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To cite this article: Beverley Skeggs & Simon Yuill (2015): The methodology of a multi-model project examining how facebook infrastructures social relations, Information, Communication & Society, DOI: [10.1080/1369118X.2015.1091026](https://doi.org/10.1080/1369118X.2015.1091026)

To link to this article: <http://dx.doi.org/10.1080/1369118X.2015.1091026>



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Published online: 20 Oct 2015.



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The methodology of a multi-model project examining how facebook infrastructures social relations

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ABSTRACT

It is the purpose of this paper to make explicit the methodology (the theory of the methods) by which we conducted research for an Economic and Social Research Council-funded research project on the relationship of values to value. Specifically, we wanted to study the imperative of Facebook to monetize social relationships, what happens when one of our significant forms of communication is driven by the search for profit, by the logic of capital. We therefore wanted to 'get inside' and understand what capital's new lines of flight, informationally driven models of economic expansion, do to social relations. Taking up the challenge to develop methods appropriate to the challenges of 'big data', we applied four different methods to investigate the interface that is Facebook: we designed custom software tools, generated an online survey, developed data visualizations, and conducted interviews with participants to discuss their understandings of our analysis. We used Lefebvre's [(2004). *Rhythmanalysis: Space, time and everyday life*. London: Continuum] rhythmanalysis and Kember and Zylińska's [(2012). *Life after new media: Mediation as a vital process*. Cambridge, MA: MIT Press] ideas about 'liveness' to inform our methodology. This paper reports on a research process that was not entirely straightforward. We were thwarted in a variety of ways, especially by challenge to use software to study software and had to develop our project in unanticipated directions, but we also found much more than we initially imagined possible. As so few academic researchers are able to study Facebook through its own tools (as Tufekci [(2014). Big questions for social media big data: Representativeness, validity and other methodological pitfalls. In ICWSM '14: Proceedings of the 8th International AAAI Conference on Weblogs and Social Media (pp. 505–514)] notes how, unsurprisingly, at the 2013 ICWSM only about 5% of papers were about Facebook and nearly all of these were co-authored with Facebook data scientists), we hope that our methodology is useful for other researchers seeking to develop less conventional research on Facebook.

ARTICLE HISTORY

Received 17 March 2015
Accepted 28 August 2015

KEYWORDS

Political economy; facebook; rhythmanalysis; big data; interactivity; research methodology

Introduction

The Facebook project is part of a more general investigation of the relationship between values and value (see <https://values.doc.gold.ac.uk/>), funded by the Economic and Social

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Research Council, UK. We were concerned to investigate if anything at all was beyond the logic and analytic of capital (Skeggs, 2014a, 2014b). We were therefore interested in the places where the imposition of capital's logic, such as friendship (and in a parallel project, faith), could possibly be resisted. In particular, we were concerned to see what happens when affective social relationships, replete with values, are monetized.

Following Andrejevic (2013) and Morozov (2014), we believe that the foremost asset for monetization today is our personal data. But if all 'data is credit data' as suggested by Douglas Merrill of ZestFinance, does this mean that all life beats to the rhythms of monetization? And, if Facebook monetizes by developing an infrastructure to sell audiences to advertisers through massive online data aggregation, how do we live the relations of that connectivity?

Facebook was chosen because it is *the* 'relational' site for social networking in comparison to the more political and opinion orientation of Twitter or sites for self-promotion. Facebook is still remarkably successful, globally expanding daily. The first quarterly earning of Facebook in 2014 were recorded as \$2.5 billion in revenue, \$10 billion annually, of which 85% of Facebook revenue comes from advertising. Eight per cent of all global advertising now takes place on Facebook. Facebook has 1.28 billion total monthly users, 802 million daily users, and 609 million daily mobile users. As Van Dijck (2012) notes, Facebook *brokers* sociality.

Our original research questions about the significance of technological infrastructuring of relations were framed with a static model of the human and the technological, which assumes that we know in advance what the social, the personal and the technical actually are. Kember and Zylinska (2012), however, note: 'It is not simply the case that "we" – that is, autonomously existing humans – live in a complex technological environment, and it makes no more sense to talk of us using it, than it does of it using us.' (p. 13). We thus moved to a more entangled understanding, but how do we know what Facebook does in the world if we cannot untangle its mechanisms? So, our research is an attempt to use multiple models and methods to address the porosity of boundaries, to untangle and investigate what Facebook does across different domains of capital, labour, code, communication and social relations.

