



Want to be on the top? Algorithmic power and the threat of invisibility on Facebook

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Abstract

This article explores the new modalities of visibility engendered by new media, with a focus on the social networking site Facebook. Influenced by Foucault's writings on Panopticism – that is, the architectural structuring of visibility – this article argues for understanding the construction of visibility on Facebook through an architectural framework that pays particular attention to underlying software processes and algorithmic power. Through an analysis of EdgeRank, the algorithm structuring the flow of information and communication on Facebook's 'News Feed', I argue that the regime of visibility constructed imposes a perceived 'threat of invisibility' on the part of the participatory subject. As a result, I reverse Foucault's notion of surveillance as a form of permanent visibility, arguing that participatory subjectivity is not constituted through the imposed threat of an all-seeing vision machine, but by the constant possibility of disappearing and becoming obsolete.

Keywords

algorithm, EdgeRank, Facebook, Foucault, Panopticon, subjectivity, visibility

One of the core functions of the media pertains to that of making something or someone *visible*. As the subtitle of Marshall McLuhan's (1964) well-known work asserts, media are 'extensions of man' because they aid us in seeing and sensing what we otherwise might not be able to access. The regime of visibility associated with Web

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2.0 connects to the notion of empowerment, as it has greatly expanded the social field of becoming recognized as a subject with a voice. On the other hand, ubiquitous computing with increased deployment of surveillance technologies has often been associated with a sense of disempowerment. The increased surveillance potential of new media technologies is thus often quite rightfully depicted negatively. However, surveillance all too quickly gets equated with the capability of technology to map, track and store biometric and affective data for the controlling of bodies in time and space. This article argues for the importance of revisiting the idea of the technical and architectural organization of power as proposed in the writings of Foucault, by highlighting an analytics of visibility rather than merely transposing the concept of surveillance onto new objects. Becoming visible, or being granted visibility is a highly contested game of power in which the media play a crucial role. While Foucault did not connect his theory of visibility specifically to the media, the framework he developed in *Discipline and Punish* (1977) helps illuminate the ways in which the media participate in configuring the visible as oscillating between what can and should be seen and what should not and cannot be seen, between who can and cannot see whom. Examining new modalities of visibility becomes a question of how rather than what is made visible, through which specific politics of arrangement, architecture and design.

Drawing on Facebook as a case study, this article investigates the notion of mediated and constructed visibility through a close reading of the News Feed and its underlying operational logic, the EdgeRank algorithm. I argue that Foucault's idea of an architecturally constructed regime of visibility as exemplified in the figure of the Panopticon makes for a useful analytical and conceptual framework for understanding the ways in which the sensible is governed in social networking sites. Methodologically and theoretically, this article seeks to contribute to calls made by several authors published in *New Media & Society* over the past years about the need to consider the infrastructural elements of Web 2.0 (see Beer, 2009; Langlois and Elmer, 2009; Niederer and Van Dijck, 2010). Following Martin Dodge's extensive work on the emergence of software in everyday life, the focus here is on 'developing cultural and theoretical critiques of how the world itself is captured within code in terms of algorithmic potential' (2010: 15). The intention is not so much to offer a definite account of the role played by Facebook in capturing the world in code, but to open avenues for reflection on the new conditions through which visibility is constructed by algorithms online. Especially in a state of pervasive visibility, we need to take a step back and ask not for the visual manifestations and representations of bodies in code, but rather of the actual configuration of such manifestations in and through the media, that is, of how visibility is constructed, and through which technical measures.¹

To explore the ways in which algorithmic architectures dynamically constitute certain forms of social practice around the pursuit of visibility, the first section outlines some of the ways in which media construct visibility by giving an account of how previous research has conceptualized the issue of mediated visibilities. The second section goes on to examine the case study, providing a detailed description of the known principles of the EdgeRank algorithm. The third section revisits the

Foucaultian analytics of visibility, arguing that the algorithmically defined visibility constructed through EdgeRank functions as a reversal of the regime instantiated by the Panopticon. Finally, the article addresses some of the problems associated with understanding algorithmic power and provides some suggestions for further research.

