

Following hashtag (#)MOOC: mobility of online courses on twitter

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Abstract

Electronic posts in social media sites have led to an interpersonal shift that allows discourse-search through the use of hashtags resulting in the emergence of ‘searchable talk’ (Zappanigna, 2011) and the rise of database culture (Miller, 2008). The hashtags have referred to ‘trending topics’ and have become linguistic markers for ‘findability’ towards a new form of sociality that is not based on reciprocity or notions of virtual community. What connects users is not who or an ego-centric node, but what is passed along in a ‘stream’ (ie. the movement of ideas, information and sentiments) of re-tweets (RT’s) and mentions (@) about some hashtagged (#) topics. This streaming sociality is the focus of this paper. To understand streaming sociality as an opportunity to expand social science research, this paper focuses on small talk about ‘massive’ and trendy topics on education-related ideas and initiatives, namely, mooc, coursera and futurelearn, on Twitter. First, it examines how Twitter as a social technology could be performed differently in simultaneous ways as context, tool and data set of social science research. At the level of theory, a ‘new’ form of networked sociality is considered outside the ‘big data’ slogan and extreme reactions on topics related to particular political events, campaigns, disasters, disease outbreaks, brand marketing or self-promotion.

Then, this paper asks how the streaming sociality of Twitter may transform the content, movement and geographical trends of online courses associated with #coursera and #futurelearn by tagging and performing the circulation of a different kind of mooc – mobility of online courses ((#)mooc). It will venture into unfamiliar territories and spaces mostly at an interface hoping to follow (#)mooc through hashtags, re-tweets and mentions of education-related tweets. At the point of data collection and analysis, free trial versions of social media analytics and visualisation softwares are used to attempt an alternative way of following the movement of online courses without ‘going big’ or ‘being massive’. To follow and tag what is happening to online courses through the ‘code/space’ (Kitchen & Dodge, 2011) of Twitter, it is necessary to attend to ‘hashtag’ bondings. ‘Hashtag’ refers to all those posts or news and events not explicitly tagged or mentioned by users. These muted tags give room for analytical moves that could potentially bridge the methodological divide between qualitative and quantitative epistemologies as social science researchers are confronted with the power of algorithms and monumentally detailed by-product data (Beer, 2012).

Keywords

Twitter, social media, microblogging, big data, phatic culture, by-product data, mooc, coursera, futurelearn, hashtag

Introduction

Social information diffusion has been of interest to researchers from various disciplines and concerns related to epidemiology, health, disaster prevention, and disease (O'Connor, et al, 2013) in social media sites. Although these prior works provide useful insights into the cultural shift that we face amidst the rise of the database culture, there would always be the social or material context that is bracketed from view, such as, external event triggers and user actions outside the 140 character-length of Twitter posts (see Postill and Pink, 2012). This paper is an attempt to respond to Allen-Robertson and Beer's (2010) invitation to further pursue the 'mobility turn' and to bring my earlier work that I have been unsystematically pursuing for the last three years (Author, 2011; 2013) within the domain of 'big data'. Here I would like to address and participate in conversations and deliberations regarding a different kind of mooc - in terms of the mobility of online courses than in terms of their 'massive' characteristics in a quantified manner based on student numbers. In search of more than just an analysis of social diffusion patterns and central actors with high online visibility, the paper in its short

deliberations proceeds to argue that the mooc worth knowing and investigating may not necessarily be massive and not particularly informational or educational. To follow online courses, mooc is located within a 140-character length of Twitter and followed through its 'code/space'. As such, Twitter has to be considered carefully. Only then, 'mooc' as a user handler and topic will be traced by drawing upon the huge resource of indexed, managed, pre-linked and pre-classified database and system structures that constitute a microblogging site.

This study proceeds without any guarantee or prior experience in the exchange, negotiation or compromise of following digital traces of data collected, tabulated and visualised out of my hands and into the hands of third party software. Aware of the power of algorithms and computer code, the movement of courses is facilitated by the processes of digitalisation and the archival resources that existed even before I thought of doing this study as part of these processes. The database and archiving tools has allowed me to perform an instance of 'mobile method' (Buscher & Urry, 2009).