From our survey of existing research, we felt that many studies took for granted, and often reinforced, Facebook's own claims as to the platform's significance, both as a primarily 'social' entity, as opposed to a primarily technological or mediatized one, and to the significance of 'networks' to represent and engage in such sociality. Google as a search engine foregrounds its relation to the technology it operates on, whilst earlier platforms such as MySpace presented themselves as DIY media tools. From its very beginning, Facebook had openly modelled itself on ideas from Social Network Analysis.¹ Light and Cassidy (2014) outline how the majority of research on social network studies (SNS)'s focus on various conceptions of network, including networked individualism (Wellman & Gulia, 1999), networked sociality (Wittel, 2001), networked collectivism (Baym, 2007), networked publics (boyd, 2008; Ito, 2007), the networked imaginary (Lievrouw & Nguyen, 2007) and networked literacies² (Lievrouw, 2012). Much of the existing software tools used in studies of Facebook, such as Netvizz, accept Facebook's self-description as a 'social network' at face value and map out the data in a form that represents a network, most commonly adopting the now familiar, node and line diagram. These are static diagrams that present a network frozen in time. Munster (2013) argues, however, that such

visualizations create a form of anaesthesia, numbing us to the very particularities and specificities of how such structures might come into being and evolve and proposes that:

Instead of seeing networks everywhere, perhaps we should look, think, and sense more thoroughly the patchiness of the network field. We need to immerse ourselves in the particularities of network forces and the ways in which these give rise to the form and deformation of conjunctions – the closures and openings of relations to one another. It is at this level of imperceptible flux – of things informing and reforming relationally – that we discover the real experience of networks. (p. 3)

We argue that we cannot assume what such socio-technical structures do in advance, e.g. do they even operate as a network for instance? For as Miller (2008) notes, socio-technical arrangements are indeterminate, complex, heterogeneous and mutable. SNS's are not simply phatic objects, or communications that have purely social (networking) intents. They are more likely to be what Langlois and Elmer (2013) characterize as thick digital objects, a combination of phatic, relational, networked and media objects that operate as an interface between different materialities (Galloway, 2012).

Network studies also tend to treat Facebook as a self-contained entity set apart from the rest of the Internet. Through the development of technologies such as the Like buttons placed on web pages and the Open Graph API, Facebook has, however, steadily expanded its presence well beyond the boundaries of its own domain, tracking users as they browse. What a given user receives on their Facebook account page, in the newsfeed or surrounding adverts, may be as much, or more, driven by activities outside of Facebook as within. Our own software and forms of visualization were designed to map these complex aspects of relational reforming and entanglement both across the Web and between Facebook and users' daily lives.

Rather than assuming that we knew what Facebook does, we wanted to get inside of Facebook to examine, as far as we could, its algorithmic behaviour and how that relates to the particular forms of sociality they construct and instrumentalize. Understanding Facebook algorithms, however, relies upon using tools and services that Facebook itself makes available, those which often reinforce the very assumptions and paradigms we were seeking to question.

Given the debates around how sociology can respond to both the opportunities and threats of research in the age of social networks and Big Data (Burrows & Savage, 2014; Savage & Burrows, 2007), we believe that it is vital that researchers continue to develop new methods and tools of analysis and not simply rely on off-the-shelf systems that may restrict the scope of investigation and how we frame the questions we put to it. We therefore developed our own tools expanding our existing methodologies to incorporate the new forms of knowledge such tools might enable. This process, however, is a complex one and so, in this paper, we wish to set out a frank exposition of the problems we encountered and how these were addressed so that our experience may help inform and encourage other researchers to continue developing new approaches to the field.

We sought to confront prevailing modes of analysis based on networks and sociality with an alternative conception of liveness and rhythm. Following Kember and Zylinska (2012), we understand 'liveness' as ongoing encounters that move in and out of synchronization and resonance with all aspects of our lives: rhythms of life rather than networks, rhythms which may come into conflict with other rhythmic structures imposed upon or

encountered, such as work, parenting, relationships, care, or different paces of information exchange arising in different media (Weltevrede, Helmond, & Gerlitz, 2014). We used software to develop a 'life method' (Kember & Zylinska, 2012) rather than just a 'live method' (Back & Puwar, 2013) to investigate the dynamics, the moments and rhythms of engagement and entanglement with the Facebook platform. Did the platform produce the user's response, as proposed by Marres and Weltevrede (2013), determining what we even understand as time, producing distinct temporalities not external from but specific to devices (Weltevrede et al., 2014)? Or was engagement a form of intra-action (Barad, 2007) organized with other social, ecological and biological relationships such as energy, affect, attention and work rhythms? How does the time of lived experience, captured and communicated on a platform such as Facebook, relate to the temporal ordering and sequencing of data that forms the basis of every algorithm? Mackenzie (2006) describes 'algorithmic time' as the coming together of the step-by-step clock process through which code operates and the 'accretion of past biological knowledge production' (Mackenzie, 2006, p. 51) that led to the creation of that code and the data upon which it operates. If our own actions are part of the algorithms (Miyazaki, 2012) of Facebook's newsfeed, are we merely enslaved within its beat or, if we also can determine aspects of algorithmic time through our own actions, is something more complex going on?

Hence, we used Lefebvre's (2004) rhythmanalysis as a methodology that links theory to our methods: 'Rhythm appears as regulated time, governed by rational laws, but in contact with what is least rational in human being: the lived, the carnal, the body' (p. 9). Rhythmanalysis emphasizes overdetermination – focusing on the many different features that co-join to determine use, drawing attention to the conjectural, and focusing on moments and elements that appear instinctual, impulsive, irresolvable and incommensurable, alongside those that we identify as habitual and repetitive. Rhythmanalysis allows us to interrogate the various moments when energy materializes and is monetized by Facebook. Our software enabled us to visualize this process, drawing out moments of engagement alongside rhythms of use, elaborating both the quality and quantity of use, with many interaction rhythms taking place simultaneously (see visualizations later) through the entanglement of lines that have different routes. Murphie (2007) and DeLyser and Sui (2013) have advocated using rhythmanalysis for understanding digital media, but only one project so far (Hochman & Manovich, 2013) has employed the technique in visualization.

