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# DATA MOMENT, ENACTED

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# ABSTRACT

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To address opportunities to work collaboratively with ethnographic material, this paper argues for engaging in tool-making, describes an approach we call speculative instruments, and gives an account of one such instrument we have devised in context of a multi-sited ethnography project in the field of Science at Technologies (STS). Our approach highlights and builds on the STS imperatives to attend to materialities, to human - non-human configurations, and to method assemblages (Law, 2004). Our aim is to inspire groups of loosely infrastructured ethnographers to gather themselves around instrumentalized data practices and gain an experience of coexistence with data as relation. Within this framing, we discuss a software-supported storytelling extension of an exercise given in (Dányi, Suchman, & Watts, n.d.), organized as a series of *data moments*.

Keywords: Science and Technology Studies, Design, Anthropology, storytelling, data moment, speculative instrument, instrumentation, card design

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# 1 INTRODUCTION AND PRIOR WORK

How can researchers engaged in qualitative, interpretative writing of ethnographical work collaborate in teams or research projects? How to work indirectly, at a distance, and by proxy with ethnographic field material such as fieldnotes, interviews, transcripts and collected objects produced by other ethnographers? What does the characteristic and cherished focus of Science and Technology Studies (STS) tradition toward the various technologies, material structures and infrastructures imply for construction of knowledge in ethnographic collaborations, and for construction and demarcation of the ethnographic fieldsites? How can ethnographically oriented STS research construct new, interesting and relevant sites of enquiry using productively it's own special interests and perspectives? The next, evaluative questions naturally follow: how to do these things well?

Anthropological ethnography has of course dealt with issues of organizing collaboration within research (Marcus, 1995, 2014) and going beyond the unfortunate, and outdated stereotype of a lone, noble anthropologist heroically conducting their fieldwork alone, without support mechanisms. In appropriation of ethnographic methods, designers have approached the theme of collaborative ethnographic work as part of their praxis in projects where participatory fieldwork is performed and the power and virtues of ethnography is recognized and put to use, but not everyone, or perhaps no-one is an ethnographer proper (Blomberg, Burrell, & Guest, 2003; Engholm, 2011; Holtzblatt & Beyer, 1997), e.g. (Oulasvirta, Kurvinen, & Kankainen, 2003; Shilton, 2013). Boundarywork of what is, or isn't "real" anthropological ethnography or "real" design is outside the interests of this text (for discussion see Jönsson, 2014; Pink & Morgan, 2013).

Closer to Science and Technology Studies (STS), the neighboring field of Computer Supported Cooperative Work (CSCW), a field allied with both STS and design, as well as information systems (IS) and various organizational studies, has convincingly exposed the need for interdisciplinary work engaged with construction of sociotechnical systems (Ri-

beiro, Singh, & Guestrin, 2016; Star & Ruhleder, 1996; Thrift & French, 2002). In *Software Takes Command*, Lev Manovich argues that at this stage of proliferation of digital technology, no study of culture is complete without study of the computer software for creation, mediation, manipulation and consumption of media objects (Manovich, 2013). This does not seem like a proposition hard to accept for researches involved in study of science and technology, but how might STS ethnographers prepare themselves for it?

In the Data as Relation (DaR) research project in the Technologies in Practice (TIP) research group at IT University of Copenhagen (ITU) we face the generic theme of cooperation while writing a handful of ethnographies about the use of big data and digitalization in Danish public sector, and the present “data moment”.

Among the researchers onboard our project, earlier research career includes encouraging and generative practices of sharing and discussing relatively “raw” ethnographic material among close peers on a regular basis, as well as co-organizing a workshop regarding collaboration in ethnography (“Ethnographer in the Network,” 2013). In *Technologies in Practice*, the Science and Technology Studies (STS) oriented research group where Data as Relation project is situated, another colleague has shared with us accounts of their prior experience in the (“ARITHMUS– Peopling Europe: How Data Make A People,” n.d.) research project in which coding (as a form of classifying as typical in social sciences, not coding as in computer programming) of field material was beneficially done collaboratively on research infrastructure setup for the purpose, organizing labour around NVivo, a coding platform popular among social scientists (Baki Cakici, personal communication, April 30th, 2018).

From the research literature and the encouraging experiences above, we wanted to propose a multi-sited ethnography project to bring disparate fields material together in relatively early stages of research well before the writeup phase, provide a sensitizing experience to inform the ongoing fieldwork, and to investigate what such an arrangement would produce and what it would require.

The question we in subproject 6 of Data as Relation have set for ourselves is this: How can fiction and digital storytelling techniques be used to inform government big data practices? To reach at these practices, we work at a distance and build entirely on the ethnographic fieldwork being in our Data as Relation research project at various sites in the Danish public sector. We thus also establish an internal politics of interdisciplinarity, reciprocity and shared destiny within DaR as a whole. For this aim, we put to use digital storytelling by configuring our ethnographer peers with a speculative instrument. This paper gives an account of development process and lessons learned of one such *speculative instrument* we crafted for the purpose, a storytelling exercise which we have arranged as a series of *data moments*, and have ran once within DaR.

## 2 LIMITATIONS AND A POSITION

Before proceeding we wish to present some limitations of our work, and a position we adopt.

Firstly, with what we contribute below we do not directly attempt to participate in the discussions of relationships between the ethnographer and the informants in the conduction of fieldwork (for discussion see (Sánchez Criado & Estalella, 2018)) or their improvements via f.ex. as *experimental collaborations* (ibid.). Instead, our focus is on collaboration among researchers engaged in ethnographic work, in the extra-fieldwork situations of concept work (Korsby & Stavrianakis, 2018) and projecting back onto further fieldwork yet to be done. Secondly, what we envision as collaboration or sharing of ethnographic material, we do not go nearly as far as what for example Murillo proposes as open data for ethnographic research (Murillo, 2018) – our interests and our work are scoped within a closely knit group of collaborators, say a research group like ours, or perhaps a looser collaboration but still within personal relations of the participating researchers. In contrast to suggestions of Murillo (ibid.), we specifically do not propose to build cross-study “global” infrastructure, but rather concern ourselves exactly with the opposite, namely in localized and localizing practices.