Media visibilities

The media represent key mechanisms in the sorting, classification and ranking of the social field. In the context of the mass media, selecting and granting visibility has been described extensively using terms such as framing (Entman, 1993; Goffman, 1974), gatekeeping (Lewin, 1947) and agenda setting (McCombs and Shaw, 1972). The media industry is built around parameters of visibility. Without wanting to illuminate, to expose or inform publics about something previously unknown, there is no apparent need for the media. As John B. Thompson (2005) points out, visibility is fundamentally mediated and affected by the medium itself. Whereas print could be managed by political powers to control visibility in a desired way, the auditory quality of radio allowed for a distinct kind of intimacy. Later, television with the use of camera angles and close-up frames could render even the most detailed facial expressions and mannerisms of public personas (Thompson, 2005). Different media forms thus instigate different forms of visibility. The printing press is a carefully managed space of visibility organised through human editorial practices. Radio constructs a form of visibility that operates through sound rather than images, exemplifying the notion that visibility should not be confused with visibility. Television, like film, exemplifies the various technical means of arranging and organizing attention by constructing certain regimes of visibility through the deployment of angles, shots, frames, time and spatial techniques. While Thompson is more concerned with mediated visibility in terms of its social repercussions on political life, his genealogy of different media forms and the kinds of visibility they instigate also support a view on visibility as medium specific. To use Marshall McLuhan's (1964) famous truism, the medium is the message, is also to say that it is the medium that makes the message visible in the first place, governing visibility in a certain direction. Media as selection, sorting and framing mechanisms, ultimately points to the fact that media visibilities are never neutral; it is always about making the content meaningful.

With the advent of the internet and the Web, the medium specificity of the architectural organization of visibility, i.e. what can be seen and heard, to a large extent became a question of software. Many scholars have rightfully observed that the internet has indeed contributed to new forms of visibility; for instance, in facilitating the visibility of 'counter publics' exemplified in anti-globalization and the Zapatistas movements (Dahlberg, 2007) and the visibility of everyday citizenship (Bakardjieva, 2009). However, inquiries into mediated visibilities need to go beyond the visual and linguistic significance in accounting for ways of appearing online. The relatively new field of software studies (Berry, 2011; Chun, 2011; Fuller, 2008; Kitchin and Dodge, 2011) usefully directs attention to the ways in which software functions as a sociotechnical actor capable of influencing users' practices and experiences on the Web. As David Beer has eloquently argued, Web 2.0 is fundamentally governed by the various sorting and filtering algorithms determining what the user encounters online (2009). An important actor and

pioneer in the digital ranking game of relevance is Google with its PageRank algorithm. The politics of becoming visible in and through the power of PageRank is based on a cultural assumption about relevance and importance that, to a large extent, relies on the amount of incoming links by other websites and their perceived authority. As Pasquinelli (2009) notes, PageRank has become the most important source of visibility on the Web today. While Google and PageRank have received a lot of scholarly attention (see for instance Hargittai, 2007; Hellsten et al., 2006; Introna and Nissenbaum, 2000) the other powerful source of visibility on the Web today – EdgeRank – has, to my knowledge, hardly been critically scrutinized at all.

Algorithmic visibility

News feed and the EdgeRank algorithm

At the time of this writing Facebook's primary feature is the 'News Feed' and forms part of the first page that users access when logging on to the site. As of August 2011, the News Feed makes up the centre column of a user's home page and represents a constantly updating list of stories from 'friends' and 'Pages' that a user has a relationship with on Facebook.² The News Feed is further divided into two different versions, the default 'Top News' and the 'Most Recent' feed. According to the Facebook help centre, the difference between the two is that 'Top News aggregates the *most interesting* content that your friends are posting, while the Most Recent filter shows you all the actions your friends are making in real-time' (Facebook, 2011, emphasis added). Akin to the algorithmic logic of search engines, Facebook deploys an automated and predetermined selection mechanism to establish relevancy (here conceptualized as most interesting), ultimately demarcating the field of visibility for that media space. As Kincaid (2010) explains, every item that shows up in your News Feed is considered an 'Object' (i.e. status update, uploaded picture). Every interaction with the Object, for instance through a 'Like' or a Comment, creates what Facebook calls an 'Edge'. EdgeRank, the algorithmic editorial voice of Facebook, determines what is shown on users' Top News by drawing on different factors relating to the Edges. At least three different components are key to determining the rank of an Edge:


- (1) Affinity. This pertains to the nature of the relationship between the viewing user and the item's creator. Here the amount and nature of the interaction between two users is measured. Sending a friend a private message or checking out his or her profile on a frequent basis heightens the users' affinity score to that particular friend.
- (2) Weight. Each Edge is given a specific 'weight' depending on how popular or important Facebook considers it to be. Therefore, not every Edge gets weighted the same. Some types of interactions are considered more important than others. Arguably, a Comment has more importance than a Like.
- (3) Time decay. Probably the most intuitive component relates to the recency or freshness of the Edge. Older Edges are thus considered less important than new ones.