Our software was thus designed to speak to these issues. We developed code that could capture 'internet time' (Karpf, 2012), entanglements, practices, attention, rhythms, and importantly, also the *contradictions* of temporal connectivity for, as Lefebvre (2004) emphasizes, not all rhythms merge seamlessly into one singular duration, but rather they may conflict with and interrupt one another and slip out of synchronicity.

Initial challenges: software development

To achieve our methodological aims, we combined data from two different sources. Firstly, that available through the official Facebook API³ and, secondly, data relating to Facebook activity but not available in the API such as advertising shown to users on Facebook and the presence of Facebook tracking users as they browsed elsewhere. This required building two data collecting tools: one as a Facebook App for the API data and one as a browser

plugin, which we named Admonitor, for the other sources. As these both produced a continuously updating stream of data, a custom website was built to collate material during the data collection phase. This site also provided 'live' visualizations of the data analysis enabling researchers and participants to review material as it was collected; they could follow their own rhythms.⁴ During the course of the data collection period, a number of new visualization tools were added in response to the activity we were able to monitor.⁵

A number of challenges were encountered in the technical realization of the project, which created delays in the schedule and caused aspects of the original aims to be rethought. Whilst some of these were due to common problems facing the development of custom software systems, such as scaling up a system from prototype to production use, others reflected the inherent politics of conducting online research in the contemporary academic environment and engaging with powerful platforms shaped by business interests such as Facebook. As Mair, Greiffenhagen, and Sharrock (2015) point out, it is common practice to omit any discussion of difficulties encountered in the development of technical components in a research project; yet, these 'worldly troubles' and the ways in which a given team responds to them can often be significant factors in shaping how a given piece of research puts social relations on display, or even whether a given phenomenon can be studied.

Many platforms, such as Facebook and Twitter, provide access to their data through an API that is often available for free through registration. Whilst this does provide an entry point to information sources that would be beyond the means of a university project to generate itself, and has been commended by many researchers, it also has to be recognized that every API is a carefully controlled gateway which, as Bucher (2013) notes in relation to Twitter, has its own politics expressed through 'protocols that structure and exercise control over the specific social situations on which they are brought to bear'. An API will only ever give partial access to data that is carefully controlled by its providers to enable sufficient openness to encourage innovative spin-offs by outside developers, which can be harvested for future internal product lines, and, at the same time, ensure sufficient closure around that data so as to protect the provider's competitive interests (Bucher, 2013). As Bucher argues, control over external data access is also exercised through the inherent instability of the API. APIs are subject not only to internal processes of structural change, shutting off some resources whilst opening others and sometimes rendering outside services obsolete overnight, but also to contextual alterations in ever-changing licence agreements and developer documentation. Facebook is well known, notorious even, amongst both users and external developers for changing features of its services without prior notice and for the patchiness of its developer documentation. Whilst our project was relatively brief (one year in total) and thus short in its implementation period, we nevertheless encountered problems as a result of these factors forcing quite a substantial rewrite of the code at a number of points during the project. What was originally planned as a three-month development time for the software quickly expanded into six months and the project had to be extended to 18 months in total.

Due to our combination of data from the Facebook API and scraping, we also found ourselves in a grey area in relation to Facebook's terms of service, as these forbid the use of gathering data through alternative sources from the API itself. Due to this, we were unable to release our Facebook App publicly and had to rely on participants signing up as Facebook test developers in order to install it.⁶ The process of registering

people as test developers proved to be difficult and unreliable, a situation not helped by the lack of documentation on the process in Facebook's own developer site. This severely restricted the number of participants we were able to recruit. In our own experience, we would therefore say that the use of such propriety APIs has to be treated with caution by researchers. They are not always as reliable as might be assumed and the restrictions on their use placed by the platform owners can have significant impacts on how a research project is able to operate. This also had an impact on the kind of sampling strategy we were able to implement. We had initially hoped for a broad sweep of participants combining both an opportunistic response through online recruitment on Facebook and other online platforms along with purposively targeted groups such as teenagers and individuals who used Facebook as part of a commercial operation such as marketing. In order to access as wide a field as possible we asked people to forward requests to as many people as possible. This meant that our sample's social location, even geographical location was initially unknown, and as we found out from the survey below was widely spread (New Zealand, Canada, Australia, Sweden, Brazil and USA). In the end, however, the hurdles posed by Facebook's test developer registration process forced us to drastically reduce the number of participants and focus on those we could support in manually signing up and guiding via Skype and phone through the process, relying on those who had the patience to stay with us.

Using Facebook messenger presented particular problems as we were alerted to the fact that many of our requests for participation and return offers to participate did not get through. We still have no idea why many enthusiastic and even tenacious would-be participants were lost on the way. We finally captured data from 33 testers. Even though getting these data was an exacting process, we actually ended up with much more than we had imagined and were able to obtain more detailed analysis from this small group than we had originally expected.

