. Techno anthropologists could mediate personally – for instance if they take up a journalistic role or the role as social critics.

But there is probably even more work to be done if techno anthropologists take up the challenge of organizing the public engagement of science (Elam & Bertilsson 2003). In Denmark, there is a long tradition for democratic engagement, most famously the consensus conferences under the auspices of the Danish Board of Technology (Jensen 2005, Blok 2007). The board is now severely underfunded and no consensus conferences have taken place for several years (Horst & Irwin 2010). There is a need to re-invent both the institutional context for public engagement of science, and well as

the specific formats for this engagement[17]. For instance, no one seems to have taken advantage of new social media for these purposes.

Another important field of public engagement is currently known as user-driven innovation.

Since 2007, the Danish government has funded user-driven innovation project with 420 mio. DKK. The wave of funding is now over, but the wave of user-driven innovation is not. In private companies as well as in as in Danish municipalities[18], there is a widespread demand for methods for generating knowledge about users, and for relating this knowledge to the development of new services and products. User-driven innovation methods[19] as well as critical reflection on these methods are therefore an important part of the curriculum in techno anthropology.

As a final encouragement to techno anthropologists, I will mention that the search for socially robust technical solutions is increasingly reflected in research funding. More and more funding is directed at so-called grand societal challenges, and some of it explicitly requires technical scientists to team up with social science colleagues. I think that techno anthropologists, alongside their colleagues in STS, are uniquely well positioned to enter into these types of collaboration.

So why is techno anthropology a new move in STS? It is a new move, because it creates new types of critical proximity[20] between STS, humanities, social sciences and technical disciplines. It is a new move because it pushes STS into playing a more active role in techno-scientific projects. And it is a new move because techno-anthropology hopefully will come a site for experimenting with what STS might be.

[17] Furthermore, I have suggested that STS scholarship in relation to public engagement exercises may be in need of re-invention (Irwin, Elgaard Jensen & Jones 2013).

[18] I thank Cristian Lima, partner at HR7, for bringing this to my attention.

[19] I use the term 'user-driven innovation' in same broad sense as it has been used in recent Danish innovation policy (Rosted 2005). The term covers a variety of distinct approaches such as participatory design, business anthropology and lead users studies (See Elgaard Jensen 2012).

[20] I borrow this term from Bruno Latour (2003), who argues that STS should aim for critical proximity rather than critical distance.

Thanks

For these reasons, I am very happy and very thankful that Aalborg University has given me the opportunity to be a part of this movement. I am very happy to have a lot of enthusiastic and bright colleagues in the Techno Anthropology research group. I am happy to have an additional set of fine colleagues close-by in the new Center for Design, Innovation and Sustainable Transition (CDIST). I want to thank all the excellent people in 'Danish'[21] STS – a great source of inspiration for me and a tremendous force in Danish social science. And then of course I want to warmly thank my family and my friends. Thank you for coming. And on a very last note, a special thanks to my toughest critic and my strongest support, who also happens to be my wife.

[21] I put Danish in inverted commas because I want to include STS researchers who have come to Denmark from abroad and made marvelous contributions. In particular, I want to thank my good friends Mark Elam, Alan Irwin and Paul du Gay.

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