In addition to the two limitations given above, we want to point to some fields of design, research and praxis we are very sympathetic with, but wish to clarify important differences with. Our approach is not in the tradition of Participatory Design (Carroll, 1997; Dourish, 2006; Kuhn, 1996), because we have no participation process in place, do not place users in the center of establishing design goals, the speculative approach we present is relatively impositive and also requires little commitments, and does not aim to make promises for material improvements of working conditions, social justice in the workplace, or address power structure issues. Though we are fascinated by and oriented towards and both multimodal anthropology (Collins, Durlington, & Gill, 2017) and trace ethnography (Geiger, Jørgensen, Hockenfull, & Ojala, 2018; Geiger & Ribes, 2011), the approach we present in this paper has as its point of departure a situation distanced

from the ethnographic field and traces therein, mediated in by our participating peers rather than experienced by ourselves. Our work is also different from the so-called Digital Methods (Rogers, 2017; Venturini, Bounegru, Gray, & Rogers, 2018) in that it does not aim to ground itself in the digital, in the sense typical of this media studies methodology. Although we engage with some techniques and figures from Data Science, we operate in interpretivist, hermeneutic and generative, not in analytic or positivist mode.

Finally and also to take a position, a stand, we distance ourselves from adoption and adaption of existing, widely accepted and proven tools typical in Digital Methods. Instead, we choose to engage in the establishment of particular and unique method assemblages (Law, 2004), postponing reusable tools, and allow the situations we find ourselves in with the materials at hand to shape our work, that is to say, of “mixing of labour with nature” (Coeckelbergh, 2015), and invite the convivial and co-constitutive relations to emerge in networks of human and non-human actors. Besides the much wider, political as well as post-phenomenological commitment to tool-making and craftsmanship, in this work we do not fear to expose ourselves to new vulnerabilities with our creations and artefacts (*ibid.*), but rather embrace them in hopefully generative purposes.

To summarize the introduction and to zoom out from our own work, we are interested if STS-framed ethnographic projects working in the modus of qualitative writing of immersed fieldwork have something more to borrow from design disciplines working closely with material and craft, including prototyping (Jönsson, 2014); (Marcus, 2014; Sánchez Criado & Estalella, 2018). We show that design can be brought into useful contact with qualitative writing while avoiding the “brainrot” caused by the schematic approach of Design Thinking (Vinsel, 2017). Safe, invested, and considered encounters with design processes can provide a worthwhile experience for those STS ethnographers whose fieldsites encounter various flavours of design in abundance. In addition to potential direct benefits of building up skills and artefacts for the use of the ethnographer as we suggest, this experience can be used to tune and train the ethnographer’s primary instrument, namely the situated, material and partial experience on the field.

Practically, we take the practice of narration from basic methodology of ethnography as our point of departure, and build an exercise schema on it. Having then objectified our own instruments, we are then in positions to perform move of infrastructural inversion (Star, 1999), and proceed to ask the relevant and typical questions of what infrastructural conditions support the existence of instruments – both our owns and of those we encounter in the conduct of our research.



### 3 THE WORKING CONTEXT: A MULTI-SITED STS-ETHNOGRAPHY PROJECT

To quote the website of three-year Data as Relation

The hypothesis of the project is that the use of big data and digitalization in the public sector and governance is not a mere technical upgrade of infrastructures, but implies a reinvention of society itself. The goal of the project is to study how innovative new data usage for decision making make new relations emerge between government, private companies, and citizens. (<https://dar.itu.dk>)

The project consists of six subprojects. The subprojects are independent from one another, under a shared feminist technoscience flavoured STS ideology. Each of the subprojects has its own research staff, a site in Danish society, and its research questions. The project website at <https://dar.itu.dk/subprojects/> presents the aims, sites, methods and participating researchers of the subprojects more verbosely, but for the purposes here it suffices to do only mild injustice by characterizing four of the subprojects as classical fieldwork-based ethnographies, one an armchairy investigation, and one as a methodological experiment. The lastly mentioned is ours, named *Big Data Stories: Intervening with Data and Visualisations*. Colloquially it goes by the simple, nominal name *subproject 6*.

Now, in any project we may ask what collaboration structures we in reality have in effect. In Data as Relation we do not have early-stage data sharing infrastructure in place. “Why not?”, one might ask. In general, there are many legitimate, well justified reasons not to establish cooperation structures across participants in a research project during the fieldwork phase, prioritizing instead individual work, later-stage collaboration in write-up such as co-authoring of texts, or more administrative solutions. Collaboration might happen spontaneously, in the abstract, in the lack of affordances towards it. In the case of DaR, content from the various subprojects have come into contact with one another in various internal meetings, and a co-authored paper which was originally known as “the position paper”, but later came to be known as “the monster paper”, referring to the monster-themed conference it was authored for, and also its format as

a compendium of monsters, written on the basis of fieldwork (Douglas-Jones et al., 2018). Additionally one of the labs of IT University of Copenhagen, the ETHOS Lab, is in the custody of our TiP research group, and might be a useful resource also for DaR research work (a question that is begged: if a lab is not used for research, what *is* it used for?).

Along the progress of the three years of Data as Relation, the subproject 6 is developing an approach for generating insights into field material which we hope can be of interest to other, STS-flavoured multi-sited ethnographies (Marcus, 1995) done in multi-ethnographer projects. We expect other such projects do exist elsewhere, and we would love to hear about them. We presume our approach to be particularly interesting for projects which, like our DaR, have relatively little systematic structures in place to weave the constructed ethnographic data towards instrumentalizing study of wider world system (ibid.). Our approach is lightweight, and low commitment, fun, takes ethnographically virtues of engagement and narrating as premises, and aims to impose very little path dependencies on the project at large.

## 4 MULTI-SITED ETHNOGRAPHY, DATA MOMENT AND JUXTAPOSITION

Before describing our approach within a framing of what we term as *speculative instruments*, the project structure of Data as Relation is first briefly explained, followed by introduction of concepts of *multi-sited ethnography*, *data moment* and *juxtaposition* which underlie our work.