Whilst scraping is frequently considered to be more prone to the instabilities of online media, in our experience, the changes encountered in scraping were less of an issue, involving only minor rewrites of some code.⁷ We were fortunate that these occurred during the testing phase, as had they happened mid-way through data collection, they could have had greater impact. Due to the timescale of the project, however, we were limited to only developing a scraper for the Firefox desktop browser as both the mobile version of Firefox and the other widely used browsers (Internet Explorer, Chrome and Safari) would each require a bespoke version of the tool.

Another restriction was that devices such as iPhones and iPads would not let us through, as Apple do not approve the use of Firefox on their mobile systems. This meant that a large proportion of willing participants could not participate as they only accessed Facebook via their mobile devices or did not use Firefox. Our sample of research participants were therefore also determined by the devices and software they use.

The Admonitor browser plugin proved to be more successful than anticipated, however, and harvested advertising data from ambient background sites outside of Facebook to a degree of detail which we did not initially think possible, providing useful information on the specific kinds of data being exchanged by tracking and advertising companies during a live tracking process. It was through the plugin that we became aware of the scale of the tracking conducted by Facebook beyond a participant's Facebook page (see later).

Methodological issues: the survey

More conventional studies of use through behavioural quantification for example, ‘75% of people do ...’ are just one element of a very complex picture. Yet, most research, even Facebook’s own, is often based on quantitative rather than qualitative behavioural analysis. Rains and Brunner (2014) found, in their content analysis of SNS research published in six interdisciplinary journals between 1997 and 2013, that 62% of a total of 327 SNS studies used traditional survey research and that whilst many applied multiple methods of analysis, only 6% used some form of qualitative research.

Although aware of all the issues from previous media research of asking people about ‘use’, where participants notoriously underreport, and provide the responses they think the researchers want, we wanted to untangle forms of engagement, types of connectivity and intra-face-action. Did the Facebook platform make people do things? What do people think they are doing with Facebook? Did Facebook incite an ‘anticipatory logic’, as proposed by Kitchin and Dodge (2011), one that structures time and action through algorithms, protocols and prescriptions that sequence the possibilities for action and modulate experience, organizing the temporality of action and hence any form of use? Kitchin and Dodge describe platforms such as Facebook as ‘transduced space’, one which transforms that which passes through it, where code and software organize the spatiality and temporality of everyday life and one is produced through the other.⁸

We thus designed questions for our research respondents around how, when and what they did with Facebook: usage, relationship to Facebook, imagined audience, performance of self, type of attention and privacy. We addressed these particular issues because our previous research on audience responses to TV in mainstream media alerted us to the significance of affects and performance, especially the anxiety people feel when anticipating judgement of one’s behaviour in public (Skeggs & Wood, 2012). We were therefore also interested in genre production, in how a specific digital form could operate as a highly charged affective medium that encourages people to divulge in a variety of ways, from the traditional biographical format to the immediate response mode. We see Facebook offering a communicative structure for generating a performance of a coherent persona (Skeggs, 2004, 2009) used to incite users to reveal information about themselves which can then be algorithmically disaggregated for the purposes of monetization.⁹ Facebook is not just a ‘data processor’ as described by Peters (2013), part of a ‘logistical media’ whose content is not representational but rather organizational, instead, we maintain, it works with traditional forms of narrative and discourse to produce a particular genre of self-revelation, whilst simultaneously doing all the data processing that allocates data into saleable segments. Facebook as a platform with *both* genre and technical specifications offers possibilities for shaping our environment not just through code but also through the curating of discourse (Gillespie, 2010).

Therefore, in a similar way to that of Rogers (2013), we recognize Facebook as an epistemological platform, one that captures, processes, analyses, ranks, recommends formats and aggregates data before we even engage with it. We therefore see platforms as performative. They have what Hands (2013) calls ‘platformativity’. Yet, most studies have only speculated about what this platformativity brings into effect, what it enables people, technology, organizations and capital to do or not do. Hence, rather than just focusing on the

capacity of the platform itself (Galloway, 2012), we want to understand the types of communicative activity and personhood that Facebook mobilizes.

Conscious of ethics from the start (we had previously worked on legality and privacy, and as a longitudinal ethnographer on 'sensitive' topics), we asked people to sign an online consent form (see <https://values.doc.gold.ac.uk/survey/>). This created some confusion with the sentence 'I understand that confidentiality will be breached if I reveal matters that I later request to be withdrawn.' However, doing Facebook research immanently through the platform meant that all participants' queries could be answered directly and a debate ensued about the ethics of digital research and our phrasing of survey questions on our Facebook timeline. This dialogue generated a much more immediate sense of interaction than any surveys we had previously conducted (although still not in the zone of the intense ethnographic encounter). Surprisingly, the survey elicited some exceedingly long and detailed personal responses. Paradoxically, this suggested to us that people felt safe to discuss some of their performance anxieties digitally.

Methodologically, it would be very difficult for social media researchers to accurately identify participants via social categories due to the design of the medium. It would depend on honest declaration of detailed information (such as education, housing, occupation, etc.) and self-identification. As SNS's have promoted and supported dissimulation in the past, many users have become skilled in subterfuge (Turkle, 2011).¹⁰ We think classifications and categories need studying in their making (gender, race, class and sexuality are after all performative). Some of the issues associated with classification became apparent through responses to the survey that revealed anxiety about revelation and judgement.

