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The Public and its Algorithms

Comparing and Experimenting with Calculated Publics

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1

THE PUBLIC AND ITS ALGORITHMS

Comparing and experimenting with calculated publics

Andreas Birkbak and Hjalmar Carlsen

Introduction

One of the fascinating promises of the World Wide Web (web) is that it seems to hold the key to ordering its own ‘messiness’. This is how Sergey Brin and Larry Page (1998) thought of their Google search engine: helping web users navigate the overwhelming amount of webpages by exploiting the fact that these sites refer to each other by means of hyperlinks, and interpreting this as a recommendation. Based on this logic, every page can be assigned a rank, making it possible to generate hierarchies in the form of Google search results, thereby “bringing order to the web” (Page *et al.*, 1999). To achieve this, web algorithms, such as Google’s PageRank, draw on methodologies found within the social sciences (Rieder, 2012). Sociological methodologies especially, and social science methodologies more generally, seem to be entering into a new relation with digital platforms that re-appropriate research methods to create hierarchies of relevance. And it is not only ‘our methods’ that are being redistributed and re-appropriated digitally (Marres, 2012c), but also political philosophies, that is, methods for envisioning a just social order, as will be argued below.

The idea that the solution to navigational difficulties posed by the web is to be found in the web itself has also been taken up within social research. One prominent example is Bruno Latour’s MACOSPOL project (MApping Controversies in Science for POLitics), where the disorientation associated with the web is to be turned into an opportunity for mapping issues:

Why mapping? It is possible we think, that the same tools, the same media, the technology of the web, which produced this sea of information, which is at first so disorienting, is also the source of a technology which allows us

22 Andreas Birkbak and Hjalmar Carlsen

to do the mapping of it. It is exactly the same technology that provided the problem that should also provide the solution to the problem.

(Latour, 2010, video)

What Latour points to here is the way in which, for his purposes, the web simultaneously generates a problem and a possible solution. Latour argues that, instead of adding something external to the web, the key is to be found through the web itself. We identify a similar dynamic of a simultaneous creation of problem and solution with respect to web algorithms, but the other way around: web algorithms position themselves as first and foremost offering solutions, while their corresponding construction of the problem, to which they are the solution, is less explicated. Still, what happens in practice is that Google crawls the web in order to discover and index new websites, with the result that Google searches return thousands of results, making its hierarchy-generating PageRank algorithm seem indispensable. With devices like Facebook and Twitter, this dynamic is made somewhat more explicit. These so-called ‘social media’ constantly invite their users to ‘be social’ by submitting new content, which results in a stream of posts, tweets and ‘likes’ that no human user can follow in its ‘raw’ version. The work of algorithms seems absolutely necessary to order this ‘mess’ and deliver a useful Facebook newsfeed and point to top Twitter trends.

The focus of this Chapter is the algorithmic methods that web services deploy to order their own disorder. Like all ordering methods, web algorithms enact the social in specific ways. In this Chapter, we read the calculative devices of Google, Facebook and Twitter as sociologies and as political philosophies. We raise the question of what it means when Google (2014b) claims that “democracy on the web works” and Twitter (2014) says that it “connects the planet to a global conversation”. What kinds of publics are enacted with these omnipresent calculative devices? And how might we distance ourselves from their positioning as self-evident and indispensable?

We examine these questions in three moves. First, we argue that the important task is to clarify, rather than critique, the political philosophies of contemporary calculative devices. We base this argument on a pragmatist understanding of publics as always in need of orientation in uncertain situations, as developed by Lippmann (1925) and Dewey (1927) and discussed further immediately below. Second, we pursue the ambition of problematising the calculative devices of Google, Facebook and Twitter. We do so by simplifying and contrasting the ‘political philosophies’ that can be derived from their algorithmic assumptions, and use these caricatures on a dataset that is not native to any of them. Third, we take advantage of the pluralistic space of calculated publics that has now been deployed in order to think about how it could have been otherwise. More specifically, we propose two alternative calculative approaches as an intervention to supplement existing calculative publics.