EdgeRank is calculated based on the multiplication of the Affinity, Weight and Time Decay scores for each Edge (see Figure 1). Becoming visible on the News Feed, appearing in that semi-public space, depends on a set of inscribed assumptions on what constitutes relevant or newsworthy stories. How many friends are commenting on a certain piece of content, who posted the content, and what type of content it is (e.g. photo, video, or status update) are just some of the factors at work in determining the rank of an Edge. The higher the rank, the more likely it will be that an Object appears in the user's feed (Kincaid, 2010). The algorithm is based on the assumption that users are not equally connected to their friends. Some friends thus 'count more' than others. The friends that count more are those with whom a user interacts with on a frequent basis or on a more 'intimate' level; say by communicating with a friend via 'Chat' rather than on the 'Wall'. This point becomes especially evident when considering the most recent changes to the operational logic of the News Feed. During February 2011, Facebook changed the settings and options for the 'Most Recent' feed. Two basic settings were implemented, a seemingly unfiltered one, showing stories from 'All of your friends and pages' as well as a filtered one displaying only 'Friends and pages you interact with most'.

It was not so much the fact that Facebook changed the News Feed feature yet again that brought about much public outcry on the matter, but the fact that Facebook had changed the default setting of the Most Recent feed to 'Friends and pages you interact with most', so that the feed most users believed to represent every update from every friend in a real-time stream, in fact became an edited one, much like the Top News filter. Perhaps what caused the most controversy was the fact that this change in default occurred without Facebook notifying its users about it. The option to change the default was tucked away at the bottom of a drop-down menu next to the 'Most Recent' tab in the 'Edit Options' tab (see Figure 2). This change in default caused a lot of content to be hidden away from users without their knowledge. Users who had noticed the change would ask where all their friends had gone, warning others about the fact that the changes 'mean that you are not seeing everything that you should be seeing' (Hull, 2011). There are at least two interesting assumptions apparent in this. First, there exists a notion about what

6. NFO: News Feed Optimization

EdgeRank



$$\sum_{\text{edges } e} u_e w_e d_e$$

u. - affinity score between viewing user and edge creator

w. - weight for this edge type (create, comment, like, tag, etc.)

d. - time decay factor based on how long ago the edge was created

Figure 1. Edge rank formula.

should be visible. Second, there is a notion that Facebook acts ideologically in that the platform is hiding something from people's view. But what is it that you should be able to see? Clearly, there is a discrepancy between what users think they should be seeing and what Facebook thinks users should be seeing.

The algorithm is furthermore geared towards highlighting certain types of Edges while downgrading others, where the type of interaction becomes a decisive factor. Chatting with someone on 'Facebook Chat' presumably counts more than 'Liking' his or her post. There is a certain circular logic embedded in the algorithm. In order for you to Like or Comment on a friend's photo or status update, they have to be visible to you in the first place. Any time a user interacts with an Edge, it increases his or her Affinity towards the Edge-creator. For instance, we can assume that Comments outweigh 'Likes', as they require more individual effort. The weight given to certain types of Edges moreover is likely to depend on the internal incentives that Facebook may have at any given point in time. If the objective for Facebook is to promote a certain product, for instance, the 'Questions' feature or 'Places', interactions with these features will probably be ranked higher than others. This is understandable. News Feed is the best way to increase awareness of new (or neglected) features and functionalities. The algorithm is not merely modelled on a set of pre-existing cultural assumptions, but also on anticipated or future-oriented assumptions about valuable and profitable interactions that are ultimately geared towards commercial and monetary purposes. By looking at the ways in which the specificities of the Facebook platform exemplified here through the EdgeRank algorithm enable and constrain ways of becoming visible online, we can begin to rethink regimes of visibility that hinge on and operate through algorithmic architectures. In doing so, this article expands on Foucault's idea of 'panopticism' as it provides a useful and still highly relevant analytics for understanding the ways in which visibility is technologically structured.

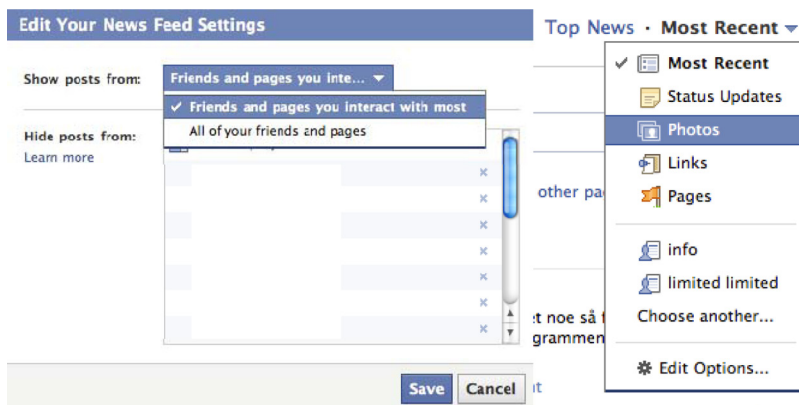


Figure 2. The new most recent feed settings with default set to 'Friends and pages you interact with most', February 2011.