We did ask respondents to the survey for their age as we had monitored the debates about the decline in Facebook use amongst young people, a factor we also experienced when we tried to recruit participants (16–18 year olds) from a local Lewisham sixth form college to our project. Out of 500, only 2 said that they still used Facebook, preferring instead WhatsApp, Instagram and Snapchat, as a result of parents using Facebook to snoop on them. Most survey respondents declined to give their age, those who did were in their 30s and 40s.

In total, we received 154 responses, averaging 3 pages in length. We organized these into five connected themes that emerged from these. In future papers, we summarize the findings of the different elements of the research. Our third method used was to organize our participant's Facebook engagement into visualizations.

Using data visualizations

We used four different approaches to analyse our visualizations. Firstly, we employed traditional statistical analysis to identify patterns of engagement – when, where, how, whom – producing graphs and maps. We began with the interaction ratio, that is, the ratio of posts in the newsfeed which have been interacted with by the participant in relation to the total number gathered. We then mapped interaction rhythms to visualize the periods in the day in which the participant is most active on Facebook either writing or responding to posts and the gaps between these interactions. We measured average hourly activity over one day and average gaps between posts within a 24-hour period. We noted the most active posters and most active respondents – a listing of users who

have responded to the most posts that the participant has interacted with. We measured the longest post durations – posts that have been acted upon over the longest periods. We then turned our attention to the newsfeed and mapped the length of longest newsfeed durations to identify posts that have been present in the newsfeed over the longest periods, the longest sponsored story durations – those that have recurred over the longest periods – and the longest Facebook advert durations – the Facebook sidebar adverts that have recurred over the longest periods. A more detailed description of the software and visualizations is available at: <https://values.doc.gold.ac.uk/interactions/>

Secondly, we mapped traditional network visualizations of our research participant's networks to make apparent the different networks of connectivity. Whereas such networks are normally egocentric, based around the account user as a central node (such as in Hogan, 2008), we removed the account user from their own network in order to show the relations between other respondents that were based on communication activities such as posting, liking and commenting, rather than the participant's own friend network. This revealed the extent to which the participant was interacting with one cohesive group of people or several distinct groups and from this, we were able to infer some insights as to the influence of these networks on content in the newsfeed. It also provided empirical indicators relating both to issues of context collapse and to the survey question on how similar a participant considered their online correspondents to be. These visualizations are dynamic and can be manipulated by the user to see the density and form of the connection (Figure 1).

Thirdly, we inspected for rhythms and patterns, as per our methodology above. The visual graph (Figures 2) shows the flows over time of interactions between users on Facebook posts that participants have either created or responded to (through liking, commenting or sharing). We collected these data over a maximum six months and for some participants, over a shorter period of time as they struggled to stay connected (as per problems above). This is displayed against a visualization of the advertising data collected by Admonitor.

We read each method alongside each other; for instance, we read participant's survey responses to see if the engagement they described corresponded in any way to what they did and the networks they inhabited. We have always worked with a theory of the subject based on contradiction rather than coherence, for often, as subjects we may not know what we are doing and/or why. This is one of the big advantages of doing multi-method digital research that can connect different social relations over time and space.

Similarly, a great deal of traditional qualitative digital research rests on cognisant speech acts given via surveys (as above) or interviews, limiting understanding to one contrived encounter or discursive moment. This, as Savage and Burrows (2007) note, marks the 'old' sociology where accounts of action represented *the* sociological method. We are thus alert to these issues and are cautious when discussing visualizations with participants to see how they read and understand their rhythms, attention and 'liveness'.

Fourthly, we analysed the adverts that appeared on participant's Facebook pages, their occurrence, if and when they were noticed and the actual content to see if they were indeed (algorithmically) effectively targeting their recipient as hyped by Facebook (Figure 3). The advertising data we gathered from Admonitor enabled us to relate patterns of user interaction with Facebook to possible patterns that might appear as participants browse the