The public and its algorithms

Following a pragmatist understanding, publics always need means for orienting themselves. This is what Walter Lippmann (1925) called the ‘coarse signs’, with which an always busy and ignorant public can find ways to approach an issue. As Dewey (1927) reminds us, one way in which a public might help itself is by appointing public officials to produce such signs that reduce the amount of uncertainty that has to be dealt with. Recognising this pragmatic need is helpful for avoiding a premature critical stance on web algorithms. Examining such algorithms as a new kind of ‘public officials’ means appreciating their value as the producers of coarse signs with which publics can orient themselves. However, such signs are only useful in so far as they are meaningful, which raises the question of what kinds of publics web algorithms assume and produce. Put differently, if web algorithms constitute a new sort of public officials, by what kind of public would these officials be employed? What public would find the signs produced by Google, Facebook or Twitter meaningful, useful and legitimate?

Answering this question amounts to a clarification of the world in which each web algorithm seems self-evident and indispensable. Here, the work of Boltanski and Thévenot (2006) offers valuable guidance by pointing out that public orderings always come with justifications. There is not only a practical need for orderings, there is also a need for being able to make apparent a world in which these orderings can be justified. Discussing contemporary web algorithm in terms of their production of ‘calculated publics’ thus has the advantage of explicating how such algorithms are simultaneously descriptive and prescriptive (see also Rieder, 2012). Drawing on Boltanski and Thévenot (2006), the algorithmic devices of Google, Facebook and Twitter should be examined as offering situated visions of not simply ‘the public’, but ‘the just public’. The reward of such a move, we hold, is a heightened sensitivity to how calculative devices not only explicitly generate the worlds they claim to describe, but also the moral trope from which we are to judge and act on this world, which is a crucial part of understanding the politics of algorithms. By ‘just public’ we simply mean a public that has been filtered and ordered as to produce a legitimate vision of the public. This has importance in so far as such a vision – always situated in a specific ‘world’ – offers the means of navigation in a critical situation, making it possible to identify, consult, oppose or support those that matter in relation to a given issue.

Following Boltanski and Thévenot, soliciting these worlds requires a positive, even deliberately naive, analysis that does not rush in with critiques external to these worlds. Instead, one must attend to internal references to what constitutes ‘truth’ and what it means to contribute to ‘the common good’ in each world. The advantage of such an approach, for us, is that it allows us to ‘politicise’ web algorithms ‘from the inside out’. By taking these devices seriously as ordering practices that care about justifying themselves, we reach a position from which

the political philosophies that come with web algorithms can be deployed on their own terms. Against the backdrop of a pluralism of calculative publics, it becomes easier, we hope, to formulate positive alternatives. In other words, we play with the idea that to politicise contemporary web algorithms, one does not have to reveal ‘true’ economic interests hidden behind rhetoric of democracy and human development (Mager, 2012; Vaidhyanathan, 2011). Instead, there is an option of taking this rhetoric seriously, and using it actively to create political differences, which has the advantage of explicating the several distinct ways in which orderings of web data are being done and justified in practice.

Three calculated publics and their consequences

In what follows, first, we combine a reading of the algorithms of Google, Facebook and Twitter with an examination of how they justify their algorithmic orderings. We do so in order to identify the political philosophy, or the vision of the just public, embedded in each device. Second, we caricature these visions in a way that maximises the contrast between them and makes them easy to operationalise. We use these caricatures to illustrate the consequences of each political philosophy on a small dataset of economics research papers selected for the purpose. Illustrating the consequences of calculative devices in this staged way, serves to open a pluralistic field of workable orderings, whose politics do not need to be unveiled or undercut. The point is to avoid the assumption, implicit in a strong critical stance, that ordering can somehow be done without. Instead, we wish to highlight the work it takes to produce orderings, which also means appreciating what a daunting task it would be to replace the orderings of contemporary web algorithms with something else entirely. The advantage of such an appreciation is a more positive description of existing devices that opens for a specification of what descriptive/prescriptive work these devices do.

Google

Google’s mission is to organize the world’s information and make it universally accessible and useful.