Rethinking regimes of visibility

Panopticism

Foucault operates with two basic notions of how things are made visible or shown, exemplified in his notion of the spectacle and surveillance. It is not just a matter of what is seen in a given historical context but what can be seen and how the realm of the seeable and sayable is constructed in order to make a particular dispositif of visibility appear. As Thompson (2005: 39) explains, whereas the spectacle designates a regime of visibility in which a small number of subjects are made visible to many, as Foucault argued was the case in the *ancien régime* with its sovereign rulers, surveillance mechanisms, on the other hand, are connected from the 16th century onwards to the emergence of disciplinary societies in which the visibility of the many is being assured by a small number of subjects. Surveillance as a mode of visibility was famously exemplified in the architectural arrangement of the Panopticon. Adapting the figure of the Panopticon from Jeremy Bentham, Foucault sought to explain the regulatory force of power inherent in specific architectural compositions. The idea of the Panopticon designates an architectural vision of a prison, a circular building with an observation tower in the middle. The prison is thus designed in such a way that one can never be certain whether one is being watched or not. 'Hence, the major effect of the Panopticon: to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power' (Foucault, 1977: 201). The uncertainty associated with the possibility of always being watched inevitably leads the subject to adjust his or her behaviour accordingly so as to behave as if they indeed were being permanently observed. Surveillance thus signifies a state of permanent visibility. The novelty of Foucault's notion of visibility constructed by the specificities of the historically contingent architectural apparatus lies precisely in highlighting the technical organization of power. As Foucault points out, the Panopticon is not a dream building: 'it is the diagram of a mechanism of power reduced to its ideal form' (Foucault, 1977: 205). By highlighting the diagrammatic function of panoptic surveillance, Foucault provides a forceful analytical framework for understanding different modalities of visibility.

As Rajchman points out in his discussion of Foucault: 'Architecture helps "visualise" power in other ways than simply manifesting it. It is not simply a matter of what a building shows "symbolically" or "semiotically", but also of what it makes visible about us and within us' (1988: 103). Conceiving of visibility as an organization of power in both a negative and a positive sense, Foucault shows that 'spaces are designed to make things seeable, and seeable in a specific way' (Rajchman, 1988). Prisons, hospitals and social networking sites are essentially spaces of 'constructed visibility'. The realm of visibility created by the panoptic architecture did not work primarily through a certain iconography, nor a visual semiotic regime, but first and foremost through the technical structuring of a way of being, implementing an awareness or attentiveness to the constant possibility of inspection. To highlight visibility as a system, a diagram, is to highlight the 'distribution of individuals in relation to one another, of hierarchical organisation, of dispositions of centres and channels of power' (Foucault, 1977: 205). It is precisely this notion of a material or

technical structuring of visibility that seems especially interesting and relevant in terms of new media. The spaces designed by the (im)material conditions of the software are similarly designed to make things visible, and thus knowable, in a specific way.

Threat of invisibility

The mode of visibility at play in Facebook as exemplified by the News Feed and its EdgeRank algorithm differs from that of disciplinary societies in one particularly interesting way. The technical architecture of the Panopticon makes sure that the uncertainty felt by the threat of permanent visibility is inscribed into the subject, who subsequently adjusts his or her behaviours. While one of the premises of the panoptic diagram pertains to even distribution of visibility in which each individual is subjected to the same level of possible inspection, the News Feed as we have just seen does not treat individuals equally. There is no perceivable centralized inspector that monitors and casts everybody under the same permanent gaze. In Facebook there is not so much a 'threat of visibility' as there is a 'threat of invisibility' that seems to govern the actions of its subjects. The problem as it appears is not the possibility of constantly being observed, but the possibility of constantly disappearing, of not being considered important enough. In order to appear, to become visible, one needs to follow a certain platform logic embedded in the architecture of Facebook. There is now a whole industry being built around so-called 'News Feed Optimization' akin to the more established variant, search engine optimization. Marketers, media strategists, PR firms all have advice on how to boost a brand's visibility on Facebook. One only needs to search for 'EdgeRank' on Google to see that the first twenty returns are almost entirely by social networking marketing or other e-commerce related businesses. While many individual users may not be aware of the algorithmic politics behind the News Feed, this has become one of the main concerns for businesses and organizations that want to reach their desired audience. According to a market report: 'Making it to that News Feed is crucial. No matter how interesting a brand's content program, visibility is required to get users to interact with it' (Shahani et al., 2011: 2). Similarly, Taylor suggests that: 'Facebook's EdgeRank holds all power of visibility' (2011).