Though the ethnographic subprojects of DaR are relatively independent and focused on single sites, from the perspective of subproject 6 we consider DaR as a whole a *multi-sited ethnography*. An important difference from the research designs Marcus (Marcus, 1995) discusses is that we have a one-to-one mapping of DaR researchers to the sites – the researchers work with their own sites. In the configuration of DaR, our subproject does no fieldwork at all, and has no real site *per se*. Our stakes are also different: we are not producing a PhD title, unlike 4 of our five sibling subprojects (one is a postdoc project). Instead, we exclusively work into and out of our peers who do. By engaging with material from all of them, it is subproject 6 which enacts the multi-sitedness, and thus works more in the abstract. In all modesty, we cannot claim our subproject to generalize from the cases, but that is the direction we move to by construct, and aim to enroll our peer researches in that movement towards the relations and patterns of world systems (Marcus, 1995). To compensate our lack of data to build up from, and to address some bootstrapping problems, the approach we are developing is strongly methodological, even schematical. The objects of study – other than methodological development – are the patterns, circulating meanings and other phenomena of the system (*ibid.*) within which these focused ethnographically sites are located.

*Data moment* is one of Data as Relation project's premises as one of macro level, system phenomenon which is experienced locally, but is not reducible to any particular one of those instances. The ethnographies being authored observe how it is anticipated, arrives, is experienced and unfolds at the sites in Danish public administration, and how the data practices at the same time enact this data moment.

To philosophize our working definitions in subproject 6 for the purposes of denoting, enacting, arranging them, we take *a moment* to be temporal rhizome of experienced activity. A moment has salient and immediate presence, *hereness* for the individuals or communities experiencing it. By *moment* we wish to express something atomic enough to be experienced as a whole, but too intertwined and proximate to exhaustively give a sufficient account of. This constitutes the meaning of a moment. A moment is unique, unstable and open, but transient – and without exception comes to pass.

To use a powerful imaginary of the thirsty plumber from ethnographic infrastructure studies in Star, Ruhleder, Bowker tradition (Star, 1999; Star & Ruhleder, 1996), we may think of the *plumber working with waterpipes-getting thirsty from bodily labour-becoming aware of desire to quench thirst-noticing the water pipes right here-reaching down-welcoming water into ones body-feeling satisfaction-noticing work at hand-turning back to work* a moment. This is the texture of moments of infrastructural everyday micro-encounters, and shall suffice for a working definition for now.

From this, a *data moment* is an experienced, temporally extended, situated causal network of activity where we pay special attention to what data does. In DaR we focus particularly in present moment in which data arrives, lands and is configured in public governance in smart city imaginaries, in the Danish tax office, as data centers and personal health. As a footnote it needs to be noted that “data moment” is literally also “a given moment”, but that would lead us onto a tangent too weird.

Finally, by *juxtaposition* we refer to the practice of placing two or more, not obviously comparable items side by side, and forcing the imagination of the observer to repair this disconnect. Juxtaposition creates generative, though not always productive moments. In subproject 6 we are inspired by a particular trope of projecting a carefully selected but inconsumerable pair of artworks on the overhead projector the main author observed at art history lectures anonymous lecturers at at University of Helsinki performed. Whether this is a conscious the pedagogical tactic, we do not know. The force at which the third is implied, when the first and second are given, is considerable, and in subproject 6 we try to channel it toward open interpretation via an exercise we have

developed. For a more thorough treatise on this practice see Lyotard. We utilize juxtaposition very concretely as we make data moments.

## 5 SPECULATIVE INSTRUMENTS

To frame the approach we are developing in Data as Relation subproject 6, and to contextualize the practical exercise we have developed, we would like to first discuss *speculative instruments*. By speculative instruments we mean on the one hand instruments which produce speculations, and on the other instruments which do not themselves really exist. They are speculating instruments, and speculated instruments. Or more usefully and to keep the instrument user always in view: instruments to *speculate with* as well as instruments to *speculate about*. In subproject 6 we participate in positing of such instruments, and try to think as materially about it as we can by means of sketches and prototypes, and rubbing them against the ethnographic practice of our peers in the other subprojects.

Speculative instruments allow us to perform the double work of asking pragmatically “since we have this, what will happen” as well as the fundamentally “what could we have” at the same time. The essence of this work is in this double move of a firstly a counterfactual to think towards, and secondly a conditional to think forward from.

In our case, in the particular arrangement of Data as Relation and subproject 6 within it, these speculations are predicated and dependent on secondary data our peers bring in and expose from their ethnographic fieldwork. By putting this distance to use, we hope our instrumentation is able to catch something generic about the DaR research sites, and is also somewhat mobile and interesting outside our project too.

An early speculative instrument which we encountered in Data as Relation was a shared hope for some sort of *übersearch* into one’s own ethnographic material. It did not exist, does currently not exist, and possibly could not exist. It had exactly the characteristics described above, and existed at the same time as an outcome of speculations of necessary work, as well as a cause of speculations future work to be possible. As imagined by our peers in DaR, it pointed to the information retrieval (IR) and knowledge management (KM) issues many ethnographers and others researchers doing qualitative observation might very well recognize: how to make sense of the overwhelming, and growing

heaps of fieldwork data for writeup. Free text searches, topic modeling, named entity recognition, timelines, tagging, keywords, photo metadata, concordance plots, network visualizations were all features of this übersearch... an expert system for qualitative writing over the three years of each of the investigations.

Besides these functional imaginations, hushed speculations included where this useful tool would come from: would Digital Methods (Rogers, 2013; Venturini et al., 2018) educated ethnographers embark on conceiving it, while conducting their fieldwork? Would subproject 6 build it for everyone to use? Would Jupyter Notebooks be it? Could text authoring software Scrivener be extended to be it? And what input would it take? And what structure would need to be enforced on the ethnographic data to make it compatible with this instrumentation?

Unwieldiness of practically building such a tool was apparent. That does not make it any less a useful imagination. Quite the opposite, imagining it together, aloud, makes felt needs more visible. Key question is this: what was such a tool imagined to achieve?

Another, less widely imagined speculative instrument and relatively realizable was a new kind of tool to collect data from Twitter. This would collect, or “scrape”, data from Twitter, and augment the style of keyword based sampling as successfully done with DMI TCAT (Borra & Rieder, 2014). It would collect individual tweets by following chains of replies both up and down a discussion, and by means of an explorative, interactive visualization make available for study selected subtrees of Twitter discussions at the researchers convenience. Both the data collection and presentation would make possible to closely read past discussion threads, a feature unavailable in available tools. Particularly tracing a discussion back from tweets collected seemed like a powerful avenue to pursue.