(Google, 2014a)

This dual ambition of being both universal and useful poses the challenge of being inclusive and exclusive at the same time, which is indeed a requirement for any just vision of the public. According to Boltanski and Thévenot (2006), any order of worth must be accompanied by an argument for how its hierarchisations benefits everyone. In Google’s case, the attempt to ‘bring order to the web’ is based on the observation that ‘democracy on the web works’, as we have already mentioned. This is ‘the truth’ that makes the common good of universal and useful information possible, and it is the principle of equivalence that is built into the PageRank algorithm: democracy ‘works’ in the specific sense that running a

continuous vote among web sites results in an algorithmic ordering that is both just and useful. In the same way as a survey enacts an opinionated person (Osborne and Rose, 1999), Google can be said to enact an opinionated website. Crucially, this mechanism is not just the tyranny of the majority, because Google's algorithm assigns different weights to different 'voters', as the name 'PageRank' indicates. This arguably introduces a conservative flavour in the political philosophy of the algorithm. Older websites have had more chances to accumulate hyperlinks pointing to them, something that Google interprets as a sign of 'wisdom' and values with a higher PageRank, that is, a vote that counts more. As such, Google can be said to show a certain respect for the 'elders', with arguably positive and negative implications. Google may be granted to 'bring order', but this order has been pointed out to come at the price of 'winner takes all' effects (Marres, 2012c). We suggest that the caricature of this vision of the just public, which will allow us to operationalise it for the purpose of ordering a dataset of research papers, is the following rule: articles vote for each other through links (citations), and votes from articles that have received many links themselves (that have been cited more), count more.

Facebook

At Facebook, they seek to:

give people the power to share and make the world more open and connected.
(Facebook, 2014)

Here we also find an indication of a common good and a truth about how to achieve it. The common good is a world that is open and connected. The truth is that this common good is produced when people are given the power to share. Contrary to Google, the ambition is not to produce a universal ordering, but rather a multitude of situated orderings based on personal connections and privileged sharing. This is pursued in practice by Facebook's newsfeed, where relevance is based on the so-called 'EdgeRank' algorithm. This algorithm qualifies and prioritises content based on evaluations of previous interactions and connections ('edges'), such as posts, comments, and 'likes' from friends. The principle that justifies this hierarchy is *recent engagement* (Birkbak and Carlsen, forthcoming), so connections in which users have already been previously engaged should be prioritised in this ordering. In order to emphasise this feature of the Facebook vision of the just public, we arrive at the following operationalisation: 'likes' (citations) from friends (co-authors) are worth much more than other citations.

Twitter

The third calculative device under consideration here is Twitter, which deploys its Twitter Trends algorithm as part of its mission to create a 'global conversation'.

What the Twitter Trends algorithm does is trying to identify the most important topics currently being discussed across Twitter. This focus on globalising is more akin to Google's mission than Facebook's, but contrary to Google's preference for authoritative voices, Twitter values a diversity of actors. As one Twitter engineer has formulated it,

[t]rends isn't just about volume of a term but also the diversity of people and tweets about a term.

(Elman, 2010, comment #11619)

In the world of Twitter, to paraphrase Boltanski and Thévenot (2006: 74–78), the 'worth' of events is based on whether they unite people who are not already friends. This is not only different from Google, but also from Facebook, whose valuation of personal ties is inversed by Twitter. The Twitter Trends algorithm sees friendship ties as a negative indicator of 'true' trends. Based on this philosophy, the just public is a diverse one, gathered around political issues rather than around social connections (Facebook) or respected elders (Google). We operationalise this Twitter vision with the rule that links (citations) from non-friends (non-co-authors) are worth much more.

Having sketched these three principles for ordering the just public, our next step is to experiment with their consequences in practice. What happens if we take these three algorithmic philosophies out of the world in which they seem indispensable? How does this contribute to a clarification of their consequences and the imagination of alternatives? The small practical experiment we present here consists of constructing an order of worth among 194 economics research papers related to the financial crisis – a dataset that was collected and examined as part of a different project (Carlsen). The articles are all from top economic journals (based on impact factor), from between 1993 and 2013, and all have 'crisis' in either their abstract or keywords. Apart from availability, this dataset has additional advantage of being 'non-native' to all three of the calculative devices under consideration. Scientific citation data thus offers an opportunity to experiment with the three principles we have extracted on a relatively equal footing.