Electronic posts or messages in social media or social networking sites have led to an interpersonal shift that allows discourse-search through the use of hashtags resulting in the emergence of 'searchable talk' (Zappaniga, 2011). The hashtags have referred to 'trending topics' and have become linguistic markers for 'findability' towards a new form of sociality that is not based on reciprocity or notion of online or virtual community as introduced by Rheingold (1993).

What connects people or users is not the person being followed, not who or the ego-centric node, but what is passed along (the movement of ideas) in a 'stream' of re-tweets (RT's) and mentions (@) about some identified or tagged topics (#). This hashtag sociality is the focus of this paper. Bringing this mobile sociality wherein what is happening does not necessarily speak of one's locale but reaches rather globally and attempts a presence elsewhere through mentions and retweets.

The software application or web service site that I introduce here is Twitonomy (www.twitonomy.com). The aim is to face 'big data' by meddling with social media data aggregators and visualisations in an exploration of the new sociality of open and distance learning in terms of massive open online courses (moocs). What do the a priori analytics do to practices of social research and to the mobility of online courses? Can educational technology researchers participate in the big data movement without going big?

This paper is a collage of algorithms not fully known to me, tweets I never did follow, lots of thinking and other text from scholarly articles and blog entries. In its pages, I will first of all attend to Twitter as a social technology to understand both its potentials and limitations as a context, tool and data for research. Then, I move to consider a third party service to explore the emergent mechanisms that produce a stream sociality and how this shapes distance learning or networked learning within a real-time web. I submit my study to the power of algorithms and then subject what I find or encounter in ways I did not expect or plan to further scrutiny, getting under the hood of streams and understanding the material aspects of the movements of online courses. I puzzle over the possibility that the mobilities turn is meshed or is in fact a computational maneuver when we try to come to terms with massive open online courses with brand platforms like Coursera (www.coursera.org) and Futurelearn (www.futurelearn.com). The mobilities of online courses do not solely lie in the hands of users, but in metrics a click can trigger alongside the commodified geo-spatial information of users.

Twitter as a social technology

Launched in 2006, twitter as a social technology provided and elicited differences in its make-up and making over the years. It's original tagline, 'What are you doing?' made it a popular friend-following tool for updates and whereabouts. Most of the tweets were said to be 40% 'babble' (BBC News, 2009) or daily chatter (Java et al, 2007). As a context it has shifted its invitation for tweeting in November 2009 to 'What's happening?' Rogers (2013) suggested that this shifted its social engagement from an ego-centric platform to a reporting machine. This transition from a friend-following social media site to event-following has significant implications to the real-time web or stream sociality. Eventually, the hashtag (#) and the @ mention marker caught on and have been attributed to having roots in the Internet Relay Chat (IRC) culture. The mention marker allows conversations not built in into the design of the twitter interface. The hashtag was reported to have been used the first time when users reported about the San Diego fires in 2007 (Sutton, et al, 2008). Users can then share these tweets with their own followers, known as a 'retweets' (RTs). This can all be done from a computer, tablet or mobile phone device, increasing its utility as a 'real-time' tool.

As a form of micro-blogging, Twitter uses a maximum of 140 characters per tweet, making it an ideal way to communicate quickly and succinctly. Its character limit makes a collection of tweets very manageable as data, which have become 'searchable talk' (Zappaniga, 2011) with the use of hashtags.

On twitter, unlike in Facebook, you are not watching the person, you are watching what they produce, it is not a social network, you are not dealing with them - you are dealing with what they put out there. Kwak et al (2010) went as far to say that Twitter is not even social with very low reciprocity in terms of followers. This presupposes a version of the 'social' that only manifests itself in direct interaction or reciprocity. People do connect socially through small text without passing along meaningful information, by merely keeping in touch (Chen, 2011; Rogers, 2013) or 'being (t)here' (Author, 2013). There is an 'available' state or presence that does not necessarily require words. In short, Twitter as a social technology and a context of study does not have to be bound or pre-defined to be either a dialogue or an information exchange (Wilkinson & Thelwall, 2012). Hence, this paper is less interested with the production and consumption of online courses under the label of FutureLearn and Coursera. Its inclinations are very much driven by hashtags and hushtags. 'Hushtag' refers to all those posts or news and events not explicitly tagged or mentioned by users.