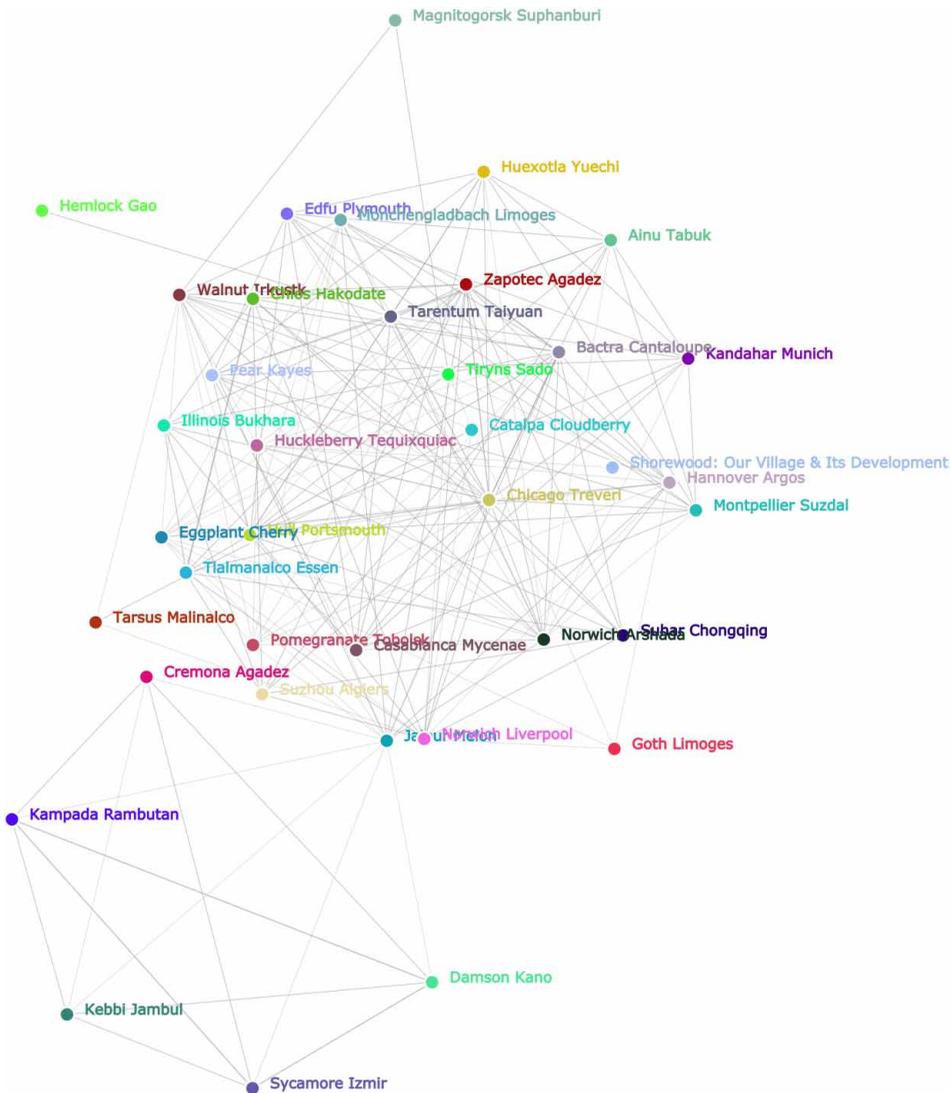


Figure 1. Network without user.

web. This enables us to learn more about how Facebook seeks to stimulate user interaction for the purposes of monetization.

Our visualizations offer a picture not just of one person's rhythmic entanglements with others and the platform but also the ambient advertising that appears behind a person's Facebook page as they use it, and Facebook's algorithmic manipulation of the newsfeed (Figure 4).

The newsfeed data revealed how Facebook attempts to attract attention to what Facebook thinks it is important for the participant to see. We know that Facebook advertises itself to investors on the basis of its supposed capture of attention and here we can see how it attempts to do so. Napoli (2003) notes how advertisers struggle to secure attention by making the immaterial material: 'In selling audiences, media firms essentially deal in