The results of the experiment are shown in the Table 1.1, where the top five papers are ordered in lists, similar to the ways in which Google, Facebook and Twitter produce lists of content.

The results of this small experiment reveal both similarities and differences between the three principles for orchestrating publics. Given that the data set is quite small, and contains relatively few co-author relationships ('friends'), it is not surprising that the top two papers are the same across the board. Apart from these 'agreements', there are at least two noteworthy differences in the orderings. First, we note that Twitter and Facebook's lists both contain a paper from 2004 that is not on Google's top five. Compared to Google's list, which contains the oldest set of papers, this is a relatively recent publication, which might not have

TABLE 1.1 Top five articles based on the ordering principles derived from Google, Facebook and Twitter

	<i>Google</i>	<i>Facebook</i>	<i>Twitter</i>
1	Kaminsky and Reinhardt (1999)	Kaminsky and Reinhardt (1999)	Kaminsky and Reinhardt (1999)
2	Johnson <i>et al.</i> (2000)	Johnson <i>et al.</i> (2000)	Johnson <i>et al.</i> (2000)
3	Cole and Kehoe (2000)	Mitton (2002)	Mitton (2002)
4	Peek and Rosengren (2000)	Angeletos <i>et al.</i> (2006)	Schneider and Tornell (2004)
5	Mitton (2002)	Schneider and Tornell (2004)	Cole and Kehoe (2000)

had enough time to win authority in the (caricatured) ‘eyes’ of Google, but which is prioritised by the ‘social’ media of Twitter and Facebook that value qualities other than authority. Indeed, these orderings also assign a higher rank to Mitton’s paper from 2002, which only barely makes it into Google’s top five.

Second, we also notice a difference between Facebook and Twitter in that Facebook includes an even more recent paper, namely the one from 2006. In our reading of Facebook’s philosophy, the methodological guideline that came to the fore was that of valuing previous interaction. The position of the 2006 paper in the Facebook’s top five suggests that it has been cited by some of the author’s previous co-authors. The fact that this recent paper made it into the Facebook top five points to a possible consequence of this particular ordering principle, namely, that relatively recent events can be given high priority in the specific settings if they relate to previous activity. In comparison, it might take a longer period of time to ‘impress’ Google with citations from works that themselves are highly cited. Facebook’s orderings thus offer opportunities for ‘shortcuts’ through network connections.

Our experiment shows that the different ordering principles – or political philosophies – of the calculative devices of Google, Facebook and Twitter have different consequences in practice. This explication is useful for thinking about what kind of world we enter when we use these devices. Google seems to enact a more ‘global’ and conservative vision of the just public, while Facebook and Twitter offers more volatile visions, based on the presence and absence of ‘local’ connections, respectively. The fact that all three devices are widely used suggests that the web is not easily described as home to some kind of singular ‘calculative logic’. Rather, prominent web services provide fundamentally different visions of ‘the just public’. What we have tried to show is that these visions are not just the results of obscure and proprietary algorithms, but explicitly justified according to markedly different principles.

Perhaps most importantly, the demonstration of this plurality of ‘web worlds’ is also an opportunity to start imagining alternatives. What might another vision

28 Andreas Birkbak and Hjalmar Carlsen

of the just public look like? One way to start thinking about this is to question the fact that Google, Facebook and Twitter ‘agree’ on the same two papers as the top ones, based on different ways of weighing citations. How might we intervene to step out of this world of citation aggregation?

Alternative calculated publics

Our suggestion is that the advantage of identifying and testing the ordering principles of these web algorithms is not only that it becomes clear that they constitute specific interventions with various consequences. The advantage is also that it might open up a space for additional interventions by researchers. One intervention, well-known in Science and Technology Studies, is:

to insist on the ‘un-boundedness of the setting’.