Methodology

The rise of scanner and database culture poses many possibilities for research which are unfortunately beyond the reach of scholars in the fields of social science (McKelvey, et al 2013; Allen-Robertson and Beer, 2010). In an attempt to face the challenge of big data, this article draws upon the visualisation powers of the commercial sector to imagine opportunities and 'follow' HE-related or academic or course-related events for rethinking 'networked learning' beyond notions of virtual or online community introduced by Rheingold (1993) towards a networked sociality (Wittel, 2001) of mobilities based on a stream sociality.

The social media data aggregator or software application that is used and introduced to the networked learning community is Twitonomy. This was performed for the first time really to explore and trial what use this software in its free (restricted, trial) version might offer for investigating an educational shift in terms of moocs (massive open online courses) towards an emphasis on another kind of mooc – mobilities of online courses, which really refers to the 'streams' of users and courses. The aim of the study was not to simply follow mooc/s, futurelearn or coursera as topics and users on Twitter and submit the search and analysis to software applications. It was an exploration of the act of following or streaming - the processes, possibilities and representations, softwares and visualisations - afforded/permitted by web-based data. Furthermore, it extends the stream imaginary by ... and to 'unfollow' and proceed to hushtag bondings as another possibility hidden or not coded into algorithms.

I only dealt with a 'slice' of Twitter data to consider streams. Perhaps I am being too optimistic or even opportunistic in following the routes of the mobile - making use of the cracks that particular tweets and algorithms open up for me to interfere in the 'live' stream. I followed other clues that track the mobility of online courses. I refer to these as hushtags (ie (#)mooc). These muted tags give room for analytical moves that could potentially bridge the methodological divide between qualitative and quantitative epistemologies as social science researchers are confronted with the power of algorithms and monumentally detailed by-product data (Beer, 2012). My attempt in this regard is very restricted and biased. I proceeded with a corpus of tweets containing the keywords mooc, coursera and futurelearn, both as user accounts and topics.

Data Analysis

The broad adoption of the web as a communication medium has made it possible to study social behaviour at a new scale. With social media networks such as Twitter, we can collect large datasets of online talk. Here I briefly describe my first attempt (it was rather multiple) to use Twitonomy.

Twitonomy

Twitonomy produces descriptive statistics and a downloadable .csv file which contains time-stamped tweets with user profiles. Its analysis basically includes 'a priori (tweets) analytics' containing numbers of tweets per day, user mentions, links, tweets retweeted, replies and hashtags. It also shows tweet history plus followers, most retweeted tweets, most replied to and most mentioned.

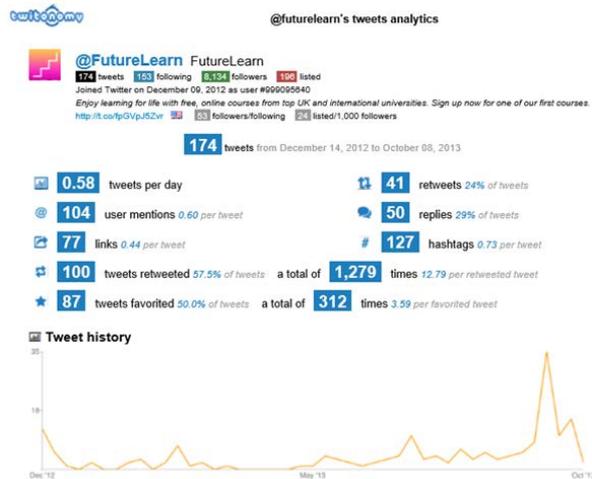


Figure 1: @FutureLearn Profile and Tweet History (via Twitonomy)