Downloaded by [79.65.164.72] at 11:27 05 November 2015

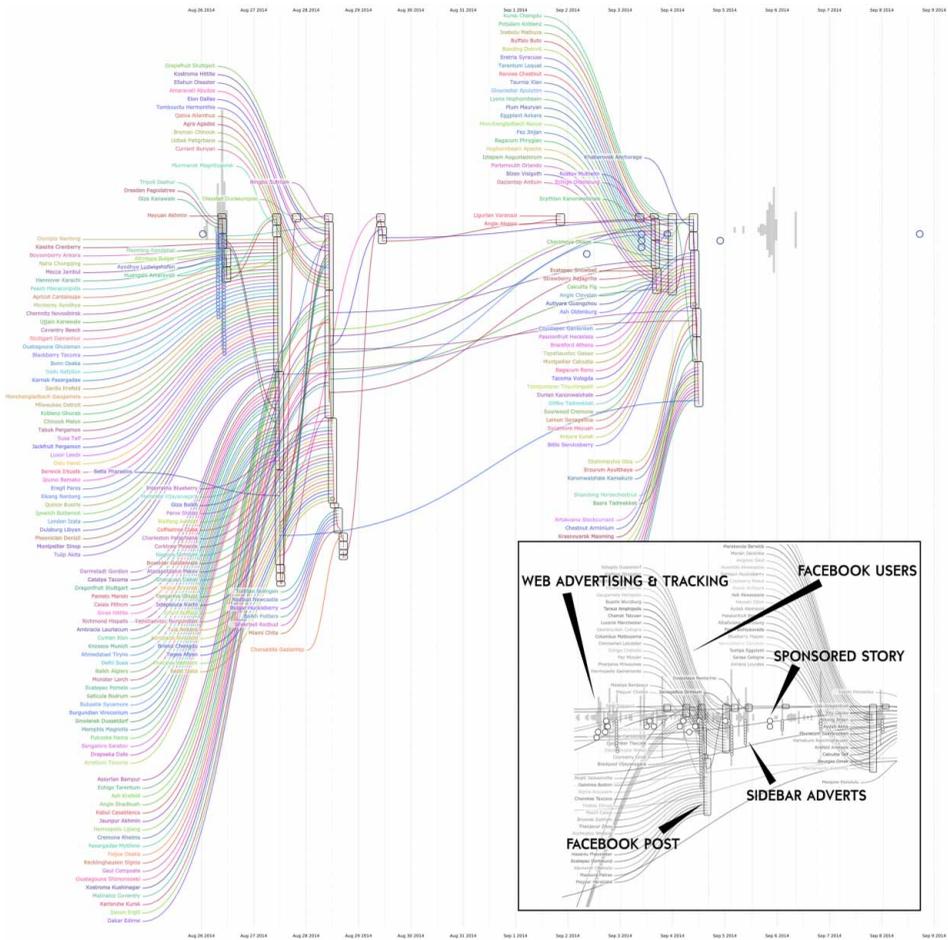


Figure 2. Interaction flows. The key to interaction flows is shown in the insert.

human attention, and human attention represents a much more abstract, elusive, and intangible product than, say, steel, insurance, or legal services’ (p. 5). In a space where numerous platforms compete for our attention, for ‘eyeballs’, attention becomes a

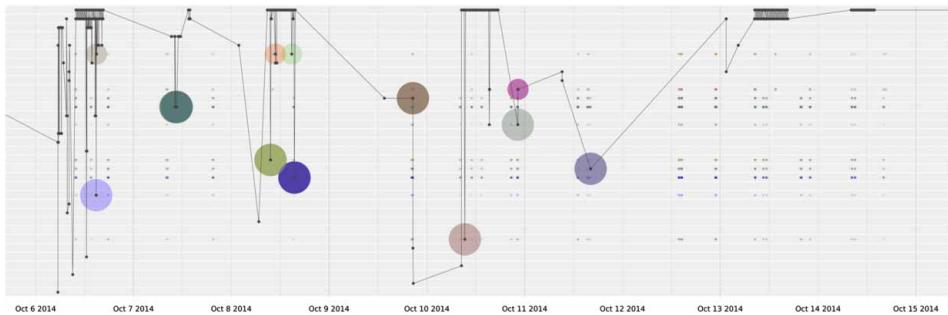


Figure 3. Advert tracking.

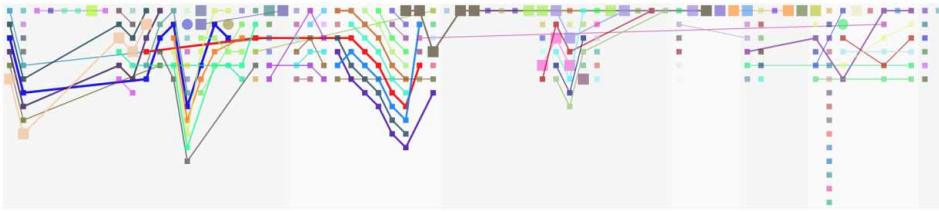


Figure 4. Newsfeed interaction.

scarce resource, one that cannot easily be extracted and converted to value. An analysis of an ‘attention economy’ (Crogan & Kinsley, 2012) where values are directly connected to value through the idea of attention as a commodity, as well as debates about attention and governmentality (e.g. Bucher, 2012), will be developed from these visualizations. Here, our visualizations of newsfeed rhythms revealed how Facebook placed items for attention but also how our participants worked hard to avoid them, by scrolling down to find items they wanted to see.

We were also surprised to see how the advertising Facebook targeted, via stories on a user’s newsfeed, was drawing not just on data collected on a participant’s Facebook page but from all other internet sites they use with a Facebook connection (see the grey patterns in the background [Figure 2](#) and the pathway in [Figure 3](#)). These are all the other sites from which Facebook is tracking and drawing information on use. At the start of our research, Facebook denied that it engaged in ambient tracking; however, since then, researchers commissioned by the Belgian data protection agency, from the Centre of Interdisciplinary Law and ICT and the Computer Security and Industrial Cryptography department (Cosic) at the University of Leuven, and the media, information and telecommunication department (Smit) at Vrije Universiteit Brussels, have drawn similar results to ours. Facebook tracks all usage on computers/devices via its social plugins which have been placed on more than 13 million sites including health and government sites (Gibbs, 2015). They are now being further investigated by the Belgian, Dutch and EU Data Protection Commissioner, although as legal theorists (Mierzwinski & Chester, 2013) note, it is almost impossible for the legal profession to keep pace with global software companies who have far greater resources at their disposal.

Making sense of data

Kittler (1999) maintains that software is able to shape our experience and existence through a recursive or recombinant set of relations between code in space and time, in which infrastructures need code in order to function and people need infrastructures to make connections (Hayles, 2012). Yet, unlike Kittler, we do not think that the power of digital media is epistemological and computational rather than just ideological. We argue that algorithms are always/already ideological (Mager, 2012), in the way of all mediating technology (Postman, 1992) because they operate for particular interests (such as Facebook’s capital expansion) and have been developed through different histories of power. If we reduced all aspects of life to computational capacity, we would lose the wider rhythms and the lifeness we were concerned to investigate. We understand how

algorithms are essential to capitals' search for opening up and intervening in new markets (Poon, 2013) hence the proprietary nature of the major social media companies such as Facebook, Google and Amazon. Algorithms are the code that searches for value through capture and connectivity, maximizing their own potential through operations on themselves, as they model users and relationships. As Neyland (2014) notes, algorithms are also open to a world yet to be built but, as our newsfeed visualizations showed, unable to fully capture the attention they require.