In subproject 6, listening to our peers we identified three needs from the imaginations they had expressed: *recall* of field notes and other collected material, *relating* the individual items, and *patterning* for helping with bottom-up analysis. A term from information retrieval, recall is the task, and an associated evaluative metric, of finding all

relevant documents from a given corpus (Croft, Metzler, & Strohman, 2009; Järvelin, 2011; Kelly, 2009). Relating is the task of identifying meaningful and interesting relations between individual items. Patterning is the task of deriving new, more abstract concepts and knowledge from organized collection of items, in a bottom-up fashion and typical of ethnographic, ethnomethodological and STS work, but also in all other inferential logic, including data-driven approaches, pattern finding, machine learning and so on.

We can view these three needs as characteristics of a data-driven process of dealing with an expanding archive of documents, following along the givenness of the *data moment* DaR holds as it's object of study. To use the working definition of given above, recall, relating and patterning are seen in light of the experience of dealing, coping (and groping) with an abundance of collected material to make sense of as it happens and unfolds, rather than with data collection or other parts of data lifecycles.

But hasn't these generic instrumentation issues already been solved? Pushing documents into an Elasticsearch instance and slapping a network graph visualizations on top of it with d3.js – that should solve it, right? Or Neo4j graph database which would just meet these imaginations out of the box, wouldn't it? Why wouldn't this be a matter of adopting an existing and well-engineered solution to support the ethnographic writeup?

In subproject 6, and we dare to say in STS in general, we won't just adopt technofixes willy-nilly. Instead – while of course keeping ourselves focused on the research goals we have set for ourselves – we much prefer to insist on longer-term, more laborious, reflexive experience and dialectic of co-developing with at least some sense of agency and power of weaving our topics and interests together with our instruments. We accept from our STS canon that “methods make worlds”. And worldmaking is not an innocent act but a political one, and is to be done with care. As STS scholars we like to get our hands dirty, to use a well worn expression, if only enough to get a sense of what such a process would entail. To push back against the separation of the social and the technical in *sociotechnical*, to experience this dichotomy and many others, and the laborious translations taking place. (Latour, 1994). To engage with the all-too-convenient separation of the designer from the user, the respective skills of these given subject positions



and the resulting alienations (Coeckelbergh, 2013). And as ethnographers, our situated, experience is our primary input for theorizing, thus we must be committed to having that experience. The need for recall, relating and patterning is a precious opportunity for data moments not to be missed.

## 6 DESCRIPTION OF METHOD: POSTCARD NARRATIVES AS RELATION

To then enter into a dialectic for speculating about the possibilities how we might instrumentalize recalling, relating and patterning, and together our own cooperation and build multi-sitedness in DaR, and to grope ourselves and our peers, the research staff on the other DaR subprojects were commanded to send “postcards” from their fieldsites to the research collective, following the exercise described by Dányi, Suchman and Watts (Dányi et al., n.d.). One of it’s authors, Laura Watts was one of the original DaR affiliated researchers. For those interested, this was practically organized as a closed, internal blog called Data Instrument with the subproject affiliates creating blogposts, each with an image, a title and a body of text. These “postcards” were visible to everyone in the research group, but in practice mostly the researchers who were tasked with sending them, were also the ones actually reading them.

One might imagine these postcards as partial and glitchy messages from distant spaceprobes, each orbiting a different celestial body (the fieldsites), being sent back to the launch site. This visual imaginary was used in visual design. During the 6-month period from summer 2017 until late 2017, total 48 postcards were received (5 authors, total 24000 words, median  $\approx$  320 tokens, mean length  $\approx$  490 tokens,  $\sigma \approx$  510).

The original prompt was to send short, relatively “raw” and unanalyzed messages with a low threshold, and this was the expected content of the postcards. The received postcards somewhat vary in genre, extent and style, but an *a posteriori* consensus exists that during the transmission time window the sophistication of the postcards increased considerably. They vary from vignettes and fieldwork diary entries to theoretical essays, and also include a delightful back-and-forth exchange starting from an random encounter with material infrastructure.

This 6-month transmission period ended unexpectedly, and relatively abruptly for unanalyzed reasons, possibly with implicit agreement among the senders, thus effectively

“killing the connection”. During this transmission phase, there was no organized response to the postcards. The authors (or anybody, to be fair) did not know for what purpose they were burdened with this recurring communication task.

A few months later, the postcards were picked up as the main author of this paper joined the subproject 6 of Data as Relation in early 2018. At that point, the postcards were literally a “dataset”, a received and loosely organized collection of “data points” with ambiguous, mediated relations of representation of the fieldsites they originated from.

A suggestion was made to revive the “transmission”, and pick up the practice of sending more postcards. This failed to attract interest. Instead, working onward from the 48 postcards received, a narration exercise was designed and later performed. The exercise design aimed at recalling the postcards a number of times, and exposing all the subprojects to postcards received from all of them, and for forcefully colliding both the postcards and the subprojects against one another for relating and patterning. The idea was to “pump” meaning from the postcards and structure from the collection of them by forcing them together in a series of hermeneutic situations.

Subproject 6 organized a “data moment” for each of the ethnographers in the five peer subprojects. These were done to prototype the exercise itself, a chain of data moments described shortly, as a speculative instrument. The session was staged as a genre typical textbook HCI experiment, complete with a follow-up survey.

The task at the mentioned data moment given to the ethnographers to perform was to draw three “narratives” from the set of total 48 postcards, some of whom they were authors of themselves. Each of these sessions lasted 30 minutes. They were performed individually, with printed copies of the postcards as material for the narratives, in the presence of the primary author from subproject 6. The ethnographer was requested to think aloud as they went along, and a custom graphical user interface, a database and an object model were used to collect the series of the postcards the ethnographers chose to be the elements of their three narratives, with replacement. These data mo-

ments were not technically recorded beyond the series of postcard identifiers, effectively creating “thin descriptions”. This thin data of the fifteen narratives from five sessions each consisted of between 3 and 11 postcards each (median = 4, mean  $\approx$  5.3,  $\sigma \approx$  2.6). All five sessions were completed within one and a half weeks.