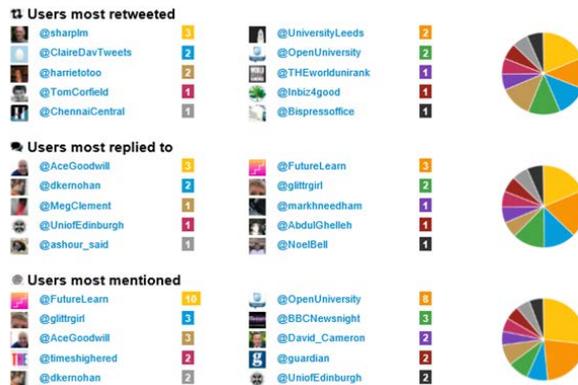


Figure 2: Twitter analytics for @futurelearn

Following mentions (@)

I followed two specific MOOCs, FutureLearn (FL) and Coursera. They are big and well branded. As Twitter users or accounts, both seemed ordinary. FL only had a total of 174 tweets between 14 December 2012 and 8 October 2013 posted by user @futurelearn. 25% were RTs, 199 mentions and 157 hashtags, where 36 of which were classified as '#mooc'. Coursera, having been in the game for longer, had a total of 1,424 tweets from 8 October 2011 to 7 October 2013. There were 533 RTs, 1,887 mentions and 103 hashtags, where 23 of which were classified as '#mooc'.

Twitter is asymmetrical - I can follow you and you can never notice or care. Lurking has become the norm and so is spamming. Following in Twitter is about flows or streams, which are user-defined. Mentions, as well as hashtags, are not pre-defined by its user interface. As such, there exists in its flows and tags the 'unmentioned' and 'untagged', in short the 'unfollowed'. A quick content analysis of the FL tweets performed a different Twitter. It became a social technology for news and adverts than place for real attention and interaction. However, before we move into this in the next section, I found a 'hushtag' in the 'unfollowed'.

Here is @moocs (Figure 3) with 937 tweets and over 1,000 followers and following and yet, the fact that it is in Japanese leaves me no space to include it more explicitly. I know this much, it is about moocs. The website address, moocs.nifty.com, tells me it is. Unfortunately, I could not 'click' and go there.



Figure 3: @moocs Twitter account

And there is @mooc (Figure 4), a user account for Motoc Claudia with no tweets and no following.



Figure 4: @mooc Twitter account

Following hashtags (#)

FL as a topic (#futurelearn) had 111 tweets collected between 20 September 2013 and 8 October 2013. There were 59 out of 71 RTs which had @FutureLearn mentioned. In total, there were 131 mentions within these tweets. #MOOC (or #mooc) was mentioned 44 times in a total of 187 hashtagged topics. There was no mention of #coursera. Platforms used by the users included twitter on mobile or tablet devices (n=37) and the web (n=50).

In terms of #coursera, there were 507 tweets collected between 30 September and 8 October 2013. There were 136 RTs (24 of which were '@coursera'), 329 mentions and 1,057 hashtags (74 of which were '#mooc'). No occurrence of #futurelearn circulated whilst #coursera was the topic at hand.

Nothing unexpected was brought to my attention in these data that Twitonomy delivered to me. However, #mooc is another story. In the 3000 tweets containing #mooc between 8 and 11 October 2013, #futurelearn appeared once and #coursera appeared 10 times. Coursera was mentioned 33 times and FutureLearn, only 3 times. This surprised me. I would have thought that these two MOOC brands would by default be tweeted with a #mooc tag as massive open online courses. At this point in time, the collected tweets brought into view another MOOC.

There were 958 mentions of '@iversity' (<http://iversity.org>). 'I just found the online course...' was the beginning line for 803 tweets, which were tweets generated by clicking the Twitter link within iversity course pages. @iversity is the European Berlin- based MOOC provider. It went online on 14 October 2013 and launched 6 courses. Recently, it was announced that iversity would be handing out official European Credit Transfer and Accumulation System (ECTS) credits for two of their online courses - Algorithms and Data Structures and Fundamentals of Marketing. The ECTS-credits would allow the courses to be recognised within all of the European Higher Education Area (EHEA). To obtain the credits students would have to pass an on-campus exam after taking the online courses.

Mainly due to the Bologna Declaration in 1999, the Bologna process was initiated and designed to promote mobility of students, teachers and researchers across Europe and finalised the creation of EHEA.