(Marres, 2012: 25)

Given the practical need for publics to orient themselves in problematic situations, it does not suffice to raise this critique from ‘the outside’. Rather, the ambition must be to intervene by devising working alternatives that supplement existing ones. What could it mean in practice to insist on the unboundedness of the setting? One way to break with the setting produced by web algorithms could be to go beyond the notion that the number of citations is the fundamental variable. One of us (Birkbak) is currently doing research on newspapers as public-generating devices, a setting in which a radically different vision of the just public can be found. In a newspaper setting, the editing work related to opinion letters and debate pages is guided by a valuation of neither friendship, nor votes or issue-connections, but *conflict*. Indeed, editors constantly look for sharp, well-defined and ‘juicy’ lines of disagreement in the opinion letters they receive.

What might a conflict-oriented algorithm look like? In the network visualisation program, Gephi, the so-called ‘ForceAtlas’ algorithm is used to spatialise networks so that they can be investigated qualitatively. ForceAtlas operates according to a principle of repulsion and attraction, where connected nodes come closer and non-connected nodes repulse (Jacomy *et al.*, 2014). Thus, it calculates publics in a way that foregrounds different clusters, instead of relying on counting and weighing relations, as Google, Facebook and Twitter each do in their own way. This is an alternative, more agonistic, calculative strategy that we as social researchers might use to inform our intervention. Figure 1.1 is a visualisation of the citation dataset as a network spatialised with the ForceAtlas algorithm in Gephi:

In the visualisation shown in Figure 1.1, the papers appearing in the three lists of Google, Facebook and Twitter are coloured in order to highlight the contrast between these approaches and the ForceAtlas approach. The nodes are sized according to the number of times they have been cited. Each citation is represented by a directed edge between two nodes. In the upper left corner of the

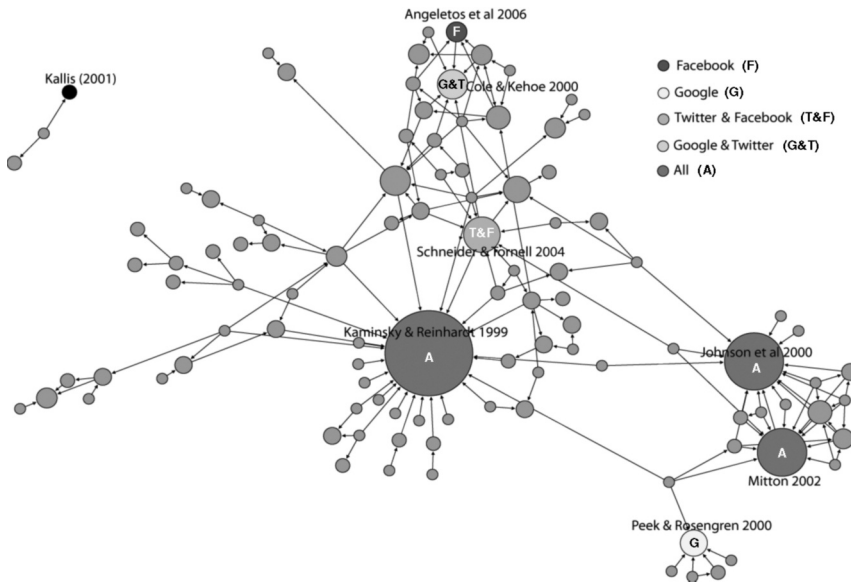


FIGURE 1.1 Citations in the dataset visualised with ForceAtlas in Gephi

visualisation, we have coloured a node black because it represents an interesting paper in a cluster that is not connected to the majority of the papers. The paper is about de-growth, and it has not been ‘seen’ by the lists generated using the principles of Google, Facebook and Twitter. Here we have another conversation, which stands out exactly because it is disconnected. This is a useful illustration of the consequences of the ForceAtlas algorithm, which justifies itself by insisting on the unboundedness of the setting. The insistence on visual representation on two-dimensional maps, instead of one-dimensional lists that comes with algorithms like ForceAtlas, renders relevance a source of uncertainty rather than a matter that is already decided upon, justified and closed.