The threat of invisibility should be understood both literally and symbolically. Whereas the architectural form of the Panopticon installs a regime of visibility whereby 'one is totally seen, without ever seeing' (Foucault, 1977: 202), the algorithmic arrangements in Facebook install visibility in a much more unstable fashion: one is never totally seen or particularly deprived of a seeing capacity. True, like the Panopticon, the individual Facebook user can be said to occupy an equally confined space. Like the carefully and equally designed prison cells, the user profile represents a schemata that 'provide fixed positions and permit circulation' (Foucault, 1977: 148). Just as with the concrete machines (i.e. military, prisons, hospitals) described by Foucault, it is not the actual individual that counts in Facebook. This is why spaces are designed in such a way as to make individuals interchangeable. The generic template structure of Facebook's user profiles provide not so much a space for specific individuals but a space that makes the structured organization of individuals' data easier and more manageable. However, whereas the

architecture of the Panopticon makes all inmates equally subject to permanent visibility, EdgeRank does not treat subjects equally as it prioritizes some above others. Whereas visibility as a consequence of the panoptic arrangement – what is commonly understood as surveillance – is abundant and experienced more like a threat imposed from outside powers, visibility in the Facebook system arguably works the opposite way. The algorithmic architecture of EdgeRank does not automatically impose visibility on all subjects. Visibility is not something ubiquitous, but rather something scarce.

In a small experiment conducted over a period of two months (March–April 2011) I used my own personal Facebook profile to compare the contents of the Top News to that of the Most Recent feed in order to see how many of the Most Recent posts actually made it to the Top News. I did the comparison a couple of times a week and took screen shots of the entire Top News feeds and manually counted the posts in the Most Recent feeds. I took the oldest story published in the Top News and compared it to the amount of stories published in the Most Recent feed up to the same time stamp. On a randomly selected day in April 2011 this amounted to 280 stories published on the Most Recent, as opposed to 45 posts appearing in the Top News within the same timeframe. At first glance, only 16 per cent of the possible stories seem to have made it to the Top News. As time decay is one of the three known factors of EdgeRank, it is safe to assume that there is a higher probability of making it into the Top News the closer to real-time the story is published. In fact, this small study showed that if the story was published within the last three hours, there would be between a 40 to 50 per cent chance of getting onto the Top News. In addition to selecting from the total amount of updates generated by friends from the real-time stream, Top News also displays its own tailored news stories that are *not* displayed in the Most Recent feed. These stories I call communication stories, as they construct a story out of two friends' recent communicative interaction (see Figure 3). Communication stories in Facebook typically take the form of 'X commented on Y's photo' or 'X likes Y's link'. Taking the tailored stories into the equation, a better estimate for the 45/280 ratio would be a mere 12 per cent chance of getting in the Top News. No matter how meticulous the counting and comparing between the two feeds, the exact percentage of stories making it to the Top News remains somewhat obscure. Like Google's PageRank the exact workings and logics of EdgeRank include more factors than is publicly known. While Affinity, Weight and Time Decay are key components of the algorithm structuring the regime of visibility in News Feed, it is safe to assume that other factors will affect the ranking and selection of Edges as well. What becomes apparent is that algorithms, especially those working at the heart of 'Big Data' companies like Facebook and Google, occupy a peculiar epistemological position where some components are known while others are necessarily obscured. Algorithms are fundamentally relational in the sense that they depend on some kind of external input (data) in order to function. Algorithms do not just represent a rigid, pre-programmed structure, understood as 'recipes or sets of steps expressed in flowcharts, code or pseudocode' (Mackenzie, 2006: 43). They are also fluid, adaptable and mutable. This means that EdgeRank is not something that merely acts upon users from above, but rather that power arises from its interrelationships with users. How EdgeRank will process the data that I provide, therefore fundamentally also depends



Figure 3. Communication stories (i.e. 'X commented on Y's photo'), April 2011.

on *me*, and my relationships with my 'friends'. For instance, Top News dynamically updates depending on how many times I visit Facebook. This makes it difficult to make a general claim about the percentage of stories making it to the Top News as the degree of influence the frequency and duration of my visits to Facebook has on the Edges remains unknown. While the dynamic nature of the algorithmic makes analysis of its exact workings difficult, we can, as Mackenzie suggests, treat the algorithm as a particular way of framing the environments it works upon (2007). Writing about the nature of software, Kitchin and Dodge (2011) highlight the power of algorithms to influence how sociality is represented and organized. EdgeRank,

acting as a gatekeeper of user-generated content, demarcates visibility as something that cannot be taken for granted. The uncertainty connected to the level of visibility and constant possibility of 'disappearing' in relation to the 'variable ontology' of software, frames visibility as something quite exclusive. Becoming visible on the default News Feed is thus constituted as something to aspire to, rather than feel threatened by.