[A]ccording to Hannes Klopper, Founder and Co-CEO of iversity, "students may be able to move freely and effortlessly between European institutions of higher education. The legal and institutional framework established to allow for this mobility may in fact reach its objective.... (and) European universities will come to the students by offering their courses online." (Eger, 2013)

This MOOC is something else. It is not so much about the mobility of online courses, but the mobility of students who choose to take them. It is only open to European institutions and students. This Berlin-based MOOC is quite different from what Coursera set out to do in terms of providing free education. It is ultimately brought back to the university campus for credit certification and pushes MOOCs into traditional higher education institutions.

In Figure 5 is a word cloud generated from the 3000 tweets containing '#mooc'. It is easily discernible by the size of @iversity that it had high frequency in the tweets and that a sizeable subset of tweets came from the iversity website, in particular iversity.org/c/6 and iversity.org/c/2 refer to two of its courses, Future of Digital Storytelling and Design 101, respectively. A click is all it takes to tweet.

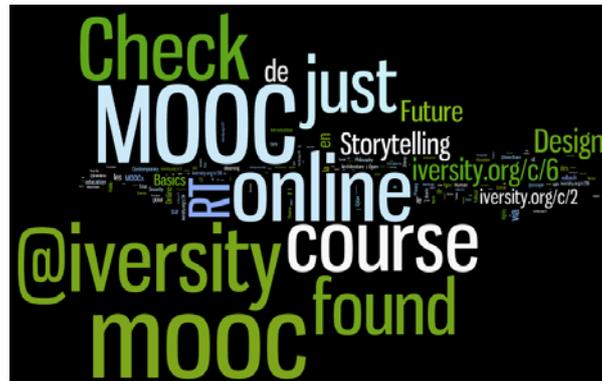


Figure 5: 3000 tweets containing '#mooc' in a word cloud

Following @futurelearn content

The growth of the Internet has been astonishing, both in terms of how we use it and how it uses us. Our use is more dynamic and fragmented and the digital objects we use collect data about data that includes geographical locations. In short, we are experiencing a cultural shift from reading webpages and documents to following streams with read-write functions that are increasingly synchronous. We are in a stream and we are the stream - a sociality less about ego-centric connections and sensibilities, but more about the deluge of data and the monumental amounts of data aggregated about data as we participate in this streaming sociality.

For the 174 futurelearn tweets collected and downloaded as .csv file from Twitonomy, a content categorisation or analysis based on Naaman et al (2010) tweet categorization scheme was adapted. Naaman et al (2010) categories included: me now, presence maintenance, self-promotion and information sharing. After performing a content analysis on the tweets the following categories emerged which are obviously coupled with the emergent mechanism of using hashtags, retweets and mentions including shortened URLs.

- FutureLearn (FL) Information or Promotion
- Specific Course Updates
- FL Student update (eg. registration to a course or results upon completion)
- Sharing Information
- Direct Messages (Replies to questions generally)
- Statements (usually with happy sentiments)

It has become very obvious that the purpose of Twitter for FutureLearn was course (brand) promotion. Admittedly, Twitter is a cost-effective service for recruitment globally.

Following 'clicks' through t.co

To shorten a URL so it may fit within the text field of twitter, we have seen the use of tinyURL, bit.ly and more recently, t.co. @FutureLearn had 177 t.co URLs within the tweets, @Coursera had 688. Tweets containing #futurelearn, #coursera and #mooc had a total of 237 t.co shortened URLs. There is nothing unusual about this. However, there is more to a click than just being redirected to the right web address.

In 2010, Twitter.com implemented their own URL shortener. They realised that Twitter users using services such as bit.ly and tinyURL, are providing tremendous amounts of data and that they were missing out. With Twitter's own URL shortener, it is able to gather information related to the number of times a link has been clicked. This becomes a measure of relevance and interest on each tweet in relation with others. All links shared on Twitter get mapped in a t.co URL (Allton, 2013). In addition, the t.co links include a custom display that shows the destinations or locations of those who clicked the link.