This thin data, together with the main author’s experience of copresence in these organized data moments was then analyzed over a number of days in both computational mode as well as qualitatively. This included hermeneutically contrasting the narratives heard, as well as performing explorative data visualization of the data collected, and involved calculations on graph theoretical centrality metrics, evaluation of uniqueness et cetera. Preliminary results from this analysis were then offered to be informally and privately reviewed by the participants before a final presentation was given in a research project meeting with all DaR affiliated researchers invited. In the spirit of participation rather than objectification and observation, it is hoped that the participating ethnographers did their own analysis of their experience for their own purposes.

The following flowgraph summarizes the exercise as a chain of organized data moments, left to right. Reading from the left, first and forming the foundation of the whole exercise, the ethnographers proper fieldwork is shown, with the set of dots representing the various events on the respective fieldsites (“Ethnoencounter”). Next, the ethnographer selects some of these events and shares them as postcards with their peers, with varying levels of analysis in that data moment (“Writeup”). Next, the ethnographers individually engage with the collection of all the postcards, organizing and narrating them in a 30 - minute sessions (“Presense-in-collision”). Following that, the narratives are collectively analyzed by subproject 6 (“2nd party interpretation”). Then, and illustrated by the blue forces in Diagram 1, outcomes of this analysis are reflected back on the early phases of the project, when the ethnographers are given a chance to hear, discuss and challenge the results of analysis in private (“Reception<sub>i</sub>”), and in the final data moment where the whole research project encounters the results of the analysis together in an open discussion

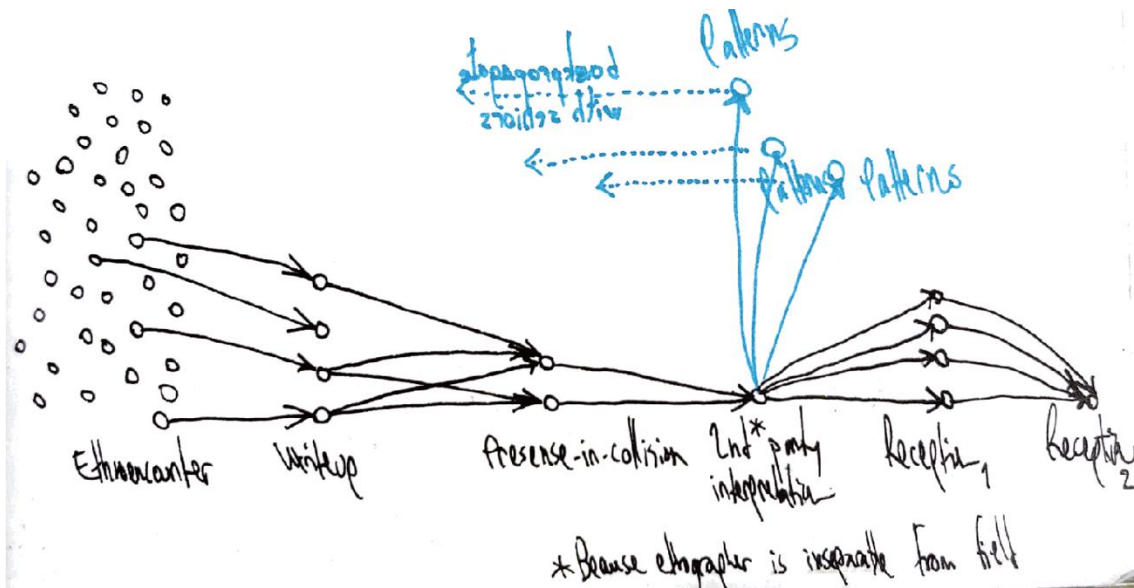


Diagram 1. Arrangement of six data moments in our storytelling exercise.

That is the protocol of the current exercise design.

A standard, private WordPress blog provided by IT University of Copenhagen infrastructures the writeup. The blogposts are modeled as *components* and instantiated from the blog via a REST API in a JavaScript React frontend user interface, presenting overviews of the blogposts in addition to printouts. We call this *data-instrument-narrator*. Together with a backend crafted in Python with Flask and SQLAlchemy following headless Model-View-Controller (MVC) design pattern afforded by Flask. We call the backend *data-instrument-campfire*. The frontend captures data from the data moment of narration by transferring user input to the backend. Most (4/5) of the participants performing this exercise chose to use the printouts for the arrangement itself, but by design the graphical user interface is used to capture the narratives. The narratives themselves are modeled as minimal *objects* and persisted in a relational database through an object-relational mapping (ORM) layer. We call this database *heritage.db*.

```

class NarrativeItem extends Component {
  render() {
    return (
      <li className="card col list-group-item bg-
light m-1 p-1">
        <div className="card-body pl-1 pr-1">
          <Title post={this.props.post}/>
          <Content post={this.props.post}/>
        </div>
      </li>
    );
  }
}

```

Program 1. React component of postcard for the View

```

@app.route('/narrative/', methods=['POST'])
def add_narrative():
    """Add a new narrative."""
    req_data = request.get_json()
    new_narrative = req_data['narrative']
    if isinstance(new_narrative, list):
        n = Narrative(narrative=str(new_narrative))
        db.session.add(n)
        db.session.commit()
    return jsonify(n.__repr__())

```

Program 2. Observing, taking note of, and translating a data moment

These sequential mediations from the fieldsite (“ethnoencounter”) through the writeup through the narration and data collection gradually thinned the material while at the

same time weaving them together in form of the narratives, opening the material up for emergence of new objects, and new interpretations of the original material as well as new generated material.

Interpretation of the narratives are infrastructured by a Jupyter Notebook titled *At the campfire*, following the idea of *literate programming* methodology of writing (Knuth, 1984). When the interpretations are reflected back on the participants, it is done directly from this computational notebook.