Visibility as a reward for interaction

Essentially, becoming visible is to be selected for by the algorithm. Inscribed into the algorithmic logic of the default News Feed is the idea that visibility functions as a reward, rather than as punishment, as is the case with Foucault's notion of panopticism. A different Top News sample from the experiment reveals the following: of 42 posts displayed, only three of the stories published by my 'friends' came without any form of interaction by others (that is, without any 'likes' or Comments). Eleven stories published were by Pages that I had 'liked', none of which had generated more than one 'Like'. Out of the remaining of my friends' stories, 15 were status updates with Comments and/or 'Likes' and 10 were of the tailored type where friends had either 'commented' or 'liked' someone's uploaded photo, video or shared link.³ My Top News was filled with stories that obviously signify engagement and interaction. Although distribution of the specific types of stories published varied over the course of the two months, stories without significant interaction seemed to be filtered out. The fact that there were almost no stories by friends that prevail on the Top News without any form of engagement by others strengthens the impression about the algorithmic bias towards making those stories that signify engagement more visible than those that do not.

Interestingly, as already mentioned, Top News displays its own tailored stories that do not appear in the Most Recent feed. The two months' worth of tracking my Top News showed a significant favouring of the form 'X commented on Y's photo' followed by 'X likes Y's photo'. This suggests that photos are an important currency for getting on the Top News, as are friends' interactions with these photos.

Most of these types of stories tailored specifically for the Top News are characterized by having many others, friends of friends, also commenting or 'Liking' the post. Of all the 45 stories published on my Top News another day in April 2011, 17 were communication stories. What most of these 17 communication stories had in common was a high degree of interaction. For example, a typical story would say: 'Anna commented on Claire's photo' along with '11 people like this' and 'View all 14 comments'. Not only does Facebook tailor specific stories for the Top News feed, these stories also receive a significant amount of visibility as opposed to other types of Edges. On average, communication stories made up a third of my entire Top News, with variations between 24 and 40 per cent. Since, on average, a third of the Top News stories do not appear in the Most Recent feed, the amount of real-time stories making it into the Top News are even less than originally thought. While there is a higher chance of getting into the Top News if the post was published within the past three hours, continuously interacting on Facebook seems to be a better bet for becoming visible.

Participatory subjectivity

The threat of invisibility on Facebook then is not merely symbolic, but also, literally, quite real. While the regime of visibility created by Facebook may differ from the one Foucault described in terms of surveillance, understood as imposing a state of permanent visibility, discipline is still part of the new diagrammatic mechanisms. While it has become commonplace to argue for the transition of a disciplinary society into a control society after the post-industrial fact described by Deleuze (1992), I do not see a necessary contradiction between the disciplinary diagram and software-mediated spaces. Discipline simply refers to a diagram that operates by making the subject the 'principle of (its) own subjection' (Foucault, 1977: 203). Discipline denotes a type of power that economizes its functioning by making subjects responsible for their own behaviour. As such, 'discipline "makes" individuals; it is the specific technique of a power that regards individuals both as objects and as instruments of its exercise' (Foucault, 1977: 170). It imposes a particular conduct on a particular human multiplicity (Deleuze, 2006: 29). It is important here to highlight that Foucault developed the notion of disciplinary power in order to account for the duality of power and subjectivation – by 'training' subjects to think and behave in certain ways and thus to become the principle of their own regulation of conduct. Through the means of correct training, subjects are governed so as to reach their full potentiality as useful individuals (Foucault, 1977: 212). Foucault identified basically three techniques of correct training: hierarchical observation, normalizing judgement and the examination.

In the Facebook assemblage, a useful individual is the one who participates, communicates and interacts. The participatory subject evidently produced by the algorithmic mechanisms in Facebook follows a similar logic to those techniques of correct training at work in sustaining disciplinary power. First, the very real possibility of becoming obsolete inscribed through the 'threat of invisibility' arguably constitutes a desire to participate. Here we can see the double logic inherent in Foucault's understanding of power, as both constraining and enabling. While visibility is constrained by the failure to conform to the inherent logics of participation, visibility is also produced and enabled by the same logic. As Foucault asserts: 'What is specific to the disciplinary penalty is non-observance, that which does not measure up to the rule, that departs from it' (1977: 178). Not conforming to the rules set out by the architectural program is thus punishable. That is, not participating on Facebook will get you punished by making you invisible.