In short, the most important aspect of t.co (as with bit.ly) is not that it can shorten URLs to fit Twitter's 140-character requirement, instead its real power lies in its ability to track click performance of those URLs and then report on the number of visits and who shared the links, including conversations around them (Wittlake, 2012). Here, a click on t.co is another hashtag, which provides compelling evidence on how online courses are mobilised without text or direct tags from users.

Following #mooc on a map

The possibility of being able to acquire the geographical data which could indicate the approximate locations of the source of every tweet allows for a visual display of where posts related to #coursera and #futurelearn occurred. Twitonomy produced world maps (Figures 6 and 7 below) complete with the Twitter bird icon indicating location. The maps are interactive as well. Clicking a tweet on the map would open a small text window providing information about its content.



Figure 6: Tweet Map for '#coursera' (from Sep. 30, 6:57 pm to Oct. 8, 8:57 pm)



Figure 7: Tweet Map for '#futurelearn' (from Sep. 30, 9:45 pm to Oct. 8, 8:46 pm via Twitonomy)

Twitonomy has the functionality that demonstrates in what order and at which place (global position) tweets occurred. This seems to add another layer of representation for the mobilities of online courses. However, the emerging web visuality that develop through a mash-up of the diagrammatic by layering geo-based user profiles and information using Google Analytics is not necessarily a representation of the mobility of online courses.

While Google promotes itself as a facilitator and organiser of information for the entire world, its search engine and mapping services are also a means used for marketing via advertisements streamed to the user's interface. Its analytics aggregates and sorts users' information, including their geo-referenced locations without user knowledge. In this light, the migration of educational programs, such as Coursera and FutureLearn, become nothing else but the commodification of geo-spatial information within the stream model and capabilities of new media. There are issues to be confronted in relation to the planar representation of visualisations and the base reality that Google-generated maps deliver (see Figure 8). The plotting of bits of trackable data is not quite the same as the processes or movements and locations of users and online courses.

We have to come to terms with the intense dynamism of Web 2.0. This is perhaps captured in the wefeefine.org site as mentioned by Allen-Roberson and Beer (2010). This web resource produces real-time visualisations of data where phrases 'I feel' or 'I am feeling' are used. Such dynamic streams will inform how we might understand the 'click engagement' of social media sites like Twitter as part of everyday practice. Having said this, I do not necessarily want to endorse 'social networking' or the 'window of opportunity' of crowdsourcing that accompanies the topology of hashtags, retweets and mentions. What is interesting is a notable shift from maps as representations to something about movements, that is, activities or processes that lead to a plastic sociality for networked learning within a platform designed and determined by new media industry models under the mooc label.

FutureLearn.com attracts visits from across the globe

Only one week after going live in beta and FutureLearn.com has already reached learners from all corners of the world.



FutureLearn has attracted learners from all countries marked blue*

The top ten countries – by visitor numbers – have been the UK, the US, China, Australia, India, Ireland, Spain, France, Canada and Germany. We look forward to everyone learning together on our partners' courses very shortly!

Thank you all for your support.

*Source: Google Analytics

Figure 8: Infographics from Futurelearn regarding its global reach

The claim of FutureLearn that it had 'reached learners from all corners of the world' is misleading to say the least. Mobility and reach is not determined by a series of mouse clicks, key presses or screen taps. These obstruct the (im)mobile practices of actual interaction in/of the stream. The maps are not blueprints - their virtual base could easily move to other places and realities. The growing techno (or geo-based) optimism and notions of empowerment or out-reach as depicted in Google analytics and visualisation obscure the politics of technology. Just like printed maps, digital maps do not simply represent realities, they create them. Locations are being reached as online courses are mobilised through social media sites, but what is actually being mapped and who decides the spread or scope of a geo-referenced location? Figures 6-8 are not value-free and definitely not Google.