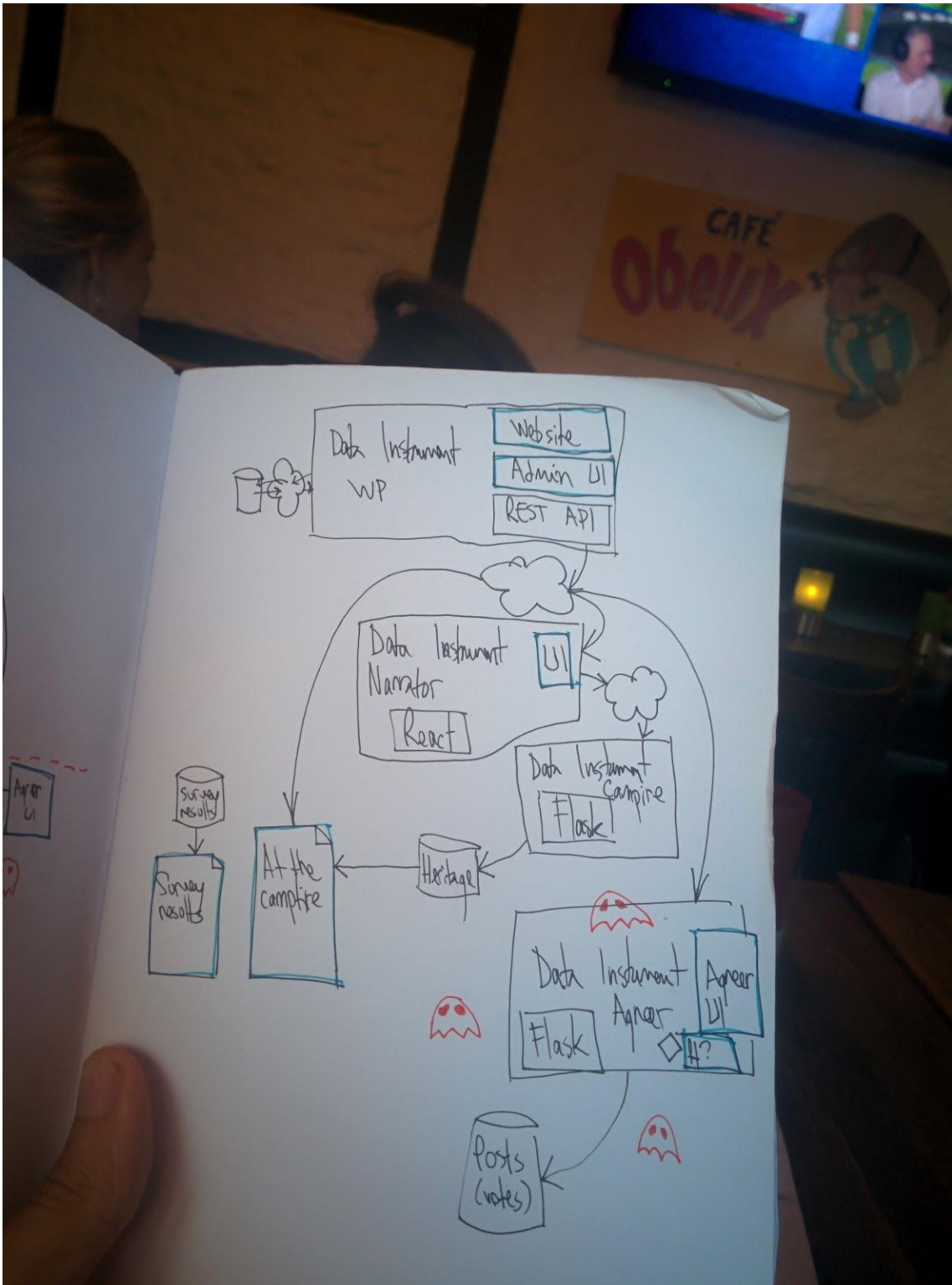


Diagram 2. Diagram 2. Exercise infrastructure. Please nevermind the lurking ghosts, they are mostly harmless.



## 7 ANALYSIS

Specific results of this instance of the exercise as performed in DaR are not reported in this paper and are not relevant for our wider contribution, but were presented at an internal DaR research meeting in late June 2018. Instead, we now focus on more generic lessons learned and demonstrate the nature of insights gained from collaborative narration exercise like the one we propose.

To construct the narratives, the elements need to be in a sufficiently accessible for recall by the person attempting to tell some sort of a narrative based on them. In the case of DaR, the participants were the same individuals who were tasked to write and sent the postcards, but there was no organized structure for them to read the ones their peers had delivered, and the timespan of approximately six months is of naturally completely unreasonable to assume sufficient memorization of the 48 postcards. Before the session to individually draw the three narratives across the postcards, the participants had spent some time refreshing their memories of their contents. Establishing this data moment therefore gave an incentive to revisit the shared items from the past six months, to be able to sufficiently perform in the data moment. This alleviates project amnesia, but places a burden of the expected future relevance on the items. For reuse of this exercise for recall of past items, some selection process would probably be necessary to establish.

In the situation of constructing the narratives across the postcards, the participants typically spread printouts of the postcards on a wide, flat table for recall and selection, sometimes appropriating nearby surfaces like shelves and chairs. This scales poorly, and our 48 items printed on singly folded A4 size already presented physical problems, requiring at minimum 1.5 square meters of surface with no overlap. The developed computer interfaces was not used by the participants at this scale, but some methods of constraining the number of items to recall from the archive (set of postcards, in our case) must be in place. As a unique event in DaR, the session seemed to be interesting and useful for recalling what the postcards contained. Part of this must be attributed to the

communicative genre of a postcard – it is questionable whether less communicative objects such as ethnographic fieldnotes, photographic notes or other documents would elicit recall. We intent to study this in a follow-up, working with a new prototype of the exercise. Majority of the postcards (77%) ended up being used in the 15 narratives.