Secondly, making it appear as if everybody is participating and communicating by emphasizing those stories that generate many Comments and Likes provides an incentive to Like or Comment as well. Simulation creates an impression, and it is precisely the power of impressions that Foucault thought was a driving force in the governing of the self. As Hoffman, elaborating on Foucault's notion of disciplinary power, explains: 'Disciplinary power judges according to the norm. He depicts the norm as a standard of behaviour that allows for the measurement of forms of behaviour as "normal" or "abnormal"' (2011: 32). By creating the impression that everybody participates, Facebook simultaneously suggests that participation is the norm. Normalization, according to Foucault, created a 'whole range of degrees of normality indicating membership of a homogeneous social body but also playing a part in classification, hierarchization and the distribution of rank' (1977: 184).

Thus, EdgeRank, by functioning as a disciplinary technique, creates subjects that endlessly modify their behaviour to approximate the normal. Because interaction functions as a measure for interestingness, practices of Liking, Commenting and participation become processes through which the subject may approximate this desired normality.

Thirdly, the participatory subject created by the algorithm hinges on an underlying idea of popularity. Displaying Edges with a high degree of interaction clearly remediates some well-known cultural assumptions and mass media logics – popularity fosters further popularity. There is thus a circular logic to the way in which visibility is organized on Facebook. Being popular enhances the probability of becoming visible and thus increasing the probability of generating even more interaction. Being confronted with communication stories that further encourage the user to ‘view all 14 comments’, ‘view all 9 comments’, and acknowledge that ‘Christina and 7 others like this’ further creates the impression that visibility is granted to the popular. EdgeRank, by emphasizing the perceived popularity of Edges, also reinforces a regime of visibility that runs counter to much of the celebratory Web 2.0 discourse that focuses on democratization and empowerment. While Facebook is certainly a space that allows for participation, the software suggests that some forms of participation are more desirable than others, where desirability can be mapped in the specific mechanisms of visibility as I have suggested throughout this article.

Concluding remarks

Suggestions for further research

Visibility online is increasingly subject to various ranking, sorting and classification algorithms. Yet, as Adrian Mackenzie has pointed out, algorithms ‘are rarely discussed in themselves and rarely attended to as objects of analysis’ (2007: 93). Given the 750 million Facebook users who are affected by the ways in which algorithmic automated processes decide whether their content deserves to get on the ‘top’, it is surprising how little attention such software infrastructures have received from the academic community. Taking up David Beer’s call for the need to explore and describe ‘power through the algorithm’ (2009: 999), I have examined Facebook’s EdgeRank as a form of disciplinary diagram, ultimately engaged in the material structuring of visibility. To my knowledge, this article provides the first critical analysis of the EdgeRank algorithm to date, but it is only the beginning. Additional research is needed to understand the ways in which algorithms signify and are suggestive of things, how they ‘make sense’ in networked environments, in terms of producing the conditions for the intelligible and sensible.

One of the problems with analyzing algorithms is their often black-boxed nature. While some components of the algorithm are known as described in Figure 1, others remain obscure. We are not seeing completely under the bonnet of the Facebook infrastructure. Further research could extend the experimental focus of this article to include many different Facebook profiles. As this article is confined to the ‘me-centricity’ of the platform by only having access to my own profile for such time-consuming screen shot recordings and the tracking of content, it would be valuable to see how the algorithm plays out in different networks.⁴ The question, however, is whether the ‘black

box' presents a problem. The answer, I believe, needs to be a compromise. As a general principle, one should aspire to open up any black box that one finds, as one of the key strategies advocated by STS and Actor Network Theory (see Latour, 1987 and MacKenzie, 2009 for a useful discussion). However, as Wendy Chun eloquently points out 'we cannot know software' since it is but a gathering of heterogeneous relations (2011). There would simply be too many factors one would have to take into account. Rather than being put off guard by the fact that technical black boxes cannot always be opened, Chun urges us to see this as an 'enabling condition' (2011: 54). Following Wardrip-Fruin's notion of 'operational logics' (2009: 13), what is important is not necessarily to know every technical detail of how a system works, but to be able to understand some of the logics or principles of their functioning in order to critically engage with the ways in which systems work on a theoretical level.