Streaming Sociality

The growing popularity of Twitter has shifted the focus from more interactivity to real-time (now) web (Borthwick, 2009; Berry, 2011). The web we know is no longer driven by pages and documents and reading, it is performed differently by various digital objects - it is now a stream, usually of messages not written in proper

sentences or paragraphs. They contain all sorts of abbreviations - hashtags, mentions and shortened URLs (Spivack, 2013). As Zappazigna (2011) pointed out, unlike the markup which is typically hidden by browsers and other display devices, hashtags are visible within tweets and no technology is used to obscure them. Consequently, hashtags increase 'findability'. Content as code-speak is used recursively not for breaking news or breaking the silence, but to increasingly trace and structure Twitter as coded stream.

Hashtag sociality in a coded stream is not so much about the connectivity of network nodes, but the flow of information and data. Hashtags give data or text the capacity to divide up, duplicate and reassemble itself in other modes of text and code. Furthermore, it is not reducible to the actual physical infrastructure that 'joins' the nodes in a network. Consequently, as was shown in the previous section, the mapping of education-related topics (eg #coursera, #futurelearn) in a diagrammatic mode is vague and easily deformed due to its 'live' (mobile) stream sociality. In a stream, the mobility of online courses is driven by content marketing platforms such as Google, Twitter and link-shortening services like t.co and bit.ly. Content engagement is defined and determined by a 'click'. The 'stream' is not about having a link on the web, it is about being clicked and shared via mentions, retweets and shortened URLs.

Conclusion

The purpose of this work was to explore the mobility of online courses beyond hashtags, mentions and retweets of particular education-related ideas or trendy topics: #mooc, #coursera and #futurelearn. I submitted data collection and manipulation to third party software application, Twitonomy. Twitter and Twitonomy were rather powerful and visually persuasive when it comes to matter of influence and reach through high frequency retweets and mentions. I tried to disrupt and meddle with visualisations and quantifications by looking at other presences or distant (small) manifestations of course movements through traces of mentions, re-tweets and hashtags. I could not deny that I was able to access 'small' data by attending to some massive visual display or considerations that I would have not seen without the help of computer code.

The data were collected in a click with options to download .csv files for further analysis. It was quick, limited and biased. To submit our methods to the power of algorithms is to be biased. And in the bigger scheme of things, moocs either as massively open or mobility of online courses have implications to the streams of networked learning as automatically delivered digital traces in computer code. There is no beginning or end to the mobility explored here. I simply started at a convenient point (at a convenient time) and the duration or time-stamps of data collected relies on how far back the software I chose was willing to provide me data records for free.

Following (#)code

Beer (2012) has suggested that there is value in enacting social science research through by-product data and social media aggregators. He spoke of a critical social science that is willing to expand its reach and domain into the context of massive social media data, which he argues to be very much part of everyday life. And at any point that we feel they become too prescriptive we can always opt to employ alternative research approaches and perhaps engage with 'social media ethnography' (Postills and Pink, 2012). As we acknowledge the power of codes and algorithms in everyday life and in our research methods, (#)mooc is created in the automatic production of code/spaces via clicks and hashtags. Underneath the hood of streams are muted systems of codes. I argue that visualisation provides hints and traces of what may be worth investigating or following not because of aggregates, but because of the automatic production of space - stream. (#)code has a role in shaping the social and geographical politics of the spread and reach of futurelearn and coursera as depicted in Figures 6-8. In introducing hashtags, the intent was to take into account how the traces of the stream are shaped by system infrastructures and other media, geographical locations and mobile devices through 'software sorting' (Graham, 2005) and spatial formations largely invisible on screens and from users.

While Twitter and Twitonomy are deemed immaterial, their operation and use could change material, both visible and visual, things (cf. Dodge & Kitchin, 2009). In a very fragmented and patchy proceeding, hashtags (ie #mooc) allowed me to search and anchor coded spaces that led me to hashtags ((#)mooc) in clicks that became tweets, Twitter accounts and a web address I could not access because of my lack of knowledge of the Japanese language and inadmissible geographical location. The way forward I propose is more blunt. I do not disagree that a dialogue with software developers is needed to understand the code, filters and algorithms of software applications as proposed by Beer (2012). However, this mainly attends to software and interface as representational device. To bridge the divide between qualitative and quantitative epistemologies, we must

attend to the mediated sociality that any social networking site or software exhibits in terms of the creation and maintenance of a system of connectivity.

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