Following Marres (2012b), we could say that ForceAtlas introduces a ‘strong’ topological approach compared to the ‘weak’ topologies of Google, Facebook and Twitter. These latter calculative devices all create and order the world in terms of networks, but they also continue to rely on various kinds of ‘popularity contests’, as we have indicated above. The web algorithms produce a weak topology in the sense that their production of networks is not entirely committed to a ‘flattening’ of the world. Some entities still rise above others due to their accumulation of likes, retweets, links, or citations. In the spatialisation of ForceAtlas, on the other hand, we encounter an ordering where entities stand out not so much because they are popular among certain sets of actors, but because they are different. When some papers challenge larger clusters by generating a

distance to them, an empty space in the map appears that invites questions about antagonism and exclusion. This comes across as a ‘stronger’ topology, since what is foregrounded is the qualitative arrangement of papers in relation to each other rather than the quantitative accumulation of citations.

The alternative vision of the just public operationalised with ForceAtlas continues to rely on citation data, however. We still rely on ‘social’ indicators of relevance (Marres, 2012c). Might we also conceive of an intervention that challenges this framing of the public? Citing someone (or linking to a homepage, or retweeting, or ‘liking’ someone’s post on Facebook) is not a transparent action in terms its motivations. In an age of digital devices, there is an abundance of computational power that allows us to engage signs more complex than links or citations. What if we focus not on the relations that are already there as relations, but take into account other parts of the texts, using co-occurrence of words as an ordering principle? This might be a fifth vision of a just public, based on the argument that the public must engage with substantial dynamics, with content that is on the move. As Marres and others have proposed (Marres and Weltevrede, 2013; Marres, 2012c), drawing on Callon *et al.* (1983), we might focus on the *liveliness* of content. Liveliness is understood here as opposed to mere popularity in that it does not value a term because it is ‘popular’, but according to whether it enters into new relations. This creates a new way of ordering the social, one that brings forth the content that is ‘happening’. Such an ordering corresponds well with the slogan of actor-network theory that one should focus on the social when it is alive and creative, because the social is, in fact, a movement (Latour, 2005).

We have tried to operationalise this idea of lively content by creating our own algorithm that focuses on whether articles’ keywords enter into to new relations. In this operationalisation, a relation is made between two keywords if they co-occur in the same article. What our calculative device then does is summarise all the relations every keyword has entered into in a given year and compare this sum across all years in the relevant time period. The keywords that are a part of a relatively high amount of new relations are assigned a higher score, and these scores are then used to give all the articles a liveliness score based upon how ‘lively’ their keywords are. The results of this algorithmic ordering are shown as another top five in Table 1.2. Each of the top five articles is accompanied by its set of keywords to give the reader an idea about what is going on.

The two ‘liveliest’ keywords in our dataset is ‘balance-of-payment crises’ and ‘currency crises’, which means that they are the keywords that co-occur with the largest numbers of new keywords each year. As shown in Table 1.2, the presence of these keywords has helped the entire first four articles rise to the top in our liveliness hierarchy. The top article includes both of these keywords, while the fifth article that only just made it into the top five is the only one that does not mobilise any of the two most ‘lively’ keywords. The liveliness of terms like ‘balance-of-payment crises’ and ‘currency crises’ might indicate how the Asian economic crisis in the late nineties sparked a great variety of ways in which economic crisis was framed. This is not at all certain, however, and, like all other

TABLE 1.2 Top five articles based on the ‘liveliness’ of their keywords

<i>Articles</i>	<i>Keywords</i>
1 Galindo and Malony (2002)	balance-of-payments crises; currency crises; price
2 Aghion <i>et al.</i> (2004)	microeconomic adjustments; currency crises; monetary-policy; intermediation; constraints; inflows; cycles; shocks; 1990s; model
3 Angeletos and Wering (2006)	currency crises; bank runs; coordination; equilibrium; liquidity; crashes; models; rates; debt
4 Allen and Gale (2004)	balance-of-payments crises; bank runs; liquidity creation; deposit insurance; model; equilibrium; information; fragility; panics; risk
5 Farhi and Tirole (2012)	monetary-policy; bank runs; liquidity; inconsistency; equilibrium; discretion; failures; private; crises; rules

algorithmic methods, this one needs constant qualitative judgement to refine its methodology (Muniesa, 2004). Our point here is that ‘the algorithmic’ is something social scientists can explore and take seriously as a way of actively engaging in the politics of methodologies.