Many of the characteristics associated with disciplinary power described by Foucault, such as the function of enclosure, the creation of self-control and the training of human multiplicity are apt characterizations of the kind of enclosed architecture of Facebook and its subtle demands for participation and interaction. However, if we follow Foucault in his understanding of surveillance as a form of 'permanent visibility', then surveillance fails to account for the algorithmic logic of creating modalities of visibility that are not permanent but temporary, not equally imposed on everyone and oscillating between appearing and disappearing. One possible avenue here might be to develop a better understanding of the extent to which unstable architectures differ conceptually from fixed and confined spaces and whether this variance makes a difference in how visibility is enabled and controlled. While it is true that Foucault described organizations of power within a rather fixed technological and architectural form, the idea that architectural plans structurally impose visibility does not seem to come in conflict with the unstable and changing arrangements characteristic of new media. On the contrary, with reference to Foucault's concept of panopticism, the aim of this article has been to argue for the usefulness of applying an analytics of visibility to (im)material architecture. Following Foucault's assertion that 'the Panopticon must be understood as a generalizable model of functioning; a way of defining power in terms of the everyday life of men' (1977: 205), I think that a diagrammatic understanding of EdgeRank provides a constructive entry point for investigating how different regimes of visibility materialize. Thus, as Diana Taylor suggests, cultivating a critical attitude towards the ways in which diagrams govern provides a means through which we can exercise 'critique' (2011: 178–186). Although Facebook encourages researchers to stay away from the platform as it only and inevitably offers a point of view that is biased, I want to suggest that rather than moving away from the platform, we should openly speak from within. By not letting the me-centricity of Facebook limit research into the closed and black-boxed spaces of commercial Web 2.0 platforms, we can start to accumulate and reassemble our individualized experiences of becoming visible in and through the power of the algorithm.

While the main focus here has been to critically scrutinize the specific modality of the technical organization, and ways of making visible or invisible, as manifest in the Top News feed, more research is needed to address the many other aspects of the Facebook architecture that also take part in the distribution and organization of visibility. Algorithms are but one aspect of Facebook's software assemblage affecting the construction of regimes

of visibility and invisibility. Considering how software has been described as a 'neighbourhood of relations' (Mackenzie, 2006), as a gathering or thing (Chun, 2011), and as a 'mutable set of relations created through diverse sets of discursive, economic, and material practices' (Kitchin and Dodge, 2011: 37), further research should look into the ways in which EdgeRank combines with other aspects of the Facebook ecology to organize regimes of visibility. For instance, how do the 'Open Graph protocol', 'Like button' and third-party apps figure into the articulation of different modes of becoming visible or invisible? How and to what extent different software components and code interact and cooperate in the production of social relations and subjectivity become critical questions for further research into Web 2.0 platforms. If an architectural framework helps to frame Facebook as a 'space designed to make things seeable, and seeable in a specific way' (Rajchman, 1988), the question of how this space becomes and shifts meaning needs to be attended to. Space, assert Kitchin and Dodge, is constantly brought into being as an incomplete solution to an ongoing relational problem' (2011: 71). This is also reminiscent of algorithms as 'proposed solutions to problems' (Mackenzie, 2006: 46). Algorithms, like space, are ontogenetic – in becoming – simply because the problems that need solutions continually change. While the problem of showing the most 'interesting' content remains, what constitutes interestingness depends on the given context, as I have shown in my discussion of EdgeRank. This ontogenetic nature or the 'variable ontology' of software and algorithms constitute an argument for an ongoing research commitment to platforms like Facebook and its sociotechnical components.⁵ Facebook is never finished. As scholars, we need to be attentive to the ways in which our research objects change in an ongoing fashion as well as to the patterns that may emerge. For instance, in the course of writing this article, Facebook has changed significantly several times, in ways that already render this study a historical object. The most recent changes to the News Feed, implemented on 20 September 2011, have done away with the dual feeds discussed in this article and have merged them together into a single News Feed. However, the argument – that algorithms are architectures of visibility, making that which touches them seeable in a specific way – has perhaps become an even more pressing issue with the new design. With Facebook stating that 'News Feed will act more like your own personal newspaper' where the 'most interesting stories will be featured at the top' (Tonkelowitz, 2011), the power of algorithms needs to be assiduously addressed. Given these new changes, what is needed is research that not only attends to changes in editorial media practices as increasingly delegated to algorithms, but also to the changes in cultural assumptions about the nature of social networking that are being built into algorithmic architectures.

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Notes

1. It seems that media studies has been mostly preoccupied with the issue of visibility understood as 'modes of expression', rather than visibility understood as something that goes beyond the merely visual, as something that designates a general mode of awareness about someone or something (Daniel Dayan's work is instructive in this regard).

2. Facebook changed its interface and News Feed design and functionality on 20 September 2011. This article is based on a study of the News Feed *before* these changes occurred and refers to how the feeds worked and looked between April and August 2011.
3. More information available on request.
4. See Langlois et al. (2009) for more on the 'me-centricity' of Facebook. This is to say that researching the specific material workings, orderings and distributions of visibility and subjectivity on Facebook is largely confined to the first person perspective of the user profile.
5. According to Adrian Mackenzie, the term 'variable ontology' suggests that the essential nature of the entity is unstable. Questions of whether it is a social or technical, material or semiotic entity cannot be answered conclusively.

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