Algorithmic data capture, although initially tied to an individual on Facebook, is made to work in ways independent of its source, independent of a person's production – hence why we argue that we need to understand the overdetermination involved in value production. The use of Facebook is not a straightforward exchange of an individual's labour for surplus value, rather data are partitioned, indexed, aggregated and disconnected from the labour of its producer before it is sold in a myriad of different ways (Nixon, 2014). It is also animated in many different ways as a commodity (Terranova, 2004). Facebook is a platform which mediates multiple features: to convert data into capital, to interest investors, to promote advertising to advertisers, to induce free development labour, to keep people connected, to encourage people to divulge, to experiment with users, to make users available to different forms of media. Facebook also operates to transmit many other media such a film, news and gossip; it mediates media.

Conclusion

Hopefully, we have established the terms for our inquiry into Facebook. This paper represents the start of the interrogation but we thought unpacking the methodology would be useful for other researchers. In this sense, our methodology is similar to what Jameson (1981) calls immanent critique, the idea that the description and criticism of a philosophical or cultural text (or in this case, a digital interface – Facebook) must be carried out in the same terms that the platform itself employs. We did 'get inside' one example of capital's new lines of flight. Our understandings of lifeness and rhythms, via software and methods that visualized networks, interfaces, entanglements, algorithms, encounters, person/a/s, conductivity, platformativity, time, tone, transduction and lifeness, hopefully open out ways of understanding some of the ways by which Facebook works. Our methodology enabled us to map a capta trail, of information captured as well as given (Kitchin & Dodge, 2011), recording lives over space and time. It is a small sample of big data, designed not to just describe patterns and networks, but also temporal rhythms, attention and activity beyond and through the interface. Through immanent research, we have advocated a practicable research ontology that goes beyond either an entrenched pessimism about algorithmic sociality or the empiricism which appears to characterize much of the study of ostensibly networked communication (Tufekci, 2014).

And we hope we address the concerns of Burrows (2012) who maintains that we need to rethink the descriptive power of the social sciences in order to reinvigorate a sociological imagination able to grasp the complexities of the data and to visualize, map and represent in ways that can claim back a distinctive jurisdiction over the social. We do feel we can say that our methodology enabled us to begin to examine our research questions: we were able to visualize how Facebook infra-structured connectivity, but also how people responded to connectivity differently, through diverse ratios of activity. We could trace and visualize

how central advertising was to the infrastructure that lay behind our connections. These do shape our social relations on the interface but we provisionally suggest are less important once we leave. These questions will be investigated in more detail through our research findings. What we have outlined here is how we have developed the methods and mechanisms for further exploration. ‘Lifeness’ as a perspective enables us to understand the dialogic, complex and contradictory nature of technical forms that incite platformativity (people are limited by how they can engage). We agree with Terranova (2004) that sociality is folded into new forms of valorization where value resides in forms of life itself, within modes of expression, intensive relations, abstract knowledge, communications and affective interactions. Yet, we also think from our initial analysis that it is precisely the ‘lifeness’ that enables our engagement and entanglement, that sets our rhythms, such as energy, time and curiosity, that may establish limits to the way that valorization can encroach.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Economic and Social Research Council [grant number ES/K010786/1 “A Sociology of Values and Value”].

Notes

1. When Facebook first launched as thefacebook.com, it described itself as ‘an online directory that connects people through social networks’ that provided ‘a visualization of your social network’. Screenshots of the original site are available at https://en.wikipedia.org/wiki/History_of_Facebook
2. Developed from Jenkins, Clinton, Purushotma, Robison, and Weigel (2009) which argued that ‘new media literacies’ comprise digital literacies plus media literacies.
3. API stands for Application Programming Interface; this is generally a surface layer provided by a software system to enable external programmes to interact with it or make use of its services.
4. Data from the Facebook API were updated on a daily basis whilst those coming from the browser plugin were updated as they arrived.
5. More detailed information on the software is available at the project website.
6. All Facebook apps intended for public use must first be evaluated and approved by Facebook. Facebook does allow developers free access to create private test versions of their apps before public release which do not require approval from Facebook. These test versions are restricted and can only be installed by users who are registered as part of the Facebook app developer scheme. Not all Facebook users can become developers, however, and we found in several cases, potential participants were refused developer status due to, it appeared in some cases, them having quite tight privacy settings enabled on their accounts.
7. Scraping is a process through which data are extracted from a live webpage by software that looks for specific patterns, elements or phrases within a page and copies the content related to these.
8. The concept of transduction is adopted from Gilbert Simondon. It was originally applied to software and how algorithms process information in Mackenzie (2002).

9. See 'Monetary and moral value: What are the consequences of Capital Experimentation with Person Formation on Facebook', paper presented at the ICS Conference on 'Protest Participation in Variable Communication Ecologies', Alghero, Sardinia, June 2015.
10. Although clearly no longer. Facebook's demand for authentication was evidenced in the recent dragging/queen fiasco, September 2014, where Facebook tried to force people to reveal their state-legitimate names.

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