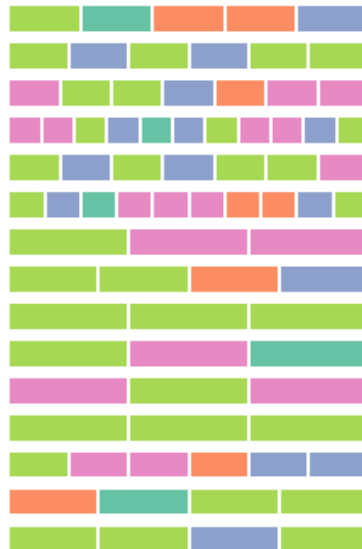


Diagram 3. Distribution of subprojects (5) as colour-coded horizontal segments across the narratives (15) arranged vertically

While the subprojects had each produced varying amounts of postcards, in the data moment of relating the items with one another as narratives, postcards from all of the narratives were found to be useful. Also all but two of the fifteen narratives built upon more than one subproject. The exercise therefore was able to pull together the subprojects into a mixed assemblage of narrative elements. We conclude from this that the postcards from the fieldsites are not too specialized to be brought into proximity with one another in a meaningful narrative. This would be interesting to re-examine with participants less familiar with DaR internal discussions, to see how confidently this observation regarding the relatedness of the postcards might be attributed to internal cohesion of DaR.

Computationally analyzing the narratives as random paths through the space of the narratives, we observe non-normal variances for degree as well as the betweenness centrality metric. Our data is extremely small though, so we refrain from making statistical

inferences which we cannot claim could not be attributed to chance. Operating in a modality of quantitative data analysis and of operating with formal abstractions is fascinating with the framing of the data moments, and a deeper engagement with the ethnographic parts of DaR might be productive for inviting the ethnographer in this kind of work.

After defining some formalizations, we observe that the ordinal order of the postcards selected as the elements of the narratives correlate with how they emerge from the fieldwork in the DaR research project. This is worth reflecting on. We tend to conclude that recall of the events as they really unfolded is at play here, that is to say the exercise participants reconstructed their own lived experience in the narratives. A research project might consider this a desirable property, particularly given the observation above that the narratives contained elements from all of the subproject sites, and thus this reconstruction of the research journey is a shared one. Orthogonally, one might decide as an operationalizable design goal for this not to happen, and instead hope the items to be recalled and related in order which would arrange around some alternative principle than the experienced, temporal order of the research project. Simple multi-time series correlation metric can be used to gauge this properly, and value of our design can be improved with careful consideration of exactly what objects are correlated with the project time. In our case, it was the fifteen narratives we collected.

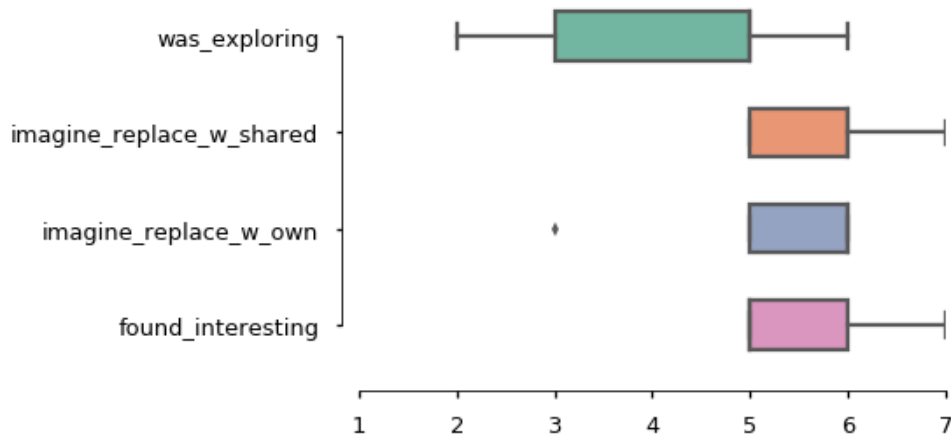


Diagram 4. Boxplot of post-experiment survey result distributions (n=5)

Immediately following up the narration exercise itself, we conducted a four-question survey, juxtaposing the open narration mode with four propositions to disagree or agree

with (Diagram 4). Of the four, the two middle questions explicitly required the participants to speculate re-use of the narration exercise with other content from all the DaR subprojects (question 2), and from their own subproject (question 3). These propositions were posed after being primed by the thirty minute main activity, and in the presence of subproject 6 researcher. Reflecting some numerical measurements and aggregate statistical distributions back on the ethnographers evoked expected rejection of validity of quantitative survey methods, a data moment worth enacting.

Regarding narrative elements, we noticed that in our instance of the exercise only one character appears: the Ethnographer; a researcher who prepares for fieldwork, goes out there, and returns back. This, naturally, mirrors exactly the work of the DaR ethnographer and is of little interest other than for autonarrative purposes. In follow-up design of the exercise, we aim to introduce some characters from other parts of the collective DaR research output to serve as narrative elements and which will focus our current exercise.

## 8 WHAT WE LEARNED ABOUT SPECULATIVE INSTRUMENTS

What speculations has this arrangement achieved? In the two modes of *speculating with* and *speculating about*, counterfactual and conditional respectively, our objects of speculation vary. In the first mode, i.e. taking what now exists, working with and along the directions afforded, we face forward and imagine more narratives being generated. It is clear that the space of possible narratives is anything but exhausted by the 15 we sourced from our peers. To produce more narratives about the existing postcards, the current exercises can be iterated. The input set can also be extended and the exercise then re-iterated. New participants could be enrolled from the DaR researchers who were not yet involved. These actions would diversify and expand the narration moment and analysis thereof. Pointing the current exercise towards other digital objects such as fieldnotes, photographs or other field material within the research project would bring our instrument back to the early imaginations of the *übersearch* for ethnographers. A another direction for expansion of the input set would be to include academic research literature in the set of available narrative elements.

Thinking along with the instrument at hand, the ethnographer who has performed and exercised this storytelling exercise once themselves might bring it to their fieldsites, frame the experience for their informants, and guide them to narrate data objects in their worlds. In this scenario, the instrument would travel from “the R&D laboratory” to “the real world”. By “real world” we mean to the hands of an ethnographer. In its current form the instrument is brittle and its mobility is limited by its specificity, though we are convinced the approach is defensible. We cannot at this point characterize how far the instrument can go and how much of its identity it ultimately would retain when adopted, translated and reconfigured with other data and other sequences of data moments. Further engineering effort would be necessary, together with the experienced DaR peers who are more tuned to pay attention to the constraints the input data place, and to other requirements on what data is useful for their research more generally.