The first and very apparent difference between this liveliness-oriented ordering and the previous orderings is that none of the articles are the same as the ones prioritised by the methodologies derived from Google, Twitter, and Facebook. As such, the liveliness algorithm offers a radical reorganisation of relevance, and a clear break from the ‘popularity contest’ of citation counts. This difference also helps to show how algorithms can be agnostic, not only in their principles, but also in their outcomes. What we have arrived at with this co-word analysis is an indication that the most cited articles might not at all be the ones in which the most is ‘happening’ in terms of movement between different ‘post-social’ relationships (Marres, 2012c). Here is a second way, then, in which we as social researchers might intervene in the pluralistic space of algorithmic orderings. Table 1.3 presents the five alternatives that have been discussed.

TABLE 1.3 Summary of the calculative devices and their respective ordering principles

<i>Calculative device</i>	<i>Ordering principle</i>
Google	Authority
Facebook	Sociality
Twitter	Issue-orientation
ForceAtlas	Antagonism
Co-word algorithm	‘Liveliness’

32 Andreas Birkbak and Hjalmar Carlsen

Needless to say, this list is not exhaustive. On the contrary, these experiments have served to show that algorithms offer a plurality of ways for us to orient ourselves in ‘messy’ environments, and that these orderings come with justifications that, if taken seriously, explicate the world and the just vision of the public enacted by each algorithm. The value of this exercise, in other words, is that it has taken us some way in answering the question of what kinds of publics various calculative devices serve as public officials for, through actively politicising these algorithms. We have tried to do this in a ‘positive’ way where we have followed along with the justifications that are internal to the calculative devices under scrutiny, thus explicating rather than critiquing their politics. This is something social scientists can contribute to by engaging with the current rise of digital methods. As Rieder (2012: 11) concludes:

We risk missing a genuinely political moment if we lose sight of how software can sometimes make it astonishingly *easy* to do things differently.
(Rieder, 2012: 11)

By experimenting with the alternative algorithmic orderings of ForceAtlas and co-word analysis, we hope to have gone some way in demonstrating how this can be true for digital social science methods and the publics they generate.

Conclusion

In this Chapter, we have tried to unsettle the ways in which the web algorithms of Google, Facebook and Twitter position themselves as self-evident and indispensable. Our strategy has been to articulate and contrast the different visions of the just public embedded in these calculative devices. The main point was not to suggest that we would be better off without these devices. The formation of publics always come with a need to orient itself with respect to a problem of relevance (Marres, 2012a), which is the inherently challenging process of simultaneously articulating an issue and the public capable of solving it. We have experimented with the idea that this is what web algorithms do, that is, that they do work as public officials. By offering automated orderings, web algorithms simultaneously prioritise issues and delineate the corresponding publics.

We have focused on how three of the most prominent web algorithms order publics. More specifically, we articulated their ordering principles ‘from the inside out’, in a way that made it possible to see contrasts and start imagining alternatives. This was achieved by paying attention not only to how the algorithms work, but also to how these calculative devices justify themselves as part of their framing the problem that they claim to be solving. These justifications offered a vantage point for identifying the political philosophy of each device. We extracted and experimented with these philosophies in a relatively ‘quick and dirty’ way, which was not supposed to be exhaustive, but rather to

serve as a heuristic through which to open a space in which it is possible to make more-than-critical interventions. In the last section of the Chapter, two such interventions were proposed, the first of which served to go beyond the focus on popularity, and the second of which went further beyond the focus on the reputational logic of citations, 'likes', retweets, and links. In a digital age, where the orderings of web algorithms play prominent roles for how we navigate our environments, it is a crucial task to flesh out the worlds that these calculative devices create for us, to experiment with their consequences, and to suggest how in practice there could be other relationships between the public and its algorithms.

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34 Andreas Birkbak and Hjalmar Carlsen

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