The second mode of thinking about this particular assemblage guides us to consider its necessary conditions. Obviously, the shape of the input data has strongly shaped the instrument itself. This instrument has been fitted to the data – a vernacular expression used in the same meaning in data practices such as machine learning (“to fit a model to data”). In the first version we have developed with our approach, the shape of input data is that of a set of postcards. The postcards are of a relatively coherent genre of content, a message written from the field site to a familiar audience of peers. Materially they each have firstly a body of text as their content, and secondly a title and an image which both serve to indirectly summarize and identify them. (Yates & Orlikowski, 1992). Furthermore, our technical infrastructure used for capture, storage and analysis of the narratives rely on unique identifiers. Other data which has in part been not exposed, and in part even actively suppressed in the data moments of which the exercise consists of, but which has been used in analysis include authorship information, publication dates and also a taxonomy of author-created tags. These are all relatively typical properties of digital objects, existing in accountability and traceability infrastructures of databases.

We observed that in the data moment of narration, the human narrators struggled to maintain open the space of our 48 postcards, but succinct, meaningful summaries such as the titles and images was helpful for recall and identification. This points to well-known scaling problems with human cognizers, and places limits on from many separate items a narrative can be constructed about. A unsurprising observation therefore suggests that the items for such an exercise must be effectively summarizeable in ways which do not too much interfere with the task of narration. Intuitively, it seems that graphical cues and open but meaningful enough item names would support the narrator make up and tell their stories. Allowing use of markers such as pens or stickers might be helpful for the participant. Data points such as numbers would fit our narrative instrumentation poorly.

The content of the messages must also be open enough to be appropriated in further narratives but specific enough to maintain a connection to their origin in the fieldsites, otherwise the meaningfulness of this purposeful exercise loses its grounding.

It is these properties which are necessary for our instrument to configure the data moments, and to generate new objects, the narratives. To establish useful speculative instruments, concurrent speculations about data are necessary.

A synthesis of these two aspects of speculative instruments might be formulated thus: how do we invite ourselves to gather around these instruments to practically maintain their, and therefore our own, conditions?

To speculate with or about instruments is also to speculate about the objects those instruments are pointed at. The intervention of pointing it at the subjugated PhD students and Postdoc researchers in a project where their supervisors are also part of the research staff naturally aligns the instruments along existing power asymmetries. We chose to proceed to go along with this (not at all strictly necessary) design after gauging the atmosphere within the research community to be receptive, and additionally extremely educated and invested in such STS concerns of gaze, data, Foucaultian knowledge and power dynamics.

## 9 DISCUSSION

Our approach depends on availability of suitable data points for its generativity, and this has been somewhat of a limit, an Achilles' heel for our work. We remain undecided whether scarcity and relative immobility and siloing of data within a bottom-up instrument design for data practices in an STS research project is ironic or not. In a way we would simply like to have a big pile of tabulated ethnographic data openly accessible within our project community, vectorize it, and throw some black-boxed, well-behaved machine learning at it to find relations and patterns which are hard for ourselves to pick out. At the same time, that is exactly what we do not want to do. What our approach aims at, and which we are hoping to develop further, is insisting the co-determination of the data, the narratives told through it, and the instrumentation of those tellings, and appreciating the experience of the *data moment*.

Historian Michael Mahoney argues against received master narratives of computer history and the computer having any history of its own. He instead argues that the computer inherits from "the histories of the groups of practitioners who saw in it, or in some yet to be envisioned form of it, the potential to realise their agendas and aspirations" (Mahoney, 2005). What are the worlds of computer software STS-scholars occupy? What are their agencies, subjecthoods, roles and experiences in those worlds? How have the ethnographic worlds brought into the computer? How might we characterize the lifetimes, convivial relations and negotiations around the computational infrastructures (Cohn, 2016)? If we were to read the computers of this community of computing, what would pictures would we discover?

All representations, and such strongly instrumentalized representations as omnipresent in contemporary data practices in particular, create epistemic and agential distances (Ruppert, Isin, & Bigo, 2017). In these distances lies their promises for knowledge and governance. There are known asymmetries though, leading to serious accountability challenges as many contemporary scholars are pointing out. (boyd and Crawford, 2012; Ruppert, Isin and Bigo 2017).



A tangential, but worthwhile remark from Nordmann's paper on speculative ethics (Nordmann, 2007) can be generalized to all speculations, and therefore transferred to our speculate instruments too. The issue is this: as propositions, speculations have "if  $\psi$  then  $\varphi$ " template. Various logical systems may be used to analyze such propositions, but the point of any speculation is to posit the antecedent with very weak commitments to its truthfulness. Nordmann describes the sedimentation of the antecedent in speculative ethics. In speculative instruments, the risk is that of vaporization. Everything hinges on positing it, and given the low commitments to it, rejecting the antecedent collapses the consequent. This conditional nature is at the same time both enabling and catastrophic for speculative instruments – rejecting any speculative instruments is not hard. Shifting our gaze from within out ethnographic collaboration to our fieldsites, we observe exactly these, considerable risks – what if, say, the data moment ( $\psi$ ) so enthusiastically engaged with turns out to be false, and the imaginations predicated on it deflate? Who has been made most dependent on the suddenly untrue data moment, most vulnerable to it? What repair work will then be necessary to re-establish a new support of  $\varphi$ , or to bring it down gracefully?

With our approach we have tried to design for the particular, for the small-scale and for the local. By attending to the human capacities which happen to also be anthropological aspirations of interpretation, decision-making and interestedness, we have attempted to introduce productive friction against instincts of instrumentation and tooling, and keep the black box from slamming shut quite so hastily. We have tried to challenge the appealing climb up on the rungs of ladders of abstraction that the laborous, demanding, expensive and hard work of computer programming encourages. By these complications, we hope to have provided some experience of being involved in software development process, an additional invitation into certain intimacy in a multi-ethnographer research, and a sense of data as relation to our ethnographer peers.

We hope this approach to be interesting to researchers responding to the STS imperative of material engagement with technology, as well to as the data practitioners in the public sector. Small practices for Big Data.

## **ATTRIBUTION**

This paper is written by Mace Ojala. The research was conducted by Mace Ojala, as member of the Data as Relation subproject 6 team at IT University of Copenhagen, which is Assoc. Prof. Marisa Cohn, Assoc. Prof. Luca Rossi and Research Assistant Mace Ojala.

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